

AGROFORESTRY

Agroforestry is an ecological method of land resource management that involves the growing of both crops and trees on the same land. It is the integration of trees into cropping systems to create diversity in production, more and diverse income for farmers, healthy foods and sustainable land management. It is implemented in any size of land and does well among smallholder farmers.

Agroforestry makes use of a wide range of trees used for diverse functions that include providing firewood, fruit, livestock fodder, plant extracts for medicinal purposes and improve soil fertility. Majority of the trees used in agroforestry, grow back when cut, hence, able to continue providing herbage and wood. Some of these trees include: grevillea, luceana, calliandra, acacia and sesbania sesban.

Today, trees in farms are seen as a crucial bridge between forestry and agriculture, striking a balance between conservation and production. While Africa's forests diminish, more trees are being planted in farms, and small-scale farmers are doing this for their own benefit and that of the environment. In many countries, agroforestry is seen as a strategy to compliment forest cover and increase the area under trees.

It is crucial to incorporate trees which are fast maturing, have the ability to fix nitrogen in the soil and which do not compete with crops, but bring in multiple benefits to livestock, crops, soil, and the environment at large; they are Nitrogen Fixing Trees. The acacia tree, for instance has long been combined with traditional farming in Africa. Scientifically, known as *Faidherbia albida*, or "Mgunga" in Swahili, the acacia possesses the unique ability to produce the much needed nitrogen for soil and plants. It goes dormant and sheds

its nitrogen-rich leaves during the early rainy season, when crops are being planted, and resumes leaf growth in the dry season.

The trees are able to utilize the atmospheric nitrogen through an association with a Rhizobium, a bacterium which is hosted in the root system of nitrogen fixing trees. These plants biologically accumulate nitrogen by pulling essential nutrients out of the air for their own use, and if managed well, can make it available to other crops as well. This reduces the need for commercial nitrogen fertilizers.

During the dry season, some trees are able to shed their leaves, while others remain green, which can be used to feed livestock. Producing staple food crops like maize, sorghum and millet under these agroforestry conditions dramatically increases their drought resilience in dry years because of the positive soil moisture and better microclimate.

The fallen leaves, weeds and crop residues do not go to waste. They are heaped to naturally decompose and later used to fertilize the farm. After they are heaped, they usually attract many beneficial microorganisms, which feed on them. The microorganisms contribute to enriching and improving soil for plants, animals and even humans. Earthworms, for example, create tunnels in the soil by burrowing, which aerates the soil to allow air, water and nutrients to reach deep within the soil. Earthworms eat the soil which has organic matter. After the organic matter is digested, the earthworms release waste from their bodies, called castings, which contain many nutrients for the crops. As an important addition to their other roles, trees not only act as natural fertilizers, but as niche for these hardworking earthworms and microbial life.

Through constant pruning and cutting firewood, one is able to increase the organic matter (leaves) in the soil, which act as mulch, keeping it moist and well aerated, and increases the activity and population of microbial life in the soil. The leaves also act as humus, a very important feature in building soil fertility.

Trees are also able to suppress weeds, reducing the time and energy needed for weeding, and promoting “easy to work” soil. Other trees, like lucena, attract bees during flowering. While collecting nectar, they help in pollination and repelling harmful insects.

Agroforestry represents a wide diversity in application and in practice. Trees can be widely scattered over a large agricultural plot or pasture or crop strips alternate with rows of closely spaced tree or hedge species. Normally, the trees are pruned before planting the crop. The trees can also act as [living fences](#) and [windbreaks](#).

With growing concerns about how smallholder farmers can continue to feed themselves in their small farms without destroying local ecosystems agroforestry is the best thing to happen to sustainable farming.