

# UNIT

# 3

## OUR ENVIRONMENT

### Unit outcomes

After studying this unit, you will be able to:

- Identify types of vegetation, their distribution and major factors that affect natural vegetation and wild animals in Eastern Africa.
- Realize the causes and effects of human interference on the environment
- Recognize conservation methods and importance of national parks
- Show an interest in preventing damage to the local environment.

Do you remember what you learnt in Unit Two of this textbook? You learnt about earth, our home. In this unit you are going to learn about our environment.

**Competencies:** After studying this lesson, you will be able to:

- Relate the presence of wild animals to the distribution of natural vegetation.
- Realize that animals adapt and evolve to suit their habitat.

### Key Terms

↔ Natural vegetation

↔ Primeval

↔ Wild animals

↔ Primate

### Types and Distribution of Natural Vegetation and Wild Animals

- Define natural vegetation.
- Give local examples of natural vegetation.
- What are the features that determine distribution of natural vegetation?
- Explain why vegetation type differs from place to place.
- What are wild animals?
- Indicate the types of wild animals available in a given natural vegetation.

Eastern Africa is endowed with different types of vegetation and wild animals. This is the result of the physical environment and the prevailing climate. In this regard there are different types of natural vegetation in Eastern Africa. The natural vegetation includes forests, grasslands and semi-deserts and deserts.

- List features of the natural environments in Table 3.1. Use the knowledge you learnt in grade five in unit three.

**Table 3.1 Features of different natural environment**

Forest	Grassland	Semi-desert

## Forests

- What are forests?
- What makes them different from grassland vegetation?
- Discuss, in groups, the different types of trees available in forests (focus on your local or nearby areas where forest vegetation is prevalent).
- First guess the types of forests available in Eastern Africa and then cross check your answer with the readings on the forest types of Eastern Africa.

### ◆ Coastal Forest

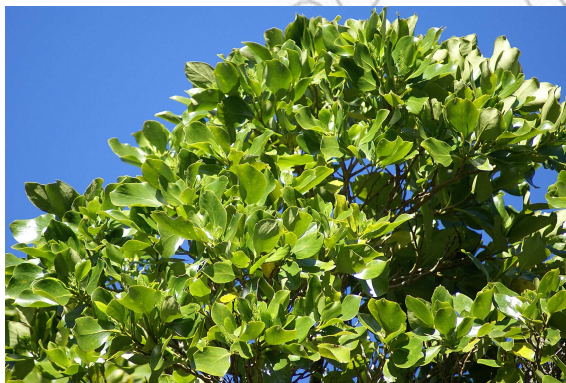
In Eastern Africa coastal and mountain forests prevail. The coastal forests of Eastern Africa include a tropical moist forest region along the east coast of Africa. The forests extend in a narrow band. They lie along the coast of the Indian Ocean. They stretch from southern Somalia in the north, through coastal Kenya and Tanzania to the mouth of the Limpopo River in southern Mozambique.

### Montane Forest

- Where do we find montane forests in Eastern Africa?
- Mention some names of montane forests?
- What advantage do forests have for the local community?
- How do the people look after the forests?

Montane forest is found in southern Sudan (adjacent to Eastern Africa), Kenya, Uganda and northern Tanzania. This forest is situated on continuous and isolated mountain ranges. The forest region consists of more than twenty-five montane forest patches (or elevational islands) of various sizes.

The **Montane forest** lies starting from an altitude of 1300m up to 4000m. On wetter slopes, there are broadleaf and evergreen trees (See Fig.3.1). The montane forest is composed of species which are not found in the lowland forest.



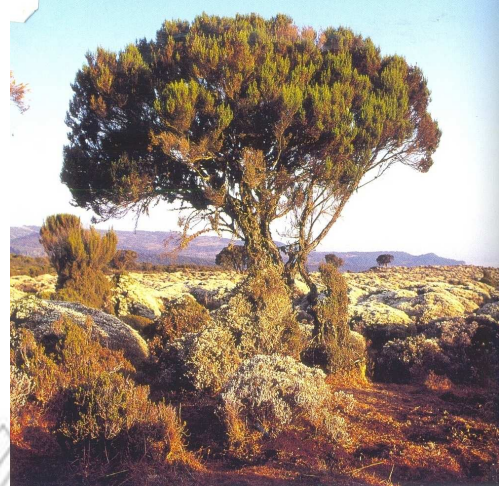
**Fig. 3.1 Broadleaf and Ever green tree**



**Fig. 3.2 Coniferous forest of podocarpus**

The uppermost belt of the Montane Zone is composed of giant heaths (Ericaceous) up to about three meters tall and covered with lichens (See Fig.3.3).

On drier slopes, a coniferous forest of junipers and podocarpus occurs (See Fig. 3.2). At the upper margins of the montane forest, bamboos may occur in patches or as a nearly continuous belt.



**Fig. 3.3 Heather**

## Lesson

# 3.1

## Review



### Activity A

#### A. Questions based on facts:

##### Individual Work:

- What can you conclude about coastal forests in terms of the environment?
- Compare and contrast coastal forests and forests on wetter slopes of mountains.
- What type of vegetation is the upper most montane zone composed of?

##### Pair Work:

- Discuss the main differences among forests of lowest elevation, wetter slopes and drier slopes on mountains of Eastern Africa.
- In Which areas are coastal forests found in Eastern Africa?

#### B. Things to do:

##### Group Work:

- Collect information on types of forests in your area.
- Find out what causes the differences in the types of forests in your area and prepare a report for class presentation.



## Case Study

### Desert in Ethiopia

Ethiopia consists of varied natural environments. Some of them are semi-desert and desert environments. The Danakil Desert is one of the desert environments.

The Danakil Desert is located in the border-triangle between Ethiopia, Eritrea and Djibouti. It is one of the most remote and most extreme regions of the world. It is also one of the lowest points in Africa. It is 120 meters below the mean sea level at Kobar Sink. This desert is centered on the Danakil Depression. It is bounded on the north by the Danakil Alps, a range of hills separating the desert from the Red Sea. This desert is characterized by black lava formations, smoking volcanic cones, hot springs and sulfur fields. It is one of the hottest places on earth, with average day time temperatures around 27°C. The high temperature reaches 50°C. The region receives an average annual rainfall of less than 200 mm. Here, the vegetation type is scanty composed of scrub vegetation and stunted bushes and tufty grasses.

The desert contains small deposits of manganese and potash, but the principal resource is rock salt. There are numerous salt lakes in the desert. The largest is Lake Asale, near the Eritrean border. Its height is 120 m below sea level.

Danakil is a name given to the natives of Afar. The Afar are herding people. They speak Cushitic language related to Somali.



**Fig. 3.4 Lake Asale**



*Danakil* is an Arabic word. It is a name given to the natives of Afar. The Afar are herding people. They speak Cushitic language related to Somali.

### Case Study

#### Grassland in Kenya (Masai Mara)

Kenya has forested and grass covered areas with other varied types of vegetation. One of the grass and different other types of vegetation covered area is known as Masai Mara.

The Masai Mara consists of rolling open grasslands with woody thickets, and patches of acacia woodland. There are tree-lined rivers, and isolated rocky outcrops known as *kopjes*. Masai Mara is bounded on the west by an escarpment. The other side slopes down to Lake Victoria. On the east, it is marked by the hills bordering the Eastern Rift of the Great Rift Valley. Across the border, in Tanzania, the Serengeti National Park is located. Masai Mara Game Park is a protected area in southwestern Kenya, on Kenya's southern border with Tanzania. First it was protected in 1948. In 1984 it was officially declared as a national reserve. The Masai Mara, which covers an area of 1,510 sq km, is one of Kenya's best known and most visited parks. The Masai Mara is of vital importance to the Serengeti environment. This environment is defined by the area used by the region's migratory herds of wildebeests or large African Antelopes (See Fig.3.5).



**Fig. 3.5 Wildebeest**

The wildebeests give birth on the open plains of the southeastern Serengeti. Here, annual rains from about November to May produce a rich growth of lush grasses. However, these grasses soon dry. As a result, the wildebeests are forced to move west across the Serengeti. Then they move northward into the Masai Mara, in search of grazing land. In essence, the wildebeests follow the rains and the associated lush grasses. In doing so, they generate one of the most spectacular wildlife in the world. From July to August, nearly two million animals move across the open dusty plains of the Masai Mara in seemingly never-ending droves. The herds turn around and disperse southward back into the Serengeti in October and November.

The herds of wildebeests and zebra are preyed on by lion, spotted hyena, leopard, and cheetah (See Fig.3.6). The Masai Mara supports the largest lion population in Kenya and is one of the best places for visitors to see cheetah.



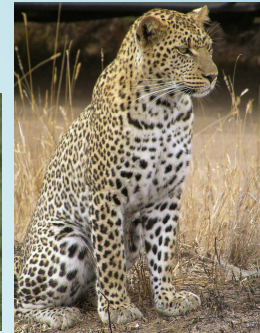
Lion



Spotted Hyena



Cheetah



Leopard

**Fig. 3.6 Predatory Animals in Masai Mara**

Wildebeest, zebra and Thomson's gazelle (See Fig.3.7) migrate into and occupy the Mara reserve from the Serengeti plains to the south. Finally, they move to Loita plains in the pastoral ranches to the north-east from July to October or later. Herds of all three species are also resident in the reserve.



Thomson's Gazelle



Burchell's Zebra



Grévy's Zebra

**Fig. 3.7 Preyed Animals**



Other mammals in the reserve include elephant, buffalo, giraffe, Thomson's hartebeest and hippopotamus (See Fig.3.8).



Elephant



Buffalo



Giraffe



Thomson's hartebeest



Hippopotamus

**Fig. 3.8 Other Mammals of Masai Mara**

Tourism can be a threat to the park's ecosystem. In the early 1990s park administrators closed parts of the park to visitors. This measure was taken simply to allow the vegetation to recover from excessive vehicular traffic. Excessive crowding of tourist vehicles around predators such as lion and cheetah has also been credited with changing the animals' behavioral patterns.



## Case Study

### Mountain Forest in Uganda

Uganda has mountain forest which gives shelter to endangered mammals. These mammals are known as gorillas. For example the huge primeval (ancient) forest in the Virunga Mountain range is one of the most biologically diverse areas on earth. It has an environment that defines the very essence of the continent. Therefore, it has been designated as a World Heritage Site.

There are many other mammals primate in the park including chimpanzees, black and white colobus, red colobus and blue monkeys, and grey-cheeked mangabey monkey (See Fig.3.9).



Chimpanzee



Colobus Monkey



Mangabey

*Fig. 3.9 Some Primates of the Ugandan Mountain Forest*

## Lesson

## 3.1

## Review

**Activity B****A. Questions Based on Facts:**

- Name the endangered animals that inhabit mountain forest in Uganda.
- Which mountain range is one of the most biologically diverse areas on earth?
- Name the predatory animals available in your areas.
- How do they live in those areas?

**Pair Work:**

- Discuss why Virunga mountain range is designated as a world heritage site.
- List the primates available in Uganda's mountain forest.
- Discuss on the advantage and disadvantage of herbivores and carnivores living together in a given environment.
- How does tourism become a threat to a park's environment?
- Discuss how you can protect a given environment in your area and present your findings to class.
- What do you do if an illegal hunter kills an animal in a given national park.

**B. Things to do:****Group Work:**

- Collect as many pictures of wild animals as possible and make an album so that you present it to the pedagogical center of your school.
- Read more on the Danakil desert and report your findings to the class.

**Pair Work:**

- Make further readings and prepare a report about Virunga mountain in Uganda.

**Animals and their adaptation to their habitats**

- Why is it that in forested areas tree climbing animals are common?

**Montane Forest: Animal Adaptations**

- Where do you find montane forest in Eastern Africa?
- What sorts of animals live in this environment?
- Discuss how animals adapt themselves to montane forest.

There are numerous creatures living in montane forest of Eastern Africa. As a result, there is a great deal of competition for food, sunlight and space. Animals living in this forest have developed special features in order to survive. This is called **adaptation**.

Montane forest of Eastern Africa is inhabited by tree climbing animals, such as monkeys, chimpanzees and gorillas (See Fig.3.10). There are also birds that inhabit the forests. All animals in this forest live on various fruits. Some animals live on smaller animals and insects they find in the forest. The animals have developed body structures that help them manipulate in this forest. On wetter slopes, there are flesh eating animals like leopard. All these animals have well specialized body to adapt themselves to conditions in the montane forest region.



Gorilla



Chimpanzee

*Fig. 3.10 Gorilla is a Montane Mammal*

### Savanna grassland

- What sort of grassland is there in your locality?
- Discuss the types of animals available in your local grassland.

The savanna grassland is another region where animals have adapted themselves to live in it. The animals that inhabit the savanna grassland are mammals, reptiles and birds. The bodies of these animals are suited to the physical conditions in the region. There are also birds that are well suited to adapt to the region. These birds live on fruits, crops and insects available in the region. Thus, due to adaptation all animals show interdependence, interconnectedness and interrelationship to sustainably inhabit the environment. This is purely the result of their adaptability to the region.

### Desert and Semi desert:

- Discuss what desert and semidesert environments are.
- How do plants adapt themselves to these regions?
- How do animals withstand the severity of the desert and semi desert regions?
- Give examples of wild animals that live in desert and semi desert regions.



Plants and animals inhabit the desert and the semi desert regions. Plants in the desert or semi desert regions need special ways of getting water. Their leaves and roots are special. Deserts are home to many reptiles, insects, birds and small animals (See Fig.3.11). Few large animals have adapted to desert life. In order to survive, desert animals have developed a number of ways of adapting to their habitat. The most common adaptation in behavior is staying in the shade of plants or rocks. Some animals stay underground to protect themselves from the heat of the day. Many desert animals are inactive during the day time. They become active and hunt at night when it is cool. Some animals get all the moisture they need from the insects, plants and seeds they eat, and do not need to drink water. Most desert animals pass little moisture out of their bodies. They do not have sweat glands. They pass only small amounts of concentrated urine. Fat increases body heat, so some desert animals have concentrated the body's fat in one place, such as a hump or tail, rather than having it all through the body (See Fig 3.11).



Snake



Mammal (Camel)

*Fig. 3.11 Desert and Semi desert animals*

**Camels are one of the few large mammals that survive in the desert, and have many special adaptations that help them.**

## Lesson

## 3.1

## Review

**Activity C**

*Questions based on facts:*

Individual work:

- Why do some animals live in water bodies?
- Why do some others live in tropical forests of Eastern Africa?
- Compare and contrast grassland and desert habitats.
- What sorts of mammals are found in the mountain forest of Uganda?
- Which mountain range forest, in Uganda, has been designated as a world heritage?
- Mention the primates that inhabit the mountain forest of Uganda.

Pair Work:

- What will happen to the wild animals if their habitats are destroyed?
- Discuss the location of montane forests in Eastern Africa.

Group Work:

- Compare and contrast gorillas and chimpanzees.
- Discuss the adaptability of animals to every ecoregion of Eastern Africa.
- Discuss how protecting montane forest, grassland, desert and semi desert ecoregions is possible.
- You remember that you learnt about animals that inhabit the forest, the savanna grassland and desert or semi desert region, in this unit. Now try the following exercise.

*Look at the table below and list the wild animals found in each ecoregion.*

Desert in Ethiopia	Grassland(Kenya-Masai Mara)	Mountain forest-Uganda

## Factors that Affect the Distribution of Natural Vegetation and Wild Animals in Eastern Africa

**Competencies:** After studying this lesson, you will be able to:

- Identify the major factors which affect the distribution of natural vegetation.
- Explain that wildlife is affected if the environment is damaged by increased human presence.
- Appreciate the aesthetic value of natural vegetation and wild animals in Eastern Africa.
- Explain that income secured from tourism can contribute to the protection of wild animals and their habitat.

### Key Terms

↔ Biodiversity

↔ National park

↔ Sanctuary

↔ Soil erosion

↔ Game reserve

↔ Species

### Key Natural and Human Factors that Affect Distribution of Natural Vegetation and wild animals

- Pin point some natural factors that help grow plants in your surroundings.
- List the possible human factors that affect the flourishing of vegetation in your locality.
- What measures should people take in order to keep plants grow well in your surroundings?
- Discuss, in pairs, the natural factors that affect the distribution of natural vegetation in general.
- Present local examples with regard to maintaining the growth and destruction of natural vegetation.
- Discuss the economic use of natural vegetation in your local area.

### ◆ Natural Factors

Natural factors are naturally found phenomena. They include:

- Soil type
- Climate
- Altitude

These factors are interconnected. They are put here separately to indicate that each can be used as a cause to explain the existence of a given living organism or thing in a certain locality. For example the



availability of fertile soil could be the result of vegetation cover. Vegetation and its type could be related to the type of climate which is the reflection of altitude variation.

Thus, natural vegetation differs due to variation in soil, climate and altitude. If you remember the different types of vegetation you learnt previously, they are the reflections of soil type, climate and altitude. Luxuriant plant growth and vegetation distribution are the results of fertile soil, high rainfall and moderate altitude.

Due to natural imbalance, the vegetation cover may be endangered. For instance, when drought occurs, vegetation cover is affected. Ultimately the land becomes bare. Bare land is exposed to erosion. Erosion in the long run degrades the landscape. If this happens continuously, then the land becomes barren. Barren land is usually less fertile. Thus, it is abandoned by both humans and animals.

### ◆ Human Factors

Human factors are usually expressed in terms of human interference. In Eastern Africa, natural regions are commonly affected by:

- expansion of tourism
- human settlement
- rapid coastal development
- expansion of farmlands

In several areas, such as the Nairobi and Mkomazi parks, large mammal populations have become more compressed and animal and plant species diversity has decreased. Rapid biodiversity loss in some of Kenya's protected areas is also closely linked with the expansion of tourism, rapid coastal development, and spread of human settlements since the 1970s. The large mammal population of Uganda's Murchison Falls National Park came under heavy pressure during the years of civil strife, leading to huge species decline and vegetation cover change. Wild animals are forced to leave their habitat due to decreasing forest cover.

Some scientists believe that the global climates are changing. This change causes global warming. They believe that the change is caused by human activity. Other scientists believe the changes being measured are only fluctuations in the atmospheric conditions. They ascertain that these changes have always occurred.



**Global warming describes and explains the pattern of increasing global temperatures.**

In Eastern Africa, in most cases, grasslands are homes for big animals such as leopards, lions, cheetah, and numerous grass eating animals. Their number used to increase in the past. With the elapse of time,

human population number showed a dramatic change. This caused the rise in demand for extra land. Thus, habitats of wild animals started to be encroached by ever growing rural population. Farmers began clearing the wild animals' habitat bit by bit to secure farmland for growing crops that would satisfy their need for food and grazing grounds for their cattle. This human interference has increased from time to time contributing to the decrease in the animals' habitat. Trees have been cut and grass lands burnt to get extra land for farming. These activities have cumulative effect in threatening the wild animals as time goes by. Consequently, the coexistence of grass eating and flesh eating animals has been disturbed. To this end, some animals like leopards and other big cats have abandoned their habitats and migrated to some other places where they could get free shelter and food. Moreover, illegal hunting has reduced the number of leopards in the wooded grasslands.

## Lesson

## 3.2

## Review

**Activity A***Questions based on facts:***Individual work:**

- What are the important natural factors that determine forest distribution?
- Explain, at length, the human factors that affect distribution of plants and wild animals .
- When is vegetation cover usually endangered?

**Pair Work:**

- Discuss how you can check human intervention that negatively affects the distribution of vegetation and wild animals
- Exchange views on how human activity plays a prime role on global climate change.
- Discuss what views some scientists hold with regard to on going global climate change.

**Group Work:**

- Collect information about vegetation depletion and wild animal migration.
- Discuss how natural factors affect the distribution of vegetation and wild animals.

**Wild Animals: World Heritage**

As mentioned earlier, wild animals in Eastern Africa are found both in forests and grasslands. These animals are important and attractive for the region. This has made the region a dignified tourist attraction center. Some countries of the region have well organized and maintained national parks, game reserves and sanctuaries. Such countries include Kenya, Tanzania, Uganda, Rwanda and Ethiopia.

Most often protected areas are visited by tourists. As a result, the protected areas in Eastern Africa have become renowned wild animal reserves where pass time visit and research based activities are carried on. Thus, the areas have been designated as world heritage.

### ◆ Endangered Species

Nature relies on delicate balances of plant and animal life to remain healthy. When one part of that balance is altered, our plants and animals can be put in danger. Although change is a natural part of our evolving world, changes that occur at a pace that is too rapid has a disastrous effect on individual species of plants and animals.

Habitat loss at an unexpected pace is the primary cause of the endangerment of species in Africa. As the rainforests are cut for wood and exploited for other natural resources, hundreds of species are put in danger of existing no more. Many animals also suffer due to overexploitation or poaching.

#### Some of the endangered mammals of Eastern Africa are:

- elephant
- cheetah
- gorilla
- leopard, etc

#### Case Study

Forests of Uganda and Rwanda are inhabited by gorillas. These gorillas have lived in these forests since the time the forests flourished. Before human population showed dramatic change in the two countries, gorillas inhabited the forests peacefully. With the elapse of time, due to deforestation and illegal hunting, the number of gorillas has decreased continuously. This has made them endangered animals in that part of the continent of Africa.

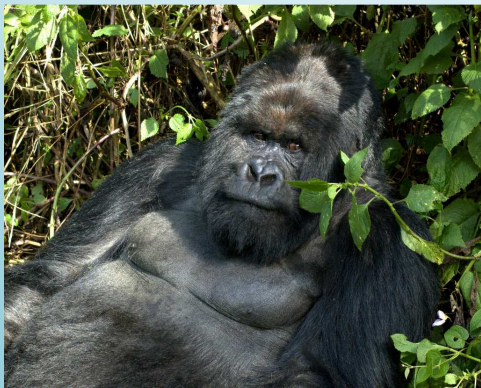


Fig 3.12 Gorilla

Gorilla Safaris are found in Uganda, Rwanda and Democratic Republic of Congo whose jungles provide the perfect habitat for the endangered gorilla population. There has been an increase in the gorilla population in recent years. However, they are still one of the world's most endangered species. Thus, they are in desperate need of conservation.



## ◆ What is WWF?

- WWF means **world wildlife fund**. WWF is one of the world's largest and most respected independent conservation organizations.
- It is an independent foundation registered under Swiss law
- WWF is a global organization acting locally through a network of over 90 offices in over 40 countries around the world.
- On-the-ground, conservation projects managed by these offices are active in more than 100 countries.
- The central secretariat for the network called WWF International is located in Gland, Switzerland.
- WWF's first **office** was founded on 11 September 1961 in the small Swiss town of Morges.



Fig 3.13 Logo of WWF

### Lesson

## 3.2

### Review



### Activity B

#### A. Questions based on facts:

##### Individual work:

- In which countries of Eastern Africa do we find gorillas?
- Discuss the negative impact of human interference in a given natural environment.

##### Pair Work:

- Exchange views with your group members to define what heritage is.
- Discuss how wild animals become world heritage.
- How are wild animals endangered?

##### Group Work:

- What does WWF stand for?

#### B. Things to do:

##### Individual Work:

- Compare and contrast cheetah and leopard.

##### Pair Work:

- Draw the sketch map of Eastern Africa.
- Show different wild animal habitats on the map.

##### Group Work:

- Make the sketch map of Eastern Africa and show the countries that own gorillas.

**Human Interference and Disturbance to Our Environment**

**Competencies:** After studying this lesson, you will be able to:

- Evaluate the different human causes of damage to the natural environment.
- Identify the effect of human interference in natural vegetation.

**Key Terms**

- ↔ Drought
- ↔ Famine
- ↔ Migration

**Causes**

- What are the pull factors for human interference and disturbance to our environment?
- Discuss, at length, the actual activities that result from human interference.

Rapid population growth in Eastern Africa has called for additional land for agricultural purposes. People are likely to encroach protected areas and clear vegetation cover. Any move to use natural resources unwisely has a devastating effect on the environment in due course of time.

Rural population's life is entirely dependent on farming and rearing animals. Domestic animals need enough space for grazing. Gradually, the area used to graze animals may be overgrazed and over browsed. In the long run overgrazing and over browsing inflict problem to the area. Thus, the widening pasture land from time to time forces wild animals to abandon their habitats.

People may simply cut trees for building construction. Unwise use of the forest resources affects the given environment constantly. Ultimately, the environment becomes barren. There arises climate change. Cattle may be starved due to lack of forage. The soil could be exposed to wind erosion.

When earlier settlement areas become unyielding due to unwise use of resources, people are forced to abandon their permanent settlement and migrate to other resourceful areas. Unless their awareness as to how to use resources in the host places is not raised, it is likely that they repeat the same deadly mistake. Migration could also be caused by unrest or climate changes in their previous settlement areas.

## Effects

When the vegetation cover in a given area is unwisely used, it is likely that soil erosion occurs. In the long run soil erosion may result in barren land unless some sort of controlling mechanism is introduced. When vegetation cover is depleted, the underground water level decreases. This results in shortage of water supply. The local climate may be disturbed and drought may set in. Drought results in famine. Famine causes migration.

### Lesson

## 3.3

### Review



### Activity A

#### Questions based on Facts:

##### Individual work:

- What is the impact of rapid population growth on land use?
- Why do people tend to encroach protected areas in their region?

##### Pair Work:

- Discuss the disadvantage of unwise use of resources.
- What will happen to a forested area if people constantly cut trees?

##### Discuss this question in terms of:

- Destroying animal habitat
- Losing upper fertile soil

#### B. Things to do:

##### Group Work:

- Collect information on vegetation cover in your area.
- Discuss what will happen to the vegetation cover if population grows rapidly in the area.
- Read on conservation and suggest possible ways that help conserve vegetation and wild animals in your area.



**Competencies:** After studying this lesson, you will be able to:

- Explain methods of conserving soil.
- Explain how to conserve water.
- Discuss how to purify water.

### Key Terms

- ↔ Afforestation
- ↔ Reforestation
- ↔ Agro forestry
- ↔ Terracing
- ↔ Contour ploughing
- ↔ Crop rotation
- ↔ Water harvesting
- ↔ Saplings
- ↔ Deforestation
- ↔ Pollutant

### Methods of conserving water and soil

- What is conservation?
- Why do you conserve natural resources?
- Discuss the methods used to conserve water and soil?

#### ◆ Reforestation

Reforestation is planting trees in areas where forests have been removed. Reforestation is vital on once lost forest lands and along river banks where river line forests were available.

#### ◆ Afforestation

Afforestation refers to the activity of growing saplings on areas where there has never been forest cover. Usually afforestation is conducted along marshy areas to withstand water logging. It is also done in areas where grass cover predominates. Afforestation is important along sides of agricultural lands where trees are grown to control incoming wind which affects the farm land.

#### ◆ Agro-forestry

**Agro forestry is a collective name for land use systems and practices in which woody perennials are deliberately integrated with crops and/or animals on the same land management unit. (See fig 3.14)**





### ◆ Terracing

Terracing is one of the methods of soil conservation. In terracing the bed like structures are easily observable on hilly areas (see Fig. 3.15).



*Fig. 3.15 Terraced Area*

### ◆ Contour Ploughing

Contour ploughing is a **farming** practice of across a slope following its elevation. The rows formed slow water run-off during rainstorms to prevent soil erosion and allows the water to settle into the soil. (See Fig 3.16)



**Fig. 3.16 Typical Contour Ploughing**

### ◆ Crop Rotation

Crop rotation is one of the oldest and most effective cultural soil fertility controlling strategies. It means the planned order of specific crops planted on the same field. It also means that the succeeding crop belongs to a different family than the previous one. The planned rotation may vary from 2 to 3 years or longer period.

#### **Advantages of crop rotation**

Corp rotation:-

1. Prevents soil depletion
2. Maintains soil fertility
3. Reduces soil erosion
4. Controls insect/mite pests. Crop rotation as a means to control insect pests is most effective when the pests are present before the crop is planted.
5. Reduces reliance on synthetic chemicals
6. Reduces the pests' build-up
7. Prevents diseases
8. Helps control weeds

### ◆ Reduce Over use of Chemical Fertilizer

When soil is tilled year in and year out, the soil nutrient may be lost due to exhaustion. Exhausted soil is less productive. To make the soil better productive, chemical fertilizers are used to provide the soil with



soil nutrient. Nowadays, as studies indicate, it is better to reduce the use of chemical fertilizers as much as possible. Instead it is better to use organic fertilizers to make the soil productive and reduce chemicals that harm the soil and mix with river water via run off. Organic fertilizers are cow dung, compost or any dried up and decayed animal and plant remains.

### ◆ Water Harvesting

Water harvesting is the collection of water for different activities including, drinking and agriculture through different means. These means include:

- Rain water harvesting
- Ground catchment Systems
- Roof catchment systems

### Water Purification

Water purification is the process of changing water from a non-drinkable state to drinkable state. This is done when the water is polluted or determined to be potentially dangerous to health. This unfortunately happens more and more as ever larger amounts of chemicals find their way into our water sources. The damage that these chemicals and contaminants can do to us is both wide ranging and frightening. There are, however, an ever increasing number of water purification systems available. Thus, there are water filters that are designed to filter out various contaminants from calcium to metals. There are also a wide variety of substances that can be added to water to counteract the pollutants in the water.

### ◆ Pollutant Reduction

Pollutants may be understood as air and water pollutants. Especially, in the urban areas, water pollutants are well observable. Something that causes pollution is called pollutant. A chemical or waste product that contaminates air, water or soil is called pollutant.

#### Air Pollutants:

- What are air pollutants?
- What causes air pollutants?

Most air pollution comes from human activities: burning fossil fuels natural gas, coal, and oil to power industrial processes and motor vehicles. Fig 3.17 illustrate the pollution of air from vehicles in cities.





**Fig. 3.17 Automobile Traffic Pollution**

### Water Pollutants:

- What are water pollutants?
- What cause water pollutants?

Water pollutants result from many human activities. Pollutants from industrial sources may pour out from the outfall pipes of factories or may leak from pipelines and underground storage tanks (See Fig.3.18). Polluted water may flow from mines where the water has leached through mineral-rich rocks or has been contaminated by the chemicals used in processing the ores. Cities and other residential communities contribute mostly sewage, with traces of household chemicals mixed in. Sometimes industries discharge pollutants into city sewers, increasing the variety of pollutants in municipal areas. Moreover, some water bodies like ponds and springs should be kept clean by keeping their surroundings clean. Any contaminated or polluted water that drains to these water bodies should be controlled. Garbages from home must be accumulated in areas far away from all water bodies such as ponds, springs, rivers, lakes, etc. People who live near or pass by the water bodies, especially ponds and springs should be trained not to clean up there. Industrial waste is commonly seen mixing with rivers around Addis Ababa. For example river Akaki is polluted by such wastes.



**Fig. 3.18 Industrial Waste**



**Liquid waste that runs into a stream from a factory can kill animals and cause health problems for humans.**

In general, pollutants may not be entirely avoided. However, they can be reduced by introducing mechanisms that help reduce waste products from industries and motor vehicles. Carbon emission from vehicles should be reduced by introducing new technology. Pollutants from cities or other resident areas can be managed by preparing waste disposal areas.

## Lesson

# 3.4

## Review



### Activity A

#### A. Questions based on Facts:

##### Individual Work:

- What does deforestation mean?
- What are the consequences of deforestation?
- Compare and contrast reforestation and afforestation.

##### Pair Work:

- Discuss the advantages of agro forestry in general.
- Exchange views with regard to the introduction of agro forestry to your area and the advantage that may be obtained in that same area.
- Compare and contrast terracing and contour ploughing.

#### B. Things to do:

##### Group work:

- Discuss for and against using more chemical fertilizers to maintain soil fertility.
- Debate the advantage of organic fertilizers over chemical fertilizers.
- Read on pollutant reduction methods and write a report on avoiding:
  - Air pollutants
  - Water pollutants and present your report.

## National Parks and Their Importance in Ethiopia and Eastern Africa

**Competencies:** After studying this lesson, you will be able to:

- Explain the purpose and importance of National Parks.
- Locate Ethiopian National Parks on the map of Ethiopia.
- Identify major National Parks of Eastern Africa.

### Key Terms

- ↔ Conservation
- ↔ Research

### National Parks of Ethiopia and Their Importance

- What are national parks?
- What advantage do national parks have?
- Name some national parks of Ethiopia.
- Pin point some parks and indicate the type of wild animals protected there.

### ◆ The Importance of National Parks

National parks are important to conserve animal and plant species. As the parks remain in their natural environment, unique plants and animals are observable. As a result they attract tourists. The parks are of help to protect indigenous plants and animals. The stunning and scenic plants and animals are important for conducting research. The parks are very important in maintaining plants and animals unique to the surroundings. As the plants and animals are well preserved there, they serve as heritages of the country.





acacia wood land vegetation. Thirty one species of mammal, including greater kudu, Grant's gazelle, Anubis baboon, grivet and colobus monkeys, black backed and common jackal are found. There are also numerous birds in this national park.



**Fig. 3.20 Pelicans in Abyatta-Shall National Park**

### ii. Awash National Park

Awash national park is located 225 km east of Addis Ababa bordering the Awash River in the upper rift valley. The park is as wide as 756 sq.km. It consists of a variety of wild animals. They include Beisaspure oryx, greater and lesser kudu, Soemmering's gazelle, Thomson's hartebeest, lion, Defassa waterbuck, Salt's dik-dik and some others.

There are numerous birds in the park.



**Fig. 3.21 Thomson's hartebeest in Awash National park**

### iii. Bale Mountain National Park

Bale Mountain National Park is located in south east Ethiopia. It touches the southern end of eastern edge of the rift valley mountain chain. It is 400 km away from Addis Ababa. The park comprises a variety of wild animals. It was originally established to protect two of the Ethiopia's endemic species: the mountain Nyala and the Semien fox.

There are a variety of birds in the park out of which sixteen are endemic species.



**Fig. 3.22 Nyala in Bale National Park**

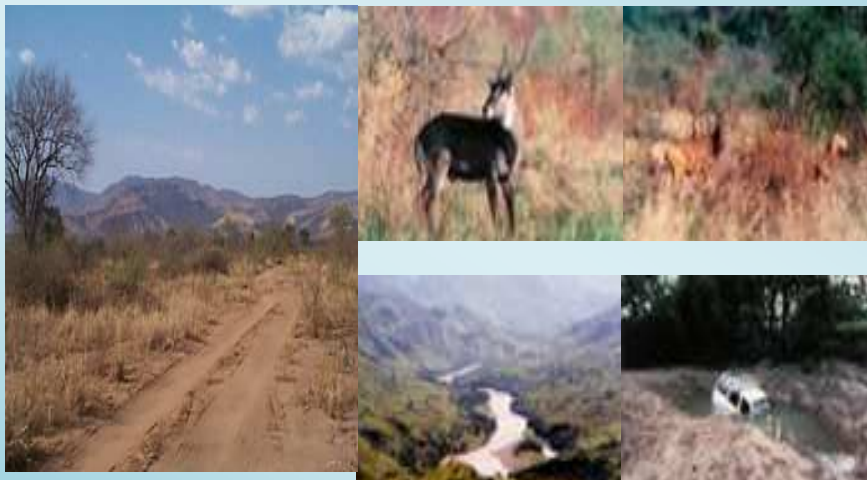
### ◆ Sanctuaries

A sanctuary is an area where animals and birds are protected. It is a kind of park where animals or birds are looked after. Here killing is highly prohibited even if an individual has a license to kill animals or birds.

There are several sanctuaries in Ethiopia. Some of them are the Babilie Elephant Sanctuary, the Kuni-Mutar Mountain Nyala Sanctuary, the Sankale Thomson's Hartebeest Sanctuary and the Yabello Sanctuary.

### Case Study

**Mago National Park** is one of the renowned National Parks of Ethiopia (See Fig.3.23).



**Fig. 3.23 Partial View of Mago National Park**

It is located in the Southern Parts of Ethiopia. It is about 782 kilometers south of Addis Ababa. Its area is 2,162 sq.km. The park is divided by the Mago River, a tributary of the Omo River, into two parts. It is 115 kilometers north of Murele and 40 kilometers southwest of Jinka. 56 species of mammals, such as buffalo, giraffe, elephant, lion, cheetah, leopard, zebra, gerenuk, and oryx are found in the park.

The Mago National Park was established in 1979. Its territory embraces savanna, acacia forest, and the Neri Swamp. Its highest point is Mount Mago.

### Case Study

#### **The Nairobi National Park Orphanage**

The Nairobi National Park Orphanage is a small sanctuary. It is located near the entrance of the national park which provides shelter to animals and birds that have been orphaned or injured (See Fig.3.24). The Nairobi National Park Orphanage gives guests a closer view of a variety of animals that they may not easily see on the small tour of the national park. The animals seen include lions, cheetah, leopards, and hyenas among others. Birds sheltered include crowned cranes.



*Fig. 3.24 Some orphaned or injured animals of the Nairobi National Park Orphanage Park*



**Table 3.1 Some National Parks of Eastern Africa**

S. No.	National Park	Area km <sup>2</sup>	Country
1	Nairobi	115	Kenya
2	Tsavo - East - West	13,000 7,800 } 20,800	Kenya
3	Uganda's Kabalega	3,895	Uganda
4	Serengeti	14,800	Tanzania
5	Gambela	5,060	Ethiopia
6	Yangudi Rassa	4,730	Ethiopia
7	Omo	4,068	Ethiopia
8	Bale Mountains	2,470	Ethiopia
9	Mago	2,160	Ethiopia
10	Abjatta Shalla lakes	887	Ethiopia
11	Awash	756	Ethiopia
12	Simien mountains	179	Ethiopia

## Lesson

## 3.5

## Review

**Activity****A. Questions based on Facts:****Individual work:**

- What are National Parks?
- Compare and contrast national parks and sanctuaries.

**Group Work:**

- Discuss why national parks are important to preserve and conserve wildlife?

**B. Things to do:****Pair work:**

- Draw the sketch map of Ethiopia and show major national parks.

**Group Work:**

- Draw the sketch map of Eastren Africa and depict national parks.



## Summary

- Eastern Africa has different natural environments which include forests, grasslands and deserts as well as semi-deserts.
- There are coastal and mountain forests in Eastern Africa.
- Coastal forests extend in a narrow line along the coast of the Indian Ocean.
- Montane forest is situated on continuous and isolated mountain ranges in Eastern Africa starting from 1300m up to 4000m above sea level.
- Grasslands are available in Eastern Africa. Grassland occurs where there is sufficient moisture for grass growth.
- Grasslands are usually found between forests and deserts.
- There are wooded savannas where grass and trees are found growing mixed together.
- Animals adapt to their habitats in response to vegetation type and climate in those given regions.
- In a given region, there are different wild animals. In forest region, for example, tree climbing animals are prevalent.
- Distribution of natural vegetation is the function of natural and human factors.
- There are endangered species in Eastern Africa which include elephants, gorillas, cheetahs and leopards in general.
- Human interference in terms of unwise use of the natural resources affects the natural environment.
- Water and soil should be conserved for sustainable use.
- National Parks are essential to preserve and conserve wild life in Ethiopia in particular and Eastern Africa in general.

## Glossary

- **Afforestation:** planting trees in places where trees have never been before.
- **Agro forestry:** planting trees along with crops.
- **Biodiversity:** refers to different types of plants in a given region.
- **Conservation:** the care and management of the natural environment; the act of protecting and preserving resources for sustainable use.
- **Contour ploughing:** sideways ploughing along the slope.
- **Crop rotation:** growing crops in turn on the same plot of land.
- **Deforestation:** ruthless removal of forests.
- **Drought:** an extended period of dry weather-lack of water.
- **Famine:** extreme hunger and starvation.
- **Game reserve:** animal protection where hunting is allowed with license.
- **Migration:** abandoning one's living area.
- **National park:** park owned by government.
- **Natural vegetation:** Plants found in nature.
- **pollutant:** substance that pollutes.
- **primeval:** very ancient.
- **Primate:** a member of the most highly developed order of mammals.
- **purification:** the process of making something pure, e.g pure water.
- **Reforestation:** Planting trees to reclaim trees lost.
- **Research:** study.
- **Sanctuary:** an area where birds and wild animals are protected and encouraged to breed.
- **Sapling:** young trees.
- **Soil erosion:** the removing of the surface soil by natural agents.
- **Species:** a group of animals or plants with a genus (group within a family).
- **Terracing:** bed like structure built along slopy area.
- **Water harvesting:** collecting water.
- **Wild animals:** animals in the jungle.

## UNIT

## 3

## Review Questions

**I. Write “True” for correct statements and “False” for incorrect statements.**

- \_\_\_\_\_ 1. In Eastern Africa montane forest is found on continuous and isolated mountain ranges.
- \_\_\_\_\_ 2. The upper most of the montane zone is composed of giant trees.
- \_\_\_\_\_ 3. The Danakil desert is located in the border between Ethiopia, Eritrea and Djibouti.
- \_\_\_\_\_ 4. Erta Ale is found in the Afar Region.
- \_\_\_\_\_ 5. The hyena is one of the most common wild animals in Ethiopia.

**II. Match the items under ‘B’ with the corresponding explanations under ‘A’.**

## Column ‘A’

- \_\_\_\_\_ 6. desert domestic animal
- \_\_\_\_\_ 7. most biologically diverse area on earth
- \_\_\_\_\_ 8. animal with high towered neck
- \_\_\_\_\_ 9. grassland region
- \_\_\_\_\_ 10. fast running wild animal

## Column ‘B’

- A. Cheetah
- B. Giraffe
- C. Virunga mountain
- D. Savanna
- E. Camel
- F. Lion
- G. Wild ass
- H. Buffalo
- I. Hartebeest

**III. Choose the correct answers for the following questions and write the letter of your choice on the space provided:**

- \_\_\_\_\_ 11. One of the following is not a grass eating animal:  
a) elephant                                      c) Cheetah  
b) wild ass                                        d) Oryx
- \_\_\_\_\_ 12. The accommodation of a living organism to its environment is called:  
a) familiarization                              c) sudden change  
b) adaptation                                    d) slow change
- \_\_\_\_\_ 13. One of the following is not a tree climbing animal:  
a) cheetah                                         c) gorilla  
b) monkey                                        d) chimpanzee
- \_\_\_\_\_ 14. Which one is most affected by drought?  
a) Vegetation cover                            c) parent material  
b) Soil    d) water
- \_\_\_\_\_ 15. One of the following is an endangered mammal of Eastern Africa:  
a) tiger    b) gorilla    c) hyena    d) jackal

- \_\_\_\_\_ 16. Which one is a collective name for land use systems and practices in which woody perennials are deliberately integrated with crops?
- a) ecoregion
  - b) afforestation
  - c) agro forestry
  - d) crop rotation

**IV. Fill in the blank spaces with suitable words or phrases.**

17. One of the world's largest and most respected independent wild animals conservation organizations is known as \_\_\_\_\_
18. Rapid population growth is dangerous as it affects the \_\_\_\_\_
19. Drought results in \_\_\_\_\_ and \_\_\_\_\_.

**V. Give appropriate answers to the following questions:**

1. List the national parks of Ethiopia.
2. What are pollutants?
3. What is the advantage of water harvesting?



### Check List

*Put a tick (✓) mark in each of the boxes for activities you can perform*

**I can:**

1. Relate the presence of wild animals to the distribution of natural vegetation.
2. Realize that animals adapt and evolve to suit their habitat.
3. Identify the major factors which affect the distribution of natural vegetation.
4. Explain that wildlife is affected if the environment is damaged by increased human presence.
5. Appreciate the aesthetic value of natural vegetation and wild animals in Eastern Africa.
6. Explain that income secured from tourism can contribute to the protection of wild animals and their habitat.
7. Evaluate the different human causes of damage to the natural environment
8. Differentiate the effect of human interference in natural vegetation.
9. Explain method of conserving soil
10. Explain how to conserve water.
11. Discuss how to purify water.
12. Explain the purpose and importance of National parks.
13. Locate Ethiopian National parks on the map of Ethiopia.
14. Identify major Natural Parks of Eastern Africa.