

Livestock and forage management in stabilising shifting cultivation

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While acknowledging the complexity and diversity of shifting cultivation systems, some generalizations can be made to illustrate the role ruminant livestock play in stabilising them. In the remoter areas of Northern Laos, rice shortages caused by frequent but irregular climatic catastrophes, are common. Such shortages can last for more than 6 months and have a serious impact on household security. Traditionally, farmers have dealt with these shortages by drawing on the natural capital of the forests, by hunting and gathering, growing less popular food crops such as maize and cassava, and by purchasing rice. Often, these farmers have little to sell but their labour, or opium, some forest products, medicine, herbs, and their livestock - cattle, buffalo, pigs, goats and chickens. The government discourages the production of opium and forest resources are decreasing as population pressure grows and villages are resettled away from their traditional forest resources. Gradually, farmers have become increasingly reliant on livestock for their cash income.

Benefits from livestock

There are a number of benefits in raising ruminant livestock:

- They have an assured market with relatively stable prices;
- They do not need transport: cattle and buffalo can be walked long distances. In one recent example, some H'mong farmers walked their 20 bulls 350 km from Xieng Khouang to market them in the capital, Vientiane;
- Provide a good profit for a relatively low input of labour;
- Are wealth that can be used in emergencies;
- Utilise natural resources (grass, rice straw, tree leaves) that would otherwise be wasted;

- The manure can be used to maintain the fertility of irrigated rice fields and home gardens. Some livestock owners sell manure to lowland farmers.

Serious problems offset these benefits including disease, limited fodder resources, and crop damage. However, the benefits are so substantial that, in almost all areas, farmers continue to raise livestock to help safeguard their livelihood.

Fodder scarcity

Factors that have contributed to the scarcity and degradation of traditional fodder resources include a growing livestock population and the over-utilisation of grassland, rice straw, and forest resources. The expansion of agriculture into traditional grazing land, the reforestation of grazing land, reduced productivity of native grasses and restricted access to forest grazing land are also serious problems.

Options for improvement

Shifting cultivators often have very few alternative ways of feeding their ruminant livestock. Alternative strategies include moving livestock between wet and dry season grazing areas; storing or reserving rice straw for dry season feeding; and cultivating grasses on fallow land to provide cut feed for penned animals.

The first two strategies are fairly well developed throughout the region and there is little potential for adaptation. However, the third strategy, managing forages, offers a promising possibility and can

be developed in partnership with farmers. Villagers are most interested in cultivating forage species that can be given as cut feed to penned animals and improving the grazing areas used for community managed herds. Case studies have shown that farmers are particularly interested in having wet season supplementary feed for their cattle, dry season supplementary feed for buffaloes and cattle and more manure for their rice fields. They also want to control the amount of damage animal inflict on crops and minimise livestock losses.

In many cases, farmers are strongly motivated to manage feed resources, but their innovative capacity is constrained by a lack of information and planting material. The successful development of forage technologies, however, does not depend on the quantity of planting material distributed, but on carefully selecting farmers who acknowledge they have a real problem and who are prepared to seek solutions in co-operation with development workers. If this approach is combined with a broad range of robust technologies, the chance of successful adoption is much higher. For example, the upland areas of Bali are renowned for the widespread use of *Gliricidia sepium*, a shrub used as a living fence and source of dry season fuel. Yet this species was only introduced in 1970 in a "hundred cuttings" and owes much of its success to the fact that farmers were able to identify their problem and found the species appropriate, robust and easy to manage.

Forages that stabilise

In Northern Laos, farmers and development workers are exploring ways in which forage species introduced into the area can be integrated into technologies that will help stabilise shifting cultivation. This is being done in two ways. First, by comparing indigenous feeding strategies, such as cutting and grazing, using an introduced species. Second, they are developing new ways of incorporating introduced forages into existing shifting cultivation systems.

Regional evaluation of more than 70 forage species in five locations resulted in the identification of eight broadly adapted and robust species.

- *Brachiara brizantha* (currently cv Marandu with other lines soon to be tested),
- *Brachiara decumbens* cv basilisk,
- *Brachiara humidicola* CIAT6133,
- *Brachiara ruziziensis* cv Kennedy,
- *Andropogon gayanus* cv Kent,
- *Panicum maximilliani* T58,
- *Paspalum atratum* BRA9610,
- *Stylosanthes guianensis* CIAT184.

These species are now being evaluated for their potential in cut-and-carry or grazed systems by about 100 farmers in three northern provinces. At this stage, evaluations are informal and without replication, because the aim is to encourage a greater number of farmers to participate in farmer innovation. Should promising innovations emerge, they will be encouraged by farmer-to-farmer visits and studied in more detail in formal, replicated on-farm trials. At the moment, farmer-managed trials are either in progress or are just beginning. They will evaluate and adapt three potentially useful innovations suggested by researchers on the bases of experience gained elsewhere. These innovations are discussed below.

Forage trees and fences

Crop damage caused by livestock is a major and constant concern in the upland areas of Northern Laos. Farmers already use some living fences (mainly *Jatropha curcas*) either to keep animals in or out of

fields. In some areas, especially those managed by H'mong people, enormous efforts are put into building solid, semi-permanent fences of wood, wire and bamboo. Living fences incorporating *Gliricidia sepium*, *Laucaena leucocephala* (on better soil) and *Calliandra calothyrsus* (in the higher areas) have considerable potential and can ease this burden as well as provide supplementary feed. However, the technical advantages and limitations of these trees need to be evaluated by farmers and development workers together and farmers' criteria for accepting or rejecting these technologies must also be carefully explored.

Oversowing upland rice.

Oversowing upland rice with *Stylosanthes guianensis* is not new but it is an innovation that has the potential to improve subsequent fallows and provide benefits such as reduced weeding and increased soil fertility. The use of forage legume species for fallow fields in shifting cultivation areas has been the subject of much detailed and promising research. Although the potential benefits such as reduced weeding requirements, improved soil fertility, easy establishment after a round of weeding and reduced risk of erosion, are well documented, farmers have been slow to adopt it. There are many reasons for this, but probably two are particularly important. First, most of the work done in Laos on *Stylosanthes guianensis* has been carried out on research stations or in researcher-managed trials with the expectation that the technologies can then be "extended" to farmers. There is a need to establish informal oversowing trials with farmers to discover what aspects of oversowing appeal to them and to see what treatments should be studied in subsequent formal trials. Second, sowing fallow fields with forages means they can be better protected from uncontrolled grazing. Fallow improvement with the farmers of Hoauy Hia village would almost certainly fail because of the lack of sturdy fencing. However, in H'mong areas where individual fallow fields are often sturdily fenced, the potential is much higher.

Informal and formal trials with farmers began with oversowing *Stylosanthes guianensis* CIAT184 in upland rice fields after the first round of weeding. The species has demonstrated particular potential. It was able to establish itself rapidly, had a low impact on rice yields if sown late enough, and is able to grow well on poor soils. Several other legume species are also being considered for this purpose.

Oversowing maize

In several areas of Northern Laos, farmers had complained about the burden of weeding maize fields. This is especially true in areas of poor soil where maize growth is slow and the crop cannot out-compete weeds. After the successes of farmers in Makroman village, Indonesia, several legume species, including *Centrosema pubescens*, *Stylosanthes guianensis* CIAT184 and *Chamaecrista rotundifolia* cv Wynn) were oversown into young maize and evaluated in informal farmer trials.

Conclusions

Farmers in the shifting cultivation areas of Northern Laos are strongly dependent on ruminant livestock for livelihood security. Diminishing feed resources have caused some farmer groups to take steps to manage feed resource, particularly through planting introduced forage species. Others recognise the problems but have not had sufficient access to information or planting materials to help them develop their own forage technologies. Both groups of farmers are prepared to work with development workers to explore ways in which local feeding technologies can be strengthening by introducing new, robust forage species, comparing them to existing species and evaluating new ways of incorporating them into existing farming system. ■

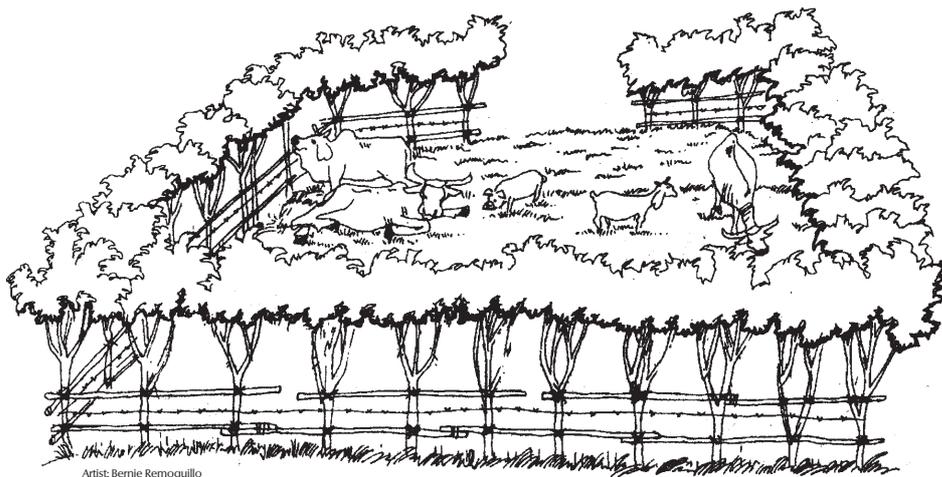
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The information in this paper has been gained from the field experiences of many dedicated development workers associated with the Forages for Smallholders Project.

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References

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Artist: Bernie Remoquillo