



Dr. Blosa Science

Sponsored by
The Science Foundation College
Uganda East Africa
Senior one to senior six
+256 778 633 682, 753 802709
Based On, best for science

digitalteachers.co.ug



UACE Geography paper 3: Physical geography of Uganda

1. The effective utilization of forest resources in Uganda has been limited capital. Discuss. (25marks)

Candidates are expected to describe the current status of the forestry in Uganda

The current status may include

- there is a high rate of deforestation
- Afforestation and re-afforestation is on increase in many areas in Uganda
- Planted forests currently cover 0.8% of the total land in Uganda
- Much of the forests destruction is due to the need for charcoal and firewood.
- Forest cover currently is 24% of the total land area in Uganda
- High rate of deforestation is recorded in Kyenjojo district
- The government of Uganda has established NFA to coordinate forestry activities.
- The government of Uganda is encouraging the use of sustainable exploitation of forestry e.g. use of simple tools.
- Some forests have been redemarcated and other gazetted
- Common planted tree species are pine and eucalyptus.

Candidates are expected to identify the types of forests in Uganda as

- Tropical lowland forests e.g. Mabira, Budongo, Maramagambo etc.
- Tropical highland forests/mountain e.g. Mt. Elgon, Rwenzori forests
- Riverine forests e.g. along river Nile, Katonga, Katu etc.
- Woodland forests e.g. Otzzi, Timu, Mt. Kei Morungole areas etc.
- Planted forests e.g. Kateera, Lendu, Agwata, Muko, Bugambo in Mbarara etc.

A SKETCH MAP OF UGANDA SHOWING FOREST TYPES.



Candidates are expected to clearly explain the impact of limited capital in development of the forestry industry in Uganda eg.

- Limited capital has led to use of crude methods and tools of felling the trees, loading the logs for example Budongo forests etc.
- Limited capital has limited setting up of modern wood and pulp industries to process forest products and timber e.g. in Mt Elgon forest etc.
- Limited capital has made it difficult to train, sensitize and pay the available labor force e.g, in Kalangala/Ssesse forest etc.
- Limited capital has made it difficult to construct roads and other infrastructure to access areas with forests potential e.g. Kalinzu forest.
- Limited capital has led to limited research to carry out effectively forest activities e.g. improved tree seedlings in forest research centres such as Nyabyeya etc.
- Limited capital has led to limited extension of power to areas with forest potential for exploitation, proper management etc e.g. in Zoka forest.
- Limited capital has hindered acquisition of land for setting up forest for example in Nakasongola.

Candidates are also expected to come up with other factors that have hindered the development of forestry industry in Uganda apart from limited capital

- Nature of forests in Uganda e.g. scattered valuable tree species, mixed species, canopies, buttress roots, climbing plants that have limited their exploitation e.g. Budongo, Mabira etc.
- Presence of wild animals such as lions, leopards, snakes that scare away exploiter such as Kibale forests etc.
- Natural barrier e.g. mountains, wetlands, waterfall which cutoff areas with forest potential such forests on slopes of Mt. Elgon etc.
- Uncontrolled wild fire which destroy large areas of forest cover for example along rivers e.g. Katonga, Mayanja etc.
- Competition with other land uses leading to destruction of forest such as agriculture, settlement, etc.
- Government policy of gazetting forest reserves for wild life conservation for example Mabira, Bwindi, Kalinzu.
- Limited market for timber and timber products due to competition from other countries.
- Limited government support and funding.
- Political insecurity e.g, forests in Bundibugyo etc.
- Natural hazards such as floods, land slides affect forestry activities such as asin manafwa.
- Corruption and embezzlement/bureaucracy by government officials.
- Unsupport land tenure system such communal ownership of land

2. Study the table below showing deforestation in selected districts in Uganda (1990 and 2005)

District	1990(hectares)	2005 (Hectares)
Kibale	114,000	58,000
Wakiso	28,000	4,000
Hoima	75,000	59,000
Mubende	19,000	4,000
Mpigi	40,000	27,000
Mityana	10,000	4,000

Adapted. 2008 State of Environment Report for Uganda, National Environment Management Authority (NEMA) p 126

(a) Calculate the percentage loss in forest cover for each of the selected districts between 1990 and 2005. (03marks)

$$\text{Percentage loss} = \frac{\text{old} - \text{new}}{\text{old}} \times 100$$

$$\text{Kibale} = \frac{114,000 - 58,000}{114,000} \times 100 = 49.1\%$$

$$\text{Wakiso} = \frac{28,000 - 4,000}{28,000} \times 100 = 85.7\%$$

$$\text{Hoima} = \frac{75,000 - 59,000}{75,000} \times 100 = 21.3\%$$

$$\text{Wakiso} = \frac{28,000 - 4,000}{28,000} \times 100 = 85.7\%$$

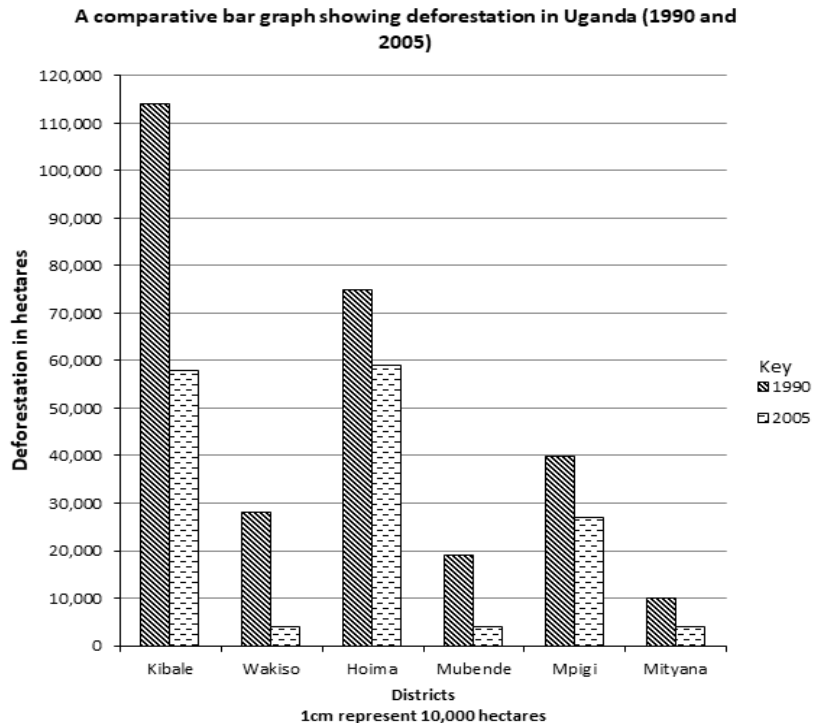
$$\text{Mubende} = \frac{19,000 - 4,000}{19,000} \times 100 = 78.9\%$$

$$\text{Mpigi} = \frac{40,000 - 27,000}{40,000} \times 100 = 32.5\%$$

$$\text{Mityana} = \frac{10,000 - 4,000}{10,000} \times 100 = 60\%$$

NB. The final figures must be given in percentage

(b) Draw a comparative bar graph to represent the information given in the table (08marks)



(c) Account for the high deforestation rate in Uganda (14marks)

The reasons for rapid forest destruction tropical rain forests

- There is increased demand for fuel wood and charcoal in urban centres like Kampala
- The increasing population used part of the forest area for settlement in areas like Kigezi, Mbale, Mbarara etc.
- 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 i.e. clearing trees to destroy pests.
- 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.
- Corruption encouraging illegal cutting of trees in government forest reserves such as Mabira forest.
- Clearing forests to prevent political instabilities like in Luwero

- The trees yield hard wood e.g. green heart, ebony, mahogany, rosewood, mvule etc.
- Trees have huge trunks which are heavy due to ample rainfall received.
- Forests develop three layers of canopy. There is a wildering mixture with climbers, creepers e.g. epiphytes, parasitic plants.
- The trees are umbrella shaped, they have bushy spreading tops.
- Some trees bear fruits.
- Limited under growth due to limited sunlight such as in Mabira forest in Buikwe.
- Under tropical lowland forests like Buggala in Kalangala, Kibaale forest appear in three canopies of very tall, medium height and short trees due to different ages
- They have a messy undergrowth composed of ferns and algae because of the boggy ground

(b) Explain the factors limiting effective utilization of tropical rain forests in Uganda (15marks)

Factors that limit exploitation of tropical forests

Physical factors

- Most of the commercial tree species such as ebony mahogany are bulky & heavy hence difficult to transport.
- Most of the trees yield hardwood. For example Mahogany, Ebony, Ironwood and red heart. These have limited market on the international market because their purpose is mostly limited for furniture purposes other than a variety of uses such as pulp and paper, Newsprint etc.
- Tropical hard wood tree species such as, Ebony in Kalangala have huge trunks and buttress roots that make felling of trees difficult..
- The hilly terrain (mountainous nature) in some countries such as Mt. Rwenzori makes felling and transportation of logs difficult.
- There is lack of pure stands for commercial tree species e.g. mahogany
- Tropical hardwood species such as ebony, mahogany take a long period of time to grow (mature). This may be 60 – 100 years to yield valuable timber. This affects the lumbering companies.
- Thick undergrowth and climbing plants in tropical forests such as Mabira in Buikwe, Kibale forests makes felling and transportation of trees / logs difficult.
- Presence of fierce wild animals e.g. leopards, reptiles, biting insects such as bees, wasps, red ants, black ants limits exploitation of tropical forests in Budongo forest.
- The tropical climate of hot wet and humid weather affects exploitation of tropical forests in Kalangala. For example it almost rains every day in Kalangala hence felling of trees is halted.
- Hard wood logs are very heavy to transport.

Human factors

- There is limited skilled labour to exploit tropical forests of Bugoma forest.
- Limited capital to purchase the necessary logging equipment such as tractors, chain saws etc. limit exploitation of forests like Kalinzu and Bwindi

- Inaccessibility due to limited communication lines in most tropical forests such as the Mt. Rwenzori forest makes exploitation of tropical forests difficult.
- Competition from other countries that produce valuable soft wood such as Norway, Switzerland, Canada, Finland affect exploitation of tropical forests.
- Local demand for charcoal and firewood cause destruction forest.
- Low levels of technology characterized by use of band axes, hand driven saws in Mabira make felling of trees difficult
- Political instabilities in Kasese and other places limit exploitation of tropical forests. These forests are used as hiding places by rebels.
- Competition from other sectors like mining and agriculture affects exploitation tropical forests.
- Bush fires started by hunters, lead to destruction of tropical rain forest.
- Limited electricity to process timber limits exploitation of tropical forests.
- High population growth rate encroaches on forest for agriculture or settlement
- Occurrence of accidents during the process of lumbering / felling of trees has often resulted into loss of lives. Hence discourage lumbering.
- Limited researches to identify commercial tree species, controlled lumbering, replanting of the forests, market have affected forest exploitation.
- Environmental conservative organizations tend to advocate against lumbering/cutting down forests.
- Mining and quarrying destroy forest
- Most tropical rain forests such as Bugoma, Maramagambo are highly heterogeneous making difficult to select valuable trees species like Ebony, mvule etc.
- Presence of wild animals that scare away lumber jacks.

4. To what extent have human activities contributed to desertification in Uganda (25marks)

Candidates are expected to define the term desertification as;

- The extension of desert-like conditions such as increased temperatures, reduced rainfall, reduced humidity, strong winds and less cloud cover to areas that were not originally having them
- Increase evaporation rates
- Loss of surface water.

Candidates are expected to identify areas experiencing desert like conditions

These areas are

- North-eastern Uganda i.e. Moroto, Kotido, Nakapiriprit, abim, Kaabong
- Nakasongola, Luwero, Kiboga
- The rift valley floor (Albert flat), Ntoroko parts of Kasese
- The Ankole-Masaka corridor i.e. Rakai, Sembabule, Lyantonde, Kiruhura, Isingiro

Candidates are expected to draw a map of Uganda showing areas which are experiencing desert-like conditions

A MAP OF UGANDA SHOWING AREAS WHICH EXPERIENCE DESERTIFICATION



Candidates should explain and illustrate how human activities have contributed to desertification in Uganda As follows

The human factors include:

- Practices of overstocking by Karamojong, Itesot destroy vegetation
- Overgrazing by livestock and wild animals in game parks like Kidepo National park leads to reduction in vegetation thus affecting formation of rainfall through evaporation/transpiration.
- Deforestation e.g. depletion of forests in Nakasongola and Luwero eliminates the source of atmospheric moisture through transpiration. This lead to increase in temperature and changes in rainfall season is a result of deforestation..
- Wetland reclamation either for settlement or agriculture for example along the shores of Lake Victoria eliminates source of vapour through evapotranspiration. This leads to scarcity of rainfall as well as reduction in humidity leading to desertification..
- Bush burning by farmers particularly the pastoralists in north-east Uganda destroys vegetation leading to reduced atmospheric vapour. The smoke contributes to the greenhouse effect leading to increasing temperatures thus desertification.

- Industrialization leads to desertification through a number of ways. First it involves wetland reclamation and Deforestation to create land for industrial establishments. This eliminates source of atmospheric vapour. For example Namanve plantation forest was converted into industrial park.
- Greenhouse gases and smoke from industries of Kampala leads to destruction of the ozone layer leading to increasing temperature.
- Drilling bore holes and construction of valley dams in Nakasongola tend to drop the water table that is a source of water for vegetation. This is followed by increasingly poor and scanty vegetation.
- Mining and quarrying for example in Kotido leads to destruction of vegetation thus elimination of the source of atmospheric vapour. This also leads to accelerated soil erosion which culminates into desertification.
- Poor farming methods such as up and down the slope in Moroto, Mt. Elgon leads to soil erosion which also eliminates vegetation cover.
- Political conflict and wars especially in Kasese and other places, have led to destruction of vegetation.
- Forests are partly destroyed in the bid to eliminate rebel hiding grounds. Consequently this eliminates the source of atmospheric vapour leading to reduced humidity, rainfall, and rising temperatures hence desertification
- Construction of roads removes vegetation cover leading to desertification
- Charcoal burning for example in Nakasongola destroys forest cover leading high temperatures and low rain causing desertification.

5. Examine the causes and effects of environmental degradation in Uganda.

Candidates are expected to define the term environmental degradation i.e.the decline in the production value of the available renewable and non renewable resources.

Candidates are expected to draw a sketch map of Uganda showing the degraded areas

The sketch map should have

Forms of environmental degradation include

- Pollution (water, land and air) in urban centers (Kampala)
- Soil erosion/mass wasting in high land areas (Kabale)
- Soil exhaustion in plantations (Lugazi, Kakira)
- Loss of vegetation cover in forested areas (Mabira)
- Overfishing in major water bodies (L. Victoria)
- Overstocking/over grazing in Karamoja, Masaka-Ankole corridor

- Settlement/urbanization which creates run-off thus causing periodic flooding e.g. Karerwe, Nakivubo in Kampala.
- Bush burning destroys vegetation cover and transforms the original vegetation cover into secondary and low quality vegetation types e.g. Karamoja, Lyantonde etc.
- Mining and quarrying which leave deep hollows that may harbor disease causing vectors e.g. Kilembe mine.
- Road construction which destabilize the landscape leading to land slides e.g. Mbale roads
- Drilling of boreholes which destabilize the water table and soil profile e.g. Moroto, Soroti. Lira etc.
- Climatic changes due to global warming e.g. in Karamoja.
- Effects of strong winds which lead to dusty conditions, high rate of evaporation e.g. in Kotido.
- Pests and diseases which affect crops in Masaka, Kabale etc.
- Invasion of water weed (hyacinth) on water bodies such Lake Victoria, L. Kyoga etc.
- Disasters such as flooding and landslides in Mbale.
- Political instability such as in Kasese lead to destruction of vegetation by explosives
- Poor fishing methods such as overfishing and use of poisons depletes fish from water bodies such as L. Victoria.
- Poaching leads to extinction of valuable wildlife species such as Rhinos in Murchison National Park.

Candidates are expected to bring out the effects of environmental degradation

- Reduction in the productivity of land/soil exhaustion and hence decline in food production in Kibale
- Shortage of wood fuel for domestic use e.g. in Tororo, Nakasongola, Rukungiri.
- Soil erosion/landslides which lead to formation of gullies, rills e.g. on slopes of Mt. Elgon
- Laterisation due to leaching e.g. in Wakiso, Mukono, Mpigi.
- Lowering of water table and water quality thus drying of shallow wells in Mpigi, Bushenyi, Kaabong etc.
- Loss of agricultural land thus leading to severe famine in Karamoja
- Loss of water catchment areas leading to the disappearance of stream and shallow wells in Arua, Nakasongola etc.
- Loss of bio-diversity i.e. the original flora and fauna are transformed into secondary form or become extinct e.g. on slopes of Mt Elgon.
- Disease outbreaks due to decline in water quality e.g. cholera, dysentery e.g. in slums of Kampala.
- Flooding especially in valleys due to increased water run-off e.g. In Kampala
- Vibrations from mines/quarries destroy settlement, property and lives e.g. Tororo girls SS from Tororo limestone mining.
- Siltation of water bodies leading to shallowness, pollution, flooding and death of aquatic animals e.g. in Luzira-Kampala
- Micro climatic changes which result into late and low rainfall e.g. Kabale, Mbale, Soroti etc.

6. Assess the role of forest resources in the development of Uganda.

Candidates are expected to come up with the status of forest sector in Uganda as follows

- Montane forest 17.9%
- Tropical lowland forest 81.7%
- Planted forests 0.8%
- Other including Riverine 0.9%
- Of these 23.6% are gazetted whereas 69.9% are non-gazetted
- there is a high rate of deforestation of natural forests
- government is encouraging afforestation and reafforestation and is providing seedlings.
- 3% of the total land area is covered by forests

Candidates are also expected to identify the examples of forests like

- Tropical lowland forests e.g. Mabira, Budongo and Maramagambo etc.
- Tropical highland forests (montane) on Mt. Elgon, Rwenzori etc.
- Savana woodlands in Teso, Lira, Kasese
- Planted forests e.g. Lendu, agirita, albera, Katera, Magamaga etc
- Riverine forests e.g. along Katonga, Nile, Mayanja, Aswa etc.

A SKETCH MAP OF UGANDA SHOWING FORESTED AREAS.



Candidates are expected to explain and illustrate with local examples the role of forests in the development of Uganda

Positive contributions

- Source of timber for example from forests like Mabira, Budongo for local and foreign markets.
- Provide timber for construction industry
- Provide firewood and charcoal for domestic use in Kampala, Wakiso etc.
- Forests like Mabira in Buikwe influence microclimate of adjacent areas leading to rainfall in Mukono and Jinja.
- Contain animals such as gollira's in Bwindi. These attract tourists leading to acquisition of foreign exchange
- Source of herbal medicine
- Absorb green house gases protecting the environment from desertification
- Source fruits, honey from Budongo forest etc which are highly nutritious
- Forests like Mabira provide employment to forest rangers, timber cutter, tourist guides etc.
- Source of government revenue through taxes and licences
- Source of recreation and relaxation
- Prevent soil erosion
- They are water catchment areas such for river semuliki, river Sezibwa etc.
- Promote development infrastructure like road network to facilitate movement of tourists and forest products.

Negative contribution

- Contain dangerous wild animals like leopards,
 - Are misused by rebels that distabilize political climate e.g. in Kasese.
 - They hinder construction of roads such as Bwindi forest
7. Study the table showing the trend in forestland vegetation in Uganda and answer the questions that follow

Types of forest vegetation	Area in hectare	
	1993/4	2005/6
Plantations	35,000	50,000
Stocked tropical High forests	650,000	500,000
Degraded Tropical High forest	275,000	220,000
Woodlands	2,975,000	2,900,000

Adapted: State of the Environment Report 2002, National Environment Management Authority p 123

(a) (i) Calculate the percentage change for each type of forest

$$\text{Percentage change} = \frac{\text{new-old}}{\text{old}} \times 100$$

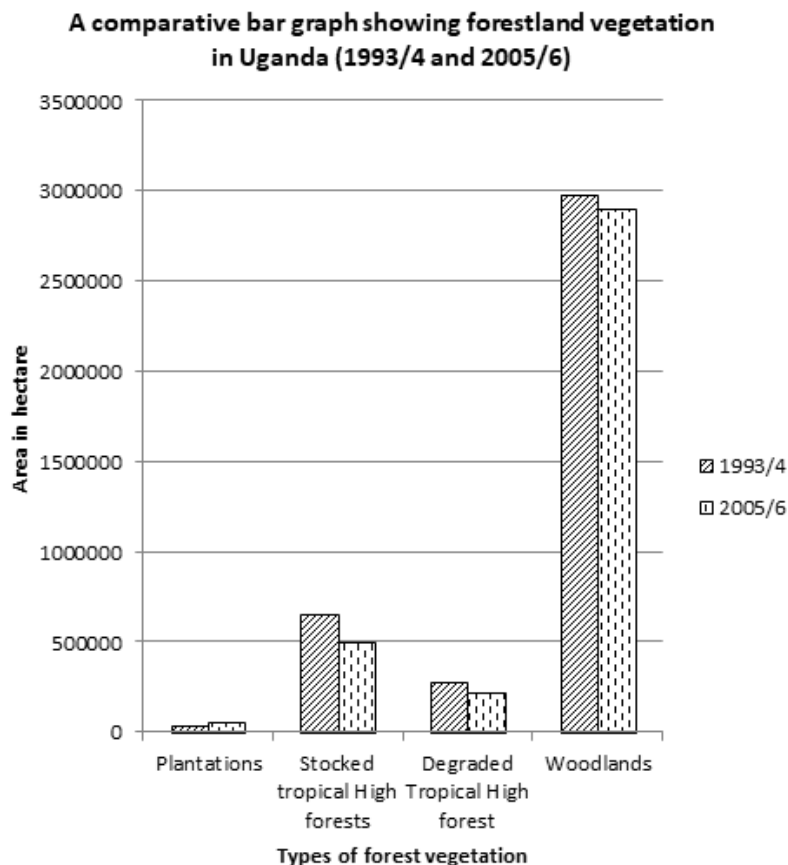
$$\text{Plantation} = \frac{50,000 - 35,000}{35,000} \times 100 = 42.9\%$$

$$\text{Stocked tropical high forests} = \frac{500,000 - 650,000}{650,000} \times 100 = -23\%$$

$$\text{Degraded tropical high forests} = \frac{220,000 - 275,000}{275,000} \times 100 = 20\%$$

$$\text{Woodlands} = \frac{2,900,000 - 2,975,000}{2,975,000} \times 100 = -2.5\%$$

(ii) Draw a comparative bar graph to represent the information in the table



(b) Account for the trend in forestland vegetation cover between 1993/4 and 2005/6

Factors for increase in plantations/planted forests

- Favorable government policy of planting of wood logs
- Planting of peri-urban forest to meet wood fuel demand
- Collaborative forest management practices
- Increased agr-forestry practices
- Re-forestation programmes in fragile ecosystems
- Gazetting more areas as forest reserve to protect catchment areas
- Increased research – ICRAF etc

Factors for the decrease in other types of forest cover

- Increased demand for timber for building and construction industry
- High energy demand especially wood fuel in domestic and industrial sector
- Extension of rural and urban settlements which have led to clearing of forests
- Increased demand for agricultural land
- Destruction of forests natural and bush fires
- Pests and diseases
- Destruction of forests by land slides
- Road construction leading to massive forest clearance
- Security concerns e.g. pest eradication in Mayuge district.
- Destructive methods of lumbering
- Corruption by forest officers