

8. Legume Usage

Legume usage is *Fundamental #2*. It helps nitrogen fixation. Rotate a legume through every year to add free nitrogen to your system. This is one of the biggest expenses in chemical based agriculture and can be minimized and even replaced by biological practices.

Bacteria help the farmer by adding surplus nitrogen for the next crop. These microbes find the nitrogen in the air and soil, and then they capture [fix] it in small colonies on the roots of the peanut, soybean, pole beans, sitao, etc. The colonies can be seen on the root in small nodules.

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Generally referred to as rhizobium, these silent workers of the underworld come in thousands of varieties. They need to be present to maximize your legume production and leave a surplus of fuel for future plantings. Good seed suppliers sell or include the inoculants with your seed order.

If you can't get an inoculant, then stick to what your area grows well. The spores will travel some and over time you will see good nodulation, which indicates a plentiful supply of the rhizobium. You can propagate the nitrogen-fixing bacteria by taking roots with populations of what you need and steeping them in water and molasses 24 hrs. Then use the drench to soak your seed or spray into the soil with EME after you plant. Once you grow your first patch of peanuts, soybean etc. you can usually keep the colony productive in your future rotations of that legume.

We use 3 types of legumes. Vegetable legumes like pole beans, bush beans, red beans or black beans are good staples. Lentils and mungo, or mung bean are great too. Mung bean grows fast and is a great green fertilizer as well. The perennial peanut is excellent as a cover crop or under sown with maize and papaya. Called mani-mani in the Philippines, *Arachis pintoi* is good as a living mulch, forage and pasture crop in warm climates. Like ordinary peanuts or groundnuts, they are drought tolerant to some degree. During our pronounced dry season, they thin out and go dormant. When the rains return in monsoon season they grow out rich and green surprisingly fast. They can be plowed in as a green manure also. These are all classified as vegetable legumes. They grow an entire life cycle in one year or less

so we can call them annuals. Most are very fast growing and produce a high volume of biomass for feed or compost.



We expand small plots section by section. Here you can view 3 stages. After soil preparation (foreground), we plant peanuts. Below that, you can see the corn marching up the hill, a natural choice for following a legume.

There is another group I label shrub legumes. Used as hedgerows and border crops, these incredible plants are longer-term soil stabilizers. They prevent soil erosion when planted across a sloping field. Sometimes called SALT hedges (Sloping Agricultural Land Technology), these perennials fix nitrogen and enrich the soil by cycling nutrients from deep below. The roots are deep and bring up trace elements from sub-soil layers and make the leaves excellent for compost, mulch, a green fertilizer or feedstock. Our goats and hogs love these trimmings in their fermented feeds. We use the *rensonii* as a cut and carry forage for the goats. They can graze the hedges also. Another hedge that we use successfully is *Flemingia*. The *rensonii* propagate from cuttings or seed. *Flemingia* grows best direct seeded

A Natural Farming System for Sustainable Agriculture in the Tropics

during rainy season or started in the nursery. They attract the nitrogen-fixing bacteria eventually but can be inoculated from existing plants.



Nodules of nitrogen fixing bacteria live on the roots of legumes.



Rensonii is part of the S.A.L.T farming system. Our worker is harvesting “cut and carry” feed for the milking goat and her kids. The shrubs can be kept low but they will grow up to 3 meters high and go to seed. We keep them at 1-2 meters.



Flemingia produces 2 seeds in each pod. When ripe, the pod turns dark brown. The seed is black.

Finally, the third type of legume we plant is the legume tree. Most of the trees here with pods are legumes. Now you have an entire root system from massive trees fixing nitrogen in the soil and producing high protein feed and fertilizer from the vegetative growth. You can use these trees as windbreaks and borders, or prune them back and treat them like hedges and add them to your S.A.L.T. project. If you keep them cut back they still do quite well.

Acacia, Kakawati (Madre de cacao), ipil-ipil, and fire trees are a few examples of legume trees that do well here in the tropics. The key to legume use is to allow natural processes to produce the fertility that you need to succeed. Nutrient cycling is enhanced because minerals and trace elements are brought up from deep below, where

A Natural Farming System for Sustainable Agriculture in the Tropics

vegetable roots would not normally benefit. The trees mine this fertility from down under and release it through composting and livestock wastes that are returned to the topsoil.



Nitrogen fixing bacteria colonies are symbiotic and make a surplus of nitrogen for the next crop.



Kakawati (also called Madre de cacao) is a hardy legume tree that grows from cuttings. It is famous for it's usage as posts that form a living fence.



Neem tree blossoms produce a green seed that turns red when it ripens. Not a legume, the *Azadirachta Indica* is a good companion plant in the salt hedge system with legumes.



Kakawati (or Madre de cacao) is *Gliricidia sepium*, as viewed up close, has an amazing leaf design. Cows, goats, pigs and even chickens eat this high nitrogen legume tree. The leaves are used as a fertilizer to enhance small vegetable beds in the tropics.



Renonii seed spreads slowly and germinates during rainy season at a very high rate. It needs constant pruning. The pedals are rounder than the pointy leaves of the Flamengia.



Fire trees are legumes that provide shade and feed livestock.





Companion planting is very helpful for pest protection as well as fertility enhancement. Corn under sown to the mongo bean or the Brazilian perennial peanut makes for good yields. Jojo Demafelis inspects the lower canopy and mulch with the author.