# RETA 5866: Fourth Agriculture and Natural Resources Research at CGIAR Centers: Developing Sustainable Forage Technologies for Resource-Poor Upland Farmers in Asia

## Forages for Smallholders Project Phase – II

## Six-Monthly Report, 1 January – 31 June 2001

R. Roothaert, C. Phaikaew, J. Samson, D. Bonilla, P. Kerridge, E. Magboo, L.H. Binh, P. Phengsavanh, Y. Kexian, Ibrahim, T.T. Khanh, P. Asis, W. Nacalaban, J. Saguinhon and G. Nakamanee

ASIAN DEVELOPMENT BANK

FSP

CIAT

# Table of contents





*Cover photo: A herder returns from grazing with his cattle, Nakornratchasima Province, Thailand (photo R. Roothaert).*

## Summary

The year started with an international workshop in Samarinda, Indonesia, where member countries presented the achievements of 2000. The theme of the meeting was scaling-up of participatory forage technology development. The countries that had established good focus sites seemed to have an advantage with dissemination, as the key farmers in those sites were experienced and functioned well as extension agents. Experiences were exchanged at the workshop and incorporated into activities in 2001.

Significant advances were made in farmer participatory research in Thailand. Field workers, who traditionally provide best bet technologies to farmers, came to realise that the appropriateness of species and management systems vary for different dairy farmers, rather than them having similar needs. At farm level, interesting sub-systems were discovered, in which different forage technologies have an advantage over others. Field workers and researchers began to analyse, plan and solve problems together with beef cattle farmers.

In Lao, a study was conducted in four villages to evaluate the use of local fodder trees and shrubs. Communities living in or near the forest margins traditionally keep beef cattle, which are grazed in cleared forestland. Tree fodder collected from the forest is an important source of animal feed during the dry season, when local grasslands have become unproductive. Sometimes the tree fodder is used to boost the condition of sick animals or cows that have calved. Data were collected from farmers about preference of species, their particular qualities and their uses. It is expected that the study will clarify how improved and local forages can complement each other.

In the Philippines, four on-farm experiments were established to measure the effect of forage systems on the soils and water erosion in hilly farms. Farmers had been involved in problem diagnosis, planning, design, management and data collection of the experiments. The activity was facilitated jointly by the International Centre for Research in Agroforestry (ICRAF) and CIAT. CIAT's expertise in forage technologies and ICRAF's expertise in natural resource management created a perfect opportunity to collaborate in a geographic area where both centres are active.
Eighty-two participatory diagnosis and planning exercises were conducted at new sites, reaching more than 1400 new farmers in the first six months of this year. The training of field workers working with experienced farmers has resulted in an efficient dissemination process. A new agreement was signed which enables the FSP to work in two more provinces in the Philippines.

Thailand produced 700 kg of forage seed, part of which was distributed to other FSP countries. Importation procedures for forage seeds in the Philippines were established, which will allow future importation. Although vegetative propagation is gaining popularity among farmers in Indonesia, Philippines, Vietnam and Lao, seeds still remain an efficient way of speeding up initial farmer testing and evaluation. For some species vegetative propagation is difficult or impossible, and effective local seed production systems still need to be developed.

In this reporting period, 162 new researchers and development workers were trained in forage technologies and participatory research approaches. Cross visits of farmers visiting each other have become part of the dissemination process in most countries and continue on a monthly basis. The FSP now works with 50 organisations which share

common goals with the project. It is an efficient way to increase the impact of forage technologies on the livelihood of farmers. Apart from the FSP annual meeting, papers and posters were presented in three other international workshops. One poster was distinguished with the best poster award. A new milestone in networking was also achieved with the completion of the first draft of the project web site, and its uploading on the internet (www.ciat-asia.org/02-FSP/fsp.htm).

# 1. Project background.

The project "RETA 5866: Fourth Agriculture and Natural Resources Research at CGAIR Centers: Developing Sustainable Forage Technologies for Resource - Poor Upland Farmers in Asia", in short called "Forages for Smallholders Project Phase (FSP) – Phase II", started in January 2000. It is funded by the Asian Development Bank for a period of three years. The goal of the project is: "to improve the livelihood of upland farmers by enhancing available feed sources to increase livestock production and strategic use of grasses and legumes to conserve soil and to enhance nutrient management (ADB[1], 1999). The participating countries are China, Indonesia, Lao PDR, Philippines, Thailand and Vietnam.

### *Objectives and outputs*

The objectives of the project are to:

- Develop sustainable forage technologies for resource-poor farmers in upland farming systems in Asia.
- Strengthen the capacity of National Agricultural Research Systems in the Bank's Developing Member Countries to develop and deliver these technologies to farmers.

The project has five outputs:

1. Productive and sustainable forage technologies for upland farming systems developed and tested by farmers.
2. Forage technologies extended to other farmers using participatory approaches for scaling-up from farm level to the community and provincial levels.
3. Effective local seed and planting material multiplication systems established and operational.
4. Capability in DMCs for developing and disseminating forage technologies using farmer participatory approaches (FPA) strengthened.
5. Network for sharing information among NARSs and in the region continued based on the Southeast Asia Feed Resources Research and Development (SEAFRAD) and electronic communications.

[1] Asian Development Bank 1999. Proposed Technical Assistance for the Fourth Agriculture and Natural Resources Research at CGIAR Centres. Manila, Philippines.

The FSP is co-ordinated by the Centro International de Agricultura Tropical (CIAT), which is part of the Consultative Group on International Agricultural Research (CGIAR). The implementing agencies in the participating countries are:

| | |
|---|---|
| China | Tropical Pasture Research Centre (CATAS), Hainan |
| Indonesia | Dinas Peternakan, Samarinda and Directorate General of Livestock Services (DGLS), Jakarta |
| Lao PDR | National Agriculture and Forestry Research Institute, NAFRI, Vientiane |
| Philippines | Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD), Los Baños, and Department of Agriculture, Region 10 |
| Thailand | Department of Livestock Development, Ministry of Agriculture and Cooperatives, Bangkok |
| Vietnam | National Institute of Animal Husbandry (NIAH), Ministry of Agriculture and Rural Development(MARD), Hanoi |

The project operates in 12 focus sites (table 1), which had been originally developed in the FSP – phase I, funded by AusAID.

**Table 1.** Focus sites in phase II of FSP and dominant farming systems

| Country | Province | Focus district/ municipality | Dominant farming system |
|---|---|---|---|
| Indonesia | East Kalimantan | Makroman, Samarinda | Rain fed lowland, intensive sedentary upland. |
| | | Sepaku II, Pasir | Extensive sedentary upland, grasslands. |
| Lao PDR | Luang Phabang | Xieng Ngeun | Extensive sedentary upland, short rotation slash and burn. |
| | Xieng Khouang | Pek | Short rotation slash and burn, intensive sedentary upland (rice), grasslands |
| | Savannakhet | Savannakhet | Grasslands |
| Philippines | Misamis Oriental | Cagayan de Oro | Extensive sedentary upland |
| | Bukidnon | Malitbog | Extensive sedentary upland. |
| Vietnam | Daklak | M'Drak | Extensive sedentary upland, grasslands. |
| | Tuyen Quang | Tu Quan, Phu Lam, Duc Ninh | Intensive sedentary upland. |
| Thailand | Nakornratchasima | Sung Nuen | Extensive sedentary upland. |
| China | Hainan | Baisha, Danzhou and Ledong | Extensive sedentary upland. |

# 2. Development of forage technologies

## *Participatory Evaluation with Dairy Cattle Farmers in Thailand*

Participatory evaluation (PE) was carried out with 7 dairy farmers in Sungnuen District, in Nakorn Ratchasima Province. These farmers rely on dairy production as their major source of income, and they have been planting and using forages for a long time. They started testing new forage species a year ago. Unlike the beef cattle farmers, the dairy farmers have their houses located within the farm.

The results showed differences in farmers' preferences of the forages. These differences were not necessarily due to differences in the general climate and soil conditions. However, differences in farmers' evaluation results were more easily explained by differences in microclimates (specific conditions of the location where the forages were planted) as well as the ways the forages were used and managed.

For instance, one farmer (Farmer A) had least preference for *Paspalum atratum* BRA 9610 but another (Farmer B) ranked it as the best. Upon discussion with the farmer, it was learned that Farmer A found that *Paspalum* hayed off and was not palatable in the dry season. However, Farmer B did not have that experience. The reason was that he planted *Paspalum* on the bank of a canal. The canal was long, and he wanted to expand *Paspalum* to cover the whole length of the canal in his farm.

Another important learning was that farmers have different criteria in evaluating forages. These were mostly related on the intended use of the forage. For instance *Stylosanthes hamata* was favoured because of its good capacity to regenerate from seed. *Brachiaria ruzizienses* was also favoured because it was easy to establish from seed. Centurion was favoured because the farmer believe that it increased milk yield.

## *Stylo evaluation (Thailand)*

An experimental plot was prepared on-station. The objective of the trial is to find alternative stylo varieties to *Stylosanthes guianensis* CIAT 184, which are more resistant to anthracnose. Treatments consist of:

1. control (CIAT 184)
2. selection of black-seed stylo 184 from China
3. composite hybrid 1 of *S. guianensis*
4. composite hybrid 2 of *S. guianensis*

The treatments are arranged in 3 randomised complete blocks. The plots are 6 m x 8 m. To build up natural inoculum of anthracnose in the area, rows of susceptible *Stylosanthes guianensis* cv. Graham will be established around the experiment as well as in between blocks.

## *Lablab Evaluation (Thailand)*

Fourteen accessions of *Lablab purpureus* of last year's Lablab evaluation trial (45 accessions) are being evaluated. The design of the experiment is a randomised complete block design with 3 replications. A plot consists of 3 rows 7.5 m long with an inter-row spacing of 30 cm, and a 1 m path between plots. Lablab was planted on 25 May, 2001.

Data to be measured are:

- Date of first flowering (the average date when 5 plants per accessions have set flowers).
- Dry matter yield at 100 days after planting, and after that harvest every 60 days, cut at 10 cm height. Fresh weights are recorded and samples of 1 kg are taken. The sample are oven dried at $70^{\circ}C$ for 72 hrs to estimate dry matter percentage and chemical analysis carried out for CP, NDF, ADF and Lignin.

**Figure 1.** The Lestari farmers group introduces new species in their *Imperata* grassland.

## *Evaluation of forages in Indonesia*

- On farm experimentation in Sepaku has shown that poor quality *limperata* fields can be improved with species such as: *B. brizantha* CIAT 6780, *Setaria sp.*, *B. humidicola* cv. Tully and Yanero, *Andropogon gayanus* CIAT 621, and *Stylosanthes guianensis* CIAT 184.

- For erosion control, the following species can be used: *Setaria sp.*, *B. brizantha* CIAT 6780, *Paspalum atratum* BRA9610, *B. Humidicola* cv. Tully and Yanero, *Gliricidia sepium, Andropogon gayanus*. However, the best species for erosion control according to farmers are: *Setaria sp., B. brizantha*, and *Paspalum atratum* .
- Women's activities started in Makroman with the planting of vegetables and maize to support the family cash income. Manure from goats is used as fertilizer.

### *Evaluation of forages in China*

- Twenty forage species and accessions are being evaluated by farmers in Wentou, Xishui villages, Baisha county , Yaxin, Danzhou city, Zali village, and Baoting county Among the species are: *Brachiaria decumbens, Panicum maximum, Paspalum atratum*, King grass, Stylo Reyan 2, Stylo black seed, *Cratylia argentea, Gliricidia sepium, Leucaena leucocephala* K636, *Macroptilium purpureum*, and *Arachis pintoi.*
- Stylo intercropping in Mango, Lychee, Longan and young rubber plantation is being conducted in Baisha, Danzhou and Ledong.
- An on-farm trial fattening of goats with stylo CIAT 184 and *Brachiaria decumbens* is being carried out in Yaxin, Danzhou city. The results show that goats can gain 1.38kg/ head in 30 days compared to only 1.13 kg/ head on local grass.
- Eight accessions of *Arachis pintoi* are being evaluated on the CATAS experimental farm: 18750, IRFL3019,17434,18744, 22160, CPI93483,18748, and one from Guangxi.

### *Evaluation of forages in Daklak, Vietnam*

Five farmers planted *Arachis pintoi* in trips in natural grassland in July 2000. The distance between the rows was 60 cm. Treatments were protection and no protection from grazing during the first three months.Participatory evaluation was evaluated was carried out in March 2001. Results showed that the legume could not withstand flooded areas, but thrived well in better drained soil. It competed well with erect grasses and shrubs. There was poor survival in plots that were not protected during the first 3 months.

In another experiment, 5 farmers planted grass and legume species in natural grassland. Strips of the improved forages were planted in rows 60 cm apart, covering a total area of 1.5 ha. The species with best survival and most aggressive invasion were: *B. ruziziensis, B. brizantha* and Stylo 184.

In 1999 and 2000, farmers planted Stylo 184 in strips along the contour in their coffee plantations. The stylo showed good growth when coffee was young. The feed was used for calves, pigs and small fish. Other benefits were green manure, reduction of weeds and soil erosion control.

Fences of *Gliricidia sepium, Flemingia macrophylla* and *Leucaena leucocephala* were established in 2000. Only gliricidia was found unpalatable. A trial will start to assess methods of training cattle to feed on gliricidia in Daklak.

## *On-farm nurseries of fodder trees*

An experiment started to test nursery methods and fodder tree species in nurseries on-farm. A protocol was developed and discussed with field workers in Thailand, Lao and the Philippines. One site was chosen in each country, and six farmers participated in each site. Data are being collected on:

- Preferences of farmers
- Number of seeds distributed per farmer per species
- Number of seeds germinated
- Number of seedlings raised
- Destination of seedlings
- Discussions during group meetings and meetings with individual farmers

Species being raised per country are listed in Table 2.

**Table 2.** Species raised in on-farm fodder tree nursery experiment per country.

| Species | Planting material | Philippines | Thailand | Laos |
|---|---|---|---|---|
| *Calliandra calothyrsus* Prov. Patalul | Seed | ✓ | ✓ | ✓ |
| *Calliandra tetragona* | Seed | | ✓ | |
| *Cratylia argentea* | Seed | ✓ | ✓ | ✓ |
| *Desmodium cinerea* | Seed | ✓ | ✓ | ✓ |
| *Enterolobium cyclocarpum* | Seed | | ✓ | ✓ |
| *Gliricidia sepium* Prov. Retalhuleo | Seed | ✓ | ✓ | ✓ |
| *Indigofera constricta* | Seed | ✓ | ✓ | ✓ |
| *Leucaena leucocephala* K 636 | Seed | ✓ | ✓ | ✓ |
| *Leucaena pallida* | Seed | ✓ | ✓ | ✓ |
| *Leucaena trichandra* 53/88 | Seed | ✓ | ✓ | ✓ |
| *Morus alba* | Cuttings | ✓ | | |
| *Sesbania grandiflora* | Seed | ✓ | | |
| *Sesbania sesban* | Seed | ✓ | ✓ | ✓ |
| *Trichantera gigantea* | Cuttings | ✓ | | |

**Figure 2.** *Mak not pa* is a much used indigenous fodder tree by Hmong farming community in Longlao (Photo: R. Roothaert).

### *Assessing the use of indigenous fodder trees in Laos*

Four villages were visited, inhabited by the Hmong and Kasah minority groups, in the hillsides of Luang Prabang Province. Group discussions with farmers were held in every village, followed by individual interviews with key informants. In three villages botanical samples were collected of trees and shrubs to facilitate identification of the species. On the last day fresh samples were collected for nutritive analysis. These samples were oven dried and sent to Thailand for nutritive analysis. Heavy rains, which had started unusually early this year and which did not stop throughout the last three days, prevented collection of samples of some species.

Information collected during the survey revealed that farmers used about 20 different local tree and shrub species, and that tree fodder played an important role in the cattle diet. Preferences among the choices varied more among villages than among farmers within a village. Harvesting practices and uses also varied among villages and were related to cattle raising systems and land availability. It is unlikely that farmers in the hillsides would actively plant local trees and shrubs, since many species naturally regenerate in fallow land.

Table 3 lists names of species that were identified. Determination is not yet complete and contradicting botanical names need to be eliminated. Data provided by farmers through matrix ranking will be analysed using a statistical package. The impact of the most preferred species on livestock production and livelihood in general, will be further investigated.

**Table 3.** Species that farmers used for feeding cattle in Lao, and samples that were sent for chemical analysis in Thailand.

| Lao name | Hmong name | Other Lao names | Preliminary botanical identification | Chemical analysis |
|---|---|---|---|---|
| Ban | | | *Bauhinia variegata* | ✓ |
| Bayhad | | | *Artocarpus sp.* | |
| Posa | | | *Broussonetia papyrifera* | |
| Sahou | | Pohou | *Trema orientalis, T. velutina* | |
| Saima | | | Not yet determined | |
| Sakham | | | *Garuga pinnata* | ✓ |
| Mailiang | | | *Berrya mollis, Eriolaena candollei* | ✓ |
| Sieo | | Sieo lieng, Sieo ngeun lieng, Sieo lap | *Bauhinia purpurea, B. viridescens, B. acuminata, B. prabangensis* | ✓ |
| Eng Leng | | | Not yet determined | ✓ |
| Deua pong | | | *Ficus hispida* | ✓ |
| Dok leap | | | Not yet determined | ✓ |
| Deua | | | *Ficus sp.* | |
| Sorsien | | Som Sien | *Sinapis alba* | ✓ |
| Houng Keo | Laveung | Houng Sa | *Ricinus communis, Eclipta alba* | |
| Mak Not Pa | | Not Nam | *Ficus heterophylla, F. pyriformis, F. variolosa* | ✓ |
| Mak Lin Mai | | | *Oroxylum indicum* | |
| Mak Va | | | *Ficus racemosa, Eugenia jambolana, E. compongensis* | |
| Kok Mailen | | | *Albizia odoratissima* | |
| Ton Mon Pa | | | *Morus sp.* | ✓ |
| Mak Kok | Kao Mo Leu Tow Tchon | | *Spondias Magnifera, S. dullis* Not yet determined | |
| Si Hai Ton | | | *Cinnamomum iners, Eucalyptus sp.* | ✓ |

### *Farmer participatory research on the impacts of forage hedgerow as soil conservation technology in San Migara, Philippines.*

During FSP Phase I, the main reason for adoption of forages in Malitbog municipality was as a feed resource. In San Migara village, however, forage has been recognised more as a soil conservation technology. It proves that farmers are natural researchers who continuously experiment on the best use of the technology, in the hope of bringing solutions to the everyday challenge brought by the presence of soil erosion in their farms. Initially 24 Alayon farmer members established contour hedgerows; now there more than 50 farmer adopters in San Migara and adjacent villages.

Elsewhere, very few 3farmers recognise the importance of conserving the environment.In San Migara for instance, farmers knew that soil erosion has been deleterious to their farming. They have monitored how it has affected their productivity and income, resulting in poverty. Most farmers still do not do anything about it and take

it as a natural fate. This attitude can be attributed to the lack of information on the degree of soil degradation or idea about the opportunity cost that soil erosion brings to the farmers.

An experiment was started to find a way of increasing farmers' awareness on soil erosion and how forage technology holds a vital part in is control. The challenge was to use learning experiences and promote forage-soil conservation technology using a farmer-to-farmer extension approach. "Farmer participatory research on the impacts of forage hedgerow as soil conservation technology" started this year, with four (4) farmer-researchers from San Migara, Bukidnon.

The process involved the following steps:
(1) Participatory diagnosis on environmental awareness and forage technologies.
(2) Problem diagnosis at household, farm and environmental levels.
(3) Exploratory walks and drives on water and soil conservation, and a field trip to ICRAF's experimentation sites in Claveria.
(4) Focus group discussion with interested farmers.
(5) Production of farmer experimental design.
(6) Establishment of experimental plots using the Alayon Farmer group.
(7) Training on data collection.
(8) Training on Farmer Research Committee at ICRAF, Claveria.
(9) Data collection and evaluation.
(10) Analysis.
(11) Participatory evaluation.

*Preliminary findings*

The participatory diagnosis (PD) was attended by 38 farmers from the locality and from Sitio Lake. The PD validated the existence of a soil erosion problem in the area. During the problem ranking, weighting and calendar exercises, most women prioritised household related problems over environmental concerns. The male group on the other hand, gave the highest ranking to farm - environmental related problems. It showed that male farmers have a higher level of environmental awareness. It could be explained by the fact that they work closer to the environment.

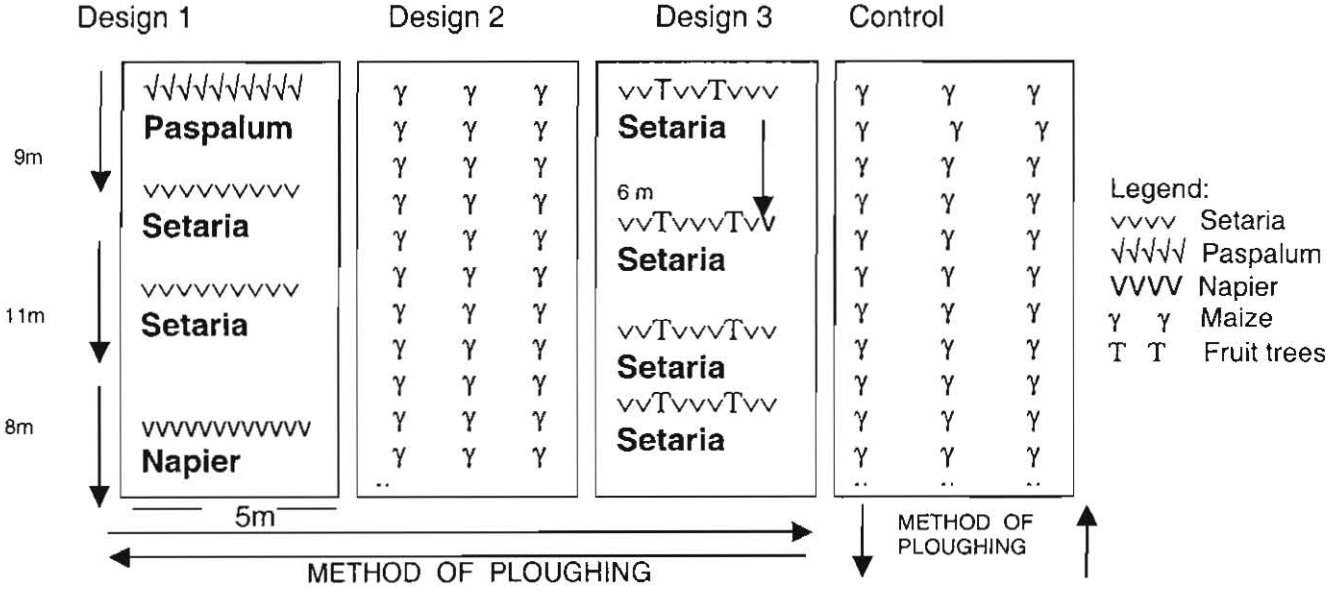
Farmers had already developed methods of measuring soil degradation and its impacts on farm productivity. Some of their indicators are as follows:
- Low yield (maize cobs have lower grain content and cobs do not fully mature).
- Thin crops.
- Loss of fertility on higher farm areas (yellowing of plant and incidence of dwarfism).
- Appearance of sub-soil.
- Low pest resistance of crops.
- Gully erosion.
- Decreasing population of earth worms.

In effect, land abandonment and opening of new forest lands usually follow when the land can no longer provide the farmers' basic needs for subsistence. This causes greater stress to the environment in the long run.

*Experimental design*

Farmers designed their experiment based on the experimental plot they saw at ICRAF. They also sought advise of some ICRAF technicians and requested that their area be inspected in order to determine if it is suitable for the experiment. Farmers were briefed on the responsibility related to their farmer managed soil erosion experiment. Their role as the farmer-researcher partner of FSP was explained to them. The layout is presented in Fig.3.

**Figure 3.** Layout of farmer experimental erosion control plots.




*The challenge*

Forage technologies have a greater role than improving the income of smallholder farmers, their savings, livestock and agricultural productivity. Their economic role in soil conservation must also be recognised and promoted. Convincing farmers on the reality of the situation, and more so, convincing them to do something about it, is a great challenge.

# 3. Dissemination of forage technologies to new areas

### *Number of new farmers reached*

Dissemination continued in all sites. Table 4 presents details of participatory exercises and the number of farmers involved.

**Table 4.** Number of participatory diagnoses, planning, cross visits and field days, and no. of farmers involved.

| Country | Site | No. of PD and PP conducted | No. of villages involved in PDs | No. of households participating in PDs | No. of cross visits and field days (no. of farmers) |
|---|---|---|---|---|---|
| Indonesia | East Kalimantan | 8 | 8 | | 8 (60) |
| Philippines | Malitbog | 9 | 9 | 185 | 2 (75) |
| | Cagayan de Oro | 6 | 6 | 200 | 4 (73) |
| | Impasugong | 3 | 3 | 46 | 1 (44) |
| Vietnam | Tuyen Quang | 8 | | 370 | 2 (220) |
| | Daklak | 19 | | 337 | 13 (362) |
| China | Hainan | 2 | 2 | 10 | 2 (80) |
| Thailand | Sikhue | 3 | 3 | | |
| Lao | Luang Phabang and Xiengkhuang | 24 | 18 | 316[2] | |
| **Total** | | **82** | **23** | **1464** | **32 (914)** |

### *Participatory diagnosis and planning with beef cattle farmers in Thailand*

Participatory Diagnosis (PD) was carried out in three 3 villages of Sikhue District, Nakorn Ratchasima Province. The farmers involved were raising beef cattle mainly through herding. The grazing resource consisted of permanent communal areas and fallow land. Crop residues, such as rice straw, cornhusk and empty cobs were also used at certain times of the year.

All three villages had been established more than 100 years ago. The houses were clustered in the village. Farms were thus located mostly away from the houses. In the beginning, farming consisted mainly of lowland rice using buffalo for draft. As more people settled in the village, additional areas were opened to cropping. Areas not

[2] 271 farmers in villages where FSP and FLSP work together, 65 farmers in villages where FSP works without FLSP.

suitable for rice were planted to other crops, primarily cassava and maize. These areas were the grazing areas for cattle and buffalo. Therefore, grazing areas have decreased over the years. Not so long ago, the villages started using tractors and stopped raising buffaloes. The cattle breed raised has also changed from native to Brahman, and lately Indu Brazil upgrades were introduced.

Crops had always been the main component of the farming system in all 3 villages. High input cost and low price of products were recognized as the major problems. Beef cattle production is secondary to crops but also plays a big role as a source of income. The main problem in beef cattle production was declining feed availability. The system had always used communal forest areas for grazing and cropping areas after harvest. However, the farmers' main concern was the decrease in communal grazing areas because these had been used for cropping.

**Figure 4.** Using a calendar to understand availability of feed resources for beef cattle in Sikhue district (Photo: R. Roothaert).

In one village, the whole area is now devoted to cropping. In this case, the farmers had to herd their animals to areas outside the village. This village had such shortage of feed resources that rice straw was used immediately after harvest. The other two villages were still able to rely on grazing after the cropping season. These villages could therefor store rice straw until the next cropping season.

All farmers in the 3 villages intended to establish forages using portions of their crop areas. They expressed interest in establishing *Brachiaria ruziziensis* (ruzi). The main purpose was to improve the condition of their thin animals. One reason why farmers chose ruzi was that there were some who have tried the species before with good results. There was a risk, however, that the species did not persist, perhaps due to overgrazing. Overgrazing could be either because the farmers did not feel the necessity to manage it well, or that ruzi could not withstand the normal grazing pressure in the

area. Both these constraints prompted farmers to try other species together with ruzi. Since farmers were very interested with ruzi, farmers could plant this forage in relatively large areas, and at the same time try out the new species in small plots.

Although grazing is the major management system, cut and carry was used for feeding the breeder bulls, especially the Indu Brazil types. These animals are normally confined and only allowed to go with the herd when there are cows in heat. When confined, the bulls are fed cut forages as well as other feeds such as bananas. Bulls were also used to generate income, from payment of breeding services to other farmers' cows. The existing rate was Bt 500 for each successfully bred cow.

Thirty three farmers intended to establish forages using portion of their crops area. They expressed interest in establishing *Brachiaria ruziziensis* and 6 of them will try 3 more species namely *Brachiaria brizantha* CIAT 6780 , *Stylosanthes guianensis* CIAT184 and *Stylosanthes hamata* cv. Verano.

Participatory planning was also done with dairy cattle farmers in Khonburi District, Nakorn Ratchasima Province. Farmers planned to try 5 forage species namely *Brachiaria ruziziensis, Panicum maximum* TD 58, *Pennisetum purpureum, Stylosanthes guianensis* CIAT 184 and *Stylosanthes hamata* cv. Verano

### *New provinces in the Philippines*

A Memorandum of Agreement was signed with Visayas State College of Agriculture (ViSCA). It was agreed that the FSP would facilitate staff of ViSCA to disseminate forage technologies in the Provinces Leyte and Cebu. In both provinces, the FSP had started some research during the AusAid funded phase. In Cebu this was successful and activities will continue from where they were left off. In Leyte, the site was less appropriate, with few farmers experiencing feeding problems that would lead to growing of forages. New participatory diagnoses and planning will be conducted in areas of Leyte, to identify communities that need forages and want to experiment with them.

## 4. Forage multiplication systems

### *Distribution of seed*

Thailand remains a centre of forage seed production providing seed to other countries in the region. It has the comparative advantage of suitable climate, and high expertise of researchers, technicians and farmers. Table 5 gives an overview of amounts of seeds that Thailand provided to other FSP partners.

**Table 5.** Amounts of seeds produced in Thailand in 2001 and distributed to other FSP countries.

| Species | China | Lao | Vietnam | Indonesia |
|---|---|---|---|---|
| *Panicum maximum* TD58 | 1 | 30 | 12 | - |
| *Brachiaria ruziziensis* | - | - | 3 | - |
| *Brachiaria brizantha* 'Marandu' | 1 | 8 | 14 | 3 |
| *Brachiaria brizantha* 'Serengeti' | 1 | 3 | 5 | - |
| *Brachiaria brizantha* 'Karanga' | 1 | 3 | 4 | 2 |
| *Paspalum atratum* | - | - | 11 | 2 |
| *Centrosema pubescens* 'Barinas' | 1 | 1 | 1 | - |
| *Centrosema macrocarpum* | - | 4 | 1 | - |
| *Centrosema pascuorum* | 1 | - | 1 | - |
| *Desmanthus virgatus* | - | - | - | - |
| *Stylosanthes guianensis* CIAT184 | - | 30 | 21 | - |
| *L. leucocephala* 'Cunningham' | - | 2 | - | - |
| *Stylosanthes hamata* | - | - | 5 | - |

About 100 kg of seeds of various species are on hold to be shipped to the Philippines, once an import permit has been obtained. It has been difficult in the past to import forage seeds into the Philippines due to strict import regulations. A meeting was held with the Chief of Plant Quarantine Service of the Philippines to discuss the problem. Forage pests and diseases were discussed and relevant documentation was provided to the Quarantine Service. The following procedures were established to enable FSP to import forage seed:

1. The seed producer issues a seed purity certificate (SPC).
2. An application for a seed import permit is filed at the Los Banos Quarantine Office, with the SPC attached. Only one permit is needed, even if the batch consists of several species. If the seeds are shipped in different batches, a corresponding number of permits is needed. Also if the seeds are produced by different producers, the corresponding number of permits is needed.
3. Once issued, a copy of the seed import permit is sent to the seed exporter.
4. A phyto-sanitary certificate is issued by the exporter.
5. The seeds are sent to the Quarantine office in Los Banos.
6. A seed health test might be carried out in some cases (7-8 working days).
7. Seeds are released if the test is in order.

### *Vegetative propagation*

Vegetative propagation is an important source of planting material for farmers in Philippines, Indonesia, Vietnam and Laos. This year, 1 million splits have been distributed in Indonesia and 234,000 splits in Vietnam. In Thailand, 4000 bags of *Arachis pintoi* cuttings were distributed to dairy farmers.

# 5. Capacity building

A training manual on 'Developing Forage Technologies with Farmers' was translated into Chinese, totalling 291 pages.

Training courses were organised in all countries and are summarised in table 6.

**Table 6.** Training courses

| Country and date | Site | Organiser | No. of participants | Type of participants | Title of the course |
|---|---|---|---|---|---|
| China | | | | | |
| 20 - 25 Feb | Danzhou | CATAS | 38 | Researchers/ field workers/ LG officers | Forage technologies and participatory research |
| Indonesia | | | | | |
| 5 -14 Jun | Sempaja, Samarinda | The Training Center in Samarinda and FSP Indonesia | 27 | Extension workers | Developing forage technology with farmer |
| 17-28 June | Samarinda | FSP Indonesia | 17 | Field worker and technicians | Development forage technology with farmers |
| Lao PDR | | | | | |
| 28 Feb - 2 Mar | Luang Phabang and Xiengkhuang | | 7 | Field staff, district staff | Participatory diagnosis |
| 19 - 22 Mar | Provincial Dept. | | 9 | staff | Extension methodology and gender |
| 29 Jan - 2 Feb | Xiengkhuang Province | FLSP | 29 | | Participatory diagnosis |
| 9 - 12 Apr | Luang Phabang | | 29 | | Technology options, Participatory extension |
| 8 - 13 Mar | Livestock Research Center | | 35 | | Agronomy training course |
| Philippines | | | | | |
| 27 Mar | Manolo Fortich | Local Government | 800 | Farmers | Beef Congress |
| Thailand | | | | | |
| 28 Mar | Khonburi District, Nakorn | Pakchong Animal Nutrition Res. Centre | 28 | Dairy farmers | Forage establishment, management and utilisation |
| 2 - 8 Apr | Pakchong | Pakchong Animal Nutrition Res. Center | 9 | Researchers and District Officers | Recording data and participatory tools |
| | Sikhue District | Pakchong Animal Nutrition Res. Center | 9 | Researchers, Livestock officers | Participatory diagnosis |

| Country and date | Site | Organiser | No. of partic ipants | Type of participants | Title of the course |
|---|---|---|---|---|---|
| | Sung Nuen | Pakchong Animal Nutrition Res. Center | 10 | Dairy Farmers | Developing forage technology |
| 21 Apr | Sung Nuen, Thailand | Pakchong Animal Nutrition Res. Center | 10 | Dairy Farmers | Forage establishment, management and utilisation |
| Vietnam | | | | | |
| 12 - 18 Apr | Daklak , | FSP national network, TN University, DARD | 20 | Researchers, Development workers and Officials | Forage technologies and participatory research |
| Apr – May | Tay Nguyen University | DARD, Tay Nguyen Univ, SAM Proj | 33 | Extension staff | Forage participatory research, forage agronomy & utilisation |
| Apr - May | Daklak: M'Drak, Ea Kar, CuJut, Buon don and Buon Ma Thuot | FSP staff, DARD | 384 | New farmers | Forage agronomy and management |
| Apr – May | Daklak | FSP staff, DARD | 384 | New farmers | Field visit on forage management |
| Apr – May | Tuyen Quang | Sam Project | | | Working with farmers, selection of forage species, and feeding |
| May | Daklak | FSP staff, DARD | 21 | Head of farmer groups, extension officers | PM&E in farmers group and district |
| May | Queensland, Australia | Beef Industrial Center, DBI | 1 | FSP researcher | Training on botanal method |

**Figure 5.** A training course for researchers, technicians and key farmers was organised in Hainan (Photo: R. Roothaert).

# 6. Networks

## *Annual meeting*

The Annual Regional Programme Meeting of the Forages for Smallholders Project – Phase II' was held in Samarinda, East Kalimantan from 15 – 19 January 2001. The Theme was: 'Scaling-up of Participatory Forage Technology Development'. Thirteen international and 22 Indonesian participants attended. Speeches, PowerPoint presentations, discussions, workplans and conclusions have been reported in the proceedings of the meeting. Letters of Agreement for 2001 have been signed with all countries to facilitate research and transfer of funds.

## *Organisations*

The FSP works through national partners in each country. The co-ordinating institution in each country has established a large network of partners who share common goals in alleviating poverty in rural areas. Many of these partners are also involved in research to improve smallholder livestock production. Table 7 lists the partners that FSP has established a good working relationship with, in terms of carrying out research or disseminating forage technologies.

**Table 7.** Organisation that FSP works with.

| Name organisation by country | Address | Activities in common with FSP |
|---|---|---|
| ***Philippines*** | | |
| Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) | Los Baños | National Co-ordinator |
| Department of Agriculture | Region 10 | Agricultural extension |
| Nitivo MPC | San Luis | PD, forage tech dev. Dissemination |
| Omagling MPC | Omagling | PD, forage tech dev. Dissemination |
| Pat-pat/ Sta Ines (small coconut growers) | Pat-pat | PD, forage tech dev. Dissemination |
| Mindagat MPC | Mindagat | PD, forage tech dev. Dissemination |
| Rural Improvement Club | Sta Ines | PD, forage tech dev. Dissemination |
| Rural Improvement Club | Omagling | PD, forage tech dev. Dissemination |
| Barangay Council | Omagling | Policy formulation |
| Malitbog Landcare Assoc. | Malitbog | Farmers Integration/peer pressure |
| ICRAF | Claveria | Field trips/cross visits |
| Philippine Coconut Authority | Malitbog | Livestock dispersal |
| DAR | Malitbog | Focused group discussion |
| DENR | Malitbog | Focused group discussion |

| Name organisation by country | Address | Activities in common with FSP |
|---|---|---|
| Rural Improvement Club | Silo-o | PD, forage tech dev. Dissemination |
| Silo-o Farmers MPC | San Luis | PD, forage tech dev. Dissemination |
| Philippine Carabao Center | CMU-Bukidnon | Livestock dispersal |
| Dept. of Trade and Industry | Bukidnon | Livestock dispersal |
| True teaching of the Holy God the Father | San Migara, San Luis | PD, forage tech dev. Dissemination |
| Sto Nino Smallhold Farmers Asao | San Ligara, San Luis | |
| Visayas State College of Agriculture (ViSCA) | Leyte | Research and dissemination of forage technologies, forage seed production. |
| Mag uugmad Foundation Inc. | Cebu | Farmer initiated extension of forage technologies |
| International Centre for Research in Agroforestry (ICRAF) | Claveria, Leyte and Los Banos | Community based natural resource management |
| ***Laos*** | | |
| National Institute of Agriculture and Forestry (NAFRI) | Vientiane | National Co-ordinator |
| FLSP Project | Vientiane | Forage technology development, seed production and dissemination |
| Japanese Overseas Cooperation Volunteer | Savannakhet | |
| GTZ | Xienghuang | Technial, training, seed for testing |
| European Union – Lao PDR | Vientiane | Strengthening of livestock services and extension activities |
| **Vietnam** | | |
| National Institute of Animal Husbandry (NIAH) | Ministry of Agriculture and Rural Developmen t, Hanoi | National Co-ordinator |
| Department of Agriculture and Rural Development | Daklak Province | Rural Development |
| Tay Nguyen University | Daklak Province | Agricultural research |
| Ea Kar Extension, M'Drak extension, Cu Jut extension, Buon Don Extension | Daklak | Agricultural extension |
| Yen Son District, Ham Yen district, Son Duong District, Chiem Hoa district | | Agricultural extension |

| Name organisation by country | Address | Activities in common with FSP |
|---|---|---|
| ADB project for forestry protection | | Develop forage technologies with farmers |
| ENDA | Phu Yen, Daklak | |
| National Program 127 | Daklak | Develop forage farmers |
| ACIAR | National | PD, PP to develop forage farmers |
| Gialai and Kontum Dept of Science and Env | | Advise on selection of adapted forage species |
| Vietnam - Sweden Mountain Development Project | Tuyen Quang | Test and collect forage species in farmer condition in high land |
| SAM-CIRAD-CA program | Bac An | Test forage species in farmers condition for soil protection and forage production |
| GEC | | |
| DED Germany | Lang Son province | Test forage species in farmers condition to get green fodder for livestock production |
| SNV (NGO Netherlands) | Son La Province | Erosion control and forage production |
| **Indonesia** | | |
| Dinas Peternakan | Samarinda | National Coordinator |
| Directorate General of Livestock Services | Jakarta | Extension service for livestock production |
| Training and Education Center of Agriculture | Samarinda | FPR training |
| Deliveri Project | DGLS, Jakarta | Participatory livestock development |
| ***China*** | | |
| Tropical Pasture Research Centre (CATAS) | Hainan | National Coordinator |
| Centre for Integrated Agricultural Development (CIAD) and College of Rural Development (CORD) | China Agricultural University, Beijing | Participatory research |
| ***Thailand*** | | |
| Department of Livestock Development, Min. of Agric. and Cooperatives | Bangkok | National Co-ordinator |
| Animal Nutrition Research Centre, DLD | Khon Kaen | Animal nutrition |

# 7. Publications

The RETA 5866 Project: Fourth Agriculture and Natural Resources Research at CGIAR Centers: Developing Sustainable Forage Technologies for Resource-Poor Upland Farmers in Asia, is now available on the internet at www.ciat-asia.org/02-FSP/fsp.htm The site will be modified after reactions have been received from users.

R.L. Roothaert and J.N. Samson, Eds. 2001. Proceedings of the Annual Regional Programme Meeting of the Forages for Smallholders Project – Phase II, 'Scaling-up of participatory forage technology development', Samarinda, East Kalimantan, Indonesia, 15 – 19 January 2001, CIAT, Los Baños.

Ralph L. Roothaert and Jindra Samson. 2001. Management of forage crops for smallholders in S.E. Asia and its possible implications on the quality of farm land. Paper presented at the Asian Agriculture Congress, 24 – 27 April 2001, Manila, Philippines.

Ralph Roothaert, Peter Horne and Werner Stür. 2001. Integrating forage technologies on smallholder farms in the upland tropics. Paper presented at the International Workshop "Forage Demand and Adoption by Smallholder Livestock Keepers", June 18-20, Addis Ababa, Ethiopia.

Ralph Roothaert 2000. Forages for Smallholders in Asia: CIAT Project begins new Phase. UPWARD Fieldnotes Vol. 9(2) p. 9.

J. Samson and R. Roothaert 2001. The Challenge of Adoption: Scaling-up of Participatory Research in Forage Technologies. Poster presented at the 6th National Grassland Congress, Legaspi, Philippines. *Awarded with Best Poster Award.*

P. M. Horne, Stür, W.W., Hacker, J.B. and Kerridge, P.C., eds.(2000). Working with farmers: the key to adoption of forage technologies, pp. 325. Australian Centre for International Agricultural Research, Cagayan de Oro.

The book "*Horne, P.M. and Stür, W.W. 1999. Developing forage technologies with smallholder farmers – how to select the best varieties to offer farmers in Southeast Asia. ACIAR Monograph No. 62, Australia*" was translated and published in Indonesian, Thai and Vietnamese.

Two radio interviews with project staff were recorded and broadcast in East Kalimantan, Indonesia, reaching farmers in all rural areas.

### *Previous publications*

The Chinese translation for FSP booklet "Developing forage technologies with smallholder farmers - how to select the best varieties to offer farmers in Southeast Asia" was completed and published.

Horne, P.M. and Stür, W.W. 1999. Developing forage technologies with smallholder farmers – how to select the best varieties to offer farmers in Southeast Asia. ACIAR Monograph No. 62, Australia, 80 pp.

Chinese, Vietnamese and Indonesian translation of Developing forage technologies with smallholder farmers.

SEAFRAD News, Issue 10, May 2000.

Roothaert, R.L. 2000. Proceedings of the Inception Meeting of CIAT/ADB Project "Development of Sustainable Technologies for Resource-Poor Upland Farmers in Asia", 17-18 February 2000, Los Baños, Philippines. CIAT, Los Baños, Philippines.

RETA 5866: Fourth Agriculture and Natural Resources Research at CGIAR Centers: Developing Sustainable Forage Technologies for Resource-Poor Upland Farmers in Asia. Forages for Smallholders Project – Phase II, Six-monthly report, 1 July – 31 December 2000.

Developing Sustainable Forage Technologies for Resource-Poor Upland farmers in Asia, Six-Monthly Report, 1 January – 31 July 2000, Forages for Smallholders Project – Phase II, 15 pp.

## 8. Human resources

### *FSP co-ordinators and counterparts*

Dr. Peter Kerridge, Coordinator CIAT – Asia, Vientiane, Lao PDR
Dr. Ralph Roothaert, Regional Coordinator FSP, Los Baños, Philippines.
Mr. Eduedo Magboo, FSP Coordinator Philippines, Los Baños.
Mr. Phonepaseuth Phengsavanh, FSP Coordinator Laos PDR, Vientiane.
Mrs. Chaisang Phaikaew, FSP Coordinator Thailand, Bangkok.
Mr. Le Hoa Binh, FSP Coordinator Vietnam, Hanoi.
Ir. Ibrahim, FSP Coordinator Indonesia, Samarinda.
Assoc. Prof. Yi Kexian, FSP Coordinator China, Hainan.
Mr. Truong Tan Khanh, Daklak, Vietnam.
Mr. Vanthong Phengvichith, Vientiane, Laos PDR.
Mr. Willie Nacalaban, Malitbog, Philippines.
Dr. Perla Asis, Cagayan de Oro, Philippines.
Mrs. J. Sahuinhon, Malitbog, Philippines
Mrs. Ganda Nakamanee, Pakchong, Thailand.
Mr. Francisco Gabunada, Leyte, Philippines.

## *Adresses of country offices*

*China*

Mr. Yi Kexian
FSP
Tropical Forages Division
Tropical Field Crops and Animal Husbandry Institute
CATAS
571737 Danzhou, Hainan
P.R. China
Fax: (86-890) 330-0157 /0440
Email: yikexian@yahoo.com.cn

*Indonesia*

Ir. Ibrahim
FSP
Dinas Peternakan TK.I Kaltim
Jalan Bhayangkara No. 54,
Samarinda, East Kalimantan 75121
Tel: (62 541) 743921/741642
Email: ibrahimfsp@smd.mega.net.id

*Laos*

Mr. Phonepaseuth Phengsavanh
FSP
Livestock Development Division
c/o Dept. of Livestock and Fisheries
P.O. Box 6766
Vientiane, Lao PDR
Tel (856-21) 222 796
Fax (856-21) 222 797
Email: fsplao@laotel.com

Dr. Peter Kerridge
CIAT-Asia
P.O. Box 783
Vientiane, Lao PDR
Tel (856-21) 222 796
Fax (856-21) 222 797
Email: p.kerridge@cgiar.org

*Philippines*

Mr. Ed Magboo
FSP
Livestock Research Division
PCARRD
4030 Los Baños, Laguna
Philippines
Tel: (63-49) 536 0020
Email: ecmagboo@pcarrd.dost.gov.ph

Dr. Ralph Roothaert
FSP Regional Office
CIAT, c/o IRRI
Domestic Airport Office
P.O. Box 7777
Metro Manila, Philippines
Tel. (63-2) 845 0563/ 812 7686 ext. 6856
Fax (63-2) 845 0606/ 891 1292
Email: r.roothaert@cgiar.org

*Thailand*

Mrs. Chaisang Phaikaew
FSP
Division of Animal Nutrition
Department of Livestock Development
Phya Thai Road
Bangkok 10400, Thailand
Tel (66 2) 251 1941
Fax (66 2) 250-1314
Email: fspthai@ksc.th.com

*Vietnam*

Mr. Le Hoa Binh
FSP
National Institute of Animal Husbandry
Ministry of Agriculture and Rural Development
Thuy Phuong, Tu Liem
Hanoi, Vietnam
Tel (84 4) 8385 022
Fax ((84 4) 838 9775
Email: fspvietnam@hn.vnn.vn

# 9. Appendices

## *Common and botanical names of forages mentioned in text*

| Botanical name | Common name |
|---|---|
| *Andropogon gayanus* | Gamba |
| *Arachis pintoi* CIAT 22160 | Arachis |
| *Brachiaria brizantha* | Brizantha |
| *Brachiaria decumbens* CIAT 606 | Signal |
| *Brachiaria dictyoneura* | |
| *Brachiaria humidicola* var. Yanero | Yanero |
| *Brachiaria humidicola* var. Tully | Tully |
| *Brachiaria ruziziensis* | Ruzi |
| *Calliandra calothyrsus* | Calliandra |
| *Centrosema macrocarpum* | Centrosema |
| *Centrosema pubescens* | Ucayali |
| *Cratylia argentea* | Cratylia |
| *Desmanthus virgatus* | Desmanthus |
| *Desmodium rensonii* | Desmodium |
| *Flemingia macrophylla* | Flemingia |
| *Gliricidia sepium* | Gliricidia |
| *Gliricidia sepium* accession Retalhuleu | Retalhuleu |
| *Leucaena leucocephala* variety K 636 | Leucaena K636 |
| *Panicum maximum* | Guinea |
| *Panicum maximum* CIAT 6299 | Tobiata |
| *Panicum maximum* T 58 | Purple guinea |
| *Paspalum atratum* BRA 961 | Paspalum |
| *Pennisetum purpureum* | Napier |
| *Setaria sphacelata* - Nandi | Nandi |
| *Setaria sphacelata* var. *splendida* | Splendida |
| *Stylosanthes guianensis* CIAT 184 | Stylo |
| *Sesbania grandiflora* | Turi |

## *Trip report Lao PDR*

Ralph Roothaert, 5 – 13 March, 2001

### Purpose of travel

- To carry out a survey on indigenous fodder trees and shrubs in Lao.
- To plan FSP activities in Lao.

### Principal contact persons

Mr. Phonepaseuth Phengsavanh, FSP
Mr. Vanthong Phengvichith, FSLP
Mr. Pheng Khammavong, Livestock and Fishery Office, Luang Prabang
Mr. Champhone, Head of Section, Livestock and Fishery Office, Luang Prabang
Dr. Peter Horne, CIAT
Dr. Peter Kerridge, CIAT

### Survey

A research protocol had been developed before the start of the field study (attached). Four villages were visited, inhabited by the Hmong and Kasah minority groups, in the hillsides of Luang Prabang Province. Group discussions with farmers were held in every village, followed by individual interviews with key informants. In three villages botanical samples were collected of trees and shrubs to facilitate identification of the species. On the last day fresh samples were collected for nutritive analysis. These samples were taken to Vientiane where they were oven dried. Heavy rains, which had started unusually early this year and which did not stop throughout the last three days, hampered sample collection in the forests.

Information collected during the survey revealed that farmers used about 20 different local tree and shrub species, and that tree fodder played an important role in the cattle' diet. Preferences among the choices varied more among villages than among farmers within a village. Harvesting practices and uses also varied among villages and were related to cattle raising systems and land availability. It is unlikely that farmers in the hillsides would actively plant local trees and shrubs, since many species naturally regenerate in fallow land.

### Institutional observations

Phonepaseuth and I completed the workplan for FSP in 2001 and 2002, wrote a budget and a Letter of Agreement. We also planned activities for the experiment of on-farm fodder tree nurseries. We decided that this experiment would take place in the lower areas in Pek District, where there is an acute shortage of tree fodder. I had brought seeds to Lao of 13 fodder tree species.

In a meeting with Peter Horne, we discussed the plans of FSP (ADB funded) and FLSP (AusAid funded). We agreed that FSP field staff would participate in three training courses on participatory research, forage agronomy and social equity, all planned this year by FLSP.

In a meeting with Vanthong we agreed that a study on productivity of Pek grasslands would be carried out this year, within a wider study to develop improved feed systems of small scale farmers which utilise these grasslands. Vanthong will write the first draft research protocol for this activity, and circulate it for comments to the FSP and FLSP coordinators. A multidisciplinary research team is needed for this study, including expertise in the fields of animal production and social science.

There is a chance that both Vanthong and Phonepaseuth will leave FSP to take up studies for PhD and MSc degrees, respectively, starting this year. This would have major implications for the co-ordination of the project in Lao. Talks are going on to seek suitable candidates for replacements, such as Mr. Viengsavanh, the former FSP co-ordinator, who is expected to complete his MSc degree this year. Reserve candidates are Mr. Somchan and Mr. Sithone, who are trained in livestock production but who have no previous experience in the FSP project, nor in participatory research. Mr. Somchan finishes his MSc degree next year. Both need to participate in the planned courses on forage agronomy and participatory research.

**Conclusions and follow up**

The survey on the use and preference of indigenous fodder trees went well, despite the torrential rains. Botanical names of samples of trees need to be identified or confirmed in the Philippines. Samples for nutritive analysis need to be sent to Thailand for chemical analysis. The post of national coordinator of FSP in Lao is still unclear for the near future, and this issue needs to be addressed by NAFRI, Peter Kerridge and myself urgently.

## *Trip Report – Thailand*

Ralph Roothaert, 2 - 8 April, 2001

**Purpose of travel:**

- To assist in the development of methodology for participatory problem diagnosis, gender analysis, planning and evaluation with farming communities in Nakornratchasima Province, NE Thailand.
- To develop workplans and agreements with the FSP programme in Thailand for 2001.

**Principal contact persons:**

- Chaisang Phaikeaw, DLD, Bangkok
- Supachai Udchachon, Director Pak Chong_Animal Nutrition Research Centre, DLD
- Ganda Nakamanee, Forage Agronomist, Pak Chong_Animal Nutrition Research Centre
- Francisco Gabunada, Consultant Participatory Research, VISCA, Philippines

**Summary**

Two field studies were carried out: participatory diagnosis and planning with beef cattle farmers; and participatory evaluation with dairy farmers. Nine field workers and researchers were trained on the job. Dairy framers have been testing a variety of forage species for many years and experiences varied according to farm conditions and microclimates. FSP had not worked with beef farmers before and the participatory diagnosis during this study was the first contact. It was also the first time gender analysis was attempted, and this needs to be developed further. Many framers are interested to try new forage technologies and species. Reports on the studies will be written at Pakchong Research Station in Thai, with summaries in English. A workplan for 2001 was completed and a letter of agreement was signed.

**Participatory research**

FSP started participatory research in Thailand only one year ago. Several training courses have been conducted in Thailand, but it was felt that the team lacked general practical experience. Our visit was intended to assist in the development of participatory methods that would be applicable to the Thai situation.

Two days were spent visiting groups of farmers who raised beef cattle, in Sisakrabue, Kaisao and Nonesalao villages, and one day was spent visiting dairy farms, in Makuemai. FSP had not worked with the beef cattle farmers before, but the farmers had received seeds of *Brachiaria ruziziensis* 4 years ago from the research station in Pakchong. When we met the farmers, their only desire was to receive more seeds of *B. ruziziensis*. They agreed, however, to participate in some diagnosis exercises with our team. The results of our participatory diagnosis showed that livestock was an important

source of income. Farmers own relatively large herds of cattle (30 – 40 heads) which are herded throughout the year. There is a feed shortage as the communal land slowly disappears as a result of cultivation of maize and cassava, relatively new crops in the farming system. Farmers agreed to test some other forage grass species for grazing together with *B. ruziziensis*, on some areas just outside the residential centre of the village. They also wanted to test some herbaceous and tree legume species for cut and carry, to be fed to breeding bulls. Use of crop by-products for feed varied among villages, and was affected by access to communal grazing land. It will have implications on the use of improved forage technologies. Reports of the PDs are being written up by staff of Pakchong Station.

A large number of forage species and accessions had been tested by dairy farmers in Makuemai. The forages were evaluated through individual farm visits. Farmers were asked about their criteria of good forages, and subsequently rated the forages that they were familiar with, using these criteria in a matrix. Ganda and Chaisang were trained on the analysis of data from the matrixes, using Excel.

Some participatory planning exercises were conducted at the same day as the participatory diagnosis. Due to time constraint, planning was short and sometimes hurried. The research team needs to revisit the beef cattle villages to present the conclusions of the PD and to elaborate on planning of participatory research. Areas to focus on are type of forage technologies that are acceptable to the farmers and their system; species that can be used for these technologies, soils and climate; design of the participatory research; and methods of collecting data and information.

**Gender analysis**

Gender analysis is in its very initial stage in Nakornratchasima Province. By using gender sensitive cropping calendars it became clear that many agricultural activities, including livestock activities, are shared between men and women. However, there are some activities where men, women, hired labour or children play a specific role. At the start of the group meetings with farmers, women were either not present or not given a chance to introduce themselves. It took some effort to convince male farmers that women's inputs in discussions are as valuable as their own input. It will be a challenge for the research team in Pakchong to ensure that women farmers are equally represented in diagnosis, planning and evaluation activities. I also recommend that during these future group activities, if the participants agree, women and men are divided in sub-groups, in order to facilitate hearing women's voices. Knowledgeable women among dairy farmers should also be identified and included in the matrix ranking exercises, either together with their husbands or alone. Once women are more involved on the diagnostic phase, I expect that they will also have an influence in research planning.

**Training**

During the field studies, nine researchers and District Officers accompanied us, helped recording data and familiarized themselves with the different participatory tools. After three days, several of them were able to conduct parts of diagnosis and evaluation. The field trip contributed significantly in developing practical participatory research skills among field workers and researchers. Reporting skills could not be assessed.

## SEAFRAD

At the moment there are only two contributions for the next SEAFRAD Newsletter, from Indonesia and from the Philippines. Contributions are needed from other countries. I promised to assist Chaisang in editing two articles from Thailand and Vietnam. Contributions from Lao and China are still needed.

## Nutritive analysis indigenous fodder

Dried samples of the study on indigenous fodder trees and shrubs in Lao were received in Pakchong. Arrangements were made for nutritive analysis in Pakchong and Khon Kaen Research Stations.

## *Trip Report Leyte, Cebu and Mindanao (Philippines)*

Ralph Roothaert, 20 – 26 May 2001

**Purpose of travel:**

- To sign a memorandum of Agreement with ViSCA, to discuss FSP activities in Leyte and identify collaboration with ICRAF in Leyte.
- To visit Mag uugmad Foundation Inc. in Cebu and discuss modes of scaling up forage adoption in Cebu.
- To visit the FSP focus sites in Mindanao and assess the activities in the new municipalities.

**Principal contact persons:**

- Dr. Paciencia P. Milan, President, ViSCA
- Dr. Zosimo De La Rosa, Director, ODRD, ViSCA
- Dr. Jose L. Bacusmo, Director, FARMI, ViSCA
- Francisco Gabunada, FARMI, ViSCA
- Leonardo Moneva, Executive Director, Mag uugmad Foundation Inc., Cebu City
- Marco Stark, Post Doctoral Fellow, ICRAF – ViSCA
- Judith Saguinhon, MAO, Malitbog
- Perla Asis, City Veterinarian, Cagayan de Oro
- Antonio Guillermo, Municipality Office, Manolo Fortich
- Elsie Gabonada, Municipality Office, Impasugong
- Ed Magboo, PCARRD
- Jindra Samson, CIAT

**Summary**

A Memorandum of Agreement was signed between the Forages for Smallholders Project (FSP) and Visayas State College of Agriculture (ViSCA). A Letter of Agreement will be developed for ViSCA, for a grant of approximately US$ 4000. The ViSCA liaison person will start FSP activities in Leyte in collaboration with ICRAF and in Cebu in collaboration with Mag uugmad Foundation Inc. The FSP had been working in these provincesearlierand there is wide scope for scaling up, especially in Cebu. Forage technologies in Malitbog seem to be adopted well in remote areas, away from the roads. This tendency implies more strenuous fieldwork for development workers in future. In the new municipality Manolo Fortich farmers have adopted large areas of napier, but it is not clear which portion is a result of FSP activities, realising that we have only started working here 6 months ago. The only development worker there needs reinforcement. In the new municipality Impasugong an active team of development workers has started work with more than 40 farmers in just 6 months time. Their continuing efforts are encouraged. In Cagayan de Oro City adoption of forage has reached a large scale. Cattle and buffalo dispersal programmes encourage farmers to plant more. There is a

uniqueness in all municipalities with regards to livestock systems, barangay laws, co-operative developments and infrastructure, which in turn results in unique forage technologies and farmers' research.

**ViSCA**

A Memorandum of Agreement (MoA) was developed by ViSCA and FSP before the trip. Dr. Paciencia explained the a formal agreement was necessary to regulate Francisco's involvement in FSP activities. She was concerned that Francisco would not have enough time to finish his studies if he was over stretched. It was agreed that other staff of FARMI would benefit from the CIAT collaboration, and that they would be involved in FSP activities in Leyte and Cebu. FARMI staff would work closely with LGU staff, ACIAR project staff, and ICRAF staff. Francisco will be assigned Liaison person between CIAT and ViSCA. Financial reporting has to go through official channels within ViSCA. A separate body was recently developed providing services to ViSCA, and greatly improving the efficiency of funds withdrawal and financial reporting. The agreement was signed 8 fold. Francisco will draft an FSP workplan for Leyte and Cebu within the next two weeks. The workplan will be summarised in a Letter of Agreement (LoA) and funds will be dispersed after signing. A laptop similar to the ones we recently bought for other FSP partners will be part of the LoA.

I also met with Marco Stark of ICRAF, who has an office at FARMI - ViSCA. Marco has developed ICRAF's soil management research programme with upland farmers in Bohol and Leyte Provinces (islands). We discussed strategies of synergy between FSP and ICRAF in Leyte, since we are now both working there. The Municipalities of Tabango and Baybay are the places where there seems to be good scope for exploratory work of FSP and possible collaboration with ICRAF. There seems to be more pressure on land in those municipalities, a factor which I consider important for the interest of farmers to develop forage technologies. Francisco will explore livestock densities in those areas, availability of LGU staff, and farmers' interests (**Action F.G.**). Soils are generally infertile and shallow, which provides challenges and opportunities at the same time for forage technologies on contours.

**Mag uugmad Foundation Inc.**

I met with Leonardo Moneva of Mag uugmad Foundation Inc. (MFI), who showed me the results of previous FSP on-farm research in the field. MFI started in 1981 and operates by farmers for farmers. During the past 20 years, 23 people organisations were formed and registered by the government. Some organisations have obtained the status of co-operative. Forage technologies are a sample of the sustainable farming practices that farmers have developed and widely adopted. About 200 farmers are growing improved forages along contours. There is scope for dissemination to other municipalities in Cebu, which MFI is happy to facilitate. Setaria *sphacelata, Paspalum atratum,* and *Panicum maximum* T58 and are extensively planted on contours. Farmers also like to plant legume trees such as *Leucaena diversifolia, L. leucocephala* K636, *L. leucocephala* 584, *Gliricidia sepium, Calliandra calothyrsus,* and *Desmanthus virgatus.* Two criteria for fodder trees which were mentioned several times were palatability and the ability to withstand frequent pruning. For the latter reason, *Desmodium cinerea* and *Sesbania spp.* were less liked. Planting material and seeds of legume trees forms a constraint for their wider cultivation. There are some farmers who

have planted *Morus alba* (mulberry) in preparation for a silk worm project. I advised that if the silk project doesn't push through, these hedges of mulberry would provide highly digestible feed for ruminants. Mulberry withstands heavy pruning and is easily propagated by cuttings. It was agreed that Leonard would write a workplan together with Francisco, which would be the basis for an LoA (**Action F.G., L.M.**). Possible new interventions would be to: 1. disseminate forage options to new areas in north and south Cebu, 2. to conduct more research on fodder trees, 3. train farmers and development workers, and 4. network with other groups.

**Malitbog**

We had an physically active morning tracking the hills of Malitbog visiting isolated farms, without infrastructure. These were farms that joined FSP 1 to 2 years ago and have planted many strips of forages along the contours in their farm land. The most preferred species were *S. sphacelata, P. atratum, and P, maximum* because of fast growth, high palatability, and appropriate growth form. *Brachiaria ruziziensis* was rejected by a farmer because of its creeping and spreading growth habit, making it less suitable to grow on contours. *S. sphacelata* was the most preferred species, because it has a strong root system and can holds soil runoff better than other species. The three species and *B. brizantha, B. decumbens* and *B. ruziziensis* are being multiplied by a farmer for distribution. *Stylosanthes guianensis* CIAT 184 is being cultivated to feed goats. Although farmers had fallow land, these were sometimes too steep for grazing or tethering. One farmer recently sold a bull of about 130 - 150 kg for PhP 5000, equivalent to PhP 33 to 38 per kg liveweight (US$ 0.66 – 0.76). Dressed meat in the local market is sold for PhP 125 per kg; middlemen are doing good business.

We visited the on farm run-off test plots developed by a farmers' group assisted by Jindra and ICRAF. The slope consists of 4 treatments: 1. Vertical ploughing without contour barriers (farmers' practice), 2. Horizontal ploughing without contour barriers, 3. Horizontal ploughing with strips of setaria on contours, and 4. Horizontal ploughing with strips of setaria, napier and guinea grass on contours. Soil is being collected at the bottom in trenches with bamboo lining. After a few weeks differences between treatment 1 and the rest were already apparent. The experiment was established through farmer's' labour, which turned out to be more expensive than hiring labourers, because the projects provided lunch for all the farmers. However, the expenses can be considered as an investment in farmers ownership of the experiment, through the provision of their own labour. Two more replicates are being constructed on other farms. ICRAF's Jun Mercado has provided useful technical advise, and has hosted the farmers during a cross visit to ICRAF's project in Claveria. The experiment deserves credit for a successful attempt of collaboration between the two CGIAR centres.

**Manolo Fortich**

Manolo Fortich is one of the new municipalities of FSP phase II. No reports had been submitted by the municipal office of Manolo Fortich since FSP activities started in October 2000. A report was submitted upon our arrival. The report describes a one day training event of 800 farmers, the 1st Manolo Fortich Beef Congress, organised by the LGU. The report lists the number of farmers who have planted forages, but doesn't distinguish between farmers who planted before FSP's involvement and the ones who

planted after FSP's involvement. Several seminars, cross-visits and farmer field days have been conducted. We visited a dairy farmer who has been in the business for two years. He had about one ha of napier, and had established new test plots of *P. maximum.* The *P. maximum* was suffering from N deficiency. He also used *Flemingia macrophylla, L. leucocephala, G. s*epium and jack leaves. All forages were either cut or grazed by tethered animals. The price of milk farmers receive is PhP 12 per kg, and they have to bring the milk daily to a collection centre, which is 3 to 7 km away. Farmers walk in stead of hiring a motorcycle in order to save money.

600 farmers in Manolo Fortich had benefited from a fattening scheme of Del Monte, in which they fatten lean cattle for 6 months and are paid for the liveweight increase. The project had strong support from the Mayor. A new candidate has recently won the elections for Mayor. She has an animal nutrition background and it is both desirable and likely that she will continue the cattle fattening relationship with Del Monte. Currently there is only one agricultural technician facilitating FSP. We need to discuss with the new mayor how we can increase the assignment of new FSP development workers (**Action E.M.**).

### Impasugong

Impasugong is another new municipality of the FSP phase II. No reports had been received since FSP activities started in October 2000, but a report was submitted upon our arrival.
The team consists of 8 agricultural technicians who operate in a group when dealing with farmers. They have scheduled weekly meetings with 3 farmers groups. The participatory diagnosis is a continuous process, whereby different participatory research tools assist different exercises each week. 42 farmers have planted forages ranging from 1 to 30 m hedges or strips. Farmers we visited were enthusiastic and were intending to expand their areas of forages with napier, setaria, guatamala grass and paspalum, using their test plots as sources of vegetative planting materials. The FSP group has worked well and I trust they will be able to use further funds in a sound and efficient manner.

### Cagayan de Oro

Although less than 10% of the farmers in the Cagayan de Oro City have livestock, we observed during our farm visits that all farmers who have planted forages, have planted large areas. They all reported they have enough forage to feed their animals throughout the year and give excess feed to other co-operative members. Many wanted to expand their area under forage as they intend to increase the number of animals. Animals they currently had were drought and dairy buffaloes; local, beef and dairy cattle; and goats. In contrast with other municipalities in Mindanao, where forage contours were the norm, farmers here planted large blocks of fodder. The most widely cultivated species is napier, but *B. decumbens, P. maximum*, and *P. atratum* are also common. One farmer recently planted more than 1 km strips of guinea grass and napier on contours, with planting materials obtained from key farmers in Lumbia and Pagalungan. *Arachis pintoi* is moderately adopted as pasture by some farmers.

The logistics of the experiment on fodder tree nurseries was discussed. A similar experiment has already started in Lao and Thailand. At least 3 male and 3 female farmers are expected to participate in each country. Training and close monitoring of farmers will be required during the first two months (**Action P.A. and assistants**).

**Other remarks**

In Manolo Fortich, Impasugong and Cagayan de Oro City Barangay laws have been implemented which poses fines on stray cattle, buffaloes and goats, to protect farmers crops. These local laws have a positive effect on the adoption of improved forages, as tethering of animals has to be done on their own land. It is interesting to note that forage systems and preferred species vary among the different municipalities, but are quite uniform within the municipalities. These systems and species are influenced by both cultural factors and by the livestock systems.