

UNIT

3

THE ECO-SYSTEM AND ITS CHALLENGES

Unit Outcomes

After studying this unit, you will be able to:

- Recognize the distribution, importance and the major factors that affect natural vegetation and wild animals in Africa.
- Recognize the availability and threats of potable water resources.
- Realize the methods to conserve natural resources.

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

- Identify and indicate the natural vegetation of Africa on the map.
- Distinguish the major wild animals of Africa.
- Discuss how natural vegetation and wild life interrelate with their environment.
- Realize that plants and animals are part of an ecosystem.
- Verify that the animals will become extinct if their habitat is destroyed.
- Discuss human factors which affect wildlife.
- Reflect that we can act to prevent climate change.

Key terms

↔ Afforestation
↔ Agroforestry
↔ Conservation

↔ Deforestation
↔ Endemic animals

↔ Fossil fuels
↔ Natural resource

A. Distribution of natural vegetation and wild animals

- What does natural vegetation mean?
- Discuss the type and distribution of natural vegetation in Africa.

◆ Natural Vegetation

When you were in grade six you have learnt about forests and grasslands in general. Now you will learn about the type and distribution of natural vegetation of Africa in a more detailed manner.



Natural vegetation refers to all plants that have grown in a given area without any human efforts. It is a plant cover of a region that results from normal conditions of climate, soil, drainage and other elements of an environment.

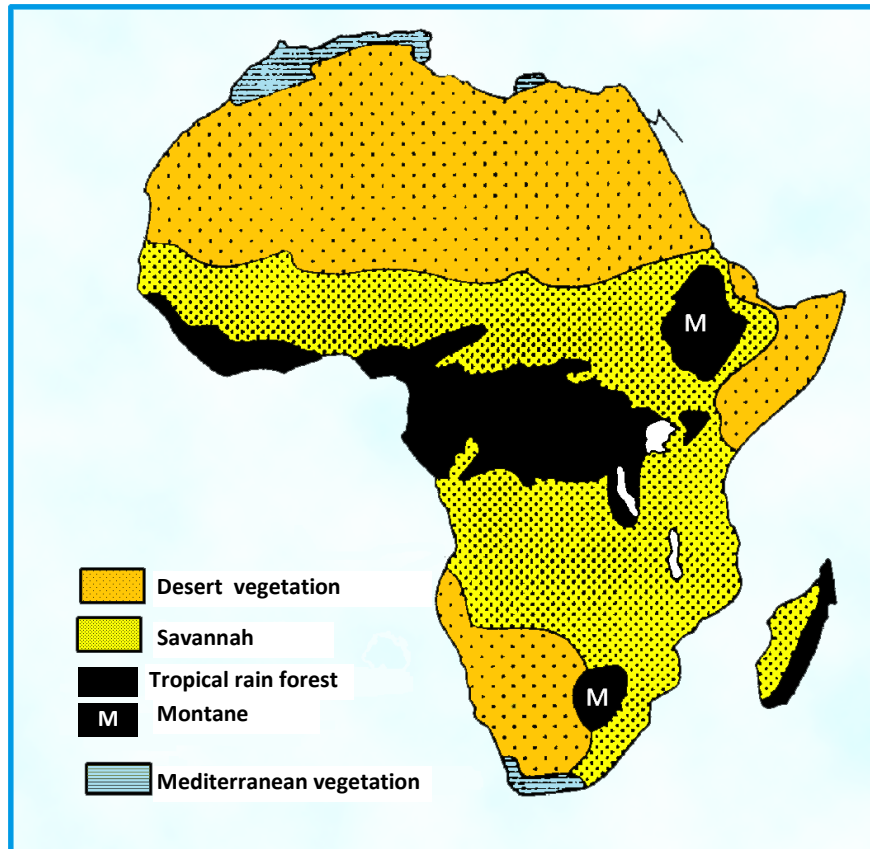


Fig 3.1. The major vegetation types of Africa

As you can see on the map given above, Africa has five different types of natural vegetations, namely- equatorial rain forest, savannah, desert and semi-desert, mediterranean and tropical highland vegetations.

Equatorial rain forest

- **What type of vegetation is the equatorial rain forest?**
- **In which part of Africa is this type of natural vegetation found?**
- **Can you mention the names of some of the very important trees that are found in such types of forest?**

This vegetation is also known as tropical rain forest, tropical lowland forest, and tropical ever green forest. In Africa the rain forest is distributed in central and western Africa and even in eastern Madagascar. The largest continuous rain forest area is found in the Congo Basin. This forest, in Africa, occurs mostly in the lowlands whose elevation is below 500m. These areas have true equatorial climate with high annual precipitation ranging between 1500mm and 2500mm and consistently warm temperature.

Structurally, the rainforest is complete and multilayered, with the tallest trees reaching up to 50 meters in height. The equatorial rain forest consists of hardwood trees such as: Mahogany, Ebony, Rosewood, Ironwood, and Green heart. There are also shrubs, bamboos, climbers, epiphytes, etc. (See fig.3.2)



Fig 3.2. The equatorial rain forest

Savannah

- **What type of natural vegetation is savannah?**
- **Discuss the nature and distribution of savannah vegetation in Africa.**

Savannah vegetation in Africa covers extensive areas between the equatorial rain forest and the desert areas north and south of the equator. Savannah lands mostly encircle the equatorial rain forests. It occupies up to 65 percent of the continent and perhaps, this is the most widespread type of natural vegetation in Africa. Savannah vegetation grows in the tropical climate regions where there is a marked dry season.

Climatically, the savannah lands are transitional regions. They come under the influence of wet on shore trade winds in summer and the dry off shore trade winds in winter. Temperature is high all year round, seldom falling below 20⁰c.

The Savannah vegetation consists of different types of grass and trees. Trees may vary in abundance from continuous closed-canopy woodland to more open park savannah, grasslands with scattered trees and treeless grasslands.(see fig: 3.3)



A Baobab Tree



Euphorbia



Acacia

Fig 3.3 Trees of savannah lands.

Desert and semi-desert vegetation

- **What types of natural vegetation are found in desert and semi desert areas?**
- **In which particular regions of Africa do we find these types of natural vegetation?**
- **Can you mention the names of trees typical of desert and semi-desert vegetation of Africa?**

This vegetation belt coincides with the Sahara, Sahel, Karroo-Namib and Kalahari highland regions. Environmental conditions of these regions are characterized by unreliable rainfall, low humidity and extremely high temperatures.

The deserts and semi-deserts are not devoid of vegetation, rather the vegetation diversity is surprisingly high. For example, North African semi-desert and desert zones support more than 3000 species, about 20 percent of which are endemic. The Namib, Kalahari and Karoo of southern Africa are perhaps, richer in plant species. However, the most common plants are xerophytes.



Xerophytes are plants having the ability to arrange their life cycle to suit drought conditions and high rate of evaporation.



Fig. 3.4 Xerophytes

Mediterranean vegetation

- **What type of vegetation is Mediterranean vegetation?**
- **In which part of Africa, do we find Mediterranean vegetation?**

This type of natural vegetation is found in the north and south extremes of the continent of Africa. The vegetation grows in areas with warm dry summer alternating with a cool rainy winter. The Mediterranean region is rich in its plant species. The very common types of vegetation found in the Mediterranean region are called **Maquis**. There are also some tree species which include: Cork Oak, Wild olive etc. Many of the trees belong to the evergreen and deciduous vegetation and are deep rooted to protect themselves from shortage of moisture during summer.



Maquis: they are low bushes, which have hard evergreen leaves and thorns and grasses.



Fig. 3.5 Maquis

Tropical highland vegetation

- What type of natural vegetation is the tropical highland vegetation?
- Can you identify the countries where this type of vegetation grows from the map fig.3.1?

Tropical highland vegetation is also known as Afromontane (Afroalpine) vegetation. This type of vegetation grows on the African tropical mountains, especially in the Ethiopian and East African highlands. The vegetation contains highland forests and grasslands which can grow well in high mountain climate. For example:

- Afromontane forests (up to 3000m in the equatorial zone).
- Alpine plants such as Asta and Gibera (over 3000m).
- Bamboo forests (2000-2500m).
- Temperate evergreen (coniferous) forests at more moderate altitudes.
- Mountain grasslands.

Wild animals

- What are wild animals?
- What is the difference between wild animal and wild life?
- What type of wild animals are found in Africa?


Wild animals range from very small to very big ones. They include birds, crocodiles, lizards, frogs, snakes, butter flies, insects and mammals.

Most of the time, the term wild animals refers to big mammals tamed or untamed. However, wild life includes both plants and animals found in the natural environments.

Wild animals are found in different environments all over the world. Africa is very rich in all kinds of wild animals. The different climatic-vegetation regions of Africa ranging from the Equatorial rainforest

to the desert provide ideal condition for the existence of a great variety of wild animals. Generally, Africa is rich in wild life because of the following reasons:

- Tropical rainforest contains a variety of dense trees and undergrowths. This forest region hosts the largest number of wild animals. These animals include tree-dwellers (arboreal) like monkeys, apes, baboons, gorillas and birds. There are also other large animals that inhabit the water bodies, such as hippopotamus, crocodiles, etc.
- Savannah grasslands of Africa are also the natural habitat of a variety of wild animals both (herbivores and carnivores). Most of them are herbivores which include antelopes, giraffes, buffaloes, zebra, elephants, etc. The most common carnivorous animals are lion, leopard and hyena.



Herbivore animals are grass or plant eaters, while carnivore animals are that feed on flesh or meat. Omnivore animals are group of wild animals that eat both grass and meat, such as apes and monkeys.

- African desert and semi-desert areas sustain burrowing animals. Some of the desert animals include: wild ass, fox, reptiles (snakes, lizards and tortoise).
- Major rivers, lakes and swamp lands of Africa are the habitat of diverse species of aquatic wild life, such as fish, crocodiles, hippopotamus and etc.

B. Importance of natural vegetation and wild animals:

- **What are the importance of natural vegetation and wild animals for the world?**
- **Discuss what will happen to the wild animals of the world if their habitats are destroyed?**
- **What do we mean by the phrase-extinction of wild animals?**

◆ Importance of Natural Vegetation

The most important uses of plants include:

- sources of raw materials in industries.
- source of food.
- for the production of medicines.
- for fuel wood production.
- to moderate the local climate.
- to shelter the wild animals.
- to increase fertility of the soil.
- for recreational purposes.
- for house construction.

◆ Importance of Wild Animals

The most important uses of wild animals include:-

- sources of food
- sources of raw material
- for educational research
- for recreational purposes

C. Major factors that affect natural vegetation and wild animals

- Enumerate the major factors that affect natural vegetation and wild animals.
- How does the destruction of natural vegetation affect the peaceful existence of wild animals?

In the discussion above, we have seen that both natural vegetation and wild animals are very important for humans and their environment. However, their peaceful existence is being disturbed due to different human and natural factors. They are population pressure, lack of awareness, poverty, climate change and wild fires.

Major Factors that Affect Natural Vegetation

1. **Deforestation:** By far the greatest of all threats to natural vegetation is deforestation. It refers to the temporary or permanent clearance of forests for agriculture or some other land use. The main causes of deforestation are:
 - Shifting cultivation, particularly in the tropical rainforest areas.
 - Permanent agriculture.
 - Fuel wood cutting and collection, mostly in the developing countries as a means of income source.
 - Extractive forest use (sawmill factories) and timber production.

2. **Impeded forest regeneration**

Deforestation may be prolonged by subsequent burning and livestock grazing that impede forest regeneration. Today, farmers in many countries burn savannah woodlands every year to promote the growth of fresh grasses for their livestock. Frequent fires, combined with intensive animal browsing of trees and shrubs, have major impacts on vegetation.

3. **Forest Degradation**

It is a temporal or permanent reduction (loss) in the density or structure of forest vegetation or composition of its species.

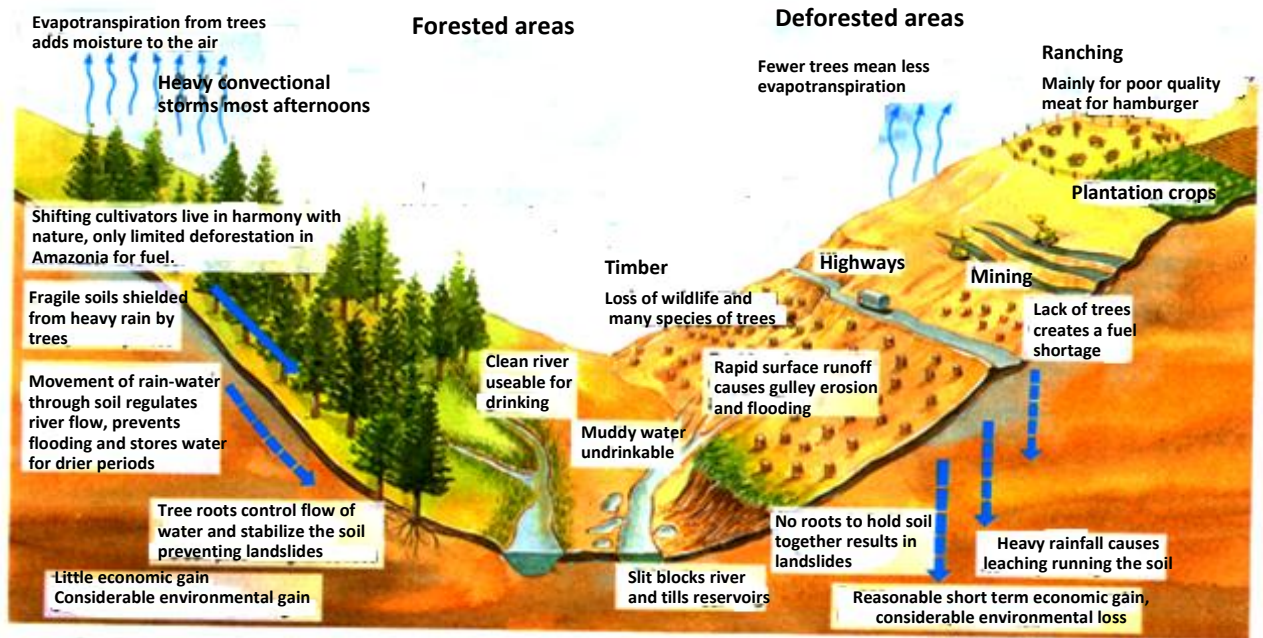


Fig 3.6 Comparing forested and deforested areas

Major Factors that Affect Wild Animals

Today, the number and variety of wild life population have declined at an alarming rate in many parts of the world. This means the depletion and degradation of bio-diversity –loss (reduction) of flora and fauna. Of course, this is a major environmental (ecological) crises to many countries of the world.

Some species of wild animals have already become extinct. Still some other wild animals are facing a great danger of extermination, and thus have been identified as endangered or threatened animals (like Walia Ibex and Mountain Nyala in Ethiopia).



Extinct wild animals – refers to a wild animal that no longer exists anywhere on the surface of the earth. **Endangered or threatened wild animal**- is a wild animal which is on the verge of extinction.

What are the major factors or reasons that affect wild animals?

- **Deforestation:** destruction of their habitats,
- **Illegal hunting:** seeking for meat, skin, fur, horn, ivory etc.
- **Overgrazing:** grazing the domestic animals over the carrying capacity of the grazing land turn grasslands into desert.
- **Burning:** setting fire on forests, bushes and grasslands.
- **Drought and famines:** wild animals die or migrate when food and water sources get scarce.

◆ Loss of Biodiversity and Extinction

- **What do we mean by biodiversity?**
- **What are the causes and effects of the loss of biodiversity?**
- **Why is biodiversity important? Does it matter if there are not so many species?**

The variety of life on earth, its biological diversity is commonly referred to as biodiversity. The number of species of plants, animals and microorganisms, the enormous diversity of genes in these species, the different ecosystems on the planet, such as deserts, rain forests and coral reefs are all part of a biologically diverse earth.

Biodiversity is the huge variety of animals and plants on our planet, together with the places where they are found.

Biodiversity boosts ecosystems productivity where each species, no matter how small, all have an important role to play. For example, a larger number of plant species means greater variety of crops, greater species diversity ensures natural sustainability for all life forms, and healthy ecosystem can better withstand and recover from variety of disasters.

Almost all cultures have in some way or form recognized the importance that nature, and its biological diversity has had upon them and the need to maintain it. Yet, power, greed and politics have affected the precarious balance.

It has long been feared that human activity is causing massive extinctions. Despite increased efforts at conservation, it has not been enough and biodiversity losses continue. The costs associated with deteriorating or vanishing ecosystems will be high.

We can no longer see that continued loss of biodiversity as an issue separate from the core concerns of society: to tackle poverty, to improve the health, prosperity, and security of present and future generations, and to deal with climate change.

However, appropriate conservation and sustainable development strategies would help avert ecological problems. While we dominate this planet, we still need to preserve the diversity in wildlife.



Lesson

3.1

Review

Activity 3.1 A**A. Questions based on facts:**

- What are the major factors that determine the growth of plants in an area?
- What are the three types of environments that are found in the tropical latitudes?
- In what particular countries are the tropical rainforests found?
- Mention the three different wild animal groups according to their feeding habits.
- List down some of the importances of natural vegetation and wild animals.
- Mention the major factors that affect natural vegetation and wild animals.
- What are the different divisions (class) of natural vegetation?

B. Group discussion:

- Tropical rainforests soil form a tall, dense mass of vegetation, yet rain forest soils, or laterites, are poor in nutrients. Why is this so? Discuss the issue in groups.

C. Individual work:

- Make a short study on wild animals of Ethiopia that are on the verge of extinction and present your findings to your classmates. Finally, invite them to discuss on the solution that can save the wild animals from total disappearance.

D. Things to do:

- Draw the map of Africa showing the distribution of natural vegetation (equatorial rainforest, savannah, desert and semi-desert, mediterranean, and highland vegetations).
- Go out for a visit of a certain market place in your locality, and observe how many people are making their livelihood by the sale of firewood. Does that mean something to you?
- Similarly, go out for a visit of a certain country side near to your locality. People are burning a forested area for the sake of opening space for agriculture or getting fresh grassland for their livestock. Can you imagine what the result would be in relation to safe existence of natural vegetation and wild animals?

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

- Explain the relationship between human beings and water.
- Compare and contrast the availability and scarcity of potable water in Africa.
- Predict threats and describe the causes of the threats to potable water in Africa.
- Identify the threat to soil resources in Africa.
- Analyze the causes of urban air pollution.

Key terms

↔ Pollution

↔ Sewage waste

A. The Importance of water for life

- How do you explain the relationship between human beings and water?
- Discuss the availability of clean water and potential water resources in Africa?
- What are the threats to potable water in the world in general and in Africa in particular?

Water is very important for life. Almost over 70 percent of the earth's surface is covered with water. It is abundant but unevenly distributed resource. There are different sources of water. These include: ground water, surface water, frozen water and water vapor.

The African region represents an important part of the world in terms of land and water: 20.2% of the world's land area, and 9 percent of the world's actual water, with only 13 percent of the world's population. The following table shows the percentage rate of actual fresh water available in the different sub-regions of Africa.

Table 3.1: Water resource availability in the sub-regions of Africa in percent

	Sub- Region	Percentage out of the total water resources of Africa
1	Gulf of Guinea (W.A)	24.09 percent
2	Central Africa	48.41 percent
3	Eastern Africa	6.58 percent
4	Indian Ocean Islands	8.74 percent
5	Southern Africa	6.86 percent
6	Northern Africa	1.25 percent
7	Sudano - Sahelian	4.06 percent

Source: [WWW.eu.Africa.Infrastructures .tf.net/WWW](http://WWW.eu.Africa.Infrastructures.tf.net/WWW) Google.com

According to the data given in the table above, in fresh water availability Central Africa stands first, followed by Gulf of Guinea (W.A), Indian Ocean Islands, Southern African, and Eastern African respectively in water resource availability.

The water scarcity that prevails in the arid countries has forced national economies to find alternative ways to satisfy the demand for fresh water. Some countries convert an increasing amount of water from poor quality underground water into usable water. Similarly, treatment and reuse of waste water is a common practice in countries in the Northern sub-region of Africa.

◆ What are the Uses of Water in Your Locality?

Some of the uses of water include:

- **Domestic use:** for drinking, cooking, washing and cleaning.
- **Industrial use:** as raw material, for cleaning and cooling.
- **Agricultural use:** for crop production and animal rearing.
- **Energy source:** for hydroelectric power generation.
- **Navigation purposes:** for transporting people and goods.
- **Environmental health:** for waste removal and purification agent. Furthermore, it has an effect on climate.
- **Recreational use:** for sport activities, such as swimming, motor boat competition etc.
- **Economic values:** As a source of fish and different minerals, like salt, gold, copper, petroleum etc.

B. Causes of drinking water problems

- **What does pollution mean?**
- **Discuss pollution as a problem of drinking water.**

Water has one major problem. This is the problem of pollution. When water is polluted its natural ability to clean itself is lessened or completely destroyed. Polluted waters have unpleasant smell. Thus, they are unfit for drinking, bathing and washing, etc. They are harmful and cause many diseases such as cholera, typhoid, dysentery, etc.



Water Pollution refers to any undesirable change in the quality of water.

Thus, what are the major causes for water pollution? The causes include the following:

- **Sewage wastes:** include human excreta, paper, cloth, soap and other detergents, all sorts of garbage and trash.
- **Industrial wastes:** including wastes from paper, food processing, chemical industries, etc.
- **Agricultural pollutants:** include chemicals such as fertilizers, herbicides, insecticides and animal wastes, etc.

Water forms many industrial uses, ranging from boilers to canning, must have various mineral specifications. The large industrial and municipal withdrawal uses of water also commonly are associated with problems of pollution when the effluent (the used water) is returned to surface drainage. Pollution affects recreation and wild life, as well as the municipal supplies of communities downstream who may also use the surface water.

Urbanism has gone hand in hand with the spread of the European type of industrial civilization. Urbanization marked the rise of the second human culture that affects the development of agriculture. The fast growth of urban centers resulted in increased concentration of people in towns. Today there is a real housing problem in many large cities where people are forced to live in cramped and unhealthy environments what might be termed ‘slum’ or ‘squatter’ settlements. The speed and unplanned urban growth in many parts of the world generated many environmental problems. The most serious of these problems include:

- lack of piped water system for homes and businesses,
- inadequate sanitation and sewerage provision, and
- considerable water and air pollution.

C. Threats to soil

- **What do we mean by threats to soil?**
- **Discuss the threats to soil.**

Erosion and land degradation are serious problems to soil. The cause for soil erosion can be grouped basically into two:

- ◆ **Natural:** heavy rainfall and the type of the slope. Agents of erosion include: running water, wind, sea waves, etc.
- ◆ **Human:** deforestation, overgrazing and bad farming practices.

Natural factors

- What are the natural factors that cause soil erosion?
- What are the effects of soil erosion?

i. Erosion by running water

Erosion by running water is dominant and common in many parts of the world. It can cause the following soil erosion:

Sheet erosion

Sheet erosion affects large areas and it occurs when rainfalls on a gentle slope which is bare of vegetation. This type of erosion results in the removal of a uniform depth of soil.

Gulley erosion

This is more localized and occurs when heavy rainfall rushes down a steep slope, cutting deep groove into the land. The grooves become deepened and widened to form gullies which finally cut up the land to give 'bad lands'.

ii. Wind erosion

Regions having a low rainfall or definite dry seasons are liable to have their soils reduced to dust and blown away by wind, if the land is bare of vegetation. The wind removes fine particles of materials in desert regions.

Human factors: include, bad farming practices and deforestation.

Bad farming practices

- The ploughing of land up and down the slope, provides human made channels which can be enlarged into gullies by surface run off.
- In shifting cultivation, a piece of forest is destroyed by fire and crops are grown in the soils of the cleared patch which are now enriched by wood ash. After one or two years of such cultivation, the patch soon abandoned and a new clearing is made. The abandoned patch soon experiences soil erosion by rainfall. Shifting cultivation usually takes place in the wet tropical regions. It is a common method of crop farming with wandering forest people.
- The cutting down of forest, especially on the higher slopes, may result in soil erosion and the spreading out of the transported soil over the lowlands where farmland can be seriously damaged.

D. The causes of urban air pollution

- What are the main causes for an urban air pollution?
- What does polluted air mean?

Ash from volcanoes, marsh gases, smoke from wild fires and sand blown dust are natural sources of air pollution.

However, far more important than naturally occurring pollutants are **substances that people discharge** into the air. These pollutants result primarily from:

- Burning fossil fuels (coal, gas, and oil). Scientists estimate that about three quarters of air pollutants come from burning fossil fuels.
 - Industrial processes other than fuel burning.
 - Burning solid wastes.
 - Forest and agricultural fires.
 - The evaporation of solvents.
- **How would it be possible to reduce if not completely stop the damage of air pollution?**
 - **Do you think people in your community are aware of the dangers of air pollution and have started acting against it?**
 - **If your answer is No, what is your stand towards helping them in their effort to fight problems of air pollution?**

Lesson

3.2

Review

Activity 3.2 A

A. Questions based on facts:

- What are the different uses of water?
- What are the different sources of water?
- What are the major causes for water pollution?
- How do you define soil?
- Explain the different forms of erosion in brief.
- Identify the natural and human made sources of air pollution, by giving brief explanation.

B. Group discussion:

- Discuss in groups on water and air pollution causes in urban and rural areas.
- Discuss in pairs on the cause of soil erosion and land degradation.

C. Individual work:

- If you are living in urban centers, visit your locality and note things related to sanitation, urbanization, industrialization and rapid population growth . If you are living in rural areas visit your locality and study matters related with bad farming practices. Finally, present your findings. Let your classmates relate them with water and air and soil erosion or land degradation pollution.

D. Things to do:

- If you are living in an urban area go to a local industry. Ask the workes what type of raw material they are using, and show you the waste disposal system. Record all the response you obtained.
- If you are living in a rural area, visit a famer burning the natural vegetation, and record all what you have observed.
- Then, when you come back to school, ask your teacher to help you realize the relationship between the two cases mentioned above and pollution of water, air and soil.



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

- Relate the conservation of natural vegetation to the conservation of other resources.
- Discuss how to control air and water pollution.
- Show interest in participating in keeping water clean for domestic use.

A. Conservation of natural vegetation

- What do we mean by the term conservation?
- Why do we need to conserve natural vegetation?
- How can we conserve natural vegetation?

Every citizen is expected to use the available forest resources properly and wisely. Human intervention against deforestation risks aims at conserving forests by:

- **Reforestation:** trees must be replaced wherever they are cut down.
- **Afforestation:** New forests must be planted where none existed before.
- Proper management of the existing forests.
- Using alternative energy sources (like solar, and wind power).
- **Agro-forestry:** in which trees, field crops and livestock raising are integrated together in adjacent locations.
- **Raising public awareness:** on the use and management of forest resources.

In this manner, we have to conserve our natural vegetation. Why then we need to conserve our natural vegetation? This is because:

- Natural resources are interdependent. This means that the destruction or the depletion of one kind of natural resource is the destruction of another natural resource. For example, when we are destroying the natural vegetation in an area, we are indirectly destroying the habitat of wild animals.
- We want to keep water, air and soil free from pollution.
- We want to protect ourselves from the dangers of global warming.



Conservation refers to the management of natural resource such as: water, soil, energy, air, natural vegetation, wild animals, etc. in ways that prevent them from being damaged or destroyed. In short it is a wise use of natural resources.

B. How to control air and water pollution?

i. Water conservation methods

- **What are the methods of water conservation?**

The following are some of the methods in the conservation of water:-

- Effective treatment of municipal and industrial waste.
- Removal of pollutants by purification.
- The regulations of chemical run off from agriculture, mining and forestry.
- The development of less pollution technologies.
- Recycling wastes.
- Use of chemicals – including the use of chlorine, etc.

ii. Air conservation methods.

- **What is air conservation?**

There are a number of ways of preventing air pollution, some of them include:

- **Government laws:** air pollution can be controlled by laws.
- **Filter systems:** can be installed in chimneys to remove solid pollutants.
- **Altering exhaust systems:** vehicles can reduce pollution from their smokes.
- **Use of mass transportation:** reduce both fuel consumption and carbon monoxide production.
- What type of a role could you play in the attempt or effort of your community trying to stop or reduce air pollution?

C. Soil conservation methods

The following are some of the methods in the conservation of soil:

- Afforestation: provides a long term solution since once the trees have grown their leaves intercept rainfall and their roots help to bind the soil together and reduce surface run off.
- The growing of **cover crops** reduces rain splash and surface run off.
- Improving farming methods: soil can also be conserved by improving farming methods such as:
 - **Rotation of crops:** improves soil fertility.
 - **Recovery period:** many tropical soils need a recovery period of five to 15 years in shrub or forest for each three to six years in crop.


- **Contour ploughing:** in areas where slopes are steep, ploughing should be done following the contours to prevent excessive erosion.
- **Terracing:** helps to slow down run off, giving water more time to infiltrate and reducing its erosional ability.
- **Strip cropping:** involves the planting of two or more crops in the same field. The crops may differ in height, time of harvest and use of nutrients.
- **Check dams:** are small dams to trap silt washed from hills.
- **Shelter belts:** are trees planted at the edge of farm lands to protect the soil from wind erosion.

Uses of alternative conservation methods

- **What do we mean by alternative methods of conservation?**
- **What do we mean by renewable and non-renewable resources?**

◆ The Use of Renewable Resources In Place of Non-Renewable Resources

Materials supplied in nature and available for human use are both renewable and non-renewable. Renewable resources include water, air, vegetation, animals, soil, etc. On the other hand, minerals are non-renewable resources. Only a limited amount of each element exists on our planet, and they cannot be replaced once they are used up. Therefore, if we are intending to conserve them, then we have to replace them by other renewable resources. Examples, instead of using fuel minerals as a source of energy or power it is possible to use solar, thermal or wind energy.



Renewable resources – are resources that can replace themselves, while non-renewable resources are non-replaceable resources. Sometimes they are known as finite or exhaustible natural resources.

◆ The Use of Organic Fertilizers in Place of Chemical Fertilizers

Too much use of chemical fertilizers such as nitrogen, potassium and phosphorus can cause environmental damage. Therefore, organic fertilizers, such as animal dung, straw, etc. can be used to improve soil structure and return its nutrients.

- **What do you know about UNEP?**
- **Where is its headquarter found?**
- **When was it established?**

Case study

United Nations Environment Programme (UNEP)

The United Nations Environment Programme (UNEP) coordinates United Nations environmental activities, assisting developing countries in implementing environmentally sound policies and practices. It was founded as a result of the United Nations conference on the human environment in June 1972 and has its headquarters in Nairobi, Kenya. UNEP has six regional offices and various country offices.

UNEP is the designated authority of the United Nations system in environmental issues at the global and regional level. Its mandate is to coordinate the development of environmental policy consensus by keeping the global environment under review and bringing emerging issues to the attention of governments and international community for action.

Its activities cover a wide range of issues regarding the atmosphere, marine and terrestrial ecosystems. It has played a significant role in developing international environmental conventions, promoting environmental science and information and illustrating the way those can work in conjunction with policy of national governments and regional institutions. UNEP has also been active in funding and implementing environmentally related development projects.

UNEP has aided in the development of guidelines and treaties on issues such as the international trade in potentially harmful chemicals, trans-boundary air pollution, and contamination of international water ways. Our human obligations are to adhere to the environmental issues and policies which the organization promotes and brings to our attention for creating better regional and global environments.



Fig 3.7 Logo "UNEP"

Lesson

3.3

Review

**Activity 3.3 A****A. Questions based on facts:**

- Explain the different methods of conserving: natural vegetation, water, air, and wild animals
- What is UNEP? What is its role in the conservation of natural resources on global term?

B. Group discussion:

- Form three groups. Let the first group make detailed study on the conservation of natural vegetation, the second group on the conservation of water and the last group on the conservation of air (prevention of air pollution). Let each group present the results of its study in class. Finally, let the whole class discuss on the presented materials by the three groups.

C. Individual work:

Let us say you are living in:

- An urban center whereby industries are dumping their waste into a nearby river or release it into the air .
- A rural area near a modern farm using fertilizers, pesticides and insecticides, and don't forget there is a river on which people in the surrounding depend for drinking, washing, growing vegetables etc.
- Make a detailed study in both cases, particularly on matters related to the health situation of the people using these rivers. Finally, present the results of your study to your classmates and invite them for further discussion on the issue.

Summary

- Natural vegetation refers to plants that have grown in a given area without human efforts.
- There are five different types of natural vegetation, namely, equatorial rain forest, savannah, desert and semi-desert, mediterranean and tropical highland vegetation.
- Africa is very rich in all kinds of wild animals. The different regions of Africa provide ideal conditions for the existence of a great variety of wild animals.
- The major factors that affect natural vegetation are deforestation, impeded forest regeneration and forest degradation.
- The major factors that affect wild animals are deforestation, illegal hunting, overgrazing, burning, drought and famines.
- Water is very important for life.
- The African region represents an important part of the world in terms of land and water 20.2 percent of the world's land area, and 9 percent of the world's actual water.
- Water has one major problem. This is the problem of pollution. When water is polluted its natural ability to clean itself is lesser or completely destroyed.
- The major causes for water pollution are sewage waste, industrial, and agricultural pollutants.
- Erosion and land degradation are serious problems to soil.
- The causes for soil erosion can be grouped into two, i.e. natural factors and human factors.
- Human factors are like: deforestation, overgrazing, and bad farming practices.
- Just as there are natural sources of water pollution, so there are substances that pollute air. Far more important than naturally occurring pollutants are substances that people discharge into the air.
- Every citizen is expected to use the available forest resources properly and wisely. The risk of deforestation can be minimized through: reforestation, afforestation, proper management of the existing forests, using alternative energy sources, agro-forestry and raising public awareness.
- The following are some of the methods in the conservation of water: effective treatment of municipal and industrial wastes, removal of pollutants by purification, the regulation of chemical run off from agriculture, mining and forestry, the development of less pollution technology, recycling wastes, use chemicals etc.
- There are a number of ways of preventing air pollution, some of them include: government laws, filter system, alternate exhaust system, use of mass transportation.
- Some of soil conservation methods are: contour ploughing, terracing, building check dams, planting shelter belts etc.
- Resources are of two kinds: renewable and non-renewable.

Glossary

- **Afforestation:** is the process of planting trees on an area where there had not been any tree before.
- **Agroforestry:** the growing of crops, the planting of trees and the raising of livestock undertaken in the same location at the same time.
- **Conservation:** is proper and wise use of the available natural resources.
- **Deforestation:** is the process of removing trees from an area of land.
- **Endemic animals:** are wild animals that are limited to a certain area or country.
- **Fossil fuels:** are such elements like coal, petroleum and gas.
- **Natural resources:** valuable substances such as wood, minerals, etc. that exist in a country's land and sea.
- **Natural vegetation:** Natural vegetation is that part of the earth's plant cover which is not cultivated by human beings.
- **Pollution:** the process of damaging the air, water or soil with chemicals or other substances.
- **Sewage waste:** liquid wastes that are carried away from buildings through passages and pipes.

UNIT

3

Review Questions

I. True or false

Direction: Write "True" if the statement is correct and "False" if the statement is incorrect in the space provided in front of each statement.

- _____ 1. Physical, non-living environment includes all organisms.
- _____ 2. Living environment refers to all organisms and nutrients in soil.
- _____ 3. Savannah covers the surface of the earth where a short winter and wet season occur.
- _____ 4. Tiger and fox are examples of omnivore animals.

II. Matching

Direction: The terms under column "B" are described by the statements under column "A". On your paper, write the letter of the correct term next to the number of the statement it matches;

Column A

- _____ 1. Plant and animal life
- _____ 2. Type of erosion along steep slope
- _____ 3. Type of erosion along a gentle slope
- _____ 4. Planting new trees in new areas
- _____ 5. The growing of crops and the planting of trees and the raising of livestock undertaken in the same location at the same time.
- _____ 6. Grazing animals over the carrying of land
- _____ 7. grass and meat eater animals
- _____ 8. grass or plant eater animals
- _____ 9. The washing away of the soil

Column B

- a) Herbivore animals
- b) Omnivore animals
- c) Erosion
- d) Sheet erosion
- e) Gully erosion
- f) Agroforestry
- g) Afforestation
- h) Over grazing
- i) Flora and fauna
- j) Carnivore animals
- k) Reforestation
- l) Pollution
- m) Conservation
- n) deforestation

III. Multiple choice

Direction: Answer the following questions by choosing the best possible answer from the given four alternatives.

- _____ 1. One of the following is not an environment of tropical latitudes.
- | | |
|-------------------------|----------------------|
| a) Tropical rain forest | c) Tropical savannah |
| b) Tropical forest | d) Tundra |
- _____ 2. One of the following is not true about tropical savannah.
- Covers the surface where a long winter, dry season occurs.
 - Large areas of tall grass are interspersed with groves of trees.
 - It is among the richest grazing lands on earth.
 - Xerophytes are common plants.
- _____ 3. One of the following is true about endemic mammals.
- They are animals that are found in an area in great number.
 - They are rare mammals limited to a certain area or country.
 - They are extinct wild animals.
 - They are endangered or threatened animals.
- _____ 4. Deforestation means
- planting new seedlings in place of the cleared forest.
 - the temporary or permanent clearance of forests for some other land use.
 - planting trees where there was no plant life before.
 - loss of flora and fauna.

IV. Fill in the blanks

- Almost over _____ percent of the earth's surfaces is covered with water.
- One of the major problems of water is _____.
- Winds remove fine particles of materials in desert regions by the process of _____.
- The body that coordinates United Nations environmental activities is called _____.

V. Short answer questions

- Define the term environment?
- Explain what an ecosystem is?
- Discuss the main causes of deforestation and its consequences.
- How do you define the term natural vegetation? What are its different components?
- Discuss the main sources of water and air pollution. What are the intervention measures to be taken?

Check List

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

I can

1. Identify and indicate the natural vegetation of Africa on a map.
2. Distinguish the major wild animals of Africa.
3. Discuss how natural vegetation and wild life interrelate with their environment.
4. Realize that plants and animals are part of an ecosystem.
5. Verify that animals will become extinct if their habitat is destroyed.
6. Discuss human factors which affect wildlife.
7. Reflect that we can act to prevent climate change.
8. Explain the relationship between human beings and water.
9. Compare and contrast the availability and scarcity of potable water in Africa.
10. Predict threats and describe the causes of the threats to potable water in Africa.
11. Identify the threats to soil resources in Africa.
12. Analyze the causes of urban air pollution.
13. Relate the conservation of natural vegetation to conservation of other resources.
14. Discuss how to control air and water pollution.
15. Show interest in participating in keeping water