Planting fodder banks for livestock

PACE Action Sheet 37

This Action sheet is about growing fodder trees and shrubs so that you can feed high quality fodder to your livestock. The main benefit is healthier animals, which grow faster and produce more milk. If you keep livestock in specific areas, and bring them fodder, you can also help stop soil erosion due to over grazing on the land.

Some plants that provide good fodder

Scientific name	African names	English names
Acacia tortilis	Tswana mosu,mosunyana	umbrella thorn
Gliricidia sepium		mother of cocoa
Cajanus cajan	Swahili mbaa i	Pigeon pea
Calliandra calothyrsus	Swahili mkaliandra	Caliandra
Faidherbia albida	Ndebele umpumbu, umtungabayen	White thorn, White acacia

This is not a comprehensive list. For more details, consult experienced farmers, local farming associations, local extension workers, NGOs involved in agroforestry projects, scientists at regional universities or government scientists. It is important to get advice about introducing new fodder species, as some, like *Leucaena leucophala*, may contain toxic compounds and can only be fed to animals in small quantities. Pods or seeds of fodder plants may need to be boiled before being safe to feed to animals.

Food fodder species contain high levels of protein and some important minerals like phosphorus which make your animals grow rapidly. Leaves, tender shoots, flowers, pods and seeds sometimes after treatment, can be fed to ruminants (cattle, buffaloes, sheep and goats) and to non ruminants (pigs, rabbits and poultry). Fodder containing high levels of fibre is more suitable for cattle, sheep and goats than for non ruminant animals like pigs and chickens.

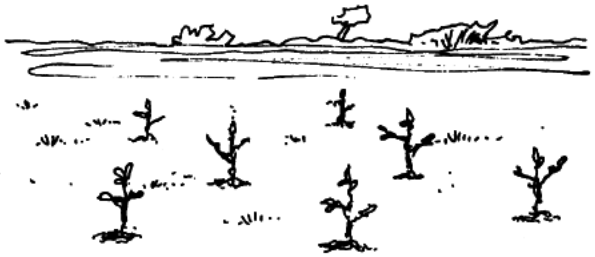
Where on the farm can fodder plants be grown?

It greatly depends on the size of your land. Fodder should not compete too much with your crops for valuable land. On small crop land, you can plant trees such as *Faidherbia albida* or *Gliricidia* to serve as living fences that separate your land from other land, and protect it from animals.

Plant the fence from stem cuttings, using *Gliricidia for example,* placed very close to each other, about 50cm. Water a lot and take care of the plant as it grows.

After six to eight months, start cutting the branches close to the ground, so that more branches can grow to form a strong fence. Keep cutting branches as the tree grows and feed the leaves to your animals.

You can also plant fodder trees in the fields with your crops. This is called intercropping. Your crop will get more nitrogen from the tree leaves that fall and from the root of the trees, especially if you plant nitrogen fixing trees (see Action sheet 36. Some examples to try are planting sorghum, maize or groundnut under or in association with *Faidherbia albida,* or planting *Tephrosia vogelii* with maize. See Action sheet 53. Make sure that the tree does not shade or cover your crop too much. Plant the trees 5, 7 or 10 metres apart to give you 60 to 80 plants per hectare, depending on how much land you have, and regularly cut down some branches and feed the fodder to your livestock.



Young *Faidherbia albida* trees planted 10m apart, left and intercropped with maize, right.

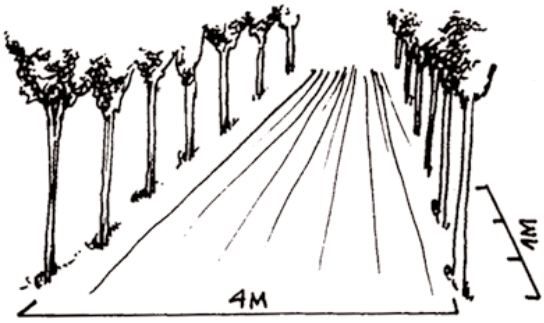
Another way is to plant the trees inside your crop land in rows and your crops such as maize, cassava, or cowpeas between the rows of trees. This is known as alley cropping.

One method you can use to establish an alley cropping system is to plant seedlings of your tree, *Gliricidia, Sesbania*, pigeon pea, etc. in individual holes arranged in rows.

Space the holes in a row 1m apart, and the rows 4m apart.

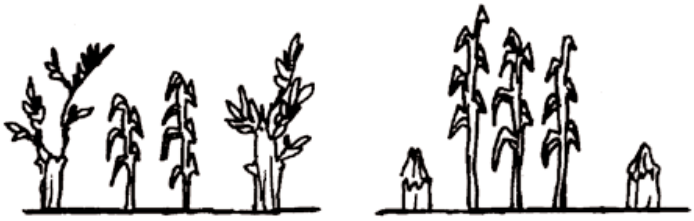
Plant the seedlings at the beginning of the rains and take care of them as you normally take care of your crops, weed and fertilize them and protect them from animals.

Leave the trees to grow for one year without cutting. At the beginning of the planting season of that year, cut the trees very close to the ground (30-60cm), and put the leaves in the space between the rows of trees, where you will plant your crops. These leaves will give nitrogen to your crops and serve as mulch.



Your crops will grow, and the tree will grow new branches which you will cut when they become too big, so that they do not shade your crops.

You have to decide when to cut the branches as this depends on the type of tree, the type of crop, the season, and the climate, wet or dry. A good guide is every six to eight weeks in humid and ten to twelve weeks in drier areas.



As your crop matures, use more and more of the tree leaves to feed your animals, and fewer leaves as mulch for your crop. During the dry season when you have no crops growing and your trees continue to grow, use all of the leaves to feed your animals.

You can try other ways of establishing an alley farm. Instead of establishing the trees first for a whole year, you can plant both trees and crops at the same time and take care of them together.

You can try smaller row spaces, such as 2m between rows, and 0.25m between trees in a row, or 2m between rows and 0.5m between trees.

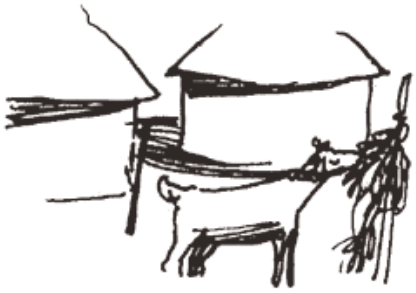
Fodder Banks

Another way to produce some feed for your animals using fodder trees is to plant trees and grasses on a small piece of land. This is called an **intensive fodder garden** or **fodder bank**. On a small piece of land measuring 10x20m, you may get enough fodder to feed five goats or sheep throughout the year. You can use *Gliricidia* as trees along with elephant or guinea grass. Where rainfall is high you will observe that grasses and trees grow rapidly using this system. After establishment, do not cut the grasses for the first time before eight weeks and the trees before twelve months. Then you can cut the grasses once every four to six weeks and the trees once every two to three months, depending on the rainfall. Cut the tree branches at about 1m from the ground and the grasses slightly lower at 75cm.

How much tree fodder can you feed to your livestock? Should you feed them green, fresh or dried?

The easiest way to feed the fodder is to let your cattle, sheep, goats or camels browse directly on trees in the range, in fallow land or in your backyard, if the trees are not too tall.

If the trees are too tall, you may have to cut the branches and carry them to your animals to eat. Animals can be fed in the field, your backyard or in a stall or boma. In this way, your animals will eat fresh leaves and small stems. Goats will sometimes eat the bark of large stems and this is also good for them. If overgrazing is causing soil erosion where you live, you may choose to keep animals in stalls or fenced off fields and bring them fodder to eat.

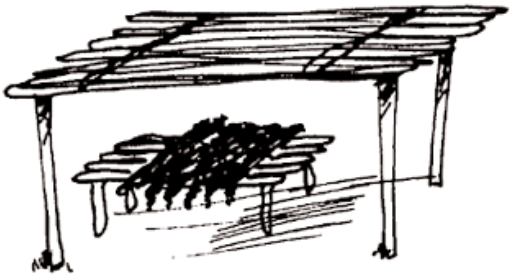


Feeding in the backyard

Feeding in the field

Feeding in a stall or boma

Another way is to feed dry forage. Cut it and dry it in the sun for a few days.



It is in this dried form that you should feed the fodder to pigs and chickens. After sun drying, crush or grind the leaves and small stems to make a leaf meal which you can feed directly or mixed with other feeds.

How much tree fodder should be fed to livestock

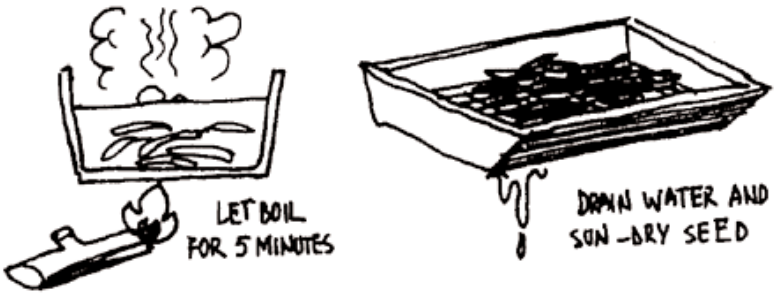
Many fodder trees such as *Gliricidia* and *Sesbania* contain very little or no toxic compounds. You can therefore feed a lot to ruminants, as much as they will eat, particularly during the dry season when there is no other green feed available. Other trees such as *Leucaena* contain toxic compounds that can harm your animals, including ruminants, pigs and chickens. You therefore need to mix them with other feeds to dilute the toxic compounds. *Leucaena* is an exotic species from South America. It is grown widely in Africa, but has started to go wild and become a weed. It is very unwise to introduce a species that is known to be weedy and invasive to an area where it does not already grow.

If you already grow *Leucaena*, you will know that you it must be mixed with other fodder to avoid its toxic effect. For example, you can feed a mixture of *Leucaena* and *Gliricidia* to sheep and goats, making sure that *Leucaena* is not more than 30 to 40% of the mixture. You can also mix one part of dry *Leucaena* with one and a half or two parts of crop residues such as maize bran or stovers, but always provide your animals with salt blocks when feeding them *Leucaena*. If you cannot mix the fodder with other feeds because, for example, your animals go out to eat crop residues, grass, hay or straw in the field, offer them an amount of fodder equal to 2% of their body weight to supplement the crop residue, grass or hay. For pigs, rabbits and chickens, the amount you can feed is even smaller. In any case do not exceed 10 to 15% of the diet for pigs, laying hens and rabbits, and 5 to 10% for growing chickens.

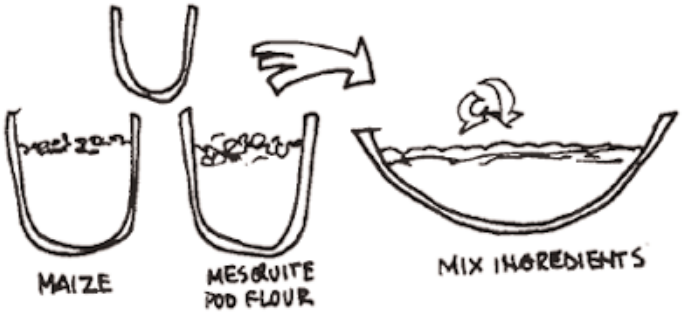
Other parts of fodder trees that you can feed to livestock are the pods and seeds of trees such as pigeon pea and mesquite (*Prosopis juliflora* – another exotic species from South America that many people now consider to be a weed problem).

However, you should not feed such seeds raw or fresh; they should be dried, cracked or ground into flour before you feed them. If they are not cracked or ground before you feed them, the animal may not digest them well and the seeds will just pass out in the faeces with no real benefit to the animal. Seeds of trees such as pigeon pea and *Prosopis juliflora* also contain some harmful substances that can be destroyed by heating. You need to treat the seeds with heat to destroy these substances before feeding your animals.

You can do this by soaking the seeds overnight in water. The next day, drain the water and add fresh water, then bring it to the boil, and let it boil for five minutes. Let the water cool down, drain it and dry the seeds in the sun.



You can also just soak the seeds overnight in cold water and dry them in the sun the following day. If these methods seem too long and difficult you may be able to buy the pod flour from factories where it has been well processed and mix it with other ingredients to feed your animals.



Remember to be cautious, although you can even feed fodder from these trees and shrubs to ruminants as the only feed (100%), it may be wise to mix at least two, or more, sorts of fodder tree. You can also mix one part (40%) of the tree fodder with one and a half parts (60 percent) of grasses, hay straw or crop residues (fresh, green or dried).

For non-ruminants such as pigs and chickens, dry and grind the fodder, and feed only between 5 to 15 percent of leaves and stems, and no more than 40 percent of pods and seeds in the diet. However, in any case, remember that the feeding behaviour of your animals fed fodder tree-based diets is a good indicator of what is to be done: If they aren't eating much, then you may need to reduce or to change the proportion of fodder from trees in their diets.

A GOOD FODDER TREE FOR ARID AND SEMI-ARID AREAS - Faidherbia albida

English: ana tree, apple ring acacia, apple ring tree, gao, white acacia, white-thorn, winter thorn
Ndebele: umpumbu, umtungabayeni
Shona: mutsangu
Swahili: mgunga, mkababu
Tigrigna: aqba, garsha, momona
Tongan: mujagwe, mutsangu
Tswana: mokosho
Wolof: cad
Zulu: umHlalankwazi

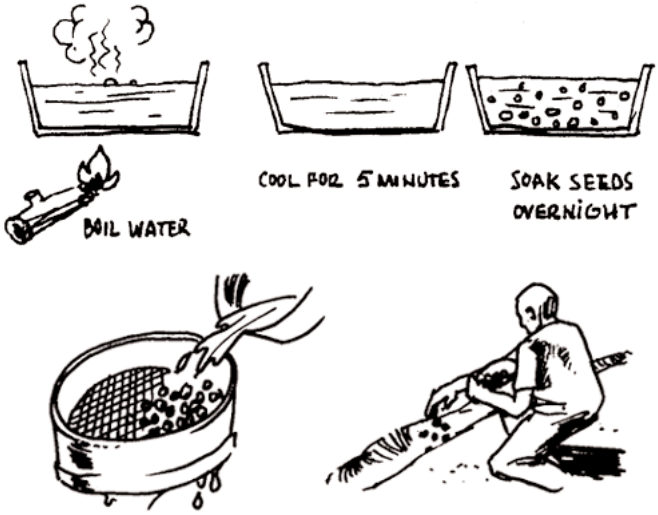
Where will it grow?

Faiderbia albida grows naturally in most of Africa along the banks of seasonal rivers. It thrives in dry areas with 400-500 mm of rainfall per year, long hot summers (average annual temperature 18-30 deg C). Can be planted in sandy soils, light clay, shallow rocky soil, and generally grows best in deep and light well-drained soils. It can tolerate seasonal water-logging and salinity.

How do you plant it?

Naturally the seeds lie dormant before germinating. To get the seeds to germinate quickly they must be nicked (a small cut made in the outer coat/shell) or treated with hot water. Nicking, called scarification is most effective but can be fiddly.

The best way is to make a tiny cut at the end of each seed with nail clippers. Alternatively, boil some water, cool it for 5 minutes and then soak the seeds overnight, using at least three times more water than seeds in order to cover the seeds completely. The following day, pour the water away, and plant the seeds immediately. Plant 3–4 seeds at the beginning of the rains in well-prepared spots in your field, about 10 metres apart, so you can have 70 or more trees per hectare.



Where can I find seeds?

Collect seeds from adult trees in your locality. Collect early to avoid insect infestation. If seeds are not available, see contact list in Action Sheet 56: Where to get tree seeds.

Planting Faiderbia albida

Seedlings protected against animals, vehicles and sand blast

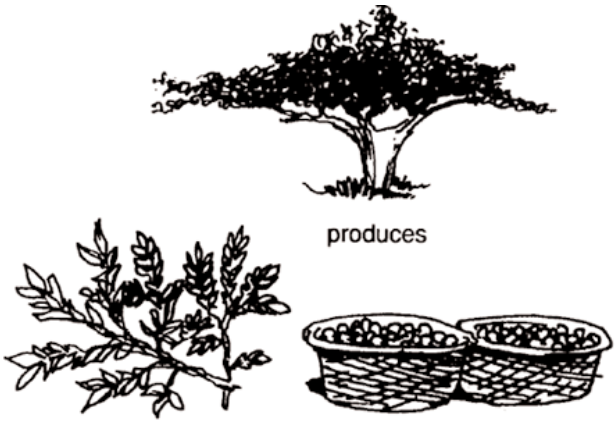
What sort of management does it need?

There is more information on this species in Action sheet 89 *Faidherbia albida*. This tree grows rapidly and may be as tall as 2m in the first year, but you need to weed regularly and protect it from animals and from sand and wind blast during this time.

You may need to prune in the 2nd year to about half the tree height to control low branching. Repeated pruning during growing season stimulates leaf production, and it can be pruned up to twice a year, although the tree will produce less and less leaves each time. Once every three to four years, about a third of the leaves and branches top of the tree should be cut off at the start of the growing season. However, careless lopping has been observed to cause wounds leading to disease in the tree. This tree can be coppiced.

How much fodder does it produce?

The adult tree produces green fodder but, most important,130 kg pods (and sometimes more) every year. These are particularly suitable for feeding to your livestock.



Another good thing about the tree is that it starts to shed its leaves at the beginning of the rains, when crops are planted. Nutrients in the leaves improve the soil in time for the new season's crops. As the tree is leafless during the rainy season, it does not compete for sunlight with crops.

The leaves grow again during the dry season to give shade and feed to your animals. It also has many other uses as food, nectar for bee-keepers, fuel wood, timber, medicine, shade for coffee, and it is a great soil improver.

Ngitili: The Wasukuma people in Tanzania have a traditional system of forest and grazing land management that provides a good supply of fodder, as well as many environmental benefits for soil, water and wildlife. In the last three decades, this traditional system of Ngitili has been revived and extended by farmers in the Shinyanga region, and up to 500 000 ha of woodland have been restored. In the Ngitili system, an area of grass, trees and shrubs is closed off to livestock during the whole of the rainy season. During the dry season, livestock is allowed to graze inside the ngitili land. It's a living fodder bank and also provides a sustainable source of fuelwood. Ngitili are controlled by traditional village guards (sungusungu) and community assemblies (dagashida), and is now being investigated as a management system for grazing lands elsewhere.

Acknowledgements

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For more information

World Agroforestry Centre – www.worldagroforestry.org

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