



Ministry of Agriculture and Livestock Development
State Department for Crop Development
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Emergency Locust Response Program
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Sustainable Agricultural Livelihood Restoration, Rehabilitation and Resilience in Kenya

Training Manual

2.2.6 SUB-MODULE 6: AGROFORESTRY SYSTEMS

Introduction/concept of agroforestry

Agroforestry is the deliberate growing of woody perennials (trees, shrubs) as agricultural crops alongside other crops and/or livestock in the same land. Existing trees can be protected and managed, or/and new ones planted. It is estimated that trees occur on 46% of all agricultural lands and support 30% of all rural populations. Trees are used in many traditional and modern farming and rangeland systems.

Agroforestry has three major attributes: productivity, sustainability, and adaptability. Good agroforestry practices should maintain or increase production (productivity), meet the needs of the present generation without compromising those of future ones (sustainability) and be culturally acceptable and environmentally friendly (adaptability).

Components of an Agroforestry System

- Land. This is managed for the benefit of the landowner, environment, and long-term welfare of society, especially in the case of hillside farming where agriculture may lead to rapid loss of soil. Unfortunately, farmers who rent land may have less interest in the long-term benefits of agroforestry.
- Trees. Particular attention is placed on multiple purpose trees or perennial shrubs. The most important of these trees are the legumes because of their ability to fix nitrogen and thus make it available to other plants. The roles of trees may include sources of fruits, nuts, edible leaves and other food; construction material; non- edible materials including sap, resins, tannins, insecticides and medicinal compounds; fuel; beautification; shade; soil conservation; improvement of soil fertility.
- Non-trees. Any crop plant can be used in agroforestry systems. The choice of crop plants should be based on those crops already produced in a particular region either for marketing, feeding animals, or for home consumption, or that have great promise for production. Other values to be considered in crop selection include proper nutrition, self-sufficiency and soil protection; knowledge of the crops; adaptations; production uses, as well as family needs; opportunities for markets. Any farm animal can be used in agroforestry systems. The choice of animal will be based on the value the farmer places on animal-derived benefits including income, food, labour, non-food products, use of crop residues and manure.

Some of the Agroforestry Tree Species in East Africa

Some of the common agroforestry trees species include *Markhamia lutea*, *Acacia mearnsii*, *Grevillea Robusta*, *Moringa oleifera*, *Calliandra calothyrsus* and *Gliricidia sepium*



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Agroforestry and crop production in Kalacha Marsabit County

Common Agroforestry Systems and Land-Use

Agri-Silviculture: It is the growing of agricultural crops as a primary component with the secondary component of multipurpose trees (MPTs) on the same managed land unit. The tree species bind soil particles in the root zone and increase water infiltration and reduce runoff.

Agri-Horticulture: Growing of agricultural crops and fruit trees on the same managed land unit is known as agri-horticulture. Fruit tree species like lemon (*Citrus limon*), mango (*Mangifera indica*), ber (*Ziziphus Mauritania*), and aonla (*Phyllanthus emblica*) can be successfully planted in agricultural fields and on degraded and low fertile lands with some restoration measures.

Alley Cropping: Growing of agricultural crops in the alley formed between the hedgerows of leguminous nitrogen-fixing tree species. This system is one of the effective measures for soil and water conservation in hilly areas.

Silvi-pasture System: Raising grasses or livestock with MPTs on the same managed land unit is known as the silvi- pasture system. This system has the potential to reclaim eroded and degraded lands. Mechanical measures combined with grass species cultivation are more effective for controlling soil erosion processes.

The grass species such as *Cenchrus ciliaris* (buffel grass), *Cenchrus setigerus* (bird wood grass), *Dichanthium annulatum* (marvel grass), *Panicum antidotale* (blue panic grass), *Panicum maximum* (Guinea grass), *Brachiaria mutica* (para grass) and *Pennisetum purpureum* (elephant grass) are important in ravine restoration.

Further Reading

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