

Cassia for fixing nitrogen



Fruit tree on home stead (Avocado)

NARO

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International Development Research Centre

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AGROFORESTRY FOR SOIL FERTILITY



What is Agroforestry?

Agroforestry is the growing of trees on farms to improve the livelihood of the rural farmers and to protect the environment. Trees on farms provide farmers with high value products such as food, fruit, medicines, fodder, timber, fuelwood, poles and manures. Agroforestry provides one way of improving soil fertility.

How agroforestry improves soil fertility

Trees and shrubs with many uses improve soil fertility by capturing nutrients from deep layers of soil, making food (fixing nitrogen from the air) and putting it back into the soil. These trees also reduce soil erosion by holding nutrient rich soil in place and by reducing the rate of run-off. Different agroforestry technologies have been developed to improve soil fertility. The main technologies practiced in Uganda include biomass transfer, improved fallows and intercropping.

Biomass transfer

What is biomass transfer?

Biomass refers to the green foliage from plants (green materials). Biomass transfer is a technology aimed at improving soil fertility. It involves cutting green manure from outside the farm, farm boundaries, hedges or near-by farms and bringing this onto your farm. The biomass transferred could be leguminous plants such as beans and leaves or grasses.



Tithonia/Wild sunflower

Non-leguminous plants such as *Tithonia diversifolia* (wild sunflower) can also be used. This has the capacity to improve soil fertility and increase yields. Tithonia easily gives away nutrients to plants (including phosphorus). The decomposed green manure adds nutrients to the soil.

How to use tithonia

Cut leaves and twigs from the tithonia hedge, chop them into small pieces then place them in planting holes, along rows or spread them over the surface. Incorporate them into the soil and mix well. Leave for at least one week to decompose then plant crops. Use a combination of tithonia and inorganic fertilisers (TSP, DAP or rock phosphate) or manures for best results (especially in phosphorus deficient soils).

What is improved fallows?

Farmers have traditionally used fallow to allow land to rest without planting crops. This practice allows the soil to regain fertility. However, under improved fallows, trees are deliberately planted to improve soil fertility. These trees are usually deep rooted and fast growing. Normally, nitrogen-fixing species that are easy to establish are used. Species that can be used in this technology include *Sesbania sesban, Cajanus cajan* (nkolimbo), *Crotalaria* and *Tephrosia vogelii* (muluku). These are grown on the farmers' field, for a season or two or even longer. The length of the fallow depends on the condition of the land. The trees directly add nitrogen to the soil, suppress weeds and provide other products such as fuelwood.



Calliandra in improved fallow

Other technologies:

Other technologies practiced in Uganda include alley cropping, intercropping, live fences or hedges, boundary tree planting, community forestry, orchards, compound trees, trees dispersed on croplands, trees on flood plains, trees in pastureland, buffer zones, wind breaks and woodlots.