Pilot Roll-Out: adaptive research in farmers' worlds

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Abstract. Agricultural research in Indonesia has resulted in limited impact in farmers' fields, particularly in the more marginal areas, because innovations are often not suited to the specific agroecological and socioeconomic conditions. In addition, the physical and institutional separation between the strategic research, regional adaptation and local development constrains the spread of innovations. An ACIAR project in Eastern Indonesia experimented with a Pilot Roll-Out (PRO) approach involving medium-scale testing of promising innovations by farmers in the context of their overall farming system and socioeconomic networks. All major stakeholders were involved in a participatory process of: (1) needs and opportunity assessment, (2) identification of suitable innovations and their implications for on-farm implementation, (3) design of a development model and communication strategy, (4) testing and adaptation of the development model, (5) medium-scale pilot roll-out, and (6) participatory monitoring and evaluation. Initial key learnings include the importance of stakeholder participation in and ownership over all research and development processes, the need of a systems approach to allow for sustainable internalisation of innovations into existing farm management practices, and institutional change from a technology-centred to a people-centred paradigm of research for development.

Keywords: participatory research, research for development, systems development, communicating innovations.

Introduction

In Indonesia, the main bodies responsible for adaptive research are the Agricultural Technology Assessment Institutes (AIATs), which are central government institutes based in each of the 33 provinces. The AIATs are overseen by the Indonesian Centre for Agricultural Technology Assessment and Development (ICATAD) based in Bogor, which in turn comes under the Indonesian Agency of Agricultural Research and Development (IAARD) of the Ministry of Agriculture. Key roles of ICATAD are:

- To establish and support agricultural technology assessment and development programs at the province level.
- To coordinate collaboration in agricultural technology assessment and development (i.e. linkages between the AIATs and central commodity-based research institutes) and in the utilisation of research outcomes (i.e. linkages between the AIATs and the extension system and communities).
- To assess the effectiveness of the technology assessment processes conducted by the AIATs.

The provincial AIATs locally test innovations generated by central research institutes and adapt them to prevailing farm conditions. The trials are typically done on the farms of selected farmers who take care of the crops or animals but have little influence over decisions made by researchers about what technologies are tested and adapted to suit their specific needs. The sites selected for the adaptive trials tend to involve optimal farm conditions and model farmers, which are generally not representative of the community. Consequently, innovations are often not adopted because they are not suited to the agroecological and socioeconomic conditions of the average farmer. In addition, a physical and institutional separation exists between the national/provincial research institutes and the local development organisations. The government bodies responsible for agricultural extension are district based and governed. As a result of the Regional Autonomy laws that have been applied over the past decade, each district has its own structure of technical departments and extension system, but all have an Agency for Food Security and Extension. This agency provides policy advice to the implementing bodies. Generally, Field Extension Workers operate from sub-district level Rural Extension Centres, but in areas where infrastructure is limited they may be based at the district Department offices. For example, in the 20 districts of East Nusa Tenggara province only 247 out of 283 sub-districts claimed to have a Rural Extension Centre in 2008, out of which only 56 had a functional

building while 49 operated from broken buildings and 105 had no building at all[1]. The dysfunctional relations between the bodies responsible for the development, adaptation and dissemination of agricultural technologies have led to poor linkages, creating problems with both the development and dissemination of appropriate technologies for farmers.

Indonesia has not been alone in having patchy results from adapting and promoting technologies for small-scale farmers. In a review of case studies from Africa looking at the spread of agricultural technologies to small-scale farmers, Lado (1998, p. 165) concluded that 'where useful technologies exist, their spread has been very limited and where they have been adapted, the benefits only accrue to a small segment of the community'. This problem appears to be longstanding and widespread (e.g. Röling 1988; Collinson 1999). Inappropriate research and extension theory and practice have been blamed for some of this failure (den Biggelaar 1991; Lado 1998, Douthwaite et al. 2003).

Like many countries around the world, Indonesia adopted the Training and Visit system (T&V) that the World Bank began promoting in the middle of the 1970s (Benor and Harrison 1977). It was a classic example of a Transfer of Technology (ToT) model of communication serving the prevailing modernisation paradigm for development (Van de Fliert 2007). Technologies to be promoted came from research centres and subject matter specialists who were supposed to provide regular training to village extension workers. The extension workers were scheduled to pass on the simple messages through regular visits to contact farmers who, in turn, were expected to convey the information to a group of follower farmers. Although criticisms of this approach began to emerge in the literature in 1982 (Howell 1982) and continued to mount (e.g. Moore 1994; Chambers et al. 1989), much of the debate did not address the more deep-seated problems with its theoretical foundations. These include the problems already recognised by Farming Systems Research advocates: farmers were treated as homogeneous; the technologies were not relevant to the physical, socio-economic and institutional constraints of many farmers; advice came in small, disconnected chunks and was discipline based rather than systems based; and the service providers failed to take account of farmers' knowledge (Röling 1988; den Biggelaar 1991; Lado 1998; Douthwaite et al. 2003). Perhaps more fundamentally, the T&V system had the same weaknesses identified for other transfer of technology models by Tully (1964), in that many farmers did not recognise that the knowledge promoted was relevant to their situation and problems because they had not been involved in a process that linked the solutions to their perceived needs. These more general critiques are at the heart of the problems identified by advocates of another paradigm for development incorporating farmer empowerment and participatory methodologies (Chambers et al. 1989).

Farmer empowerment has been a long time coming; perhaps because it requires many agricultural scientists to acknowledge another epistemology, constructivism, rather than positivism that has been the basis of much of their training. This is difficult for many and probably impossible for some. Farmer empowerment calls for a reversal, or at the very least a significant realignment, in the traditional power relationships. This realignment requires a shift in culture, a significant and difficult thing to achieve in cultures and institutions that have hierarchical systems of organisation and respect. In many countries, including Indonesia, farmers are at the bottom of the hierarchy from a social and educational perspective. The T&V system entrenched this outlook. It requires a major shift in thinking by researchers and extension officers alike for them to acknowledge that farmers have prior knowledge and experiences, and hence a valid role to play in identifying, assessing and adapting innovations.

In 2007, a scoping study was conducted in four provinces of Eastern Indonesia for an AusAID funded program aimed at supporting ICATAD in their adaptive research functions (the ACIAR SADI program[2]) to explore ways of improving the outcomes of adaptive research (Connell et al. 2007, p. iii). It found that the successes had to be tempered by a failure in many cases to take advantage of opportunities, resulting in reduced impact because of poor adaptation of technologies and poor linkages with dissemination partners. While it addressed many issues, a key finding was the need for the AIATs to involve farmers more in identifying, assessing and adapting innovations to suit local constraints and conditions, and to integrate this process with the dissemination partners (e.g. government extension service, non-government organisations (NGOs), commercial businesses) so that these partners would take ownership of the technologies.

[1] Data as per July 2008: http://bkp2-ntt.com/program-kegiatan/8-4118/73-penyebaran-balai-penyuluhan-pertanian-juli-2008.

[2] Smallholder Agribusiness Development Initiative – sub-program 3 coordinated by the Australian Centre for International Agricultural Research with a focus on Support for Market-Driven Adaptive Research

One of the recommendations arising from the scoping study was for the development of a roll-out phase in the technology assessment process, hereafter referred to as Pilot Roll-Out (PRO). PRO was to be 'the process of further testing agronomic or management approaches with a wide group of farmers and villages beyond the original adaptive trial site with farmers taking the lead on how they use or modify the agricultural technology, agronomic or management approaches, with researchers and extension agents watching to assist them in making more useful recommendations to those farmers in other places' (Connell et al. 2007, p. 9). This was to follow on from the traditional Adaptive Research phase defined as 'the process of testing a variety of modifications to recommended agricultural technology, agronomic or management approaches in conjunction with a small number of cooperative farmers to see what variation is best adapted to the particular provinces, districts or villages in a process overseen closely by researchers' (p. 9). While conventional adaptive research at the AIATs typically implies technology assessment in farmers' fields (primarily considering the agroecological context), PRO assesses the applicability and adaptability of technologies in farmers' world (including socioeconomic and institutional context).

In the context of PRO, one of the key limitations of participatory approaches is that they focus on the local level. To deal with the pressing issues of development at the regional and national level, however, a successful model must address the issue of scale (Douthwaite et al. 2003). For the purposes of this paper we will use the definition of the Consultative Group on International Agricultural Research (CGIAR) to describe the objective of scaling up: 'Scaling up leads to more quality benefits to more people over a wider geographic area more quickly, more equitably, and more lastingly' (Menter et al. 2004, p. 10). Its aim, therefore, is to spread beneficial innovations arising from research and development activities so that they can be adapted and adopted to suit a wider range of people and farming systems to improve their living standards. This includes: (a) horizontal scaling up – the geographical spread through replication and adaptation of innovations to key stakeholders in more communities at the same social scale of decision making; and (b) institutional scaling up - building an enabling environment for the spread of innovations by expanding institutional involvement to higher levels from community to district and national scale, and broadening indirect impact through integrating with, involving and influencing other institutions and stakeholders (Uvin et al. 2000; Douthwaite et al. 2003; Menter et al. 2004).

With support of the ACIAR SADI project, ICATAD established an Innovation Team in 2008 involving sixteen researchers and extension specialists from within its own staff and four AIATs in Eastern Indonesia. The aim was a critical review of the institution's methodologies for technology assessment and knowledge exchange, and to experiment with the concept of Pilot Roll-Out as an adaptive research phase. The purpose of this paper is to provide a theoretical framework for PRO and outline the methodology being trialled to develop an effective technology assessment process leading to farmer practice change. The methodology will be illustrated by a case from East Nusa Tenggara and tentative conclusions will be drawn based on initial evaluation activities.

Framework for agricultural research for development

The Indonesian Agency for Agricultural Research and Development (IAARD) has been operating on the basis of a ministerial decree issued in 2005 that outlines the guidelines for agricultural technology development and implementation. These guidelines present a framework for agricultural research and development, implying four phases that are connected in a linear way (Badan Penelitian dan Pengembangan Pertanian 2005):

- Phase I: research, resulting in technology components ready for field testing.
- Phase II: assessment of technology components in field locations, resulting in location specific technologies and recommendations.
- Phase III: development of a technology package considering agroecological, socioeconomic, cultural and institutional conditions, resulting in a development model.
- Phase IV: dissemination of the technology package through implementation of the development model, resulting in agribusiness development.

Although the guidelines describe the need for feedback mechanisms across the various phases, in reality linkages between the institutions in charge of Phase I (central research institutes), II/III (provincial AIATs) and IV (provincial/district technical departments) are generally poor due to the reasons described in the previous section. This causes a disconnect between the phases and, hence, prevents maximum impact in the farmers' fields.

The ACIAR SADI supported Innovation Team critically analysed the methodologies applied for technology assessment and development in their respective provinces (South and Southeast

Sulawesi and West and East Nusa Tenggara) through a range of case studies conducted in 2008-09 (Tim Inovasi *in prep*.). They came to the following conclusions calling for a substantial institutional change:

1. Technology assessment activities are not planned based on needs identified among target communities. The methodology lacks a needs and opportunity assessment process. This leads to the testing and introduction of technologies that (a) are not needed, (b) do not solve existing problems, and/or (c) do not suit the agroecological, socioeconomic and/or market conditions of the majority of farmers in a target area.
2. Assessment activities often consider only one technology, whereas accompanying innovations (technologies or management approaches) necessary for an overall improvement of the system are not available.
3. Technologies are often complex and require knowledge, inputs, labour and investment funds, whilst the development model applied does neither reckon with the need for training pitched at farmers' abilities nor with continued and adequate provision of inputs, labour and credit facilities.
4. Collaboration and coordination between stakeholder groups (researchers, technical staff, service providers, private sector) is weak, which is partly due to the short-term project-based nature of activities, and partly to institutional isolation of the stakeholder groups.
5. Technology assessment activities tend to target the same communities over and over again and involve the relatively more prominent community members (village officials and farmer group leaders) who are not necessarily representative for the majority of farmers in the community. Results are therefore not necessarily replicable to the conditions of the average farm and farm family, let alone the more marginalised groups in the community.
6. Communication and knowledge exchange processes in the farm-based technology assessment trials are top-down (from researcher to farmer) and media used are not effectively pitched to the target audience. There is no process in place to empower farmers to have their say and influence decisions. Research results are generally not analysed with or communicated to them. As a result, no or limited location-specific adaptation of technologies takes place and outreach is not effective.

A first step for the Innovation Team to instigate institutional change was reviewing the IAARD framework for agricultural research and development in reflection of their own case study findings. This was followed by a reformulation of the framework into a 'Research FOR Development' (RfD) framework to represent possible solutions to the limitations they identified. They agreed on the need for (a) the addition of diagnostic and evaluation research phases, (b) the articulation of the concept of pilot roll-out in the adaptive research phase, and (c) substantiation of linkages and feedback mechanisms across stakeholder groups involved in research and development. The reorientation of phases in the framework, the linkages amongst the phases, and the expected outcomes of each phase are illustrated in Figure 1. A diagnostic research phase is placed in the centre of the framework, representing a mechanism that continuously identifies, analyses and reports on farmers' needs and opportunities. This implicitly implies a different development focus, namely that farmers have a need to solve their problems and improve their livelihoods themselves. This has, on the one hand, implications for how research and development agendas are set, and, on the other, how support is offered. Instead of the usual but unsustainable practice of handing out 'goodies', development should focus on farmers' capacity building to identify needs, review and test options, and make better informed decisions of what change would work for them. Simultaneously, services and inputs required by farmers to implement the change need to be made available.

The proposed framework is also innovative in the Indonesian context in that it positions pilot roll-out as an adaptive research activity - one that allows the testing of innovations within the farming system's context at an intermediate scale to assess the potential for large scale application and impact. This extra step in the RfD cycle is expected to result in development models with (a) innovations that are better suited and adapted to local conditions, (b) outreach mechanisms and media effectively pitched at the intended target audiences, and (c) better prepared service providers to facilitate outreach of the development model at a larger scale.

The framework implies that stakeholders assume clearly pronounced but shifting roles and responsibilities across the phases, as displayed in Table 1, to ensure that the function of each phase can be fulfilled effectively and linkages across phases will materialise. Collaboration and communication at all phases is important to make the transition of roles and responsibilities possible and ensure the establishment of effective linkages.

Figure 1: Agricultural Research for Development Framework

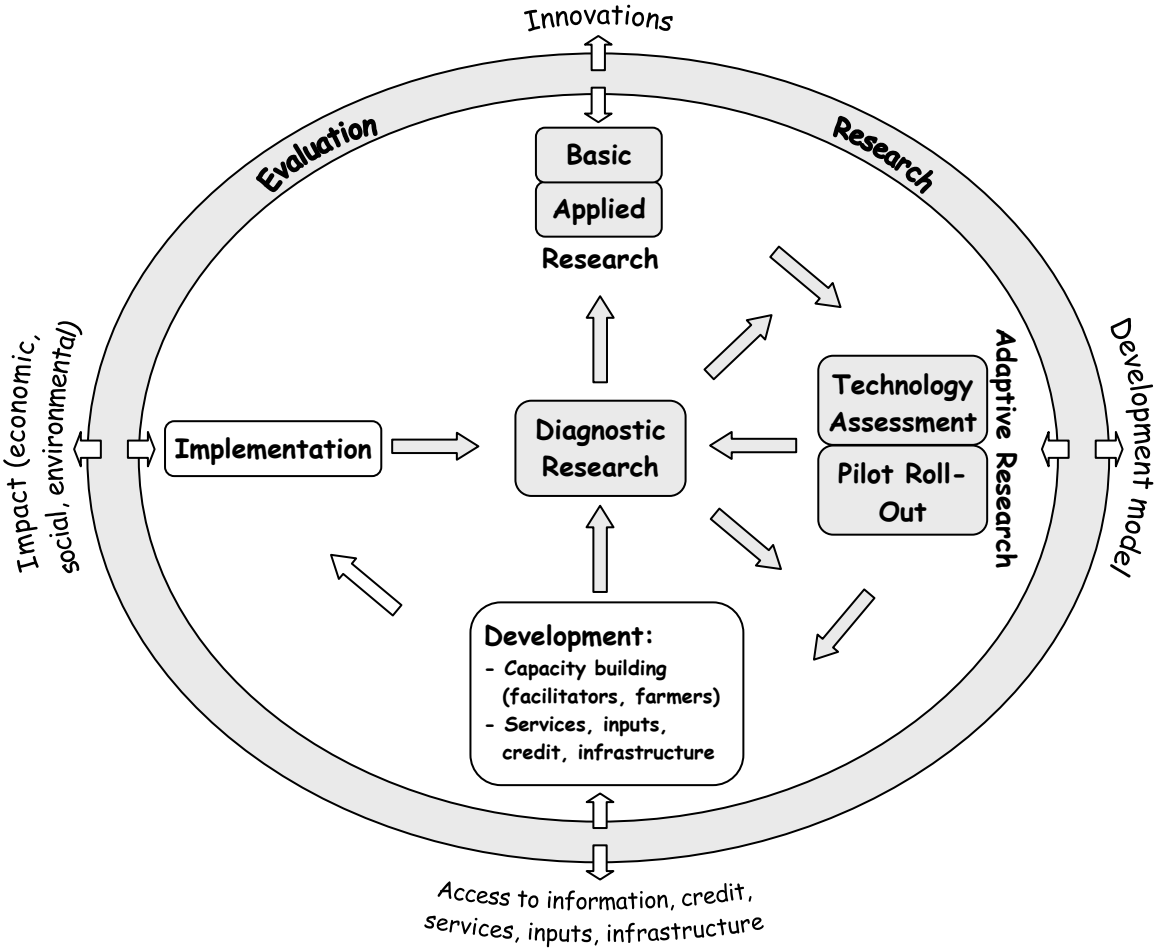

Table 5. Stakeholder roles in the Research for Development framework

Stakeholder	Diagnostic research	Basic research	Applied research	Adaptive research		Development	Implementation	Evaluation research
				Technology assessment	Pilot roll-out			
Farmers	++	-	+	++	++	++	+++	+
Universities	+	+++	++	-	-	-	-	+
Research institutes	+	++	+++	+	+	-	-	+
AIAT	+++	-	+	+++	+++	+	-	+++
Extension officers	+++	-	+	+	++	+++	-	++
NGOs, CBO	+++	-	+	+	++	+++	-	++
Private sector	+	+	+	+	+	++	-	+

+++ = initiation and coordination
++ = major participation/interest
\+ = limited participation/interest
\- = no active role

Principles, practice and evaluation of pilot roll-out

The pilot roll-out (PRO) is a crucial phase in the research for development process to make available options that support sustainable change in the farming system. The function of the PRO is to develop (design, implement, evaluate and improve) an effective model for community outreach of potential innovations. The PRO links previous research phases to community outreach activities to result in more successful on-farm implementation of innovations (testing, adaptation and internalisation). The concept of PRO is based on the mandate of AIATs to carry out technology assessment to include both (a) local adaptation of promising innovations, and

(b) proof of significant impact from locally-adapted technical options. As such, PRO serves three main aims:

1. *To assess the potential of an innovation on a larger scale and in a realistic context*
   PRO implies a true test of the potential of an innovation to generate significant impact. The number of farmers to be testing and adapting the innovation in a PRO activity could be 300-500 farmers, depending on the sector of agriculture. Researchers will have to work with farmer groups, rather than individuals, and service providers (public and private extension officers, other development practitioners and/or retailers). To reach larger numbers of farm families, well designed, gender specific communication processes will need to be developed and tested as part of the PRO.
2. *To encourage local adaptation of innovations*
   Sustainable practices are fully suited to local agroecological and socioeconomic conditions. This means that agricultural innovations need to be adapted to individual farm conditions, considering both physical and socioeconomic factors. Consequently, extension methods promoting these innovations require training and guidance to farmers about how to adapt technologies to their local realities and only integrate those components into their farming system that offer benefits to them. At the PRO scale mentioned above, individual farmers will mainly be making their own decisions based on the options offered to them and the skills developed to test, adapt and evaluate new ideas, inputs and/or implements. The PRO process, however, should ensure that the necessary information is made available to farmers and skills are taught for them to make better decisions.
3. *To involve multiple stakeholders*
   The proposed scale of technology assessment in PRO allows for different stakeholders to be brought together to reflect real world operations and break down the research-extension divide. These stakeholders include farmers, extension officers, researchers, private sector partners, staff from NGOs and members from community-based organisations. Knowledge exchange will be fostered between disparate stakeholders when the piloting is done at a reasonable scale, which will demonstrate the possible effects of external supporting and counteracting processes and forces on the spread of innovations within communities. Involvement of stakeholders in the adaptive research phase is expected to cause a greater sense of ownership over the development model that is designed, which will benefit large-scale implementation later.

PRO should be conducted at a scale that encourages local adaptation of (technical) options but which is still manageable as an adaptive research activity. It minimally implies a two-season activity, with a first small scale design phase and a second intermediate-scale pilot phase. It could, however, stretch over three to four seasons depending on the need for finetuning both technology and communication methods for either of the two phases. Consecutive seasons preferably involve increasing levels of scale and/or complexity to match farmers' realities. PRO must encourage farmers to adapt innovations to their own opportunities and constraints, and where necessary strengthen their skills for adaptation. These include experimentation, observation, agronomic and economic analysis, and informed decision-making skills.

Innovations to be trialled in PRO need to be confirmed as robust and 'ready' for scale. The criteria applied for selection of 'PRO content' include:

- Evidence that the innovation helps solve an important technical problem in the area, one that occurs widely, causes substantial production loss, has negative socioeconomic impacts, and/or is perceived as being important by producers and agribusinesses.
- Proof that the innovation will help farmers meet a market demand.
- Proof that the innovation is locally adaptable, considering environmental and socio-economic conditions and labour availability.
- Evidence that the innovation enables significant impacts.
- Indications that the technical knowledge and skills needed to implement the innovation can easily be acquired and implemented by farmers locally.
- Confirmation that inputs or services needed to implement the innovation are available locally.
- Evidence that the innovation will not have any significant negative impacts or expose farmers to greater risk.

PRO needs to have substantial activity focused on monitoring and responding to outcomes in the field. If farmers are encouraged to adapt options, they will do so. Inevitably, there will be some surprising outcomes, which need to be captured for better understanding both the limitations of technical options in the field and the potential for wider uptake.

As of September 2008, the four AIATs participating in the ACIAR SADI project tested and developed the PRO concept on carefully selected cases. These concern regeneration of cocoa plantations in South and Southeast Sulawesi, corn-cattle systems in East Nusa Tenggara, and improved upland rice varieties in West Nusa Tenggara. The first phase in each of the locations consisted of (a) community based needs and opportunity assessment activities, (b) participatory workshops to design the development model and a monitoring and evaluation system, (c) socialisation and planning meetings with stakeholder groups, (d) piloting of the development model, which depending on the location, included a variety of field based training events, experiments and group meetings, and (e) monitoring and evaluation activities. Implementation of the second phase, testing the development models at an intermediate scale, is planned for 2010-11.

Evaluation of the first phase of the four PRO cases (September 2008 to December 2009) was conducted by applying a triple loop learning approach. The stakeholder groups in each location reviewed whether PRO activities were implemented and delivered as planned in the development model (single loop), and whether these activities and outcomes actually resulted in the achievement of the goals of the PRO concept (double loop). In addition, the Innovation Team established criteria to review whether the overall PRO concept, as a new adaptive research phase, addressed their initial concerns about traditional ways of conducting technology assessment (triple loop). These criteria particularly related to the effectiveness of a diagnostic research phase (needs and opportunity assessment), the benefits of active involvement of farmers and other stakeholder groups as research partners, and the importance of applying a systems approach acknowledging farmers' realities. The next section will describe the PRO case in East Nusa Tenggara to illustrate the above principles and practices, and present initial evaluation findings.

Pilot Roll-Out in East Nusa Tenggara: Plant maize, harvest cattle

The AIAT team in East Nusa Tenggara (NTT) initially intended to design their pilot roll-out project with a focus on livestock management issues. They believed that their institute had produced several field-tested technologies for livestock management, such as legume cultivation and preservation, which were considered ready for larger scale testing and dissemination. However, during the community-based needs assessment in the district of West Timor, where the pilot activities were concentrated, it became clear that the majority of farmers were not in a position to try out any of the technologies, let alone adopt them. The main reason was that hardly any of them owned cattle. They appeared to take care of cattle owned by others, including the local government's livestock department, based on a range of agreements that provided them with varying levels of benefits and risks. In all cases, however, the actual income for the farmers was so low that there would be no incentive for them to invest in any improved management practices. Nor did they have any capital to invest in innovations. Apparently, in the previous technology assessment activities the AIAT researcher in charge had only involved the farmer group leader, but his farm, with some 10 self-owned cows, was not at all representative for the rest of the community and no one would ever be able to follow his example.

The community needs assessment activity revealed that the farmers are trapped in a downward spiral of dependency. The small income they earn from raising other people's cattle is barely enough to buy food during the two to three months of food shortage that they are generally experiencing before harvesting maize, their main food crop. Farmers in West Timor tend to cultivate maize only on an area of land that they can manage with their own family labour using traditional practices, generally less than 0.5 ha. This is, however, not sufficient to feed the family throughout the year, partly due to substantial post-harvest losses. After discussions with representative groups of farmers, the NTT Innovation Team became convinced that farmers can only be helped out of this dependency cycle if they would collaboratively work on the farming system as a whole. The AIAT in NTT had produced several improved maize production technologies over the years (including improved varieties, cultural practices, weed control and post-harvest technology), none of which ever gained acceptance from farmers. Using several of these technologies within a systems approach, the PRO team, including several farmers, designed a scenario in which farmers would realistically be able to improve their maize production. The anticipated maize yield would provide enough food for the family for the whole year and a surplus that could be sold at the market, allowing them to purchase their own cattle. The slogan became 'Plant maize, harvest cattle'.

The main components introduced for an improved maize production system were: increased cultivation area (preferably a minimum of 1 ha), use of an improved (but non-hybrid) variety, reduced seed rate, herbicide use, post-harvest technology and marketing. At the end of the

season, farmers harvested two to three times more maize than they used to do, stored more using better storage methods to last them throughout the year, and sold the surplus. Most of the participating farmers bought one to two calves from the surplus maize income, although a few started out with purchasing pigs, and some even invested in a rice threshing machine or home renovations. Once they had their own livestock, the AIAT team began to introduce livestock management innovations. The main input for the farmers from the researchers consisted of awareness raising, technical training, mentoring throughout the year, and a loan to buy seed and herbicide to be paid back in kind (maize seed) at the end of the first or second season.

During the evaluation process, the farmers provided very positive feedback about the process and initial outcomes, but were also able to outline areas for improvement. On top of harvesting more and being able to expand their farming enterprise, they particularly valued the fact that they had been consulted and listened to, at an early stage as well as throughout the implementation process and during the evaluation. The regular interaction with the researchers and extension officers, through training sessions and group meetings during which they provided their opinions about the innovations and activities, allowed them to build up confidence that the proposed changes would actually fit their specific farming conditions. Moreover, they immediately practised and trialled the innovations in their own fields and made the necessary adjustments. The variety of choices made in how to invest their surplus income is an indication of adaptive management, and hence internalisation of principles, which is more likely to lead to sustainable change than straightforward adoption of standard recommendations. Whether this process can be replicated on a larger scale, when the extension system is in charge rather than the AIAT researchers, still remains to be seen, but enthusiasm about the approach displayed by the extension officers involved in the design process is promising.

Lessons learned

While farmers have generally expressed their appreciation for being involved as partners in the research activities, for the Innovation Team members, this project has also been a liberating experience, although at times a hard learning process. The realisation about what farmers actually need emerged out of a question that they had never thought of asking before: "Why DON'T things work?" Initial key learnings from the experiences of the first year of designing and experimenting with the PRO approach include:

1. The importance of a participatory and gender-specific needs and opportunity assessment phase for (adaptive) research agenda setting, and hence the capacity of researchers and extension officers to facilitate such a process
2. The need for a systems perspective when introducing innovations, and hence the possible integration of a range of innovation and traditional practices; and
3. The importance of ownership over all stages of the research and development process by all relevant stakeholders for effective adaptation and sustained implementation of innovations.

All three aspects call for a strong participatory approach in research planning, implementation and evaluation as well as a farming systems focus at the PRO phase. This requires the researchers to be competent team players and facilitators of a communication process. They need to be able to accommodate sharing of perspectives between stakeholders with different disciplinary and practical backgrounds. Such functions require capacity building of researchers and may not suit every researcher. This should be taken into consideration when the PRO concept is reviewed for its suitability to be institutionalised in a revised agricultural research for development framework by ICATAD. The experience of the Innovation Team has shown that this is a process that cannot be achieved through a short training in introducing participatory methods and toolboxes. It requires individual and institution learning and self-reflection through a continuous and context-specific process, implying trial and error. The Innovation Team members have shown tremendous growth in their ability to critically analyse their own approaches and practices, design and try out new models, and suggest ways to institutionalise these in the current system, while bit by bit stretching the boundaries of the system and their own abilities. The challenge will be for ICATAD to expand this experience across the 33 provinces, and not fall into the trap of introducing the new approaches as yet another project with a limited lifespan and ignoring implications within the institutional context. Institutional change will be required to allow a transition from a technology-centred to a people-centred paradigm for agricultural research for development in Indonesia. This will eventually lead to more consistent impacts of research in the farmers' fields.

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