Drawing together information and practice through integrated on-farm research

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Abstract

Connecting researchers in multi-disciplinary teams and bridging the gap between research outputs and end users is – or should be - a high priority for research and development projects. The results from a research for development project in southern Laos and other sources informed the knowledge sharing approach undertaken, using Focal Village (FV) sites to integrate the use of various technologies on-farm and within villages, in order to enhance systems level understanding and as sites for co-learning and extension. These sites represented the major agro-ecological zones identified in the project area. Using an agro-ecology typology approach provided a basis for site selection and integration of technologies, with a clear definition of the application domain of the knowledge generated, and of the integrated farming systems that may be possible within each. The integration of technologies at the farm and village level enhanced understanding of integration points and farming systems, while integration of planning and project management enhanced the effectiveness of project activities. Focal village sites had value as an integrating factor for project activities, providing a common location to work together, and thereby enhancing organisational integration. Working together across disciplines was a new experience, which benefitted from training, mentoring, planning and budget support.

Keywords

Research; development; integration; knowledge sharing

Introduction

Knowledge sharing approaches used by multi-disciplinary research projects are undertaken to connect researchers and to bridge the gap between research outputs and end users. The approaches undertaken depend on many factors, including technical application, research approach, bio-physical constraints and implementation. Methods for integrating research processes and outputs are necessary when working in diverse project teams, but such methods are often not initially clearly identifiable at project initiation, and there is no one approach that can be relevant in all situations. Instead, there is a need to draw on a range of skills, tools and approaches to achieve desired outcomes. Integration in research refers to the drawing together of different perspectives (e.g. disciplines) to improve overall understanding of a complex problem, and improve the application of this resulting knowledge (Bammer, 2006); this process is becoming increasingly important for multi-disciplinary research projects and programs. Too often, these projects are developed with the assumption that because they are multi-disciplinary, integration will be achieved automatically; however, integration does not just "happen", rather it is a complex process that needs to be planned carefully (Proctor et al., 2010) and assigned the same level of importance as other project activities. Useful approaches to integration may come from a range of sources, and there is a continued need to document relevant experiences in order to consolidate and distil common themes and practices (Gonsalves et al., 2005).

A multi-disciplinary research project on 'Developing improved farming and marketing systems in rainfed regions of southern Lao PDR' (hereafter referred to as 'the project'), funded by the Australian Centre for International Agricultural Research (ACIAR), was implemented in southern Laos from 2010 – 2014. The project was set up as a partnership between the National Agriculture and Forestry Research Institute (NAFRI) (the in-country project lead) and several international research organizations, and linked with provincial and district agriculture staff for implementation of on-farm research in eight districts. Five components worked across the farming system in crop agronomy, livestock, water and hydrology, socio-economics and marketing. The knowledge sharing component took on a 'boundary spanning', facilitative role in terms of coordinating with other components and external stakeholders for improved integration of project activities, capacity building and extension of project results. 'Boundary spanning' refers to those organisations or individuals that are committed to building bridges within a project team and or between the research community and the end user, and are accountable to all groups (Kristjansen et al, 2009).This paper describes the approach of the knowledge sharing component, in order to draw out general approaches to linking information and practice that may be used in subsequent projects.

Targeting technologies through Focal Villages

At the commencement of the project, each component's research activities were located in a range of geographical locations within the project's target districts. Focal Villages (FV) were identified to integrate the use of various technologies on-farm and within villages, in order to enhance systems level understanding and as sites for co-learning and extension. These villages were selected based on previous project activity, including baseline socio-economic surveys, other research activities, and level of accessibility. The use of FV as key project learning sites offered pathways for outscaling promising technologies. Targeting proactive farmers in progressive villages as a way of promoting uptake of high potential agricultural activities has been cited previously as a way of out scaling agricultural research in Laos (Alexander et al., 2010). The establishment of trials by farmers under local growing conditions is also an effective way to encourage acceptance of new technologies such as new crop varieties (Harris, 2011), and was valued by participating farmers and district staff for these reasons in this project also.

Selecting villages using a typology approach

The socio-economic component identified six broad agro-economic zones within the project's operational area; these formed the basis of a more detailed household typology. The location of these zones follows a west-east transect in Savannakhet province in southern Laos, from the lowlands adjacent to the Mekong River, to the uplands adjoining the Vietnamese border. The defined zones include irrigated lowland, supplementary irrigated lowland, rainfed lowland, transitional (households engage in both lowland and upland activities), diversified upland and remote upland. FV were selected to represent these major types of agro-ecological zones. Taking a typology approach to planning and applying technologies is an identified method for outscaling results, allowing a clear definition of the application domain for the knowledge generated and integrated farming systems that may be possible within each typology.

Activity implementation

The project worked in the FV for the life of the project, and for three seasons as targeted areas for integrated activities (2012 – 2013) (Table 1). The development of activities over the seasons shows a clear move from individual component activities towards more integrated activities for research and demonstration. There was a limit to the activities that could be undertaken in the first season, but several additional activities were identified in each village where the project could 'value add' onto previous component activities. In the first season, the project worked with 26 farmers in six villages, primarily on Best Management Practices for lowland rice, forage systems for improved animal production and submergence tolerant rice demonstration.

In the dry season of 2013, the post-rice crop trials were the first real opportunity to apply an integrated planning process in the target villages. In suitable locations where supplementary irrigation was available, the post-rice sweetcorn crop was included as an integration point, with input from all components for improved sweetcorn production. Management recommendations for sweetcorn were adjusted (staggered planting times, irrigation rates) to allow this activity to provide a livestock feed source over a longer period; this may also have implications for marketing options. The need to develop protocols in conjunction with each other was agreed, to ensure synergy for what was delivered to project district and farmer collaborators. In the wet season of 2013, activities were maintained both for integration and for use as sites for farmer learning. In addition to existing component activities within the FV sites, district staff developed District Action Plans to extend promising technologies within their districts. These included demonstration sites, cross-site visits and farmer training sessions for relevant technologies. These plans enabled the district staff to have more input into the setting of priorities and activities for extension activities within the project.

All learning and interaction with stakeholders takes place within local institutional and political contexts, which were reflected in FV settings; real learning hinges on context sensitivity, tactical flexibility and collective engagement in problem solving (Castella et al., 2006). These sites allowed a learning exchange between district and provincial agriculture staff, farmers and researchers, as the synergies in these systems became better understood and adapted to niche situations, resulting in some of the research activities being adapted based on joint feedback from farmers and researchers. For example, farmers in one village (Ban Phanomxai) expressed a need for options to manage a major insect pest of wet season rice, Rice Gall Midge. Farmers reported regularly losing over 40% of crop yield due to this pest. Several different management options were trialled in order to complement the existing work being done on rice production (variety selection, nutrient management, Best Management Practice implementation) (Table 1). Common sites lead to improvements across the farming system, as farmers could observe several new technologies in a similar environment. This situation allowed farmers to gain experience and confidence in the application of new technologies under local conditions.

Table 1. Activities implemented in Focal Village sites in 2012 - 2013

Village	Activities implemented		
	Wet Season 2012	Dry Season 2013	Wet Season 2013
Lowland A (Supplementary irrigation)			
Ban Nagaxo, Outomphone	– Direct seeding - rice – Site-specific nutrient management – Forage – Poultry management – Best Management Practice - rice	– Staggered planting of sweetcorn, improved management, irrigation interval trial, feed stover to livestock	– Direct seeding rice demonstration (DAP) – Rice variety demonstration (four most suitable varieties) – Rice with fertilizer after sweet corn
Ban Phanomxai, Phalanxai	– Best Management Practice - rice – Forage production – Rice variety trials – Site-specific nutrient management of rice – Monitor Rice Gall Midge damage/yield relationship	– Staggered planting of sweetcorn, improved management, irrigation interval trial, feed stover to livestock – Rice Gall Midge pheromone trial	– Best Management Practice for rice demonstration (DAP) – Rice variety demonstration (four most suitable varieties) – Rice Gall Midge ecological engineering trial – Variety trial for Rice Gall Midge resistance – Rice Gall Midge pheromone trial – Forage production demonstration (DAP) – Rice with fertilizer after sweet corn
Ban Nahsomvang, Phontong		– Staggered planting of sweetcorn, improved management, irrigation interval trial, feed stover to livestock	– Rice with fertilizer after sweet corn
Lowland B (Rainfed/Supplementary irrigation)			
Ban Done Jod, Phontong	– Forage production – Poultry management – Best Management Practice - rice	– Irrigated forage production – Staggered planting of sweetcorn, improved management, irrigation interval trial, feed stover to livestock – Intercropping peanut - mungbean	– Rice with fertilizer after sweet corn – Forage production and use – Nutrient cycling trial (cattle/forage) – Pond lining trial
Transitional			
Ban Napokham, Phin	– Forage production – Best Management Practice - rice	– Forage production	– Forage production and use – Nutrient cycling trial (cattle/forage) – Rice with fertilizer after sweet corn – Rice variety demonstration (four most suitable varieties)
Upland			
Ban Nong vilay, Nong		– Staggered planting of sweetcorn, improved management, irrigation interval trial, feed stover to livestock	Rice with fertilizer after sweet corn

Integrating project activities

For research projects, taking an integrated approach to the application of improved technologies can help facilitate farmer-extension-researcher interaction (Castella et al., 2006). Focusing on integration of project knowledge of technologies at the farm level, applied in a way that fit the Lao smallholder farming systems context, aimed to benefit farm households and communities. The aim was to introduce improved options for different parts of the existing farming system in a way that fit with the local conditions, and through this explore the effects of systems changes. A better understanding of the integration points and the whole farm system could test the ability of relatively small changes to the existing systems to bring about positive change within the farming system.

FV sites were valuable as an integrating factor for project activities, offering targeted sites for practical on-ground implementation of activities. They provided a common location to work together, enhancing organisational integration. By selecting these common sites, opportunities for dialogue and cooperation among project components were enhanced. For researchers, the use of FV also allowed a space to see the whole picture, giving insights into how events are interconnected, which can lead to targeted interventions for change. Using a FV approach meant that project components worked together more closely, and took a more problem-oriented approach, rather than strictly disciplinary. This was seen in terms of project planning meetings, project field visits that included members from all components (as opposed to strictly component visits), and the development of protocols which incorporated different activities. Incorporating the FV sites into the project structure highlighted the importance of establishing good communication and working relationships among project counterparts. It is acknowledged that provincial and district staff are an important source of support for farmers; however, the process of different disciplines from these organisations working together at a common site or on an integrated activity is new, and required an adjustment in the way of thinking. Ongoing support is needed for this to happen, including training, mentoring, planning and budget allocations. There is a need to not only build technical skills, but also to improve competency in fundamental skills such as facilitation, stakeholder engagement, monitoring and evaluation and impact assessment at all levels (Gonsalves et al., 2005; Kristjansen et al., 2009). The development of such skills was a key focus of the knowledge sharing approach, and was reported by district staff, who rated stronger networks and improved communication as outcomes associated with the project (see Sengxua et al, this issue).

One of the risks of systems research approaches such as described here, is that it often takes a long time to see changes in a system. It is recognised that the level of integration at any site is an evolving process, and that the benefits from integration and systems research take time to accrue (Tipraqsa et al., 2007), meaning that there may be limited additional outputs from the first few seasons. In locations like rural Laos, where many other management factors influence the farming system, and detailed record keeping and site data are often limited, this type of research can be challenging to undertake. Nonetheless, it is important that such research is undertaken to allow the identification of the wider effects of individual activities within the farming system, and increased understanding of the interplay between constraints and solutions, and the prioritization of these. In using the FV approach at the local level, these locations became areas of learning exchange and ownership that in some cases were maintained after the project concluded, with farmers and local staff as experts able to share their knowledge and experiences.

Conclusion

FV sites had value as an integrating factor for the project activities of the research project. They provided local relevance and practical application to enhance understanding and adoption of technologies introduced. FV sites were used for learning sites for project participants to see the effects of integrated activities while offering pathways for outscaling promising technologies. At the FV sites the project targeted proactive farmers in progressive villages as a way of promoting uptake of agricultural activities with high potential. Importantly, they provided a common location to work together, enhancing organisational integration. By selecting these common sites, opportunities for dialogue and cooperation among project components were enhanced.

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