



**Case Study: Institution-Based Information Systems
Lao Agriculture Database**

1. BACKGROUND

Reason for development of a strategy

The National Agriculture and Forestry Research Institute (NAFRI) was established in 1999 as one part of the overall restructuring of the Ministry of Agriculture and Forestry (MAF), Lao PDR. NAFRI is recognized as the key organization in the emerging national research and technology system in Laos. NAFRI aims to contribute to the goals of the Government of Laos by focusing on adaptive research to overcome specific problems limiting production and causing degradation of natural resources. NAFRI consists of seven discipline specific research centers and one regional research center (Figure 1).

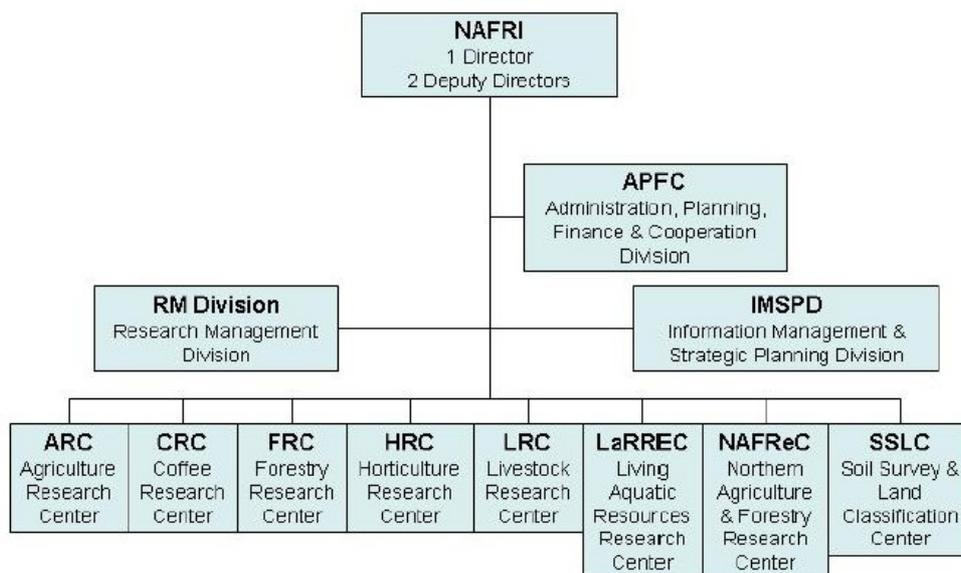


Figure 1. NAFRI organizational chart

Information and communication systems are seen as a key service to improve research. This is both to help ensure that researchers can access the global knowledge system as well as that their research can be more widely disseminated. In recognition of this, NAFRI, with support from the Lao-Swedish Upland Agriculture Research Program has been strengthening its overall information services since 2003.

In 2003, the NAFRI Information Management Division developed an information service strategy for 2004-2010. The 2004-2010 Information Services Strategy targets improvement of information exchange between NAFRI centers and other key stakeholders in the agriculture and forestry sector, and at the same time improving the ability of researchers to access the global knowledge base. The

strategy focuses on three aspects. The first focused on improving information management systems both for retrieving relevant research and reports as well as supporting NAFRI to improve its research information management systems. The second area focused on ICT infrastructure and services including the connections within NAFRI HQ and between centers, and basic services such as website, email, back up facilities and virus protection. The third area focused on "outreach" which included production and dissemination of research as well as improving networking and coordination among a wide group of stakeholders within the conceptual Lao Agriculture Knowledge Information System (LAO AKIS).

In 2004, NAFRI established a partnership with FAO and the Thai National AGRIS Centre (Kasetsart University, Bangkok), to improve the management of information for researchers. This included exploring how to adapt the AGRIS system to the Lao context as well as translating AGROVOC and improving library management.

The Lao AGRIS system was chosen for two reasons. First, some key NAFRI information staff had been exposed to the AGRIS system and had close linkages to the head of the Thai AGRIS center at the KU Central library. The team was interested to engage and work with KU again as they had been instrumental in supporting the development of the Department of Forestry Library system back in the 1990s. Second, after looking at a number of regional and international systems, the team felt that it wanted to be part of a wider network which the AGRIS network offered. At that time, issues of the WebAGRIS software and its weaknesses were understood but the benefits of joining a network seemed to outweigh the limitations of the current data system.

From the basis of their study on a typical national AGRIS system, the NAFRI team felt it necessary to expand the service to what is now known as the Lao Agriculture Database (LAD), which covers a broader set of agriculture and forestry related information, while "Lao AGRIS" refers exclusively to traditional agricultural research reports. This was done as there is a wealth of agriculture and forestry related information which is not shared and/or could be considered as "grey literature." NAFRI felt that it was important to actually capture this type of information, along with research reports. Second, a functioning agriculture and forestry research system is just emerging in Laos and it was felt that there was not enough information to focus solely on this and it would be important to use this system in collaboration with extension staff.

Organizers

The Information Service Unit (ISU) of the NAFRI Information Management and Strategic Planning Division is the main party responsible for the development and implementation of this strategy to develop LAD and Lao AGROVOC.

Summary of Funding and Technical Support Sources

LAD has two main sources of funding, with the government of LAO PDR providing for operating costs, staffs salary and others provisions in-kind such as building space, and the Swedish International Development Agency (Sida) providing funds to initiate and develop LAD.

Also important is technical support for the development of Lao AGRIS and Lao AGROVOC from the Thai National AGRIS Centre (Kasetsart University, Bangkok). In addition, the FAO Regional Office for Asia and the Pacific has provided training support through the years to NAFRI information staff.

2. STAKEHOLDERS

As the project originated from the need to address NAFRI's mandate, the main stakeholder in the strategy development has been NAFRI, particularly the Information Management and Strategic Planning Division (IMSPD) (see Figure 1). Once the strategy was elucidated, the stakeholders involved in LAD development expanded to include:

- NAFRI IMSPD as the lead in implementing and developing the system
- NAFRI research center (RC) staff involved in collecting and indexing information, and
- National Agricultural and Forestry Extension Service's (NAFES) National Information Center for Extension (NICE) actively contributes content to the system.

Figure 2 shows the internal relationships within MAF at the central level which need to be fostered. The establishment of AIM is to foster improvement of collaboration between NAFRI and NAFES and to improve information dissemination to the district and provincial levels. From the MAF IT side it is hoped that they will accept LAD as the national standard to help promote and make an official system which different line agencies could use.

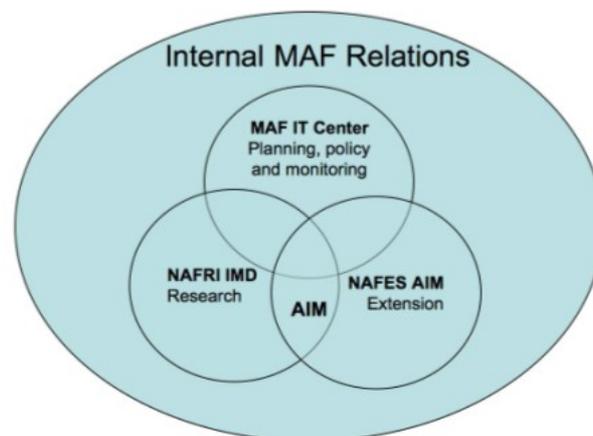


Figure 2: Agriculture Information Management initiative

(Source: Project to establish the inter-agency NAFRI-NAFES working group on Agriculture Information Management (AIM), January 2007-April 2008.)

As LAD has evolved the potential uses and benefits more evident, additional stakeholders have shown interest in or already become involved in supporting the system, including:

- MAF Information Technology Center
- Centers, projects and international research centers working with NAFRI (e.g. IRRI, IWMI, CIFOR, CIRAD, CIAT, etc)
- NAFES provincial and district level extension staff
- students and professors of the National University of Laos
- NGOS
- Donor and international agencies such as Sida, FAO and Kasetsart University.
- Science and Technology Education Agency (STEA) which supports internal and external connectivity

The LAD management structure has taken a couple of years to evolve. The main challenge has been the lack of staff to actually manage and oversee the development process.

| <i>Responsibility</i> | <i>Who</i> | <i>Comments</i> |
|---|---|--|
| Overall management | Head of Information Unit and NAFRI Librarian | No clear head of system |
| Day to day management (collection, overseeing all aspects of system, promotion, etc). | 2004 – 2005: NAFRI Librarian with support from Editors 2006 – now: 1 part-time manager and 2 support staff | Librarian had difficulties because of added responsibilities Part-time manager went on study abroad |
| Indexing | 7 indexers trained from different divisions and centers of NAFRI | All 7 indexers trained have gone to study abroad or been transferred |
| Editing | ISC Unit head and information service adviser | Often unable to edit on time due to other responsibilities |
| Inputting | NAFRI library staff and LAD support staff | |
| IT support | NAFRI IT Team | |

Table 1. The “LAD team” responsible for LAD development

As shown in Table 1, there has been a range of issues that the LAD team has faced. First is that there have been a number changes in staff over the last three years during LAD development, and only since late 2006 where new staff (young graduates on contract) put to work on LAD full-time.

From its beginning the LAD system has faced a problem similar to that of other AGRIS centers whereby the responsibilities are merged with the existing library activities without an increase in resources. At NAFRI, while the head librarian has been instrumental in getting LAD approved by management and developed, it has also placed heavy burdens on her workload and forced her to juggle both responsibilities.

From this the LAD team considers it necessary to have one to three experienced staff put in charge of such a system and provided with incentives to really build up and promote the system.

As of now there is still not a clear management structure for the LAD system. This is due in part to the lack of staff as well as the need to formalize LAD’s existence and stakeholders both within NAFRI as well as within the greater organization of MAF.

3. PROCESSES

Development of the Lao AGRIS strategy

The strategy to develop Lao AGRIS was based on the initial information needs assessment carried out when developing the NAFRI information service strategy.

It was recognized that there is a wealth of information produced in Lao but it is not easily found and there is no system for collecting and widely disseminating this information. As such other stakeholders (MAF, NAFES, STEA, NUOL, etc.) were not involved in the initial development but it was felt that their participation would be included once the system was established.

From this, the NAFRI team also looked at some other regional systems such as MekongInfo and the RECOFTC information system. However, it was decided to use Lao AGRIS system (see section above).

The plan for establishing AGRIS at NAFRI was based on discussions with the Thai AGRIS Center and NAFRI staff and has included four phases, though these phases were not really planned as such, rather it has been an iterative process. In the initial discussions, it was decided to develop Lao ARIS and Lao AGROVOC at the same time. The main reason for this was that there was no standardized translation of agriculture and forestry terms in Lao Language and it was felt that this would be beneficial in the long-run. In addition, with Sida support it was felt to be ambitious as it was not sure how long funding for such research support activities would last.

The development of both Lao AGRIS and Lao AGROVOC can be broken into four phases.

Phase 1 (May 2004 - August 2004): gearing up and planning. This included a trip by the head of Thai AGRIS Centre to Laos, a field trip to Thailand, the development of an MOU between NAFRI and the KU central library, and then a short proposal or concept note which detailed out the overall process for developing the system.

Phase 2 (September 2004 - December 2005): Implementation of the plan and establishing the overall system the database systems, processes for collecting and inputting and capacity building of staff.

Phase 3 (January 2006 - November 2006): Finalization of initial development of the Lao Agriculture Database and Lao AGROVOC.

Phase 4 (January 2007 - present): Expansion and institutionalization of the systems within NAFRI.

Table 2 below shows the key aspects of what was involved in each step for both Lao AGRIS and Lao AGROVOC. An analysis of both is in the next section.

| Phase | What was involved in each phase | Outputs |
|--------------|---|--|
| Phase 1 | <ul style="list-style-type: none"> Discussions between NAFRI and Thai AGRIS Center in Bangkok | <ul style="list-style-type: none"> MOU Established between NAFRI and Thai AGRIS Concept/proposal developed Linkages and relationship between key actors improved |
| Phase 2 | Adapting and developing Lao Agriculture system Installing the Lao AGRIS System Capacity building of staff to use Identifying materials and reports for inclusion in the first batch of records | <ul style="list-style-type: none"> Adapted AGRIS system ready for use Worksheets and process for inputting developed 10 trained for indexing and cataloguing Around 200 materials identified for first input |
| Phase 3 | <ul style="list-style-type: none"> System updated and revised based | <ul style="list-style-type: none"> Adapted system installed with an |

| | | |
|---------|--|---|
| | <ul style="list-style-type: none"> on identified problems with Lao Font • Further capacity building of staff to index and catalogue • Further inputting of around 300 materials. • Installing Lao AGROVOC to work with AGRIS inputting of Lao AGROVOC terms for each of the AGRIS records • Developing the on-line system and interface • Meeting to open up LAD and AGROVOC to key stakeholders within NAFRI. | <ul style="list-style-type: none"> Lao author, organization and key word database • New staff trained in indexing and cataloguing • More than 1000 records inputted into system along with 300 full text. • Workshop held to open LAD to the wider community • LAD and Lao AGROVOC placed on NAFRI website |
| Phase 4 | <ul style="list-style-type: none"> • Three staff identified to work on LAD full time (1 full time staff and 2 part time staff) • Developing new LAD system to deal with previous problems • Discussions with other stakeholders to collaborate • Further cataloguing of materials • Scanning in of old documents | <ul style="list-style-type: none"> • A LAD section established within the Information Service Unit • Other activities still in development/process |

Table 2. Establishing Lao AGRIS/LAD

As of June 2007, a functioning LAD/Lao AGRIS center has been established within NAFRI and the Lao AGROVOC has been translated. However, there has been no formal approval of NAFRI's status as an AGRIS center nor has LAO AGROVOC been approved by the Ministry of Agriculture and Forestry to disseminate widely.

While the process took longer than the original plan, this is not surprising as the initial plan was quite ambitious (to finish Lao AGROVOC and establish a functioning AGRIS center in one year). In actuality, the process for finalizing Lao AGROVOC took about two years and establishing an AGRIS center has taken longer than expected as well. Below is a summary of the some of the key issues and lessons learned in relation to the development of LAD.

Weakness of the data system and complicated nature of AGRIS

During the beginning of the AGRIS installation it was realized that there were a number of compatibility problems with the AGRIS/CDS/ISIS data system and Lao fonts. A temporary solution has been developed by Kasetsart University in which Lao key words are put into a separate database and to search a numbering system is used. This is also the case for authors and organization. While this solution has worked it is quite complicated for data entry and not very user-friendly, especially for new or inexperienced internet users.

The other issue that has arisen in the use of the system is that the interface and disseminating it widely to those who do not have internet. In terms of the interface, many people find it very complicated to search as most are now only accustomed to "Googling". In Laos there is relatively little internet connectivity outside of the capital city. Thus, there has been discussion to provide provinces and districts with CDs to use but this has proved difficult with the old system.

With this in mind NAFRI has been exploring the possibility to improve/update the system using open source technology. The idea is to update three main areas: 1) the ability to search and input directly with Lao font; 2) develop off-line inputting

for those organizations interested in inputting their information, and; 3) develop capability to put data system on CD/DVD to send out to provinces and districts.

Human resources within NAFRI to implement LAD/Lao AGRIS

As mentioned previously, one of the main challenges has been to find the necessary human resources within NAFRI to manage the Lao AGRIS system. Thai AGRIS staff repeatedly emphasized the need to assign staff to manage AGRIS but there was not enough staff to do this. From 2004 (when the project began) until 2006, overall management has been split between the head librarian and the information service unit head (summarized in Table 3). While both tried their best, they had other responsibilities to attend to as well and could not devote their full time to LAD/Lao AGRIS. It was not until early 2007 that a full-time staff member¹ was appointed to work on LAD (this was only half-time as well) and two young contract staff were assigned to work as assistants. Thus, at present there is not clear management structure for LAD in place. This has been one of the main challenges to further expansion.

In addition, the main strategy for collecting, indexing and cataloguing materials was to use young research staff within the NARI centers. On the one hand this worked well as they were motivated and interested to work together. On the other number of staff from different centers have been trained in indexing and there has been a high attrition rate as many of these young staff were transferred to different departments or went on to further studies.

| Year | Manager | Cataloguers/indexers |
|------|---|---|
| 2004 | No manager – shared between librarian and head of ISU | 10 researchers from different centers trained |
| 2005 | No manager – shared between librarian and head of ISU but | 5 more researchers trained as many left or did not have time. In total 7 indexers |
| 2006 | Two indexers take the lead in editing and inputting Lao key terms | All 7 indexers either have left or do not have time to further participate |
| 2007 | Two young contract staff overseeing LAD with support from Librarian | No cataloguers or indexers at this point, and new strategy has to be found. |

Table 3. Institutionalizing or formalizing the role of AGRIS within NAFRI

The NAFRI team took a conscious decision to work first on AGRIS and AGROVOC rather than waiting for formal approval/recognition from FAO. Their idea was that they would like to build up the system informally first before trying to seek approval from MAF as this would take some time. This type of strategy was used both for Lao AGROVOC and LAD development and has had both positive and negative consequences. On the short term this allowed the NAFRI team to work without having to seek approval from MAF or other higher institutions for both Lao AGROVOC and LAD. On the other hand now that both systems are ready for wider sharing there is a need for approval from MAF (for LAD) and other higher authorities (ministry of culture and information, etc) for Lao AGROVOC. This has slowed down the wider development.

Involvement of different actors outside of NAFRI

While LAD is known by many actors, there has not been the involvement of other actors as anticipated. In a sense the NAFRI team took the 'build it and they will

¹ He left in May 2007 for further education

come approach'. Unfortunately, there has not been active involvement (i.e. not one project or organization inputting materials), this is for a number of reasons. First, because NAFRI is not 'formally recognized' many of the government organizations do not see this as something that they need to contribute to. Even projects at NAFRI do not see the 'need' to input or contribute to LAD. Another issue is the lack of staff at NAFRI who can work on this full time and develop the necessary relationships with other organizations that is needed for true collaboration. Finally, there has been a lack of involvement from outside because there is just not enough staff in different organizations who can spend time indexing/cataloguing.

In relation to this, the stakeholder meeting to disseminate and share LAD with a wide range of stakeholder was cancelled because of a major internal ministry meeting and thus many actors have not been exposed to LAD to see how they can contribute

Funding from Sida/NAFRI Programme

The project would have not been possible without three major factors within the project. This included:

1. Supportive management at NAFRI
2. Flexible funding support from Sida
3. Support from Thai AGRIS Center.

The NAFRI Management (at the director level and head of the division) has been very strong. Both the Director General and the Head of the Division so the development of Lao AGRIS/LAD as an important element of developing information services at NAFRI as well as providing an important service to the agriculture sector. Without their support and encouragement, staff would not have been motivated to work on this.

Sida has also been a supportive to the LAD development. Their funding was not rigid or fixed and has helped to really start the process off. There is interest from some donors and projects to further LAD. Money is not so much the issue as the concern over human resources and the ease of use of LAD.

Finally, the support from the Thai AGRIS center was crucial. Many staff from the NAFRI information service unit had a long relationship with the head of the Thai AGRIS center (as she had assisted in developing the first library system for the department of forestry). This was crucial as there was trust and relationship already so from both sides it was easy to work as the Thai AGRIS center understand the differences of working in Thailand and Laos. They were also able to systematically support capacity development within the NAFRI team which has been one of the crucial areas.

Developing Lao AGROVOC

AGROVOC took longer than expected again primarily of staffing constraints within the NAFRI team. Table 4 below provides an overview of how AGROVOC was developed. More than 15,000 terms were translated by more than 40 specialists from NAFRI, NUOL and NAFRI is under process to ask for permission from MAF to offer LAO AROVOC to FAO and other agencies who have expertise or knowledge of agriculture and forestry terminology. NAFRI is currently in the process of getting formal approval from MAF and the Ministry of Culture and Information to hand it over to FAO.

The Lao and Thai AGROVOC have potential to create important synergies between two languages which are similar but also different. A simple site has already been made which combines the use of Thai and Lao AGRIS together by searching in

either Lao or Thai Languages. There is discussion between the Thai AGRIS Centre and NAFRI to continue the development of the system and to incorporate more relevant and unique local language terms beyond those which are have equivalents on the official AGROVOC term list.

Ownership/knowledge of the Strategy by Stakeholders at this Time

As mentioned above there is strong ownership within the NAFRI information service unit and within some centers at NAFRI. In addition, the extension service is interested to collaborate with the system as well as many of the faculties at the National University of Laos. However, due staff limitations and that the system has just been developed there is a need to further develop linkages and actively work with other agencies and organizations.

Financial Aspects of processes

The development of LAD has proceeded with two main sources of funding. The government of Lao PDR maintains an annual budget provided through NAFRI for operating costs and staff salaries. Other provisions are also made in-kind such as building space. In addition to funds from the national government, NAFRI has been successful in attracting donor funding for its ICT development program. The Swedish International Development Agency (Sida) support to NAFRI has provided the financial and technical assistance necessary to initiate and develop the project. This includes budgets for computers, servers, training, incentives for indexing and inputting information, and for technical assistance. (Table 4 provides an approximate cost for establishing the LAD center.)

| Item | 2004 | 2005 | 2006 | 2007 | Funding agency |
|---------------------------------|-------------|-------------|-------------|-------------|-----------------------|
| Office space (electricity, etc) | 500 | 500 | 500 | 1000 | NAFRI |
| Staff fees | - | - | 2,000 | 1,500 | NAFRI |
| Indexing. Cataloguing fees | 3,000 | 3,000 | 1500 | 1,000 | Sida |
| Computers | | 15000 | - | - | Sida |
| Server facilities | - | - | - | 5,000 | Sida |
| Training and dissemination | 2,000 | 1,000 | 1,000 | 1,000 | Sida |

Table 4. The Annual costs of running the LAD center (in USD)

4. CONTENT OF STRATEGY

NAFRI through its Information Management and Strategic Planning Division (IMSPD) has developed an Information Service Strategy (2004 – 2010) under supervision from SIDA. LAO AGRIS is one of the strategies to have an international standard of agricultural database that can be recognized and sharing information internationally.

The strategy focuses on developing the interlinked systems.

1. Development of Lao Agriculture Database (LAD) and Lao Agriculture Research Information Management System (LAO AGRIS)
2. Development of Lao AGROVOC (based on AGROVOC, the common agriculture thesaurus/dictionary produced by FAO)
3. Strengthening NAFRI library system together with development of National Agriculture Library information System (NALIS) as a searching tool.

Principle area of interested includes:

- Internal research data management under NAFRI.
- Scientific and technical information from national and international agencies.
- Agriculture extension, education information, local wisdom that need to package for local users.
- Research and organization management information system as a guideline for policy management.
- ICT/ICM knowledge for appropriate local development of application.
- Collect and utilization of age paper

Relationship to National Policies and Strategies

Currently there are no national level policies which relate to LAD/Lao AGRIS, but as mentioned earlier NAFRI has a mandate to collect and coordinate agriculture and forestry related information in Lao PDR. Thus, the LAD fits in with NAFRI's own mandate and goals.

In addition, the Information Services Unit has developed a partnership with NAFES through the Working Group on Agriculture Information Management.

Key URLs

LAO Agriculture Database: <http://lad.nafri.org.la>

National Agriculture Library Information System: <http://nalis.nafri.org.la>