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Bridging the gap between formal and informal research in agriculture and natural resource management

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Introduction

Many of the efforts to transform scientific knowledge into sustainable agriculture and natural resource management (NRM) have brought only limited benefits to smallholder farmers, including fishers, livestock-keepers and other resource users. Donors, policymakers and civil-society organisations (CSOs) are urging the formal agricultural research and development (ARD) sector to make its research more relevant for smallholders. Several formal research institutions are seeking ways to engage more directly with smallholders and supporting organisations in the field in order to achieve this aim. These institutions are also open to learn from examples of ARD driven and co-managed by smallholders and facilitated by CSOs outside of the formal ARD sector, in what could be called "informal" ARD.

The CGIAR Research Program (CRP) Aquatic Agricultural Systems (AAS) is taking an approach to ARD that seeks to embed research in development processes and, in so doing, strengthen the system's capacity to innovate and adapt (Leeuwis *et al* 2014). Similarly, the CGIAR Research Program Climate Change, Agriculture and Food Security (CCAFS) seeks to translate knowledge into action for change through social-learning processes (Kristjanson *et al* 2014). AAS and CCAFS have linked up with PROLINNOVA[1] to explore the approaches, experiences, outcomes and impacts of "informal" ARD facilitated by CSOs.

A desk study was designed to identify good examples of CSO-facilitated "informal" ARD, examine the kind of impacts that they reportedly produced and draw lessons for work in both formal and informal ARD. As information on the process and outcomes of these initiatives rarely appears in double-refereed scientific journals, the initial sources were mainly project reports and articles for development practitioners as well as – where available – reports on project evaluations and impact assessments.

From *ca* 130 cases identified through PROLINNOVA's various networks and a Web search, 11 cases from Africa, Asia and Latin America were selected to assess various impacts of farmer- or community-led processes of research and development in agriculture and NRM ("FL-ARD"). The processes built on local knowledge and generally sought more intensive ways to use local resources with low levels of external inputs. The main selection criteria were: led by smallholders, supported by CSOs, structured interaction of farmers with other innovation-system actors, documented evidence of impact, and innovation lasted several years. The 11 cases used for the analysis (see Table 1) were clustered in three groups:

i) Cases 1–3, in which the FL-ARD process was initiated and carried by farmers themselves with minimal external support
ii) Cases 4–8, in which the FL-ARD process was initiated through external intervention of a CSO
iii) Cases 9–11, which focused on institutionalisation of an FL-ARD approach.

This paper presents the main findings about the impacts of FL-ARD in terms of food security, ecological sustainability, economic empowerment, gender relations, local capacity to innovate and adapt, and influence on ARD institutions. It then draws lessons for future partnerships between formal and informal ARD actors who are seeking common goals in serving smallholder communities.

[1] PROLINNOVA (PROmoting Local INNOVAtion in ecologically oriented agriculture and NRM) is a multistakeholder international network, facilitated by non-governmental organisations (NGOs), that promotes local innovation and farmer-led participatory research and development processes (www.prolinnova.net).

Table 1: Overview of 11 cases of FL-ARD analysed in the desk study

No.	Name of case	Country	Supporting CSO
1	Improving *zaï* planting pits	Burkina Faso	Informal group of farmer innovators
2	*Campesino a Campesino*	Nicaragua + other Central American countries	UNAG and other farmer organisations
3	Farmer–scientist partnership	Philippines	MASIPAG (farmer organisation)
4	Farmer-experimenters	Honduras	World Neighbors (NGO)
5	Farmer participatory research (FPR)	Tanzania	FARM–Africa (NGO)
6	Smallholder action research	Burkina Faso	Diobass (NGO)
7	Participatory innovation development (PID)	Mali	PROLINNOVA–Mali (NGO-led multistakeholder platform)
8	Local agricultural research committees (CIALs)	Honduras	FIPAH (NGO)
9	Participatory extension approach (PEA)	Zimbabwe	ITDG / Practical Action (NGO) with German bilateral development
10	Participatory technology development (PTD) approach	Vietnam	Helvetas (NGO) with Swiss bilateral development
11	Institutionalisation of FPR approach	Ethiopia	FARM–Africa (NGO)

Outcomes and impacts of FL-ARD

Types of innovations. FL-ARD led to various types of locally appropriate innovations and adaptations. Technological innovation featured prominently in the documentation, but there was little about social and institutional innovation. Most of the examples were related to land reclamation or improvement, soil and water conservation (SWC), plant breeding and varietal selection, crop husbandry, and crop and animal protection. Examples of techniques for storing and processing and for livestock husbandry were few.

Disseminating FL-ARD results and approach. The FL-ARD results were documented mainly by the supporting CSOs, who also guided the farmers in keeping records of their trials. However, the data were often incomplete and seldom systematically analysed. The NGOs and the farmer researchers used the documents to disseminate results to other farmers and shared more widely through workshops, newsletters and magazines. The most common ways of sharing findings of FL-ARD were spontaneously from farmer to farmer through informal networks and through deliberately created opportunities for farmer-researchers and other farmers to meet and exchange, such as innovation fairs. Innovations that required no or few external inputs and brought obvious benefits spread quickly in these ways. NGOs seeking to integrate FL-ARD approaches into government institutions documented and shared the process and lessons from using the approach, but then included little about the results of FL-ARD. It was striking that external evaluators often missed the point and looked for spread of technologies rather than spread of the approach.

Impacts on farmers' livelihoods. FL-ARD reportedly led to greater food and nutrition security through higher and more dependable yields, better storage and increased crop diversity. Especially the greater agrobiodiversity led to greater resilience to environmental risks and to pests and diseases. FL-ARD in ecological farming techniques often led to higher household incomes compared to conventional farming techniques using external inputs, and allowed farmers to accumulate savings and to invest in economic assets. Some locally developed farming techniques increased labour productivity; others demanded higher labour inputs, at least at initial stages, e.g. *zaï.* Most of the FL-ARD involved reduced use of chemical inputs and had a positive environmental impact. The documented impacts were mainly at household rather than community level, although some cases of stronger cohesion and joint action within communities were noted. Farmer-led experiments with introduced technologies tended to bring more benefits to medium and better-off farmers; experiments based on endogenous innovation using local resources tended to be more relevant for the poor and for women. Where women were encouraged to become experimenters, they often became more outspoken and active in the community also beyond farming activities.

Impacts on local capacity to innovate and adapt. A key area of impact was farmers' capacity to continue the process of innovation to address other and new challenges. Strengthening individual capacities (confidence, knowledge and skills to experiment and innovate) was a key feature mentioned in all cases. Men and women farmers were recognised as innovators by their farming peers and by external ARD actors. Many among them became skilled facilitators and continued to train and support others. Local organisational capacity was also strengthened as a result of farmers working and learning in groups,

initially for experimentation and later for other activities, such as marketing, labour-sharing, savings and credit, and lobbying for the rights of smallholders. Farmers became better able to identify and link up with relevant sources of information and partners in innovation. Several cases showed that creating spaces for social learning stimulated innovation, but there is little documentation on whether this led to continued processes of innovation after the CSO interventions phased out.

Impacts on formal and informal ARD institutions. The FL-ARD approaches led to some changes in both formal and informal ARD institutions, including government research and extension organisations at different levels, educational institutions, NGOs, community-based organisations (CBOs) and farmer organisations (FOs). In six cases, the main path for institutionalisation was through formal ARD institutions; the other five cases focused on the informal (CSO) sector. Institutionalisation through the formal sector was slow with limited success: although some changes in mindsets, skills and knowledge were observed among staff, no case reported significant changes in structures and working mechanisms of the organisations or in their budget allocations. NGOs, CBOs, FOs and farmer movements appear to have been more open and receptive to integrating farmer-led participatory approaches.

Lessons learnt

From the 11 cases, several lessons are drawn that are relevant for future partnerships between formal and informal ARD actors who are seeking common goals in serving smallholder communities.

Supporting FL-ARD processes. Explicit attention needs to be given to not only "hard" (technical) but also "soft" (socio-institutional) innovation. Smallholders develop innovations that can be applied by others and inspire them, but many low-cost low-risk innovations are not easily recognised by farmers and formal ARD actors. When farmers are encouraged to work in several small groups, they can tackle a wide diversity of topics, responding to heterogeneous needs in the community. This often leads to some form of sustained communication among group members also after the intervention ends. FL-ARD activities that bring "early wins" sustain the enthusiasm and motivation of farmers to experiment and to engage in longer-term research. Introducing new technologies without giving exact specifications gives the farmers flexibility and space to experiment and adapt to local conditions. Also the introduced approaches to stimulating and facilitating FL-ARD need to be adapted in each country and constantly improved through critical reflection.

Spreading results of FL-ARD. FL-ARD often leads to site- and household-specific interventions, but still gives ideas to and encourages other farmers by showing how households under similar conditions manage to address their problems. Spontaneous spread of local innovations needs to be monitored to learn more about the dissemination pathways. Results of FL-ARD should be shared through farmer-to-farmer extension, national symposia for farmer-researchers and farmer innovation fairs, and should include disseminating information about the process of joint experimentation and learning. The farmers and NGOs should reflect on the pros and cons of restricting intellectual property rights to different types of locally developed technologies and what impact this could have on innovation processes.

Scaling out FL-ARD approaches. In addition to scaling out specific innovations, efforts are needed to share and scale out the approaches of stimulating and supporting farmer experimentation, so that this is done by a larger number of farmers and other ARD actors over a wider area. FL-ARD approaches can have long-term impact in terms of farmers' increased capacity to investigate, experiment and share knowledge. It appears to be more important to start small, gain experience and scale out gradually, and to stimulate farmers' curiosity instead of trying to perfect their research capacities. FL-ARD can both generate and harvest social energy, so that people are willing to move beyond individual or household gains and engage in activities that benefit others in the community.

Scaling up FL-ARD as an approach. Scaling up or "institutionalising" FL-ARD involves building the capacity of different stakeholders and their organisations to apply the approach as part of their regular work. It is a complex process that requires capacity strengthening and change in individuals and, through them, change in organisations. It requires broad multistakeholder alliances pursuing an agreed theory of change. When FL-ARD is being introduced into government services, care must be taken to embed the approach so that the underlying principles of the FL-ARD approaches are embraced and practised by all staff at all levels within the organisations. This poses challenges, as learning within government organisations is often poor on account of high staff turnover and frequent administrative restructuring and changes in policy. There may be greater chances in embedding and sustaining FL-ARD approaches within informal-sector institutions such as CBOs, FOs and informal farmer networks. Where government

structures and policies are not conducive, the most promising pathway for "institutionalising" the ideas, principles and spirit of FL-ARD approaches is probably through such less formal structures.

Gender and other equity issues. There should be a conscious and consistent effort to deal with gender and other disparities within FL-ARD approaches. Being tagged as "participatory" does not automatically mean that men and women have equal opportunity to take part in FL-ARD processes. In addition to gender-conscious facilitation, also timely and pertinent socio-economic assessments, close observation and continuous adjustments can make the FL-ARD methodology more inclusive and can open up spaces for marginalised groups, including women.

Roles of formal ARD actors. Useful innovation in farming is happening without inputs from formal science. However, scientists can play an important role by sharing their knowledge and skills, by building farmers' capacity in certain aspects of experimentation, by helping farmers understand why something works or not, by documenting what farmers are doing and sharing these experiences widely, and by validating technologies in scientific terms to increase credibility in the formal ARD sector. In the case of complex experiments in CSO-facilitated FL-ARD, scientists can help farmers recognise which factors affect outcomes and can systematise results from the trials. Agricultural advisory services can help link farmers with a wide range of relevant sources of information and potential partners in innovation. To the extent that FL-ARD is integrated into decentralised plans of formal ARD, it would be advisable to make a budget available to support farmers' experiments. If researchers and advisors are to play these new roles, FL-ARD must be integrated into agricultural education and training.

Roles of CSOs. CSOs play a strong role in capacity development for FL-ARD to strengthen both technical and socio-organisational skills. CSOs have been successful in training paraprofessionals to take over CSO roles in promoting FL-ARD. Encouragement provided by national and local organisations of smallholder farmers can help in spreading an FL-ARD approach. The role of social capital (motivation, trust, networking capacity, ownership) in the FL-ARD process should not be underestimated. It is this quality that may make such approaches more successful in the CSO than the formal ARD sector. Where the political conditions allow it, FOs and NGOs can form networks and use their experiences in FL-ARD in policy dialogue and advocacy to maintain or expand the space to continue this approach.

Roles of donors. External funding can help initiate or strengthen the FL-ARD process and is particularly important for longer-term farmer research that brings returns only after several years. Long-term commitment of donors that recognise the value of FL-ARD helps farmers slowly but surely build up the capacity of their networks. Prevailing mechanisms for external funding of FL-ARD are oriented to project cycle management, which can constrain the flexibility and creativity of partners in the innovation process. Donors wanting to support the institutionalisation of FL-ARD in the formal and/or informal ARD sector should be prepared to give more time – and not necessarily higher funding levels – to achieve this.

Conclusion and outlook

The cases of FL-ARD analysed in this study suggest that such approaches can have profound, self-reinforcing and long-lasting impacts – especially on capacity to innovate – that conventional impact evaluation does not pick up. Action research needs to be conducted in the midst of ongoing ARD processes led by farmers and rural communities in order explore the impacts more deeply and understand how they come about. This kind of research could be integrated into the work of the CRPs and other formal ARD actors, giving sufficient space for reflection and mutual learning with the farmers and the supporting CSOs. The lessons from this desk study and from such action research will provide guidance for better integration of "formal" and "informal" research in development by smallholder communities.

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* All references to the documents used in the desk study can be found in the study report by Wettasinha *et al* (2014).