Version 2.

A Farming Systems Research / Extension Strategy for the National Agriculture and Forestry Research Institute in Laos.

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A Farming Systems Research / Extension\(^1\) Strategy for the National Agriculture and Forestry Research Institute in Laos.

Executive summary

1. This document contains the essence of a strategy that will guide the introduction of a farming systems research/extension strategy within the National Agriculture and Forestry Research Institute of Lao-PDR. The document may be considered as a working document as, over time and with experience, the strategy will need adjustment and refinement. The document deliberately does not contain details of how the strategy should be implemented as this will evolve with experience within LSUAFRP and other related programmes. However, there are guidelines for implementation based on experience elsewhere.

2. The rationale for a FSR/E strategy emerges from much experience in many other countries which is that conventional, disciplinary and commodity driven agriculture and forestry research institutional structures, organisation and operations are incomplete without containing a systems approach to research and extension. The basis of this argument is that within agriculture there are important linkages, interactions, boundary and emergent issues that need to be addressed if alternative technologies are ever to be relevant to different contexts. In particular, it is suggested that the complexity of upland farming systems can best be addressed through a farming systems approach.

3. In addition, a farming systems research approach may be seen as an effective way of analysing poverty and gender issues within farming and livelihood systems. The placing of such issues within a wider context is essential if we are to find sustainable improvements to existing systems.

4. NAFRI has already taken the key steps to establish FSR/E at the heart of its research strategy. The formation of a FSR/E team at central level and the development of good working relationships with the national extension service (NAFES) at District level are key elements in this strategy.

5. To reinforce these measures the strategy proposes a structure that will operate at Central, Provincial, District and Village Community levels to devise, design, implement, monitor, review and regulate activities. This requires the setting up of new formal procedures and a Committee (the Research-Extension Advisory Committee) to guide the process over the next few years. This Committee should have clear terms of

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\(^1\) Although FSR has been used throughout all the literature related to the LSUAFRP to date, it is considered that the expression Farming Systems Research/Extension (FSR/E) better captures what this kind of research is about; the interface between formal, conventional, primarily station-based research, and applied /adaptive farmer-driven on-farm research and development activity. For this kind of research/extension to succeed, researchers, extensionists and farmers need to work as teams in all situations. The acronym, FSR/E was coined by the International Farming Systems Research Association more than 20 years ago.
reference with an mandate to encourage interdisciplinary thinking and action between institutions and in the field.

6. The systems approach contains a number of key concepts: systemic thinking, interdisciplinarity, wide stakeholder involvement, system linkages and synergy, a poverty focus, learning and critical reflection, links to basic research and an appreciation of the need for different boundaries of analysis from farm field to village, catchment and district.

7. Operational needs for FSR/E teams need to include regular working with farmers and rural communities throughout the growing seasons, informal research with farmers, the use of indigenous knowledge and skills, the need to establish a systematic monitoring and evaluation system for the whole process.

8. The planning of the farming systems research and extension process needs to take account of the growing season and the needs of farmers rather than the institutional needs of formal research agencies.

9. Reviewing FSR/E is unlike any other kind of research activity as it needs particular criteria to assess linkages and approaches which cross conventional boundaries. The criteria used for assessment need to be agreed by all participants and reviewed on a regular basis.

10. FSR/E requires some special training inputs and facilities. These can take place in country (on the job training) and abroad. However, it is recommended that at least two year’s home experience within the FSR/E programme are necessary before overseas training is considered. Good linkages and exchanges with existing research and extension programmes in the region are considered to be essential in this formative stage of development of the strategy and the programme.
1. Introduction and background

The Lao-Swedish Agriculture and Forestry Research Programme (LSUAFRP) has been developed as a support for the Government's Strategic Vision for the Agricultural Sector (MAF. 1999). The focus of the Programme is on the uplands of the country within which a diverse mix of farming systems have developed. People who live in these areas originate from a number of different ethnic groups and most practice forms of crop/fallow cultivation systems which have various types and lengths of fallow combined with a few years cropping with a mixture of annual crops, dominated by upland rice and Job's tears. Many also have a range of livestock, both large and small, that are free ranging and scavenging. A significant number of people who live in these areas live in periodic or severe poverty. (see Annex 1 for a definition of the poor in Lao PDR)

As many governments before them in other parts of the developing world, the Government of Laos would like to phase out shifting systems and transform them into permanent, settled, farming systems, cropping with trees, annual crops and both small and large livestock, including fish. The policy involves providing some incentives for people to move and resettle close to roads and receive allocated land. It is not the purpose of this paper to suggest alternatives to this policy, but it is worth reflecting on the fact that many people have lived, more or less successfully, in these upland areas for many years and have evolved a system of resource management that has its own rationale and is, in the medium term at least, sustainable. The intention with a well structured and organised FSR/E programme is that many ways of managing resources will be researched and evaluated and several systems will be developed which are more sustainable for the majority of people in the longer term. It is also important to recognise that there is some voluntary movement of people to re-settle close to the roadside as this opens up potential market opportunities and access to services.

The upland areas are generally characterised by many authors (eg. Roder, 2001) as having a poor infrastructure, limited alternative agricultural technology options, poor credit and savings environment, weakly developed markets and poor access to market information. The development of primary and secondary road systems may change these characteristics rapidly, at least for those with road access.

There is already much on-going activity in the upland areas, much of it funded by external donors, in the development and demonstration of alternative technologies and in the use of farmer participatory technology training and development methods. This work generally comes under the responsibility of non-government agency activity or as applied research and development within (or outside) NAFRI or NAFES agendas.

NAFRI is a relatively young institution with three main divisions and nine Centres (and one Project) which are based on commodity or disciplinary lines. There is only a short
history of research in the country and much of this has been focused on lowland rice production and on on-station, reductionist research approaches and methods. The development of farming systems approach within research represents a new departure although it has been discussed for many years (see - National Agriculture and Forestry Research Master plan, MAF 1991). Only now is this being translated into a formal institutional plan.

As part of the support to the developing NAFRI system, the Senior Farming Systems Research Adviser has been asked to help develop a Farming Systems Research/Extension Strategy which would be relevant to the upland areas, but might be more widely relevant nationally. The steps necessary to achieve a working model that incorporates a farming systems research approach are difficult and will take several years to develop, but there are many lessons that can be taken from the experiences of other countries that have been through the experience over the past 30 years.

This document attempts to set out a General Strategy for FSR/E within NAFRI. In order to illustrate how operations might work at Provincial and District level, information from the LSUAFRP has been used. For the strategy to be operationalised elsewhere in the country, the exact relationships with the Centre, the role of research stations, staffing numbers, training needs and details of villages and districts would be different, but the intention is that the LSUAFRP serves as a pilot training model for later adoption on a wider scale.

2. The development of an effective farming systems research/extension strategy.

2.1 Farming Systems Research/Extension: history, philosophy and approach.

The programme document of the Lao-Swedish Upland agriculture and forestry research programme (LSUAFRP, 2001) contains the background and justification for the development of an FSR approach in Laos uplands (pages. 19-24) so this will not be repeated. However, there are a number of recent developments in the approach which are worth emphasising as many older perceptions of systems of technology development and transfer, and a rather dated view of what farming systems research is, still persist.

The FSR/E approach originally arose out of the failure of conventional, reductionist / positivist science and technology thinking, to address fully the problems of complexity in risk-prone, diverse environments and in particular, to develop appropriate ways of combining indigenous knowledge and applied scientific methods to the persistent problems that many farmers faced. Other factors which led to the change of approach
included the need to focus on poorer, subsistence-oriented farmers and to understand the mechanisms which drive and sustain their farming systems.²

The approach has always included the assumption that research and extension systems overlap when engaged in this kind of adaptive, on–farm research and that an essential first step is to reach a combined understanding by all actors of what the objectives of this kind of work are and what are appropriate contributions from each institution. Indeed, the separation of Research from Extension (physically, in their mandates and in people’s minds, has been one of the major reasons why research has often been ineffective and irrelevant and why extension programmes have often been misguided). A close working relationship which involves a strong researching element within any extension or development activity and an extending approach to any applied research activity, is essential for the success of FSR/E in any context.

It is important to stress that FSR/E is not a method and that there is not only one way to conduct research with a systems perspective. Indeed, the whole FSR/E movement has seen very rapid and diverse development since its origins over 30 years ago. There is a great richness about the way in which the many thousands of practitioners have evolved, diversified and shared their experiences. So much so that there is a continuing and healthy, debate on meanings, terminology, language and understanding of what is included in farming systems research and extension and how it should evolve in the future.

An important development has been the recognition that an understanding of people’s livelihoods, which include the sustaining of human, physical, biological, social and economic capital, are crucial in understanding how the poor can survive in the future. Much of farming systems research/extension has already evolved to accommodate this perspective which has developed during the essential debate about boundaries and the need to operate at several levels of analysis in this kind of research.

There have been major strides made in the development of poverty-focused farmer-participatory research methods over the past 10 years and there is now a significant body of experience from many areas of Asia, Africa and Latin America that demonstrates the value of farmer involvement in the process of designing, planning, implementing, monitoring and evaluating farming systems research and extension. There are many examples of this contained in the materials now held by the Farming Systems component of LSUAFRP at NAFRI. (see Gibbon, 2002. Annex 3). These materials illustrate the benefits of the close involvement of resource users, farmers, cultivators, livestock owners, artisans, traders and other stakeholders in the development of systems approaches to sustainable rural livelihoods.

²“A farming system may be defined as a complex, interrelated matrix of soils, plants, animals, power, labour, capital and other physical, biological and social inputs controlled, in part, by farming families and influenced, to varying degrees, by political, economic, institutional and social factors that operate at many levels. Farming families attempt to satisfy their needs for food, cash and other needs by the manipulation of inputs available to them in order to produce useful output. This may be achieved through non-agricultural as well as agricultural activity”.

6
A final point that needs to be made here is that farming systems research/extension is complementary, not competitive, both with conventional scientific research and with extension methods and efforts. The benefits of adding a systems perspective to many research systems, at district, regional, national and international research levels, have been evident for more than 30 years. The challenge has been to adapt complex institutional structures, often made up of many different division and components, to a flexible way of operating systemically across divisions and, more importantly, to convince senior managers and heads of centres and divisions, that this way of thinking and operating will bring great benefits to the overall effectiveness of work in agricultural and rural development research and extension.

There is now a substantial body of experience and literature on the institutionalisation of Farming Systems Research within research and extension institutional structures and many useful documents on “good practice” in the reform process of Agricultural Research Organisations. (see: Byerlee and Alex, 1998; FAO, 1992; Gibbon, 1991; Prezno, 1991) The World Bank paper entitled: “Reforming agricultural research organisations: creating autonomous bodies and managing change” (World Bank, 1998), sets out the principal reasons for creating greater autonomy which are: to have greater administrative flexibility and greater involvement of different stakeholders in order to focus on client needs, to enhance scientific rigour and to promote a sense of ownership among researchers. This paper sets out some useful “good practice” guidelines which include:

- Linking organisational reform to public sector reform as a whole,
- Reviewing autonomy options
- Establishing sound governance and management procedures
- Establishing good rules of operation
- Developing an appropriate institutional culture – vision, principles, participation and performance management
- Measuring performance and ensuring accountability

These guidelines are a useful starting point for the introduction of farming systems research into a newly formed national research system.

2.2 Rationale and Justification for an Upland FSR/E Strategy for Laos

Present situation

It is evident from the wealth of literature on the Northern Uplands of Laos that there is great biophysical complexity and ethnic diversity in these areas. It is also evident that the areas contain high concentrations of rural poverty due to a range of historical, socioeconomic and infrastructural reasons. (ADB, 2001). The agricultural and forestry research system is relatively new although elements of the system have been in existence for some time. Much of the ground work for this development had been laid down over
ten years ago in the National Agriculture and Forestry Research Master Plan (MAF, 1991).

Until relatively recently, the main concentration of research had been on the development of improved rice germplasm and superior (to local) lowland rice technology. This focus, together with investments in irrigation infrastructure and other inputs, has been a research and development success as the country has achieved rice self-sufficiency in a relatively short time. There are many donor sponsored research and development activities which continue to support this activity in the lowlands. However, despite the fact that there probably remain many unsolved problems in the lowland systems, the attention of the donor community, and the national research system, has switched to the rainfed, upland areas in which many of the inhabitants are unable to fulfil their annual rice needs from their small areas of lowland rice and their areas of upland rice in extensive fallow systems.

Following a considerable amount of work in recent years (see CIAT, 2002; NAFRI, 2002; Overgoor and Kanyasone, 2002; Roder, 2001), there appear to be many alternative technology options that are feasible for the rainfed uplands. However, relatively few have been adopted that have made a significant difference to overall productivity and incomes of the region. Extensive shifting cultivation or short fallow systems persist, but are now constrained and there are signs, in some areas, that farmers are constantly looking for alternative ways of managing natural resources in these environments.

The current national research institutional structure and organisation (NAFRI), either at the Centre or at the District level, is not yet well equipped to deal with complex, risk-prone environments with low output potential and poor, often migrating, human populations. It is the essence of this proposal, that a farming systems research/extension approach can play a significant role in the development, not only of the research system itself, but also in contributing towards the development of more sustainable land use and livelihood systems in the Laos Uplands.

**The need for systems thinking**

A starting point for the institutionalisation of FSR/E is the need for systemic thinking at all levels of the organisation. This includes, as a first step, an ongoing discussion about the meanings of systems, farming systems and agro-ecosystems. This implies an understanding about linkages, boundaries, flows, interactions and meanings of

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3 Systems thinking provides a set of ideas, tools and methods for engaging with and improving complex situations, referred to as messes. It is a holistic approach that emphasises the connections between issues and components in the mess and simplifies the complexity by thinking at a greater level of abstraction or generality. Systems fosters a multiple perspective approach to complexity and assumes that insights and ways of improving situations will be generated by facilitating stakeholders and participants to shift their established way of thinking about the mess. Systems is likely to be most useful in contexts where reductionist, single perspective or command and control processes have failed to provide adequate management of the complexity involved.
sustainability. Most importantly, there is a need to think about the societal context of farming systems and how research and technology interventions might change the nature of peoples’ farming systems. The approach also requires researchers to ensure the participation of resource users in all aspects of the research and extension process.

The need for clear objectives

With any new strategy, there is a need to set out clear objectives that relate to the specific and the wider context. The three main objectives which have guided this strategy are set out below.

- The principal objective of the FSR/E strategy is to develop a coherent and sustainable approach to farming systems research which both complements, and enhances, existing research and extension activities, both within NAFRI and also in other research and extension projects and programmes where similar approaches are being developed.
- A second objective is to bring together many researchers, extensionists and farmers in order to develop more sustainable farming and livelihood systems – primarily for poorer farming families who are the main managers of natural resources in the upland areas of Laos.
- A third objective is to develop to the skills of all researchers involved by encouraging them to develop a holistic and systemic approach to researching farming and landscape level problems through experiential learning and training.

Over time, these objectives may be added to and modified as the programme evolves and new priorities emerge.

2.3 Institutional structure: present organisation and proposed linkages

The institutional structure of NAFRI currently includes a centralised structure with 3 Divisions, 9 Centres and one Project. (see Annex 2). It is also important to bear in mind that there are a number of externally funded projects (eg. The CIAT/ACIAR Forages and Livestock Project and the LAO-IRRI Project) and programmes that work in close collaboration with the NAFRI system (eg. within the Integrated Upland Agriculture Research Programme) and with other agencies.

In parallel to this structure, a new extension institution has been created (NAFES). This has a Central, Provincial and District level structure and also there are several agricultural and rural development projects which come under its organisational structure and direction. Within the NAFES operation, there are several projects and programmes which are engaged in applied technology.

Many of the above mentioned projects are already involved in farmer- participatory approaches to technology development within applied/adaptive cropping, agroforestry or crop/livestock systems research and development activities and need to be associated
with, or incorporated into, any farming systems research/extension structure and organisational umbrella which is developed during the coming years.

The, recently initiated, Lao-Sweden Upland Agriculture and Forestry Research Programme has been set up to strengthen NAFRI, particularly in the area of capacity-building and to assist with the development of a farming systems research approach and in some key research areas. This programme has 7 components, of which Farming Systems Research/Extension is the most relevant to the current strategy development. However, the other components (Forestry, Land Management (including soils), Socioeconomics, Research-Extension linkages, Information and capacity building) are all intimately linked to the development of the FSR/E within NAFRI. The Programme has dual, but inter-related, functions. It is designed to contribute to the development of farming systems research and extension strategic thinking, organisation and training among the research scientists who make up the group within NAFRI and it is also designed to develop, test and demonstrate the validity of the FSR/E approach within a number of villages and landscapes in Phonsay and Nam Mo Districts.

The Farming Systems component of the project is made up of a small core group who are currently based with the Research Management Offices of NAFRI. This group is supported by the Programme Coordinator, two long term advisors, in socioeconomics and farming systems research, and the rest of a wider farming systems team is made up of (usually two) scientists drawn from most of the main Centres which come under the NAFRI Structure. There is also a Farming Systems Research Unit within the Lao-IRRI project. This is mainly concerned with lowland rice-based farming systems research, but its activities perhaps should be incorporated, or at least linked to, a national Farming Systems Research/Extension programme.

The decision to construct the NAFRI-based FSR/E team in this manner was a good one as past experience in many other countries has shown that establishing large, multidisciplinary, free-standing FSRE teams, rarely works well. However, this structure is not without problems, the most difficult of which is that many members of this group are scattered physically in their different institutional bases and they also have other duties to perform within their own disciplines and with their commodities. Bringing the whole team together for any operation is not easy and much of the energies of the core group will be taken up with constant liaison and communication with the Heads and staff members of the collaborating Centres. As the group gain experience and maturity, a number of subgroups (also across Centres and disciplines) may form to address key system themes and problem areas. (see below).

In the development of the national FSR/E strategy it is important that a number of key functions and responsibilities are assigned to the FSR/E core team. It is proposed that these are :-

1. The effective coordination of work which has an FSR/E approach across all current Programmes, Centres and Projects.
2. The development of the FSR/E concept and programme within and outside NAFRI. The creation of an FSR/E understanding and culture is critical to the sustainability of the approach.

3. The development of an intimate working relationship with NAFES at all levels is also critical to the success of the approach. In effect, these relationships already exist and it is hoped that none of the recent institutional developments will jeopardise these.

4. The development of working relationships, both across all components and with relevant Centres and Stations in the Provinces and Districts.

5. The deployment of appropriate human resources which are needed for effective operations, both at Central level and at regionally based research centres.

6. Ensuring that a minimum number social and natural scientists from many centres receive appropriate training in farmer-participatory research, interdisciplinary research methods and systemic thinking.

7. Information resource flows (relevant books, papers and videos) made accessible to all staff within and outside the FSR/E team and for this information to be utilised in field action research.

2.4. Proposed Structure to implement FSR/E

The structure of FSR/E would contain 8 main stakeholders and groups:-

1. **Research –Extension Advisory Committee**. A multidisciplinary scientific group containing senior natural and social scientists NAFRI, NAFES and MAF with relevant systems experience. (proposed: 6 people)

2. **Core FSR/E team** (full time) of 3 based at NAFRI HQ (one to be a social scientist)

3. **FSR/E Team** (part time) A minimum of 2 staff with FSR/E responsibility in key components of the programme (Forestry, Land Management, Socioeconomics,) and Centres (SSLC, HVRC, LRC, LARReC, AFMAR). (16 people)

4. **Regional FSR/E Group** Regional Research Station or Centre-based research staff (NARC, AFRC, TRC) (6 people) who spend at least 50% of their time in the field on on-farm research. Also, at least one designated farming systems generalist based at the Provincial level office. (PAFO)

5. **District Field Office (Research) and District Agriculture and Forestry Office(Extension) Group**. Designated research and extension staff at district level to work with farmer-researcher groups and FSR/E teams. (6 people)

6. Village based **Farmer-research groups**. These are groups of farmers, formed to research technical options and address common themes or particular systems focus eg. Sloping lands, lowland resource management, crop/livestock interactions, farming systems intensification.

7. **Farmer-Researcher collaborators**. Individual farmers who participate in replicated, or exploratory, field trials. (May be some of the same people in 6, above). This is not really a group but they are important actors.
8. **Village Community group** who evaluate research and development activities and their relevance in the wider socio and economic context.

*Notes:*
1. Groups 2+3 make up the Main FSR/E Team. Groups 5, 6, 7, and 8 make up the District level group who work, partly together, but also with the Main FSR/E Team or sub-groups from it.
2. The above represent the minimum initial number of people needed to establish a National Farming Systems Research/Extension Programme. On this estimate it is a total of about 30 people who need training in farming systems principles and methodology. These figures are approximate and only apply to the situation within the existing LSUAFRP.
3. Other existing Programmes and projects have registered their interest in working with the FSR Groups and in participating in training courses. This means that for the purpose of planning training needs, it will be necessary to raise the above figures, perhaps double them over the next two – three years.

This list above may seem like the creation of rather many levels and groups, but experience shows that all these stakeholders in the research and extension system need to be recognised. A useful exercise would be to carry out an actor linkage matrix (Biggs and Matsaert, 1998) which was begun by the consultant during his August visit but not completed. This would enable the core team to understand where the strengths and weaknesses were between these key stakeholders and where more effort was needed to develop better relationships.

A representation of this structure is given in Figure 1.
Figure 1. Proposed structure of relationships between NAFRI/NAFES for effective FSRE operations.

Ministry of Agriculture Council for Science and Technology

Research/Extension Advisory Committee

National Agricultural and Forestry Research Institute. (FSR/E team base)

National Agriculture and Forestry Extension System

Regional Agric. and Forestry Research Centre

Provincial Agriculture and Forestry Office

District Field Office (researchers)

District Agriculture and Forestry Office (extension)

Villages: Farmers, Farmer groups, women’s groups, poor farmers, farmer innovators

Strong linkages

Linkages need strengthening
The Research/Extension Advisory Committee (REAC) is the major innovation in this list. This is also a suggestion which emerges from some valuable experience elsewhere. A major problem with the existing structure with regard to FSR/E is that research themes and budgets are controlled largely by Heads of Centres or Components. Senior staff sometimes change, postpone or reject research proposals without necessarily having understood the demand from the field situation. If the programme is to have any credibility as one that addresses farmer needs and farmer-derived research proposals, then the review process has to be carried out by a neutral body that is made up of a cross section of the main interest groups in Research and Extension Institutions. The panel should be a relatively small number (about 6 people) and have very clear terms of reference. They should be there to support and guide farming systems/research activities, review and suggest modifications. A major meeting and task for this group would be to manage an annual review and re-planning meeting at which the results from one season are presented and critiqued and the plans for the following season are approved or modified.

This committee will be responsible to the Ministry of Agriculture Council of Science and Technology and will have links with the Agricultural Research Council. The composition of REAC could change over time with individuals serving for a limited period (say 3 years maximum). The chair of the group could also rotate to avoid any disciplinary bias. The panel members should visit the field every year.

The other groups are self evident and may need some adjustment over time. The current list is based on the fact that known individuals exist at Provincial and District level who can be valuable to the FSR/E team in the critical building stage of the Programme. It is also important to recognise that the Research Stations4 have human and other resources and facilities that can be usefully utilised. There should be a pooling of research station expertise to produce regional (eg. Northern Uplands) teams who can support Provincial and District level research and extension initiatives.

The Farmer–Researcher teams (FRTs) are also an important innovation as one of the main objectives of this kind of research is to develop a research capacity within every village. No externally supported research programme should remain for ever within a village so the sooner a capacity to continue research after the programme leaves is developed, the better. (This is not to imply that continuing support could not continue in a variety of ways). There is much experience from elsewhere that this kind of “informal institution” can play a very important role in research, development and dissemination activities. It is important that this team does not only contain the wealthier farmers (as seems to be happening now with some of the on-farm trials) but has a group of farmers, young and older and some poorer members, who are interested and motivated to do something to improve village livelihoods. The focus on an “area–based“ approach may help in cutting across wealth categories.

4 Thong Khang Agroforestry Station, The Northern Agricultural Research Station, The Teak Research Station.
2.5 Linkages

There are a number of ways in which the FSR/E Team will need to link their activities to other individuals and agencies.

1. It will be necessary for the FSR/E core team to attempt to integrate all FSR/E activities with all other agencies engaged in farmer-oriented, on-farm research: district, provincial and national levels. New FSR teams or units can emerge from existing Research Centres. There needs to be some coordination with such groups and it might be very beneficial to hold at least one annual review meeting with all livestock, crop and farming systems researchers to exchange experience on applied research methods with farmers.

2. The FSR/E Team will be mainly involved with on-farm research with extension agents at district level, some Province level staff and farmers at village level. It is clear that these links are good at District level, but at Provincial and National level there is some way to go before the linkages can be seen to be really effective.

3. When working in villages, it is inevitable that the field team will interact with other research and development programmes. (eg. Water, health, energy, market development.) Some coordination of these activities and a search for complimentarity would be useful.

4. It has been implied throughout that research and extension activities are inseparable so it is perhaps inevitable that as part of the research and learning process researcher will become involved in farmers to farmer extension, study and exchange tours, farmer innovator workshops and seeds and technology bazaars. All these exchanges lead to new idea about research and research methods.

Throughout this discussion there has been an emphasis on the working relationship between research and extension and an assumption that readers are aware of the overlap between research and extension activities in the applied, action research area. This relationship may be expressed in the following manner.

Figure 2. Working relationship between research and extension activities.
The two ovals represent the total areas of responsibility of research and extension. The area of overlap is in FSR/E where research and extension staff take joint responsibility (together with farmers) for all applied activity. Working relationships at all levels from the Centre to the District need to acknowledge this relationship.

In fact, the diagram could be taken further by including farmers in the relationship which takes place at village or community level.

**Figure 3. Different spheres of responsibility and interest of researchers, Extension and Farmers**

Research

Farmers

Extension

Applied systems research and development

Farmer-researchers and farmer groups activities
3. Concepts and Framework for FSR/E

In order to reinforce the understanding of the basic concepts, FSR/E teams might agree to incorporate the following into their working relationships:

- Try to foster systemic thinking
- Develop an interdisciplinary approach but respect for different disciplinary contributions
- Build on previous and parallel experiences
- The open participation of all stakeholders
- A focus on system linkages and synergy
- A conscious decision to work with some technologies that are appropriate to the needs of poorer farmers.
- Learning and critical reflection.
- Linkages to basic and strategic science research
- The use of a range of boundaries for the analysis of, and operation within, systems; from households to communities, hillsides and catchments areas.

As additional elements occur to the teams they should be incorporated by mutual agreement. It is suggested that this list is kept in a prominent place so that all team members can be reminded of their commitment as appropriate times.

4. Operational modes for the FSR/E Team

The Core Farming Systems Team, plus representatives from Crops, Livestock, Forestry, Soils, Aquaculture, Horticulture, Machinery and Socioeconomics make up the main NAFRI, FSRE team. As the programme develops it will become evident that working with the whole team can only take place on particular occasions and that a pragmatic approach to research development is to form smaller, operational sub-teams or working groups, on the basis of need or focus. For example; water management, sloping land management, crop/livestock systems, whole farm monitoring studies.

The team needs to work regularly in the field as an interdisciplinary team together with District extension staff and other researchers wherever possible. It is suggested that a number of the main team should be resident in District Centres, or a Programme built house, for significant periods in the year. (eg. the growing season for annual crop scientists). The manner and procedures for working need to be agreed though regular dialogue, review and re-planning. These need revisiting periodically as circumstances change.
5. Field Operations: tasks, trials and review activities

The current way in which field operations are conducted needs developing in a more systematic manner in order to coordinate related activities and to encourage interaction between members of different Centres and components of LSUAFRP.

It is proposed that the following steps are a minimum set to guide field operations:

1. Regular field interactions of farmers, researchers and extension staff in order to design, implement, monitor and review activities
2. Participatory diagnosis and design procedures is repeated at the start of any new village activity.
3. The design of experiments to fit the needs and circumstances of small or poorer farmers or of women. This means that there needs to be a recognition of multiple cropping and multiple crop-use strategies, ownership of small stock and few in number, scarce labour availability, low external inputs, limited market access and low cost tools.
4. Regular reviewing of previous experience and updating secondary knowledge and local knowledge and on changes in farming systems is carried out.
5. Field experimental work is visited regularly
6. Researchers and extensionists should experiment with techniques of research and extension that are widely used elsewhere. These include: systems studies, family case studies, topic questionnaire studies, observations during regular field walks, farmer innovation plots, farmer – field schools and group activities that encourage learning for sustainable natural resource management.
7. Mid- and End of Season Workshops for critical reviews and re-planning exercises.

All this will require a longer period of in-field time during the agricultural season to be spent by more researchers. The building of District offices should help this process, but there does need to be a commitment to longer periods of field experience by all participating staff.

6. A monitoring, review and re-planning system for farming systems research/extension

It should be obvious that this form of research is not like conventional, natural science experimental research. Because of this, and particularly because of the range of activities that are necessary for this kind of research to be successful, there needs to be a system of monitoring and evaluation introduced that is participatory, transparent and constructive.

5 This does not imply that the team should only work with poor people, but they should make a conscious effort not to work predominantly with richer farmers as seems to be the case at present.
Conventional systems of monitoring that record main activities and financial expenditure are already in place. What is now needed is to add a range of techniques that will detect change among farming systems and farming livelihoods as the process of research develops.

This form of monitoring requires the following minimum elements:-

1. Groups of researchers, extensionists and farmers meet at village and district level on a regular basis in the field to review activities and assess their effectiveness. At such meetings there is a need to use some forms of common language. This is often best done by using a range of participatory learning and action methods – maps, charts, diagrams, matrix ranking and scoring, problem and solution analysis and analyses through SWOT (strengths, weaknesses, opportunities and threats) and FFA (Force Field Analysis). These methods need to be recorded and published in reports alongside other forms of record keeping and results from the field trials. (see Guijt. 1998)

2. These materials are also presented to the wider community at the end of the season in order to obtain feedback for future planning.

3. In addition, farmers and the wider community, should be asked to contribute indicators which reflect their perception and judgement as to what constitutes positive (or negative) change in their farming system. These criteria are then used alongside other (often more quantitative) criteria, that are used for assessing change.

4. All the active researchers and their extension colleagues then need to reflect critically on the season’s work in order to develop more relevant proposals for next season. The whole group should be required to attend a meeting in order to develop interdisciplinary themes.

5. The results of the field and district level interactions are then brought to a central annual research and extension review meeting which is set up to provide critical feedback and to generate proposals for activities during next season. The Programme Advisory Panel will play a major moderating role at this meeting and will strive to eliminate repetition and overlap between and within programmes, coordinate efforts of different donor programme activities and look for synergy.

6. The revised plans for next season are presented back to provincial and district staff and farming communities. These plans are approved and modified (if necessary) and a full work plan is developed.

7. Over this process, the Core FSR/E Team need to note and record lessons from all research activities and the implications for future research.

These steps represent a departure from existing practice and will require a great deal of effort and commitment by all the stakeholders if an efficient system is to evolve. Overall, the objective of all this activity is to develop a greater integration and complementarity of current disciplinary and commodity oriented research in future operations.
7. The planning process for FSR/E within L-SUAFRProgramme

In addition to the development of a general NAFRI FSR/E strategy, the L-SUAFRP needs to develop some specific, additional activities which will support the proposed changes and evolution from the existing situation.

1. The development of annual and 5 year work plans. In these plans it is vital that budget allocations are made for interdisciplinary activities which take place across Centres and disciplinary areas.
2. The programme needs to ensure that there is a balance between Programme Components based on needs as determined by District and village level participants, not driven by sectoral research interests.
3. The Logical Framework in the Programme Document needs revision on regular basis (every 6 months) in order to reflect the changing reality of the real world. Many of the existing indicators and means of verification are acceptable and necessary, but there is a particular need to develop more farmer-driven, qualitative, as well as quantitative indicators of change. These can only be developed through intensive dialogue with farmer–participants.
4. The development of a Participatory Monitoring and Evaluation system (see 5 above) will take time but if it can be shown to have value within the Programme, then it will make the acceptance of such an approach more possible within the whole NAFRI system. It is important to note that many projects and programme already have introduced participatory M&E systems and are involved in training courses in these techniques and methods.

In this document, the need to develop a generic FSR/E Strategy have been the primary objective. At the same time, the existing LSUAFRP has provided a model on which future national strategy can be based. The LSUAFRP itself is subject to review and will change in structure during its life. At present (Dec. 2002) there is a recognition that the current structure needs revising and the component divisions need adjustment. It may be the farming systems perspective should give an overall framework to the programme and that the current “components” should not have an entirely independent existence. This will be reviewed during a mid-term review in early 2003.
8. **Criteria for the assessment of the Farming Systems Research/Extension Programme.**

In the development of a new initiative such as this, it is necessary to examine the progress of the programme by using a series of appropriate criteria. Below are a selection of questions which have been found to be valuable tools for internal (and sometimes to guide external) assessments of FSR/E Programmes. They are presented here as an aide to the internal process of development. It may be useful to use these questions on a regular basis and at least once per year during an annual review process. The use of such questions may be valuable in the preparation for the Mid-Term Review which is planned for early 2003.

1. Does the research respond to national and regional research objectives and needs?
2. Is the research directed towards the needs of poorer client farmers and rural people?
3. Are indigenous knowledge and skills used in the research planning and design process?
4. Has a systems approach been used in the research process, including the use of interdisciplinary analysis?
5. Are both formal and informal research methods used?
6. Are farmers involved and partners in the design, planning, implementation, monitoring and evaluation of experiments and other research activities?
7. Are there close links between basic and applied research and between on-station and on-farm research?
8. Is the research activity well integrated with agricultural extension and other rural development activities?
9. Is the research linked to national, regional and international programmes?
10. Is the research subject to rigorous monitoring and evaluation procedures?
11. Do current institutional structures, organisational procedures and reward systems enable and encourage research scientists to engage in many, if not all, the above activities?

If the answer is “yes” to the majority of these questions, the Programme may be judged to be a success. It may also be useful to display this series of questions in a prominent place in the Farming Systems Research Offices: at NAFRI headquarters, Regional and District Offices.
9. Training and Learning needs and opportunities for FSR/E Teams and other programme participants.

The development of a new Farming Systems Research/Extension Programme at NAFRI requires a major effort in training and support for capacity building. The LSUAFRP has a component which is concerned with overall capacity building which will be finalised in October 2002 so there will be no attempt to pre-empt this here. However, there are a range of suitable activities and courses in which training and learning can take place that are normal components of a FSR/E team training programme. A number are listed below.

- Farmer study tours in country or to neighbouring countries with similar landscapes and systems, accompanied by some researchers. Other upland districts with a longer history of research and development activity would be suitable.
- Researcher/extensionist study tours to neighbouring or regional countries. (Thailand, Vietnam, Nepal, India, Bhutan, Philippines)
- Regular short–courses in farming systems research methods (two weeks in country)
- Participatory methods courses, including: facilitation and communication skills, technology development and monitoring and evaluation. (one or two weeks in country)
- Field techniques for on-farm experiments: design, implementation, recording, analysis and presentation. (two weeks)
- Intensive English Language courses (4-6 weeks) (Singapore ?, Australia, UK)
- Research proposal writing course (1 week)
- Monthly travelling meetings/seminars between NAFRI Centres combined with occasional seminars at other research centres or events (day)
- Literature study and discussion days (one per month)
- Intensive systems courses in other countries (Thailand – Chiang Mai and Khon Kaen, Philippines – IIRR, ) (up to 4 weeks).
- Technical training and upgrading to Diploma
- Diploma training and upgrading to BSc
- BSc training in Thailand, Philippines or Australia
- MSc training in the Region.(Thailand, Vietnam, Philippines, Australia) Field work in Laos with groups of students working together.
- PhD. Split programme with 50% time in Laos and focus on systems problem relevant to FRS/E programme. (Thailand, Australia, Europe)

There will be many other researchers and extension staff who are currently working in other projects and programmes, who would also benefit from these courses. It is essential that there is good liaison between the main research and development programmes so that
there can be some joint training activities. There is already a wide range of trainer expertise in the country which could be utilised for many of these courses.

A key decision in relation to upgrading skills and general training needs (to be investigated in depth over the coming months) is how to decide on priorities in a situation in which many donors are offering higher degree programmes. The fact is that at the present time, English, and the ability to pass the English Language test requirements, are a major obstacle so need to be given high priority. Secondly, there are relatively few people who are able to take advantage of Masters and PhD programmes so greater emphasis should be placed on upgrading technical people to Diploma and BSc in the first instance. A priority might be to send 10 promising people to Australia or the Philippines for BSc programmes. At least half these students should be women. There is a chronic shortage of women in the research system so special attention needs to be given to the training and support for the development of women professional in both disciplinary sciences and interdisciplinary studies.

The different classes of training option are listed in the latest version of the Human Resource Development document (Van Gansbergen, 2002). Despite all the opportunity for formal training in the region and elsewhere, there can be no substitute for good field experience in systems research. All staff who have just begun to develop some experience in this work need at least two seasons experience before they go abroad for further training. They will make much more use of the formal training after they have grasped the basic principles from an intensive period of field experience.

Conclusion

It may be concluded from this basic setting out of a possible FSR/E strategy, that NAFRI faces a very considerable task ahead if all this is to be achieved. The most difficult problem to overcome is that the National Research System has relatively few well qualified and experienced staff. Many already have several responsibilities and cannot devote the bulk of their time and energy to FSR/E activities. Most of those who are in the system urgently need a great deal training in the development of their basic research skills (including on-farm research skills) and particularly in an understanding of the concepts and approach that is incorporated within a farming systems research programme. They need very intensive training in the development of language skills, not only to help them write reports and communicate generally, but, most importantly, to enable them to read all the relevant literature that is available on this subject. It is suggested that good linkages with experienced professionals in neighbouring country institutions and with the wider international community will be essential in the next five years for the objectives to be realised.

A key areas to be worked upon are the organisational and working relationships between NAFRI and NAFES at all levels. This is in hand and progress so far has been excellent.
Comments and additions to this report (and the Lao translation) are welcome
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Annex 1. Who Are the Rural Poor in Lao PDR?

- Among the 4.2 million rural people of Lao PDR (1997), representing 80% of the total country population of 5 million, about 40% or 2 million rural people are estimated to live in poverty. These poor rural people, comprising about 300,000 households scattered in more than 6,300 villages are generally small farmers depending on precarious livelihoods and living in remote and very diversified biophysical environments, who underwent several forms of disruptions. The majority of these 2 million rural poor people belong to the various ethnic minorities with the following estimated breakdown by ethno-linguistic grouping: 56% of poor Mon-Khmer, 15% of poor Hmong-Mien, 13% of poor Tai-Thay, 9% of poor Tibeto-Burmese and 7% of poor Lao.

- Most of these rural poor villagers are living in upland forested areas and practice slash-and-burn shifting cultivation to produce rice and other crops for family and animal consumption. They also raise animals. Some lowland poor have moved from upland areas where they were actually better-off. To compensate from rice shortages they usually generate income (often through barter trade agreements) by: (i) collecting and selling various NTFPs and wildlife from the forest, (ii) selling small livestock products when they can afford owning some, (iii) hiring out labour to richer farmers of same or different villages, (iv) producing and selling opium (only in some northern and central provinces), (v) selling some vegetables and also (vi) some handicraft products.

- Agro-ecosystems of the poor are low-input rice-based agricultural systems stressed by external factors beyond the control of villagers. Family labour is the major input. Not having sufficient rice to eat and not owning livestock as safety nets are perceived as main poverty indicators by rural communities. The lack of integration into the market economy is not considered as a sign of poverty by the rural poor. Poverty in Lao PDR does not mean hunger due to various coping mechanisms in a country with a low population density and relatively abundant in natural resources. The spiritual interpretation of poverty and other disruptive life events is important for the poor and is generally corrected through ethnic-specific ritual means.

- Poor rural villages are often relatively small (between 50 and 200 inhabitants), scattered and difficult to access by car. They often live in cultural and geographical isolation. Within villages, voices and opinions of the poorest are less important than the better-off. The poorest are never found in village committees. The poorest have less contact with the local administration than the better-off. The poorest families are generally not in a position to actively contribute to development initiatives because of a lack of assets and limited availability of family labour. But poor rural people generally have a good traditional knowledge.
of their bio-physical environment. Poor rural women and children often belong to the 10% of severely malnourished people in the country. Poorest rural women are generally overloaded by various household and farming activities and constrained by a lack of birth spacing.

- Most rural poor do not have access to safe drinking water, suffer from diarrhoea, malaria and respiratory infections. Lack of access to appropriate medical services is prevalent in most rural poor villages. Infant mortality rate is high. Illnesses are often treated using traditional medicines. Infant mortality rate is high. Education and literacy levels in the Lao national language are very low because of the lack of appropriate education system for ethnic minorities speaking various different languages. As demonstrated in the NSC/ADB Participatory Poverty Assessment, in many cases, rural poverty in Lao PDR is a recent phenomenon and is not endemic. Several poor people said they became poorer due to land access restrictions or resettlement as a result of the government land allocation programme. Some of them also suffered from pest incidence, natural disasters and war-related stress. Most poor rural people are upland shifting cultivators forced to reduce the fallow period of their cropping system. With the relocation of several ethnic minority villages, substantial numbers of rural poor are also located in the lowlands or near main roads where they are encouraged to produce wetland rice and permanent upland agriculture.

Source: National Human Development Report for Lao PDR (Draft, November 2001)
Annex 2 NAFRI Structure

KEY.
- ARC: Agricultural Research Centre
- SSLCC: Soil Survey and Land Classification Centre
- HVRC: Horticulture and Vegetable Research Centre
- CRC: Coffee Research Centre
- NAFRC: Northern Agriculture and Forestry Research Centre
- MAF: Ministry of Agriculture and Forestry
- NAFRI: National Agriculture and Forestry Research Institute
- LRC: Livestock Research Centre
- LARReC: Living Aquatic Resources Centre
- FRC: Forestry Research Centre
- FIPC: Forest Inventory and Planning Centre
- AFMARP: Agriculture and Forest Machinery Applied Research Project