

Farmer evaluation of forages in Vietnam: Progress and plans

Bui Xuan An¹, Le Van An², Truong Tan Khanh³, Le Hoa Binh⁴ and Bui The Hung⁵

Farmer participatory research with forages began at four locations in Vietnam in 1997. A brief description of the four sites is presented in Table 1. The aim of this work was to identify which broadly adapted forage species are preferred by farmers and why.

Site descriptions

The descriptions of each of the locations where the project has commenced on-farm evaluations are as follows:

M'Drak, Daklak Province

General description

M'Drak District is located in the central highlands of Vietnam. Of 196,600 ha, more than 65,000 ha are *Imperata* grasslands and 'bare hills.' Rolling hills dominate the landscape with a high degree of sloping land (>70% of land has a slope >10%). Soil is moderately infertile and acidic (pH: 5.0-5.5). The altitude varies from 500 to 900m. Average annual rainfall is 2000 mm, with 8 wet months.

Table 1. Physical characteristics of sites for on-farm forage evaluations.

Site	Latitude	Altitude (m)	Annual rainfall (mm)	Wet season	No. of wet months (>50 mm)	Soil characteristics	Farming system
M'Drak	12° N	500	1890	May-Dec	8	<ul style="list-style-type: none"> - PH (H₂O): 5.0-5.5 - Sandy loam - Well drained - Moderately fertile - P deficient 	<ul style="list-style-type: none"> - Shifting cultivation on steep hills - Extensive grasslands - Home-gardens - Small areas of paddy rice in the valleys
Xuan Loc, Hue	16° N	150	2300	Jul-Feb	8	<ul style="list-style-type: none"> - PH (H₂O): 5.0-5.5 - Sandy loams - Light to medium-textured - Well drained 	<ul style="list-style-type: none"> - Slash-and-burn cultivation on steep hills - Irrigated rice - Home gardens - Livestock
Ha Giang	22° N	70	1800	Apr-Nov	8	<ul style="list-style-type: none"> - PH (H₂O): 5-6 - Fertility medium - Well drained - P deficient 	<ul style="list-style-type: none"> - Wetland rice in the lowlands - Forestry - Home-gardens of fruit trees - Intensive upland cropping
Tuyen Quang	21° N	40	1640	Apr-Oct	7	<ul style="list-style-type: none"> - PH (H₂O): 5-6 - Fertility medium - Well drained - P deficient 	<ul style="list-style-type: none"> - Wetland rice in the lowlands - Forestry - Home gardens of fruit trees - Intensive upland cropping

¹ University of Agriculture and Forestry, Thu Duc, Ho Chi Minh City, Vietnam.

² College of Agriculture and Forestry, University of Hue, Hue, Vietnam.

³ Department of Agriculture, Tay Nguyen University, Buon Ma Thuot, Daklak, Vietnam.

⁴ National Institute of Animal Husbandry, Thuy Phuong, Tu Liem, Hanoi, Vietnam.

⁵ Vietnam-Sweden Mountain Region Development Program, Hanoi, Vietnam.

Description of the community

There are two main ethnic groups in M'Drak: the *Ede* and *Kinh*. The *Ede*, a local minority group, has been living in the M'Drak area for a long time. Their main farming system is shifting cultivation. Maize and upland rice are grown. After 3-4 crops, when soil fertility is exhausted, they move to another place. Since 1975, there have been attempts by the government to settle the *Ede* people and discourage shifting cultivation. Consequently, the main farming system consisted of replanting forests, keeping livestock (mainly cattle), and cultivating intensive annual crops (mainly wetland rice, upland rice, maize, and beans). The *Kinh* people migrated from different areas to M'Drak 10 years ago. This group has experience in agricultural production. Their intensive farming includes industrial crops (coffee, pepper, rubber), intensive upland cropping, lowland rice, and livestock (raising cattle). Most families in the area raise cattle and goats, with income from livestock contributing about 30-40% to total household income. The main feed resource for cattle is *Imperata* grassland. Agricultural and forest land was allocated to farmers, according to the capability of each family to work that land. Few farmers have private land for grazing. Some are now trying to improve *Imperata* grassland and to plant forages to maintain a regular feed for their animals.

Xuan loc, Thua Thien Hue Province*General description*

Xuan loc commune is located in Phuloc District, Thua Thien Hue Province at 16°15'N. It is an upland area with an altitude ranging from 100 to 300 m and a high proportion of sloping land. The original forest vegetation was destroyed by herbicides during the war, slash-and-burn cultivation and timber harvesting. *Imperata* grassland has rapidly replaced all areas where forests were destroyed. The total land area of the commune is 42,000 ha. Of this, cultivated agricultural land occupies only 120 ha, with 30 ha for wetland rice and 90 ha for cassava and other upland crops. The climate is monsoonal with a short dry season from March to July. Annual rainfall is about 2,600 mm, with 80% falling in September-November. Soils are mainly infertile, well-drained sandy loam, with pH - (H₂O) ranging from 5.0 to 5.5.

Description of the community

There are two ethnic groups in the commune – the dominant lowlanders (*Kinh*) and the *Vankieu*. The population of the commune is more than 2,000 people who belong to 450 households. Lowlanders migrated to this district from the coast in 1976. Many were poor fishermen seeking a better future. The *Vankieu* people migrated from another province in the north in the 1980s. The main agricultural activity of the *Kinhs* is cultivating irrigated rice and food crops such as cassava, sweet potato, and beans. The *Vankieus* practice slash-and-burn farming with cassava and upland rice as main crops. With the clearing of the forest in the early 1980s, 4,000 ha of communal grazing land (mainly *Imperata*) became available. Cattle number increased rapidly, providing a new and reliable source of income, requiring little investment or labour. About 60% of farmers in the commune depended on cattle raising for their livelihood. However, deforestation also created problems. The intensive rainfall in September-November and the steepness of the slopes resulted in erosion problems. In 1993, a reforestation program was implemented. This included a ban on cattle grazing in the reforested areas. Suddenly the increased cattle number and reforestation efforts left farmers with insufficient feed for their animals. Cattle and buffalo are a major source of income for most households. There are more than 1600 cattle and 200 buffaloes. Some families have 10–30 head of cattle. A few farmers have started to raise goats. Most animals graze freely on the *Imperata* grasslands, with cut native forages provided as additional feed. Some locally available by products (rice straw, sweet potato leaf and root, rice bran) are also used.

Ha Giang and Tuyen Quang provinces

General description

Ha giang and Tuyen Quang are located in the northern mountain region of Vietnam. Winters are cold with strong winds. Rainfall ranges from 1600-1800 mm (with some mountain areas receive as much as 4800 mm). The wet season begins in April and last 7-8 months. The soils of the mountainous and hilly regions are medium-textured, moderately fertile, and well drained. The land use systems are mainly wetland rice in lowlands, home gardens with fruit trees, forest plots, and shifting cultivation and natural grassland (in a few areas). Cattle and buffalo are kept for sale, meat, and draft power. The demand for meat increases at about 6% per year in this northern region, while the number of animal is increases only 2-3% per year. Animals graze freely on natural grasslands, forest, and fallow cropland during the day and are brought back to the houses at night. Some farmers supply extra feed at night, especially during cold weather or during ploughing. Feed shortages are becoming severe in these communities.

Procedures and outcomes of participatory diagnoses

Xuanloc Commune, Hue

Participatory diagnosis

A PRA conducted at Xuanloc in 1995 showed that livestock provides a vital source of income for most villagers. But their major problem is year-round feed shortage because of reduced land areas for grazing. In 1996, the College of Agriculture and Forestry in Hue conducted a PD of 50 households within the commune.

Problems identified by farmers, in order of priority, were:

- Lack of feed for their cattle. Farmers said that their cattle have very low weight gain and are thin. Some die during the cold, wet weather.
- Less land available for grazing. Most land was used for replanting forest trees. Animals were forbidden to graze in the new forests.
- Poor quality of animal breed. The farmers wanted to try crossbred cattle which have become common in other districts.
- Children spend a lot of time taking care of the animals. They do not have enough time for their studies.
- Wandering animals destroy crops.
- Soil erosion as a result of heavy rain.

Current coping mechanisms:

- Feeding animals with agricultural by products.
- Planting elephant grass for use as cattle feed.
- Obtaining credit to acquire crossbred cattle.
- Make plans for forest land use.

A nursery of forage species established in the commune in 1996 became a useful demonstration area. Farmers were able to see what the forage species look like.

On-farm activities

1996

- Established a forage nursery of 53 species. The nursery was set up on 2,000 m² of a farmer's field.
- Farmer's meetings convened to discuss potential use of forages according to their farming system.
- Data collected on growth and development of forage in the nursery every month.

1997

- Farmer participation in the nursery evaluation was encouraged to gain initial feedback on what species are liked and why.
- Data collection from the nursery continued.

- 5000 seedlings of *Leucaena leucocephala*; *Calliandra calothyrsus* and *Gliricidia sepium* were produced and distributed to eight farmers for evaluation.
- It was initially planned to begin on-farm evaluation in 1998, but some farmers were so keen in getting started that seeds of *Stylosanthes guianensis* CIAT184; *Brachiaria brizantha*, *B. decumbens*, *B. ruziziensis*, and *Panicum maximum* were distributed to eight farmers ahead of schedule.

1998

- The number of farmers evaluating the forages will be expanded.
- A training course on developing forage technologies with farmers was conducted in February 1998.

M'Drak, Daklak

Participatory diagnosis

Participatory diagnosis has not yet been conducted in M'Drak but is planned for April 1998. However, on-farm work began in 1997 because the FSP local partners have considerable experience in the area. Moreover, farmers at the Chu' kroa commune had substantial livestock feeding problems which they were anxious to solve. Chu' kroa commune was established in 1987 by the Kinh migrants from the over-populated areas of north Vietnam. The commune consists of 320 families in six villages situated on 20,000 ha of land. However, the commune has very little rice land (65 ha) and *Imperata* dominates large areas of the hills. After the commune was established, land was allocated to farmers according to their capacity to use the land. In this way, families with excess labour received more land than families with none. As a result, large differences in land area exist: some households have more than 90 ha and others have less than 1 ha. The primary agricultural activities are upland cropping (cassava, beans, sweet potato), forest plots (government pays farmers for maintaining small plots of *Eucalyptus* and *Acacia*), and livestock (cattle, pigs, chickens and fish). Approximately 1500 head of cattle are kept by 90% of the households, with number per household ranging from 1-2 up to 90 animals. Cattle raising is an essential source of livelihood for these farmers, providing income and using land that cannot be used for any other activity (the *Imperata* grasslands). Usually, the cattle graze during the day and are put in pens at night. The most common problem mentioned by farmers is the very poor quality of grassland. As a result, they have to take the animals over long distances to find green feed each day. During the wettest time of the year (November and December), animals are frightened by the thunderstorms and become lost. They, therefore, need to keep their animals closer to home during this time.

On-farm activities

1995/1996

- A nursery evaluation (comprising 70 grasses and legumes) was established on a farmer's field in M'Drak District. After two years of evaluation, 20 promising (adapted) species emerged. The best species were *Andropogon gayanus* CIAT 621, *Brachiaria brizantha* (several accessions), *Brachiaria decumbens* cv. Basilisk, *Panicum maximum* CIAT6299, *Brachiaria humidicola* (various accessions), *Stylosanthes guianensis* CIAT 184, *Chamaecrista rotundifolia* cv. Wynn and *Arachis pintoi* CIAT 17434.
- These species were planted in three other regional sites to confirm their broad adaptation (one in an area near M'Drak, one at Buon Don, and one at Kontum). The broad adaptation of these species was confirmed. The regional evaluations generated interest among the local farmer groups who visited the nurseries and brought home some planting materials.

1997

- Farmers from Chu' kroa commune visited the forage nursery and identified forage species that they want to test. 15 farmers in the commune and 5 farmers who have

been allocated land by the Daklak Livestock Production Company planted these forages.

- The species planted were *Andropogon gayanus* cv. Kent, *Brachiaria brizantha* CIAT6780, *Brachiaria decumbens* cv. Basilisk, *Panicum maximum* TD58, *Brachiaria ruziziensis*, and *Stylosanthes guianensis* CIAT 184.
- Regular meetings with farmers were held. Some farmers have already begun to expand the area that they are cultivating. A significant demand exists from other farmers in the commune who have seen these forages growing and who want to become involved in the project.

Ha Giang and Tuyen Quang Provinces

Participatory diagnosis

The work in Ha Giang and Tuyen Quang is conducted in collaboration with the Vietnam Sweden Mountain Rural Development Program (MRDP). This program has been going on for 7 years. Detailed PRAs were conducted in the target villages over the first 5 years. A consistent finding was the identification of livestock feed shortage as a major problem. As a result, the MRDP invited FSP to participate in forage technology development in their target areas.

The main problems identified by the farmers in raising livestock were:

- Lack of good animal breeds.
- Disease.
- General feed shortages (particularly in the dry season).
- Lack of cheap feeds for fish and pigs.

To overcome feeding problems, farmers use many agricultural residues and by-products as substitute feed.

On-farm activities

1997

- Innovative farmers were identified in each location to take part in the evaluation of forages for intensive backyard systems. The species originally offered were those that performed well in a regional nursery established at the Forestry Research Centre in Vinh Phu. These were legumes: *Stylosanthes guianensis* CIAT 184, *Stylosanthes hamata*, *Centrosema pubescens* cv. Cardillo, *Centrosema brasilianum*; and grasses: *Brachiaria brizantha* CIAT6780, *Brachiaria decumbens* cv. Basilisk, *Brachiaria ruziziensis*, and *Panicum maximum* TD58.
- In Ha Giang, 11 farmers planted forages. However, within the same wet season, 10 other farmers multiplied the species they liked (vegetatively) and planted these on their own land.
- In Tuyen Quang, a similar situation occurred. Seven households initially planted forages and 3 others joined spontaneously using vegetative planting material.
- Most forages were planted in small backyard plots. Participatory evaluation showed that the most preferred species are *Brachiaria*, *Panicum maximum* TD58, and *Stylosanthes guianensis* CIAT184. The main reason is that these species can also be fed to fish and pigs.

Conclusions and future activities

Farmer evaluation of forages began in 1997. At four locations, we have started working with a small number of farmers. In the process we have gained a lot of experience in using participatory methodologies. These methodologies, though time-consuming, are an effective way of working with poor farmers. If we really want to help these poor farmers solve their livestock feeding problems, we need to commit ourselves to working closely with them over a number of years, not months.

We have learned that, at all sites, there is considerable demand and potential for expanding on-farm work in 1998. The species that proved to be broadly adapted include *Brachiaria brizantha* CIAT 6780, *Brachiaria decumbens* cv. Basilisk, *Panicum maximum* TD58, and *Stylosanthes guianensis* CIAT 184.

The activities planned for 1998 include:

- 1) Getting more farmers involved in each site.
- 2) Expanding to other villages in the target areas. In Ha Giang, we will collaborate with World Neighbours in an area where Hmong farmers have started to manage grasses and *Leucaena* to feed their livestock. In Daklak, we will begin collaborative work with a GTZ rural development project that has found many farmers who want to eradicate *Imperata* (a problem similar to that in Chu' Kroa). Also, in Daklak, we will start evaluating cover crop species for erosion control in smallholder coffee plantations with DANIDA.
- 3) Commencing on-farm evaluations in Binh Thuan Province under the supervision of the College of Agriculture and Forestry in Ho Chi Minh City.
- 4) Conducting regular participatory evaluations of forages at existing sites and new sites.
- 5) Introducing some potentially promising species for evaluation, including *Setaria sphacelata* cv. Solander (for the north), *Chamaecrista rotundifolia* for ground cover in fruit orchards, earlier flowering lines of *Stylosanthes guianensis* for the north, and *Flemingia macrophylla* for fish feed.
- 6) Conducting a training course on 'Developing forage technologies with farmers' (in February 1998) and provide follow up field experience and informal training for participating farmers.
- 7) Training farmers on forage production, management, and utilisation.
- 8) Continuing other activities which support our on-farm work, including forage tree legume evaluations and seed production in Daklak (OFI), *Gliricidia* evaluations on farm in Quang Ninh province (FAO), and *Brachiaria* seed production trials in Daklak.
- 9) Translating and publishing the manual '*Field experiments with forages and crops. Practical tips for getting it right the first time*'.

Acknowledgements

The authors thank the following for supporting the program with funds, facilities, and staff: the FSP regional program, local villages and districts authorities at all sites, Hue University of Agriculture and Forestry, Tay Nguyen University, College of Agriculture, (Ho Chi Minh City), National Institute of Animal Husbandry, and all the farmers in the various sites.