Accelerating the Impacts of Participatory Research and Extension on Shifting Cultivation Farming Systems in Lao PDR

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Abstract

Throughout the northern uplands of the Lao Peoples Democratic Republic (Lao PDR), farmers are facing major challenges to sustain or improve their livelihoods due to population pressure, resource scarcity and land degradation from shortened fallow periods. The problems and opportunities of shifting cultivation farming systems and household livelihoods are complex. Upland systems not only require different technologies from the lowland areas, they also require different research and extension approaches. Over the last decade, it has been found that farmers’ capacity to innovate and achieve significant impacts is stimulated by using decentralised participatory research and extension methodologies.

The current challenge for most organisations and projects is to move beyond simply trialing new technologies with individual farmers on a small scale to enabling significant impacts across larger numbers of households, villages and districts. This is critically linked to increasing the capacity of research and extension staff and their organisations to embrace participatory approaches that generate learning and change. A new research project funded by the Australian Centre for International Agricultural Research (ACIAR) over the next 2 years will investigate ways to accelerate and spread the impacts of participatory research and extension on farming systems change in Lao PDR. This paper describes the background, objectives and methodologies of the project. Discussion of some of the anticipated outcomes in relation to changes in upland farming systems and livelihoods, extension processes, and organisational development follows. Conclusions are drawn on the importance of monitoring and evaluating learning processes aimed at farming systems improvement, sustainability, and social change within an international context.

Introduction

Poverty alleviation among rural households and villages in upland areas of Indochina remains a major challenge due to their remoteness and reliance on shifting cultivation farming systems. Shifting cultivation involves the burning and clearing of forest or regrowth vegetation to grow upland rice and other crops such as maize, vegetables, fruit, sesame, Job’s tears and teak trees. In Lao PDR more than 85% of the population live in rural households and about 40% are fully or partially involved in shifting cultivation mostly in the mountainous northern provinces where 65% of shifting cultivators live (Hansen, 1998). Although poverty in Lao PDR has been considerably reduced along the Mekong River corridor due to market intensification and diversification opportunities, upland areas of northern Lao PDR have not benefited from such social and economic development (Sisouphanthong and Taillard, 2000). The ‘poverty gap’ between lowland populations and ethnic groups in upland rural areas has widened over the last 20 years as upland farmers have not had the same opportunities to diversify or change their farming systems as their lowland counterparts who have benefited from direct transfer of irrigation and crop technologies.

Poverty in upland areas has increased due to the interventions of war, resettlement, post-war population increases, natural disasters and poor implementation of land allocation policies (ADB, 2001). This has led to shortened crop rotations, lower rice crop yields, weeds, pests, increased labour requirements, livestock diseases, loss of forest and wildlife resources and land degradation in some areas (Roder, 2001). Upland rice constitutes 65% of the total rice area in the north (compared to a national average of 31%) due to the small potential for irrigated paddy cultivation. Under these circumstances, householders rely heavily on

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livestock production, fish raising and cash crops for capital accumulation and cash income (more than 50% in many cases) (Hansen, 1998). Feed shortage is one of the limiting factors in livestock production.

Farming systems vary within and between villages depending on ethnicity, land tenure, soil type and fertility, labour availability, access to forest resources, market access and opportunities, incidence of animal and crop disease, family size and structure, traditional connections with the land and farming skills. Within this context, there is increasing recognition that:

- The problems and opportunities of shifting cultivation farming systems are complex requiring different research and extension approaches from the lowlands;
- Farmers’ capacity to innovate and make changes to these farming systems can be significantly stimulated and facilitated by using decentralised participatory research and extension methodologies and;
- Progress is critically linked to increasing the capacity of staff at all levels within their organisations to conduct participatory approaches that generate learning and change.

**The Forages and Livestock Systems Project**

The ACIAR research project described in this paper has evolved from the Forages and Livestock Systems Project (FLSP), a five year project funded by AusAID and managed by CIAT (the International Centre for Tropical Agriculture). The FLSP uses participatory research and extension approaches to develop livestock and forage technologies with farmers in northern Lao PDR. The project started working in the upland provinces of Luang Prabang and Xieng Khouang in July 2000 with three main objectives:

- Improving productivity of small and large animal systems
- Increasing labour efficiency and reducing workloads in livestock production
- Enhancing sustainable cropping systems through improvements in soil fertility management and reduction in soil erosion.

District extension staff from the Department of Agriculture and Forestry (DAFO) work directly with farmers from at least eight villages in each of the four districts. Male and female staff work in paired teams. They are mentored by their provincial team leader who also coordinates monthly provincial meetings. National staff from the National Agriculture and Forestry Extension Service (NAFES) and National Agriculture and Forestry Research Institute (NAFRI) mentor provincial staff and oversee project operations and funding.

The FLSP follows a participatory research and extension cycle process (Horne and Stür, 2003). [see Appendix]. It starts with village meetings to diagnose problems and issues, and introduces the concept of working with new forage and livestock technologies. Farmers (male and female) who are interested in trialing forage varieties or livestock management strategies are invited to form a focus group within the village. Extension staff provide forage seed and cuttings to individual farmers to establish plots along with management and feeding advice. Livestock management strategies are discussed at village meetings and vaccines provided in conjunction with recommended husbandry practices.

Focus group meetings are held at strategic times throughout the year to observe forage production and discuss problems such as failure to germinate, disease or pest attack, frost or waterlogging, nutrient rundown or harvesting methods. Farmers are currently using a range of forage species (grasses, legumes, sweet potato, cassava and maize). Plots sizes vary from 1200m² to 1.6 hectares. Harvesting is done manually using scythe implements and carried in baskets or tied bundles back to where livestock are penned or tied up. Farmers are using the forages to feed pigs, cattle, buffalo and chickens, which have traditionally been fed using native vegetation from the forest, streams or gardens. Short-term environmental benefits mentioned by these farmers include less firewood and fodder needed from distant places.
forest areas, good groundcover and reduced erosion. Longer-term environmental benefits from reducing or modifying areas of shifting cultivation are yet to be realised. Engaging the poorer households and small animal holders is also a key issue to be addressed.

Impacts of participatory research and extension

Some impressive, sometimes unexpected impacts on farming systems are now emerging from the FLSP. District extension staff are developing case studies of some of these impacts as shown in the boxes below.

**Fattening village buffalo with forages**

Mr and Mrs. Lao Ly live with their ten children in Xang village, Xieng Khouang province, Laos. For many years, they have been planting rice (mostly in shifting cultivation fields but more recently in a small area of paddy). They normally keep one buffalo to help them with heavy work, such as ploughing the paddy field. In recent times the village has been reducing the area of land they slash and burn, which has resulted in a more reliable source of water from the mountains for their irrigated fields. But this has had a negative effect as well: the grazing lands for animals have been gradually disappearing. To supplement the meagre feed resources that their buffalo could graze in the hills, Mrs Ly and one or two children would spend 4 – 5 hours each day cutting grass about 5 km from the village and carrying it home.

In 2001, Mr and Mrs Lao Ly started working with district extension workers on small trials with 4 grasses (*Andropogon gayanus* “Gamba”, *Panicum maximum* “Simuang”, *Brachiaria brizantha* “Marandu”, *Pennisetum purpureum* “Napier”) and 1 legume (*Stylosanthes guianensis* “Stylo 184”). Within 6 – 8 weeks of cutting and feeding these forages, they noticed that their buffalo was not only stronger but fatter. Mr Ly particularly preferred “Simuang” and “Stylo 184” because his buffalo seemed to thrive on these two varieties.

In 2002, Mr and Mrs Lao Ly decided to expand their forage area to more than 1000 m² and experiment with ways to use the forages. They sold their buffalo just before the wet season and bought a new one for 3.9 million kip (USD370). Over the 2 – 3 month period of heavy work they fed the buffalo cut forage every day. They noticed that not only was the buffalo stronger but she gained weight during this period. This had never happened before…normally the buffalo would lose weight because of the heavy work and poor feed. At the end of this period they sold the buffalo for a profit of 700,000 Kip (USD67).

Since then they have bought and sold two more buffalo using the same method and on each occasion made about 450,000 kip (USD43) profit. With the new forages, not only did they get a strong buffalo and make a good profit but now it only takes one person to cut forage each day. The labour saving for Mrs Ly and children has been substantial.

(Note: to compare these profits with the normal farm income, one hectare of upland would yield rice worth about 1.2 million kip (USD115) and take up to 250 – 300 person days per hectare to produce).
Mr. Thit Bounthanh lives with his family in Piknyai village, Luang Phabang province, Laos. They rely on lowland and upland crops for their livelihood, with few sources of cash income apart from fattening pigs. In the past they would normally keep about 15 – 20 pigs, which they would fatten for market in 4 – 5 months during the wet season. Every day someone from the family would search for leaves and tubers of the water yam which was the staple food of the pigs. The yam grows wild along the small streams that flow through the village. The yam leaves and tubers are cooked with rice bran and fed to the pigs as a mash. In recent times, however, with increased numbers of farmers raising pigs in the village, the yam has become scarcer and one person from the family now needs to spend 2 – 3 hours per day searching for it.

In 2001, Mr Bounthanh had 2 sows and 13 piglets. After 4 – 5 months of feeding, the sows were still thin and weak and were unable to produce enough milk for their piglets. He tried to sell the two sows but the best price he was offered was only 340,000kip (USD32) for the two pigs and the buyer was reluctant to take them because they were so thin.

In 2002, Mr. Bounthanh decided to evaluate the legume, \textit{Stylosanthes guianensis} (Stylo 184) which the local extension staff had told him was a good supplementary feed for pigs. Once he saw how palatable stylo is for pigs, he decided to mix 1kg of fresh stylo leaf with the normal feed of rice bran and yam tubers for two sows and also feed them an additional 2kg of fresh leaf in the middle of the day.

Within one week he noticed big differences. His sows started to fatten, were producing more milk and both the sows and piglets were more energetic. After 4 – 5 months these two sows had reached 75 kgs and he was able to sell them for 645,000kip (USD62). On top of this, the piglets had fattened much faster than before.

He was particularly proud that many farmers came to him wanting to buy the sows. His answer to these farmers was that he was going to expand his area of stylo next year and try to increase his herd of pigs to 25 animals. He recommended that they should do the same.

(Note: Mr. Bounthanh’s profits compare with the value of a normal day’s contracted labour in Pik Nyai village of about 10,000kip (USD9))
These impacts are currently localised but could potentially be widespread. In the early stages of participatory research small scale expansion often occurs, driven by the desire of farmers and extension workers to move from small plots to ‘significant’ areas. In subsequent years, however, expansion (to larger areas, to more farmers, to more districts) is only driven by the clear demonstration of tangible, achievable and substantial impacts (Fujisaka, 1999; Horne et al., 2000).

Field days and cross visits (where farmers from one village visit another village) have been held to demonstrate impacts and innovations, and encourage farmer to farmer information exchange. An important element of facilitating these activities is team planning and reflection on extension processes, group learning and farmer innovation. There has been a significant increase in the capacity of staff to communicate with farmers, organise visits and field days, develop workplans, facilitate groups and continuously improve their extension practice (CIAT, 2002). At the provincial and national level, staff have developed skills in mentoring, team planning, project management and evaluation. Project monitoring and evaluation is conducted using adoption surveys, observations, focus group meetings and interviews (Stur, 2001).

Accelerating and spreading impacts: an integrated systems approach

Many development projects concentrate their efforts on changing farming systems through technical interventions, expecting that expansion of impacts will somehow occur spontaneously (commonly referred to as ‘scaling out’). However, moving from participatory research with individual farmers to scaling out requires that researchers and extensionists develop new knowledge and skills to work with groups of farmers, understand whole farm systems, livelihood systems, knowledge systems and community systems (Millar & Curtis, 1997; Connell, 2000).

Once farmers are inspired to experiment and innovate, how can research and extension staff facilitate greater integration of technologies within and across farming systems? How can local staff learn to go beyond working with individual farmers to working effectively with farmer groups which can eventually run their own affairs? How can they stimulate ongoing sharing of local farmer knowledge and experience? How do organisations support staff in their work and commit to the theory and practice of participatory approaches (referred to as ‘scaling up’)? How can organisational change be encouraged and facilitated?

This research project is taking an integrated approach to the issue of ‘scaling out’ and ‘scaling up’ with an emphasis on institutional capacity building for participatory research and extension. It is anticipated that the results will have implications beyond the geographic and institutional limits of the project. The objectives of the ACIAR project are to investigate effective ways to;

1. Understand how and why farmers are able to modify their upland farming systems away from a reliance on shifting cultivation through their use and innovation of relevant technologies. *(Farming systems change)*

2. Accelerate and spread impacts resulting from participatory research and extension. *(Extension process change).*

3. Facilitate organisational learning and development towards participatory approaches. *(Organisational change).*

Figure 1 below illustrates the interdependent nature of the three research areas. The linkages or relationship between changes in extension processes, organisational development and farming systems will be explored in terms of both their relative and accumulative impacts and their subsequent importance.
The Lao government has identified a need for greater policy commitment to farmer demand-driven approaches (MAF, 2001). A major challenge identified from the literature on institutionalisation of participatory processes in public sector organisations is for them to become more client-oriented and relevant to the poor. To do so, such organisations need to respond to the highly differentiated needs of rural communities, while offering services and technologies that support and sustain their diverse livelihoods (Bainbridge et al. 2000). Institutions and their policies need to be adaptive and capable of transformation, particularly through the development of internal feedback mechanisms that incorporate innovative approaches used by members. Changing the internal workings of organisations is one of the key challenges confronting the ‘scaling up’ or institutionalisation of participatory approaches.

There is a critical need to ensure that project-level learning and change is sustained beyond the life of projects. This requires conducting action research to explore the organisational opportunities and constraints to institutionalising participatory approaches in agricultural or farming systems research and development. Through learning and development, staff can build confidence and skills to create change in their own organisations.

**Research methodology**

The project involves adaptive research and incorporates capacity building in the context of development activities in Lao PDR. This means that the research process is responsive to emerging findings and concepts. In qualitative research terms this is referred to as ‘grounded theory’ whereby the research generates and confirms theory that emerges from close involvement and direct contact with the empirical world (Patton, 1990). (as distinct from forming a scientific hypothesis and testing it using experimental research methods). This does not preclude the generation of quantitative information which will emerge from case study interviews, measurement of impacts and staff interviews.

Qualitative research methodologies will be used for all three research areas including participant observation techniques, focus groups, semi-structured interviews and case studies (Patton, 1990). Lao staff are already familiar with some of these methods as part of their project monitoring and evaluation skills. Participation in this research project will further enhance their skills in impact assessment and extension research.

Table 1 below summarises the research methods to be used for each of the three research areas.
### Research Area

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<th>2003/4</th>
<th>2004/5</th>
<th>2005/6</th>
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<tr>
<td>Farming Systems</td>
<td>Twenty case studies of farmers and households across four districts who are modifying their farming systems using innovative technologies. Extension staff involved in using semi-structured interviews.</td>
<td>Case study data analysed with staff to determine factors influencing farmer capacity and willingness to make the transition to more sustainable farming systems, including overcoming barriers.</td>
<td>A report on the factors (social, environmental, economic) influencing farmers to modify farming systems will be prepared in Lao and English to guide policy, research and extension programs.</td>
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<tr>
<td>Extension Processes</td>
<td>An inventory of the impacts and indicators from participatory research and extension methods used in FLSP to date. Observation and reflection of focus group meetings to discuss impacts.</td>
<td>Observations and reflections to determine the effectiveness of different extension processes in stimulating social learning and use of local and scientific knowledge in accelerating innovation.</td>
<td>Survey of extension staff and farmers who have been involved in participatory processes (to accelerate impact) in order to gauge their feedback and impressions of those processes. Individual semi-structured interviews.</td>
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<tr>
<td>Organisational development</td>
<td>Semi-structured interviews with all FLSP staff to explore their motivations barriers to development and views on how to achieve effective organisational learning and change. Reflections on training and team/individual learning.</td>
<td>Analysis of constraints and opportunities to institutionalising participatory approaches. Analysis of workshops with managers at national, provincial and district levels on organisational learning and development</td>
<td>Evaluation of progress with organisational change using focus groups and individual interviews. Analysis of impacts on departmental policy and programs.</td>
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### Table 1  Summary of Research Methods

Research activities and findings of one research area may inform, verify or influence the approaches and outcomes of other research areas. This is known as ‘triangulation.’ Verification techniques also include ongoing, reflexive accounts of the research process by the researcher, feedback through communication with peers and subjects, persistent observation and the use of multiple sources and methods (Patton, 1990).

For example, interviews with case study women farmers may reveal that pig feeding and management is a major constraint to achieving profitable livestock production and labour efficiencies in several villages. By organising cross visits to other villages where women farmers have experimented with different feeding and housing practices based on their adaptation of introduced technologies, the process of information exchange and learning can be observed and impacts measured. The effectiveness of different extension methods in stimulating interaction of local and scientific knowledge, spread of innovations and further technology adaptation can be determined. The role of government extension staff and national research staff in facilitating the farmer learning process can be researched at the same time. Or research findings may reveal greater influences within village organisations on women farmers’ ability to improve small livestock production and labour efficiencies. The influence of organisational environments on staff capacity to facilitate impacts can also better understood.

Extension research using an action learning process will build new skills in extension evaluation and an understanding of how extension theory can improve extension practice for Lao government staff and students. The project team will also draw on Australian experiences with farmer-driven research and extension as a way of comparison and to stimulate new ideas and approaches in both countries. Much can also be learnt from extension and rural social research in Australia which has been applied in the context of commodity research, natural resource management and farming systems research and extension (Millar and Curtis, 1999; APEN 2001; Cary et al., 2002). Opportunities will be provided for networking between researchers involved in farming systems and extension research in Australia and Lao PDR.
Discussion

The following anticipated outcomes and benefits from this project are discussed as well as potential constraints in achieving these outcomes.

Building farmer capacity and willingness to make the transition to more sustainable farming systems

At the local level, this project will use an action learning process to engage farmers and village households in focus group discussions, household interviews, developing case studies, and reviews of cross visits and field days. The use of case studies as a communication tool (presented as fact sheets and posters) will help to disseminate farmer ideas and practical examples to other villages and farmers. The results of group discussions and cross visit reviews will directly inform and improve extension approaches so that more appropriate technologies and systems are developed for upland areas. Alternative technologies being presented to farmers in the project area have the potential to reduce household reliance on shifting cultivation, forest grazing, and harvesting of forest products which could bring short and long term environmental benefits.

However technical solutions have to be considered within the social, political and economic context. Upland farmers appear to be motivated to find alternatives to shifting cultivation on social and economic grounds (eg labour reduction, increased income) and are less likely to be motivated by possible environmental benefits unless they can be clearly linked to productivity. Environmental factors may also be constraining farmers from taking up new technologies or modifying their farming systems (ie acid soils, slope/aspect, access to water).

It is important to acknowledge existing indigenous knowledge and practices within and across communities and encourage sharing of innovations or technology adaptation measures. This also includes local knowledge held by extension staff who gain a wider appreciation of opportunities and best practice methods from working with a number of villages in a district, and being exposed to innovations in other districts and provinces. These issues will be monitored and evaluated throughout the project to see if they play a major role in accelerating and spreading impacts.

The ultimate aim is to assist the process of farmer innovation by blending outside knowledge, the basic building blocks of technologies and their indigenous knowledge to find integrated solutions. The study on factors enabling or constraining farmers to change their farming systems will inform agency staff working in policy, research and extension so that appropriate programs can be developed.

Potential social inequities need to be addressed to ensure adequate representation of women and minority ethnic groups. Inequities may occur if information and ideas remain with particular groups according to gender, ethnicity, wealth, political or geographic boundaries. Factors inhibiting participation may include labour shortages, remoteness, status in the village, health or communication problems. It will important to move the emphasis away from the ‘model’ farmer to consider beneficial technologies and innovations from a range of farmers which can be applied to diverse situations. Careful management and monitoring is required to ensure that participation is not exclusive and that the poverty gap does not widen between those who are able to benefit and those that do not. This will require strong mentoring by both provincial and national staff who in turn will receive support from NAFES, FLSP and CSU staff.

Increased knowledge and skills of research and extension staff to carry out participatory research and extension, impact assessment and extension research.

Lao government staff will receive both formal and informal training in using case study methods, conducting and analysing semi-structured interviews, making and documenting observations and evaluating impacts as they emerge. These skills and the accompanying enhanced knowledge and understanding of extension theory will continue to be applied in their extension work beyond the life of this research project. Partner country staff will also gain social benefits from improving their team, leadership and extension skills.
Again, potential social inequities need to be addressed to ensure adequate representation of women and minority ethnic groups in staff development. The national organisations involved will also have to be aware of potential distancing of project staff from the rest of the organisation if they are the only ones gaining skills in this area. The project will need to work with partner country organisations to plan for building social capital in participatory research and extension throughout Lao PDR.

**Innovative and culturally appropriate methods for institutionalising participatory research approaches.** This project will work directly with Lao government organisations involved in delivering participatory research and extension through the FLSP, namely the District and Provincial offices of the Department of Agriculture and Forestry, and the National Agriculture and Forestry Extension Service. Staff in these organisations will be involved in a process of organisational analysis, training and planning to develop a unified agreement on the purpose and practice of participatory research and extension. One of the challenges facing the Lao government is how to develop an extension delivery system for the whole country based on the experiences of many locally based individual donor funded projects and overseas examples.

Project results will be extended to other in-country projects and extension networks in Lao PDR (government and NGO). It could act as a catalyst to bring together disparate groups within the country who have been independently implementing participatory and farming system approaches. A spin-off of the project will be to initiate an informal link between researchers and extensionists who are committed to these approaches, with the aim of providing a ‘critical mass’ of support within the country for participatory research and extension. Project results will also reach a wider international audience through association with CIAT and the Participatory Research and Gender Analysis Program managed by CIAT. A guide on how to achieve impacts using participatory approaches will be produced in Lao and English. This guide will be disseminated to Lao government and NGO staff and other South East Asian countries.

**Conclusion**

This project is focused on monitoring and evaluating the learning and change process aimed at accelerating farming systems improvement. Participatory research and extension approaches and methodologies are now readily accepted as advantageous when applied to international rural development. Once impacts start to emerge locally, it becomes more of a challenge to find ways to accelerate and spread the process of learning and change to other areas whilst maintaining momentum in existing villages. Methods, tools and ideas are needed to both stimulate and sustain the learning process for farmers, extension staff and development organisations. This research project will provide a toolbox based on in-depth analysis of what works and what doesn’t work, so that other projects and organisations can make the transition. It will provide a roadmap to farming systems change and sustainability for the uplands of northern Lao PDR.

**References**


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Appendix  The FLSP Participatory Approach

PRELIMINARY WORK (2-4 MONTHS)

Selecting Villages ➔ Participatory Diagnosis: agreeing on issues

FIRST CYCLE (6-12 MONTHS)

Form focus group and explore technology options

Test Options on small scale

Evaluate Options

Focus Group Meeting

Report Back to Village
(combine with field visit, encourage new farmers)

LATER CYCLES (1-3 YEARS)

Integrate promising solutions on farms
(encourage innovation, expansion, adaptation)

Reach other farmers in the village
(facilitate exchange of experiences, farm visits)

Share successful technologies with other villages
(work with local champions, form farmer groups, conduct field days and cross visits, support expansion, use extension materials)