THE LIVING FENCE: ITS ROLE ON THE SMALL FARM

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WHY A FENCE

There are several reasons that a small farm needs fences:

- Marking the boundary lines between farms or next to roads.
- Separating fields used for distinct purposes
- Keeping animals from straying
- Keeping animals out of crop fields

The fence represents an investment of labor and/or money. Both items are always scarce on the small farm. While in general labor and money are interchangeable, it is always desirable to limit both. While a fence costs something, it also yields something -- protection. On a small farm it is always desirable to increase the yield, that is, the positive results obtained through money and effort.

A living fence can increase the yield of labor. Major fences are usually constructed of poles and wire. Minor fences, such as those used for fencing small animals, can be constructed entirely of wood, or of poles, slats, and woven wires. Major and minor fences can be constructed principally of living poles, thus reducing the costs of the initial price of the fence. Usually living poles will last much longer than wooden (dead) poles and thus maintenance may be reduced.

Living fences are widely used now in a wide range of ecological situations, from very dry to rain forest conditions. Suitable plant materials are available for almost all ecological conditions.

OTHER BENEFITS FROM A LIVING FENCE

Firewood

As a general rule, firewood is used for cooking in third world countries. A living fence post can be trimmed periodically and the branches can be used as firewood. Where wood is scarce, this means that firewood is produced readily near the farm home where it will be used. Extra firewood may be sold or bartered.

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Fertilizer

The leaves that fall from the tree as well as the leaves and small branches cut away on harvest of trees for firewood can be (1) composted, (2) immediately mixed with the soil as fertilizer, or (3) left on the ground as a sheet mulch. Because trees are deep rooted they bring mineral nutrients from the deep soil that may not be available to annual crops. After residues from trees rot in or on the soil, such minerals are released into the soil and become available to crop plants. If the tree is leguminous the amount of nitrogen in the leaves will be large enough to significantly affect crop yields. Furthermore, pruning of trees results in partial die back of roots, releasing additional nutrients directly into the soil. Nitrogen is always difficult and costly to obtain, and leguminous trees are a principal way to get nitrogen from trees.

Other Uses

Feed. The leaves of many trees are edible as feed for small animals. The edibility of leaves as feed varies not only from species to species but also with age. When fence posts are used to produce feed, space is conserved on the farm.

Food. Leaves, flowers, fruits and seeds of some species might be good food for people. Knowledge of these edible qualities might be useful in producing food for family use and for sale.

Fibers. A few plants in living fences yield from large or small branches that can be used directly for tying, can be retted (rotted under water), or can be pounded into useful fiber or cloth.

Shade. Trees may provide welcome relief from the hot sun for people or animals.

Construction materials. Many trees can be harvested for their wood, which then can be used for construction of building, small articles, or artwork, or be sold.

Medicines. Some plants used in fences are also used in primitive medicines. However, caution is recommended in their use.

Windbreaks. In some areas windbreaks might be very necessary to protect against winds and thus to permit the growth of some crops.

DISADVANTAGES OF LIVING FENCES

Some living fences can have serious disadvantages as follows:

- Tree growth may be excessive and pruning may require excess work.
- Trees through shade or superficial roots can compete for water and fertilizers with other crops.

Because of these reasons, living fences have to be controlled. Whether or not living fences are used on the farm will depend on the weighing of the advantages versus the disadvantages.

ESTABLISHMENT AND CARE OF LIVING FENCES

The tradition of living fences varies from place to place in the tropics, as does the suitability of the various species used to make them. There may be many other species of trees that are well suited that have not come to the attention of the author. In any area it would be desirable to investigate the trees that are already being used as living fences. It might also be appropriate to select for suitable species for living fences in the wild.

If new species are selected, they should have the following characteristics:

- Resistance to cattle (can be observed in pastures).
- Can be grown rapidly from stakes or seeds.
- Have other useful properties.

If suitable materials are not locally available, then importation of seed might be desirable. The species most recommended would be:

- *Bursera simarouba*- for dry regions.
- *Gliricidia sepium*- for areas of alternating wet and dry.
- *Erythrina bertervana*, or other Erythrina species- for wetter areas.

Trees and other plants are used as living fences in three principal ways: posts, hedges, and palisades (a fence of closely set stakes). While any tree can be used as a living post, many trees would not normally be so used because of their size, propagation difficulty, slow growth, adverse characteristics, or inadequate lifetime. A few large trees used as occasional posts are retained for other values (teak as valuable wood, mango for fruits and shade). The majority of the species used as living fence posts can be propagated from large woody cuttings, generally the size of the fence pole required. There are, however, exceptionally fast growing trees that are planted from seeds.

Posts are used with conventional barbed wire or wire screen. Plants that are used in hedges tend to be spreading so that they fill in the spaces between them rapidly. They may or may not be strung with wire. Plants used as palisades are planted very carefully as close together as necessary in order to achieve an animal proof cage-like fence immediately. Such plants may be propagated from stakes or offshoots.

Living fences are seldom fertilized. They are often pruned, however, to form them, to obtain new planting material or other products, and to eliminate excess foliage. In some cases, pruning is an annual task, usually done during the dry season. Fences can be carefully formed by weaving and tying branches, if so desired. Insects and disease are seldom a problem.

SPECIES FOR LIVING FENCES

EXCEPTIONAL SPECIES

Only a few species very widely used are featured here (see Table 1 for a listing of additional species.)

Gliricidia sepium, Mother-of-cacao (madre-de-cacao, madera negra, mata raton). This small leguminous tree is so well known to farmers in some countries and so useful that it has been given a medal in Honduras. Common from low to medium elevations, the tree prefers a medium rainfall, and is well adjusted to a periodic dry season. The tree can be propagated from branches. An old living fence post will tend to produce a large number of long, narrow branches, perfect for planting. The branches root readily but the rate of growth is moderate. Gliricidia can also be propagated from seed.

A narrow fence with broad crown is produced. Its lifetime is almost indefinite. The wood of old trunks become black and very hard, and so are useful for many small objects. Animals tend to feed on the foliage, but in fences most is borne out of their reach. The foliage is a useful feed in moderate amounts but there is some question of its toxicity in large amounts. Flowers, buds, and very young leaves are often cooked as a vegetable. The dry seeds are poisonous and are ground and mixed with other grains as a rat poison. Leaf fall occurs during the dry season and the leaves make valuable mulch. The tree was used in the past as a shade tree for cacao and coffee, but now has been replaced by Inga species. On triennial pruning a good quantity of firewood is produced. Pruning also results in root dieback and release of nitrogen to the soil.

Erythrina berteroana, Dwarf immortelle (bucar o bucare enano). This leguminous tree is small to medium in size, and is commonly used as a living fence post or a support tree for vine crops. Other Erythrina species may be substituted it. The tree is covered with dense foliage that is perennial. Because the leaves are not lost during the dry season, this tree is best suited for regions with somewhat more rainfall than is required by Gliricidia. Propagation is from branches, big or little, usually planted where they will be used. However, seeds can also be used. Growth is moderate to rapid. The fence is narrow with a dense crown. The foliage is attractive to animals and frequently used for feeding rabbits, sometimes with ill effects.

The wood is soft and of limited use except for fuel. On pruning the tree a large amount of useful mulch is produced. The seeds are poisonous. This is a favorite shade tree for coffee in Central America.

Yucca elephantipes , Yucca azote. This is one of the most common plants in living fences in Central America. Cuttings of branches large and small are frequently planted close together, and as they grow, make a practically impenetrable wall. The tree is easy to propagate, slow to grow and has a long life. The flowers are edible.

Bursera simaruba, Gumbo limbo (indio desnudo, jinote). Gumbo limbo is especially appropriate for dryer areas where madre-de-cacao is not suited. Planted as large posts, it will root even under fairly dry conditions. This tree has few other uses, for even its wood is soft and short lived.

Moringa oleifera, Horseradish tree. This "vegetable tree" is one of the most successful plants in ECHO's seedbank. It handles dry seasons well and grows especially quickly the first year. The Asian Vegetable Research and Development Center in Taiwan has developed a gardening plan which starts with palisade of moringa grown from closely spaced seed. Trees are pruned at about head height, and the leaves used as a nutritious cooked vegetable or for animal feed.

ADDITIONAL SPECIES USED AS LIVING SPECIES

See Table 1 for a listing of several species of plants that can be used in living fences. Most of these seeds are not available through ECHO's seedbank. Those that we do have are only available in small trial packets – not enough for a living fence.

If you want us to refer you to a commercial source of seed, please be sure to mention this in any correspondence.

Table 1. **SOME PLANTS THAT CAN BE USED AS LIVING FENCES.**

Species Name	Common Name	Adaptation*		Propagation	Traits	Pruning	Other Uses / Notes
		Altitude	Moisture				
Acacia nylotica	Thorn tree	1-3	1	seed	wide, thorny, hedge	yes	nitrogen fixing, firewood
Acnitis arborescens	Wild tree tobaco	1-2	2-3	seed, cuttings	fast, succulent	yes	cooked fruit w/jelly
Agave spp.	Agave	1-2	1-2	offshoots	succulent	no	ornamental, fiber
Anacardium occidentale	Cashew	1	1	seed	large, broad	yes	fruit, nut, firewood, oil, gum
Bambusa glaucesans	Bamboo	1-2	2-3	offshoots, stakes	medium, dense, climbs	no	medium culms
Bambusa vulgaris	Bamboo	1-2	2-3	offshoots, stakes	high, dense, climbs	no	large culms, erosion control
Bauhinia rufescens		1-2	1-2	seed	dense, hedge	yes	nitrogen fixing, fiber, lumber, tannin, medicine

* Altitude: 1 – 0 to 2000 meters; 2 – 2000 to 4000 m; 3 – 4000+ m
Moisture: 1 – low (30-50 inches/yr); 2 – medium (50-70 inches/yr); 3 – high (70+ inches/yr)

Table 1. **SOME PLANTS THAT CAN BE USED AS LIVING FENCES,** continued.

Species Name	Common Name	Adaptation*		Propagation	Traits	Pruning	Other Uses / Notes
		Altitude	Moisture				
Bixa orellano	Annatto	1-2	2-3	seed	hedge	yes	vit. A rich fats in seed coat
Bombacopsis quinata	Pochote	2	2-3	seed	large, tree	yes	lumber, tannin, medicine, firewood
Bromelia pinguin	Pinguin, Pinvela	1-2	1-2	offshoots, seed	spread, hedge, 1-2m		edible fruit and heart, not cattleproof
Bursera simaruba	Gumbo limbo	1-2	1-2	stakes, seed	medium, tree	yes	medicine, firewood
Byrsonima crassifolia	Nance	1-2	2-3	seed	medium, tree	yes	edible fruit, charcoal
Caesalpinia eriostachys	Saino	1-2	1-2	seed	shrubby, hedge	yes	bark is poisonous to fish, firewood
Cassia grandis	Canafistula	1-2	1-2	seed	rapid, small, tree	no	medicine
Casuarina spp.	Australian pine	1-2	2-3	seed	tall, tree	yes	firewood, lumber, windbreak, erosion control
Cedrela odorata	West Indian cedar	1-2	2-3	seed	large, tree	no	lumber
Cereus spp.	Pitahaya	1-2	1-2	stakes, seed	thorny, branched, trunks	yes	fruit, ornamental
Chlorophora tinctoria	False mulberry	1-2	2-3	seed, stakes	small-medium, tree	yes	lumber, medicine, dye
Cochlospermum vitifolium	Rope tree	1-2	2-3	seed, stakes	medium, tree	yes	cortex for rope
Codiaeum variegatm	Croton	1-2	2-3	cuttings	hedge, 1-2m	no	ornamental, tender foliage edible
Cordia spp.	Cordia, manjack	1-2	1-3	cuttings, seed	medium, tree	yes	lumber, fruit of some, firewood
Cornutia pyramidata	Dye tree	1-2	2-3	seed	small, tree	yes	dye, firewood
Croton niveus	Quina, copalchi	1-2	2-3	seed	shrubby	no	medicine
Cupressus lusitanica	Cypress	2-3	2-3	seed	large, tree	no	lumber, shade, windbreak
Cyathea spp.	Tree fern	2-3	2-3	transplants	small, tree	no	starch, orchid growth, ornamental
Datura candida	Trumpet	1-3	2-3	stakes	small, succulent, tree	yes	ornamental, medicine / poisonous
Diphysarobinoides	Gudchapilin	1-2	2-3	seed	shrubby	yes	nitrogen fixing, dye
Dracaena fragrans	Dracaena	1-3	2-3	stakes	palisade, tall	tops	ornamental
Drimys winteri	Winterbark drimys	1-2	2-3	seed	medium, tree	no	medicine, condiment, firewood
Erythrina berteroana	Dwarf erytherina	1-3	2-3	stakes	medium, tree	yes	nitrogen fixing, foliage for rabbits, vine support somewhat, poisonous
Erythrina poeppigiana		1-3	2-3	stakes, seed	large, tree	yes	nitrogen fixing, coffee shade
Euphorbia cotinifolia		1-2	1-2	seed, stakes	shrubby	no	poisonous
Euphorbia lactea	Mottled euphorbia	1-2	1-2	pieces	dense, 3-4m	no	poisonous, latex
Euphorbia neriifolia	Leafy euphorbia	1-2	1-2	pieces	dense, 2-3m	no	medicine, poisonous, latex

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		Altitude	Moisture				
Euphorbia tirucalli	Pencil euphorbia	1-2	1-2	pieces	dense, 3-4m	no	poisonous, latex
Ficus citrifolia	Citrus-leafed fig	1-2	2-3	stakes, epiphyts	dense	yes	edible fruit, latex, feed
Ficus goldmanii	Strangler fig	1-2	1-2	stakes, epiphyts	medium, tree, dense	no	shade
Ficus pertusa	Strangler fig	2	1-3	stakes, epiphyts	medium, tree, dense	no	
Gliricidia sepium	Mother of cocoa	1-2	2-3	stakes, seed	medium, open, tree	yes	edible flowers, foliage as feed
Grevillia robusta	Silk oak	1-2	2-3	seed	large, tree	no	firewood
Hibiscus chinensis	Hibiscus	2-3	2-3	stakes	shrubby, palisade	yes	edible foliage, feed
Hibiscus tiliacea	Majoe, majayua	1-2	2-3	stakes, seed	dense, foliage	yes	cortex for fiber, edible foliage and flowers
Jatropha curcas	Physic nut, tartago	1-2	1-2	seed	small, tree	yes	medicine, poisonous
Inga spp.	Ice cream bean	1-3	1-3	cuttings, seed	medium, tree	yes	nitrogen fixing, firewood, edible pulp of fruit
Leucaena leucocephala	Leucaena	1-2	1-2	seed	palisade, small, tree	yes	firewood, edible foliage, nitrogen fixing
Ligustrum lucidum	Glossy privet	1-3	2-3	cuttings	hedge	yes	wax
Ligustrum vulgare	European privet	1-3	2-3	cuttings	hedge	yes	wax, dye, charcoal, fiber
Mangifera indica	Mango	1-2	1-3	seed, grafts	large, tree	no	fruit, shade, firewood, medicine
Manihot esculenta	Cassava	1-2	1-2	stakes	shrubby, palisade	no	edible roots and foliage, starch, feed, poisonous
Moringa oleifera	Horseradish tree	1-2	1-2	stakes, seed	small, tree, palisade	yes	edible foliage and pods
Opuntia spp.	Prickly pear	1-2	1	stakes, seed	prickly shrub	yes	edible fruit and pods
Pedelanthus tithymaloides	Slipper flower	1-2	1-2	cuttings	small, herbaceous	no	wax, medicine, poisonous
Phylollostachys bambusioides	Bamboo	1-2	2-3	offshoots	tall, culms, spreading	no	
Pithecolobium spp.		1-2	1-3	seed	small to large, tree	yes	lumber, nitrogen fixing, some for fruit, foliage, med.
Prosopis juliflora	Mesquite	1-2	1	seed	spreading tree	yes	edible pods, firewood, charcoal, tannin, gum
Randia karstenii	Crucilla	1-2	2-3	seed	small, tree	no	firewood
Sesbania grandiflora	Sesban	1-2	1-2	seed	medium, tree, palisade	yes	edible foliage and flowers, nitrogen fixing
Spondias mombin	Hog plum	1-2	1-2	stakes, seed	large tree	no	lumber, fruit, firewood
Spondias purpurea	Red mombin	1-2	1-2	stakes, seed	medium, tree	no	fruit
Stachytarpheta franzii	Cat's tail	1-2	1-2	stakes, seed	small, tree	no	firewood
Syzygium jambos	Roseapple	1-2	2-3	seed	large, tree	yes	fruit, firewood
Syzygium malaccense	Malay apple	1-2	2-3	seed	large, tree	yes	fruit, firewood
Tabebuea rosea	Red poui	1-2	1-3	stakes, seed	small, tree	no	firewood
Tectonia grandis	Teak	1-2	2-3	seed	large, tree	no	excellent lumber
Yucca elephantipes	Bulbstem yucca	1-3	1-3	cuttings	palisade	no	edible flowers, dye

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