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Agroforestry

This is the system of farming in which farmers that have multiple uses together with crops and/or pasture on the same land

Importance of agroforestry

- Trees provide shades for animals.
- Legumes planted fix nitrogen in the soil.
- Trees area source of fodder to livestock.
- Some trees provide fruits that if food to man.
- They are source of firewood
- Provide materials for construction
- Leaves decomposed to form humus.

Reasons why there is limited adoption of agroforestry by farmers in Uganda

- Land fragmentation limits the size of land for agriculture.
- Inadequate training
- Lack of permanent land ownership.
- Inadequate supply of seed/seedling supply
- Poor infrastructure such as roads to distribute seedlings
- High costs of seedlings
- Lack of education about the benefits to agroforestry.

Types of agroforestry practices commonly carried out by farmers.

- **Agro-Aquaculture** where the keeping of aquatic organism like fish in ponds surrounded by shrubs, trees and grass lawns.
- **Agri-silviculture system** where cultivated crops are intercropped with trees/shrubs for sustained production of food, fodder and wood.
- **Agri-silvi-pastoral system** where there is the integration of trees, crops, pasture and livestock on the same land for production of fodder, wood and pasture.

- **Entomoforestry** where the rearing of useful insects in association with trees, such as bee keeping (apiculture) and silkworm rearing (sericulture)
- **Silvo-pastoral system** where trees are planted with pasture to provide shade and forage for animals.

Characteristics of agroforestry trees

- They are quick maturing/grow fast
- They are deep rooted with few extensive lateral roots/have deep root system
- They have a narrow /less dense canopy
- They should grow straight with few or no branches
- They are easy to establish and quick to eradicate
- They withstand repeated pruning/are able to sprout easily and quickly grow
- They are nutritious and palatable to livestock/non-toxic
- They are resistant to pest and diseases
- They support growth of crops; some possess nitrogen fixing bacteria.

Conservation and utilization of forest (tree) resources.

- Leguminous trees and shrubs contain bacteria in their root nodules that fix nitrogen in the soil hence improving soil fertility.
- Trees have medicinal uses against major diseases. E.g. neem trees are used in treatment of malaria.
- Trees provide timber and other wood products
- Trees and shrubs nectar for bees to make honey
- Trees provide fruits for food
- Trees provide vapor for making rain
- Trees provide wood for fuel

Causes of deforestation in Uganda

- There is increased demand for fuel wood and charcoal
- The increasing population used part of the forest area for settlement
- The mining and quarrying destroy forest cover.
- There is increasing need for agricultural land
- The creation and extension of urban centres/ urbanization
- The construction of transport routes i.e. railways, roads, etc. destroy forests
- The poor government policies e.g. degazetting forests, failure to restrict exploitation and destruction
- The influence of pests and diseases
- Political instability .
- Improved technology by manufacturing industries for forest products to be used as raw materials
- High demand for forest products such as herbs , fruits, roots have led to rapid clearance of forests

- Wild/bush fires
- Destruction by wild animals.

Effects of deforestation on the environment

- Destruction has led to changes in climate in the area e.g. decline in rainfall
- Removal of vegetation results into problems of soil erosion.
- Rapid loss of soil fertility due to loss of humus which affects crop production. Lowering of water table that is reflected in loss of surface water.
- Leads to siltation of river channels due to the excessive run off.
- It increases pollution especially of air and reduction in purification due to loss of carbon absorbers.
- Loss of valuable tree species e.g. for medicine, timber/loss of animals and birds.
- Destruction of natural habitats for wild animals leading to migrations
- Shortage of wood fuel and charcoal leading to energy crisis.
- Causes reduction in government revenue and foreign exchange.
- Displacement of the communities which depend much on the forests for their livelihood.
- Leads to unemployment
- The flooding of rivers destroys lives and property
- It contributes to landslides and its negative effects
- It has created energy crisis/ scarcity of fuel
- Lack of wind breaks contribute to the destruction caused by wind storms
- There is displacement of the indigenous forest communities
- Loss of revenue / decline in export/ industrial earnings.

Measure being taken to combat deforestation

- Afforestation
- Re-afforestation
- Controlled exploitation of forestry resources
- Forest protection legislation
- Use of alternative source of energy such as electricity, solar energy, biogas etc.
- Educating the public to plant trees, and protect the available forests
- Training official forest worker on efficient utilization of forests
- Encouraging agroforestry
- Carry out research in forestry

Management practices for trees

- Training: using stakes for tree species which produce more products
- Mulching to suppress weeds and reduce the rate of soil erosion.
- Weed control using physical or chemicals to reduce competition with trees

- Protection against livestock trampling and bruising
- Pruning to increase light penetration
- Pest and disease control
- Proper spacing of trees for proper growth.
- Application of fertilizers and manures to improve tree growth
- Coppicing
- Pollarding
- Irrigation
- Thinning or removal of weak and unhealthy seedlings to allow enough space for the remaining plants.

1. Which one of the following is a practice where trees, shrubs and crops are grown together?
 - A. Agrosilvipastoral
 - B. Agrosilviculture
 - C. Alley cropping
 - D. Taungya - culture
2. A lever was used to lift a load of 80N by applying an effort of 20N. what was the mechanical advantage?
 - A. 0.25
 - B. 4
 - C. 25%
 - D. 400%
3. Which one of the following is NOT a characteristic of a good agroforestry tree species?
 - A. Having light canopy to allow sunlight penetration
 - B. Being deep – rooted
 - C. Being easy to establish
 - D. Being able to compete with crops
4. How should annual crops be planted in the system of agroforestry? As
 - A. Scattered trees
 - B. Wood lots
 - C. Shelter belts
 - D. Hedges

1.B 2B 3D 4A

5. (a) Define agroforestry

It is a farming system in which farmers deliberately plant multiple trees together with crops or pastures on the same land.

(b) Describe three types of agroforestry practices commonly carried out by farmers.

- Agro-Aquaculture where the keeping of aquatic organism like fish in ponds surrounded by shrubs, trees and grass lawns.
- Agri-silviculture system where cultivated crops are intercropped with trees/shrubs for sustained production of food, fodder and wood.
- Agri-silvi-pastoral system where there is the integration of trees, crops, pasture and livestock on the same land for production of fodder, wood and pasture.
- Entomoforestry where the rearing of useful insects in association with trees, such as bee keeping (apiculture) and silkworm rearing (sericulture)
- Silvo-pastoral system where trees are planted with pasture to provide shade and forage for animals.

(c) Give six characteristics of agroforestry

- They are quick maturing/grow fast
- They are deep rooted with few extensive lateral roots/have deep root system
- They have a narrow /less dense canopy
- They should grow straight with few or no branches
- They are easy to establish and quick to eradicate
- They withstand repeated pruning/are able to sprout easily and quickly grow
- They are nutritious and palatable to livestock/non-toxic
- They are resistant to pest and diseases
- They support growth of crops; some possess nitrogen fixing bacteria.

6. (a) Explain why farmers are encouraged to integrate trees in their crop gardens. (06marks)

- Trees provide shades for animals.
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- Provide materials for construction
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(b) Describe the characteristics of a tree species good for conserving soil. (08marks)

- Should have deep and extensive root systems anchor the soil, reducing soil erosion and improving soil structure.
- Should have dense canopy to reduce the impact of raindrops on the soil surface preventing splash erosion
- Should have ability to fix nitrogen

- Should have High Organic Matter Contribution in form i.e. lot of leaves and organic material contribute to the formation of humus, which improves soil fertility and structure.
- Should resist strong winds and thus act as wind breakers to reduce wind erosion
- Should be adaptable to local condition to thrive and provide long-term conservation

(c) Outline the causes of deforestation in Uganda. (06 marks)

- Increased demand for timber for paper, building and construction industry leads to cut down trees and consequently deforestation. An example is the allocation of Namanve plantation forest to development of industries.
- High energy demand especially wood fuel in domestic and industrial sector. Firewood constitutes over 80% energy requirement in Uganda for domestic cooking, firing bricks and preservation of fish at the fish landing sites such as Kasenyi fish landing site. In the rural areas such as Nakasongola firewood is almost the only source of fuel for cooking and light.
- Extension of rural and urban settlements which have led to clearing of forests and conversion of green space into built up areas for example the expansion of Kampale has eaten up all wetlands around it such Kyambogo-Kireka wetlands.
- Increased demand for agricultural land, trees are cut to provide land for crop growth and rearing of animals. For instance there is massive deforestation in Kalangala district to grow palm oil trees; and part of Mabira forest has been cleared to grow sugarcanes for commercial production of sugar.
- Deforestation also occurs due natural causes such bush fires, pest and diseases, land slides, volcanic eruptions, earth quakes, climate changes, floods and droughts.
- Transport leads to massive forest clearance to make ways for roads, railway and airports for example Northen bypass.
- Security concerns e.g. pest eradication in Mayuge district and removal of rebels hideouts.
- Corruption by forest officers that fail to enforce forest protection laws.
- Mining and quarrying is another cause of deforestation; for instance mining of copper at Kilembe mine led to massive deforestation in Kasese.