

# Indigenous fodder trees for rehabilitation

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In the hilly communities of Western Batangas, South Western Luzon in the Philippines, farm households depend largely on the sale of livestock as a source of income, and are farmers therefore highly concerned about the available fodder supply. In this area, the main farming system can be characterised as slash-and-burn or swidden agriculture. Patches of land (0.5-1.0 ha) are cleared from tropical rainforests and then planted with food crops such as corn, rice and beans. After growing crops for two to three years, the area is left fallow for four to ten years. These fallow lands are used as grazing areas and consequently do not get the chance to recover. Instead, grazing animals cause land degradation through overgrazing and trampling the land. Manure and urine return only a limited amount of nutrients to the soil. Furthermore, the fallow lands usually only provide poor quality forage. The livestock carrying capacity of these grasslands is low because of the predominance of poor quality pasture grasses such as *Imperata cylindrica*, *Themeda triandra* and *Chrysopogon aciculatus*.

Cattle and goat raisers have traditionally relied on indigenous fodder trees and shrubs as animal feed. They shifted to *Leucaena leucocephala* (ipil-ipil) when this multipurpose tree was heavily promoted in the 1970s. However, after a psyllid (an insect) attack destroyed *Leucaena* stands in 1985, farmers showed a renewed interest in the use of indigenous fodder trees and shrubs, although the remaining *Leucaena* stands continue to be utilised.



Farmers carrying fodder over long distances. Photo: Blesilda Calub

Farmers appreciate fodder trees and shrubs as they play an important role in bridging the gap in fodder supply during the critical dry months. Being perennials, trees are more able to withstand prolonged periods of moisture stress than grasses. In addition, fodder from trees and shrubs have a high nutrient value that supplements the, often poor, quality of crop residues, the normal feed during these dry months. However, harvesting of fodder trees and shrubs has often been so heavy that the trees cannot regenerate as it prevents trees from producing the seeds required for natural regeneration. Despite these problems, farmers were not inclined to plant fodder trees. They believed that, being indigenous, these trees would grow by themselves. At the same time farmers also pointed out that fodder trees and shrubs that used to grow around their homes have now receded farther into the mountain forests. They now need to travel further and spend more time gathering tree fodder.

## Domestication of fodder trees and shrubs

From 1997 to 2002, a project on the domestication of indigenous fodder trees and shrubs was undertaken to address these problems. The project had an action research/participatory technology development approach. On-farm trials were conducted with farmers to help refine technologies that would fit into existing farming circumstances. Farmers participate in the programme because they liked to experiment and try out new technologies. They were also attracted to the idea of having an assured supply of fodder.

A Participatory Rural Appraisal (PRA) was conducted to understand the existing silvipastoral systems, identify the different fodder trees and shrubs and rank them according to characteristics identified by farmers and project staff. We then continued to study the “highly preferred” species, looking into propagation and nursery techniques, herbage production, cutting management and persistence studies as well as feeding value and nutrient composition.

## Farmers' preferences for tree species

The species included in the research were identified in collaboration with farmers. Farmers' preferences for certain fodder species were based on feeding values (palatability and ability to fatten), tree growth characteristics (fast regrowth, ease of propagation and establishment) and tree management issues. For farmers it is important that the trees are tolerant of frequent cutting and the cut herbage is easy to handle.

Farmers like to plant various different species as they say that animals do not like to eat the same fodder all the time, but prefer to consume mixtures of several species. Other farmers pointed out that they prefer fodder species that serve other purposes as well. For example, they prefer to plant fodder trees that can also serve as fence or border markers or can hold soil in very steep portions of their fields.

Many farmers still want to plant *Leucaena* despite the psyllid infestation. According to them, *Leucaena* is fast growing, it can fatten animals quickly and the animals like it a lot. However, some farmers only plant *Leucaena* because they believe that it is not necessary to plant indigenous species.

## Preferred planting sites

Farmers have started planting fodder trees and shrubs along farm boundaries and in backyards. Many farmers are limited to these planting sites as their farmland areas are small or because they do not own their land. But they also prefer fodder species to be near their homes to save time gathering fodder. Women in particular indicated that they prefer planting near the house so they do not have to go far for fodder or leave their homes for a long time. In addition, planting near home reduces the risk of fodder being surreptitiously collected from their trees by others. Planting along boundaries is also done to mark the borders and to ward off stray animals.

Farmers with relatively larger holdings (2-4 hectares) can plant fodder trees as hedgerows integrated with crops. Those with larger fields in steeply sloping areas have established several hedgerows of *Leucaena* or *Gliricidia*. They were pleased to see that soil gets trapped on the upper slope of the hedgerows. These farmers may also plant trees in blocks as fodder banks in areas where crop farming is difficult. This is often on steep slopes or near waterways. However, farmers will prioritise planting food

crops wherever possible. In general, they only consider planting fodder trees, or some fruit trees, where the land is not suitable for food crops.

### Fodder production

Some trees, such as *Leucaena*, *Gliricidia*, *Muntingia calabura*, *Erythrina orientalis* can start producing fodder as soon as six months after planting. Other species like *Trema*, need at least nine months, or in the case of *Macaranga* and *Pipturus* 10-12 months, before they can be cut for fodder. *Streblus asper* and *Albizia saman* are very slow growing in the first three years, which makes them difficult to recommend to farmers, although they have a high nutrient content and are relished by animals. Instead of planting, farmers were advised to allow the natural stands of this species more time to regrow, so they would not die.

Depending on the tree species and soil conditions, average edible herbage yields from 90-120 day old regrowing trees is 1.5 kg dry matter per tree. At this rate, 400 trees will yield 600 kg fodder. If a 300 kg cow consumes 7.5 kg dry matter per day, it will be assured of good quality feed for 80 days. In practice, however, farmers try to extend the availability of green fodder throughout the dry season. Usually, they will give their cattle tree fodder once a day (about half of what is required) and for the rest of the day, the animal feeds on crop residues or grazes the remaining grasses in the fields. If the farmer has some spare cash, he may mix some rice bran and salt to the water. In most cases however, his animals will be mainly dependent on tree fodder to survive this critical period.

The frequency of cutting fodder or harvesting from these trees depends not only on the species but also on the season.

*Leucaena* and *Gliricidia* can be cut every 60 days during the rainy season but every 90 days during the dry season. *Trema orientalis*, *Muntingia calabura* and *Macaranga tanarius* can be cut every 90 days during the rainy season and every 120 days during the dry season. *Streblus asper* can only be cut every 4-6 months.

### Farmers' management of planted trees

Trees planted on or near crop fields need to be cut regularly to keep them from shading the crops. This may cause a problem, as the trees need cutting at the beginning of the cropping season when labour is in short supply. In this area, however, overharvesting is the more pressing problem. Trees tend to be cut too frequently, when there is little regrowth and this can threaten their survival.

About 30-40 farmers in various villages continue to plant indigenous fodder trees and shrubs using seeds (for *Leucaena*, *Trema orientalis* and *Macaranga tanarius*), stem cuttings (for *Gliricidia* and *Pipturus arborescens*) and wildlings (for *Muntingia calabura* and also *Trema orientalis*). Some also plant *Flemingia rostrata* and *Desmodium rensonii*.

### Challenges

Promoting tree planting for the purpose of rehabilitating degraded lands is not, in general, appealing to farmers. But they can be easily motivated to plant certain species such as fodder trees and shrubs that directly address their needs. Promoting fodder tree planting in degraded grazing lands is like hitting two birds with one stone. On the one hand, it helps meet livestock raisers' needs for fodder, and on the other hand, trees help alleviate degradation.

Successful adoption by farmers, however, does not happen overnight. It involves working hand in hand with farmers in

analysing the root causes of their problems, identifying possible solutions, and testing these together. In addition to involving the farmers in research activities, it is useful to conduct complementary activities such as training seminars. These should not only focus on the technical aspects of growing and managing the trees but also on enhancing farmers' appreciation of sustainable resource management. On-going monitoring and evaluation with the active participation of farmers is also important.

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**Table 1: Farmers' preferences of indigenous fodder trees**

Botanical name	Farmers' criteria			Overall rank
	Feeding value	Tree characteristics	Tree management	
<i>Macaranga tanarius</i>	9	9	8	1 <sup>st</sup>
<i>Streblus asper</i>	9	9	8	1 <sup>st</sup>
<i>Trema orientalis</i>	9	8	6	2 <sup>nd</sup>
<i>Cordia dichotoma</i>	8	7	7	3 <sup>rd</sup>
<i>Ficus angustissima</i>	7	8	7	3 <sup>rd</sup>
<i>Ficus balet</i>	7	8	7	3 <sup>rd</sup>
<i>Ficus hauili</i>	7	8	7	3 <sup>rd</sup>
<i>Ficus spp.</i>	7	8	7	3 <sup>rd</sup>
<i>Muntingia calabura</i>	9	6	7	3 <sup>rd</sup>
<i>Albizia lebbekoides</i>	8	5	8	4 <sup>th</sup>
<i>Albizia procera</i>	4	8	8	5 <sup>th</sup>
<i>Pipturus arborescens</i>	7	7	6	5 <sup>th</sup>
<i>Pterospermum obliquum</i>	7	7	6	5 <sup>th</sup>
<i>Vitex parviflora</i>	5	7	8	5 <sup>th</sup>
<i>Grewia multiflora</i>	7	5	7	6 <sup>th</sup>
<i>Anaxagorea luzonensis</i>	6	6	6	7 <sup>th</sup>
<i>Antidesma bunius</i>	7	6	5	7 <sup>th</sup>
<i>Antidesma cordato-stipulaceum</i>	7	6	5	7 <sup>th</sup>
<i>Bridelia stipularis</i>	6	6	6	7 <sup>th</sup>
<i>Gardenia longiflora</i>	6	6	6	7 <sup>th</sup>
<i>Arytera litoralis</i>	5	6	6	8 <sup>th</sup>
<i>Garuga littoralis</i>	6	6	5	8 <sup>th</sup>
<i>Kleinhovia hospita</i>	6	6	5	8 <sup>th</sup>
<i>Pterocymbium tinctorium</i>	6	6	5	8 <sup>th</sup>
<i>Grewia rizalensis</i>	6	5	5	9 <sup>th</sup>
<i>Leea manillensis</i>	6	5	5	9 <sup>th</sup>
<i>Pterospermum diversifolium</i>	5	5	6	9 <sup>th</sup>
<i>Zizyphus trinervia</i>	4	6	4	10 <sup>th</sup>
<i>Capparis micracantha</i>	4	5	4	11 <sup>th</sup>

**Farmers' criteria range** from 3 (lowest possible score) to 9 (highest possible score)

**Overall rank ranges** from most preferred (1<sup>st</sup>) to least preferred (11<sup>th</sup>)