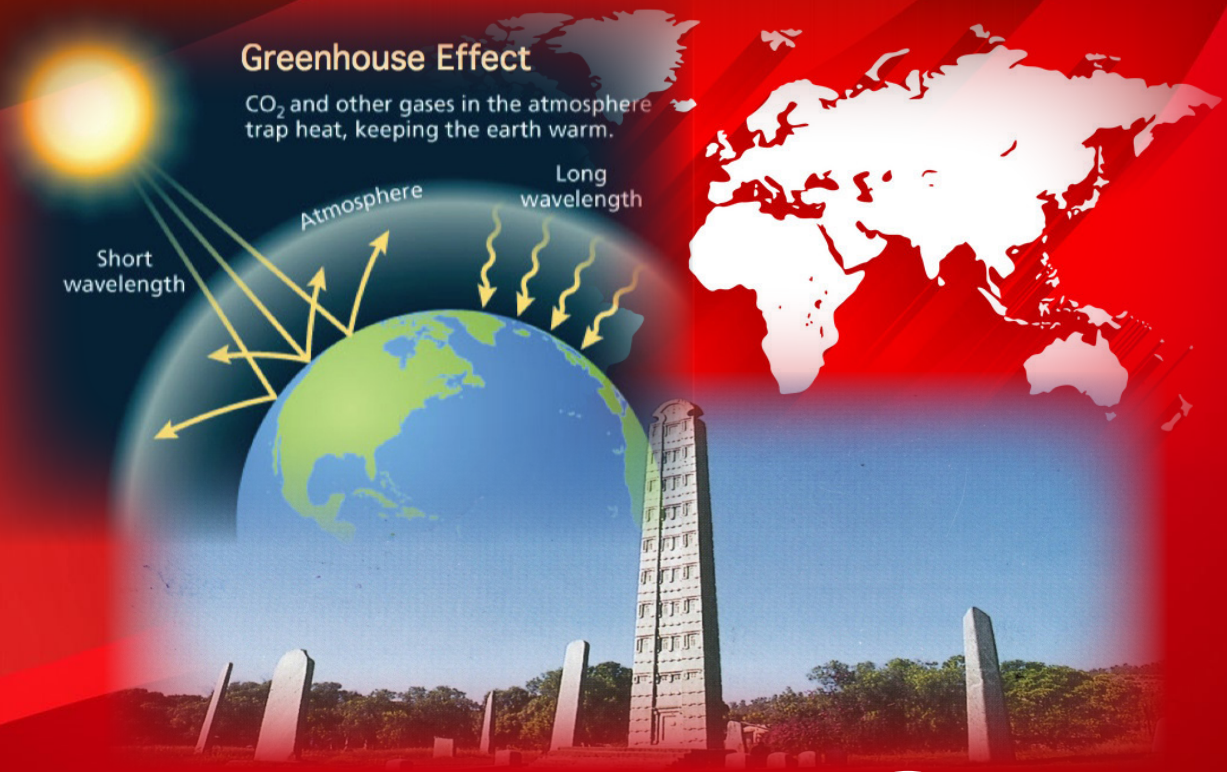
SOCIAL STUDIES

STUDENT TEXTBOOK



Grade 7

Federal Democratic Republic of Ethiopia
Ministry of Education

Sidaama National Regional State
Education Bureau

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SOCIAL STUDIES

Student Textbook

Grade 7

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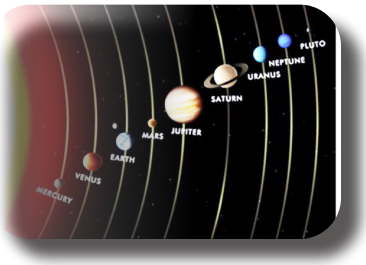
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UNIT ONE

1. PHYSICAL CHARACTERISTICS OF THE EARTH

Unit Outcomes



After the end of this unit, students will be able to;

- *explain the origin of the earth and the solar system;*
- *describe the four components of the earth and their interaction;*
- *explain the earth's internal layers and their characteristics;*
- *identify direct and indirect sources of information regarding the interior layers of the earth;*
- *identify major elements, minerals and rocks forming the crust of the earth; and*
- *analyze the spatial distribution and economic importance of rocks in Ethiopia.*

Introduction

Dear students! This is the first Unit of your textbook. Our earth contain both physical and human features. Leaving the human features for the incoming units, physical parts of the earth contain both living and non living things. Physical parts are naturally made features of the earth that include the earth itself and its components.

Hence, in this unit, you will learn about physical characteristics of the earth. The major topic to be include are origin of the earth, solar system, the major external components and layers of the earth, internal layer of the earth, the sources of information of the interior of the earth and major elements like rock forming of the crust and importance of rock in Ethiopia.

1.1. ORIGIN OF THE EARTH AND SOLAR SYSTEM

Competencies

After the study of the lesson, you will be able to

- *Discuss the origin of the earth*
- *State the members of the solar system*

Key Terms

- Galaxy
- Gravity
- Solar system
- Universe

How the earth was formed?

1.1.1. Origin of the earth

The earth's origin is associated to the process of the formation of the solar system. Some scientists believed that the solar system, of which the earth is a part of it, was formed from the particles which were mostly made up of hydrogen and helium, dust particle and other elements. Moving in space gradually, these particles pulled each other because of gravity. Then, they came together to form a thin disc. The disc, in due course, split into rings and kept

spinning. The spinning rings at the center formed the sun, while the outer rings result in the formation of nine planets, include the earth. The earth is one of the nine planets that along with the other planets and elements of the solar system revolve around the sun. Earth and other planets including the sun were formed at the sae time and from the same materials about 4.5 billion years ago.

Solar system

What is solar system?

The solar system is the "sun" system. It is made up of the sun and everythings that orbit (revolve) around the sun. It includes the sun at the center, the nine planets and their satellites, comets, meteor, meteorites and asteroids.

Universe is the totality of space in which every thing is found. The universe contains many galaxies. **Galaxy** is a large group of stars. Our solar system is found in Milky way, Milky way is our Galaxy. The sun is the biggest member of solar system. It makes almost 99% of the solar system and the planets are the other members make up 1%. There are nine planets orderly from the sun; these are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune and Pluto. All planets do not give off light and heat of their own. They move around the sun along definite path. The path of each planet is called ***orbit.***

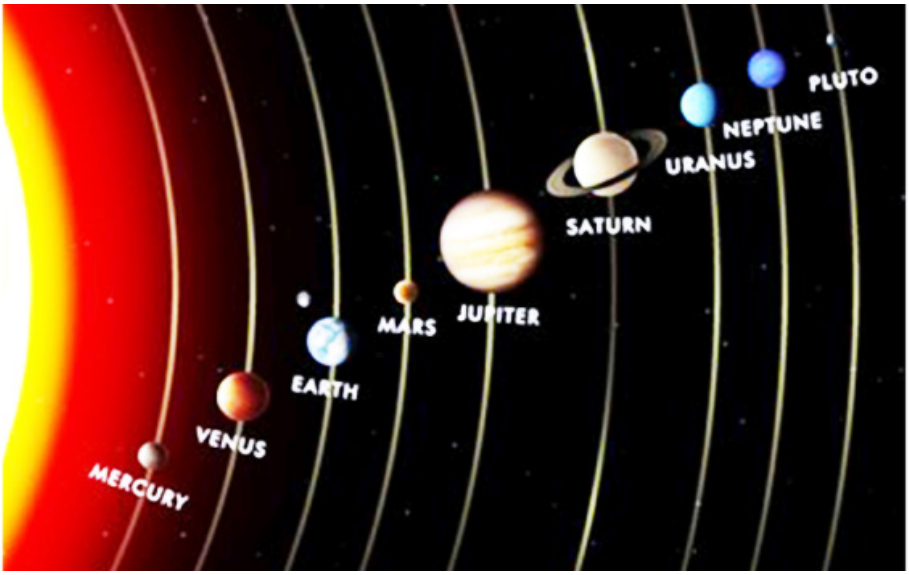


Figure 1.1 solar system

1.2. EXTERNAL COMPONENTS AND INTERNAL STRUCTURE OF THE EARTH

Competencies

After completing this lesson, you will be able to;

- *State the four external components of the earth and their constant interaction;*
- *Analyze how and why different earth's materials are differentiated into different layers;*
- *Distinguish different sources of information about internal parts of the earth; and*
- *Describe the layers of the earth.*

Key Terms

- Hydrosphere
- Crust
- Lithosphere
- Mantle
- Biosphere
- Core
- Atmosphere

Activity 1.1

Answer the following questions

1. Discuss with your partner about the origin of the earth.
2. Using different materials such as mud or wooden ball make model to show the relative size of the sun and the nine planets according to their size and their distance from the sun.

1.2.1. External Components of the earth

What are the external components of the earth?

External components of the earth are divided in to four main parts. These are: Lithosphere, Biosphere, Hydrosphere and Atmosphere.

Lithosphere

What is lithosphere?

Lithosphere is rocks outer parts of the earth. It is made up of crust and the uppermost mantle. It is also the coolest and most rigid parts of the earth.

Biosphere

What is biosphere?

Biosphere is life-supporting part of the earth's surface. It extends from the surface and oceans to few kilometers into the atmosphere. It is in this part where plants and animals exists.

Hydrosphere

How do you understand the hydrosphere?

Hydrosphere includes all water portion of the earth and it accounts about 71% of surface of the earth. It includes Ocean, seas, lakes, rivers, glaciers, ponds etc. Ocean is the largest water body in the hydrosphere and it constitutes about 97% of the earth's water.

Atmosphere

What do you know about atmosphere?

Atmosphere is a mixture of gases. Its components are grouped into major and minor gases. The major gases are Nitrogen (78%) and Oxygen (21%) and the minor gases are argon (0.95%), carbon dioxide (0.03%) and etc. Half of the mass of atmosphere found below an altitude of 5.6 k.m. About 90%

found within altitude of 16k.m and about 99 % is concentrated in the first 30 kilometers above the surface of the earth.

These four external components of the earth are inter related one another. For example, Hydrosphere provides water for human and animals for drinking and water for plant growth (Biosphere), Plant root grow in the soil (Lithosphere) and plants use carbon dioxide from atmosphere to make food and release oxygen.



Activity 1.2

Answer the following questions

1. Discuss the relationship between the external components of the earth?
2. What is the largest water body in the hydrosphere?
3. What percentage of the hydrosphere covers earth's surface?

1.2.2. Internal Structure and Sources Information about the Internal Parts of the Earth

Internal structure of the earth

What do you understand about the layers of the earth?

The major structural components of the earth that are separated by sharp discontinuities are the crust, the mantle, and the core. The crust forms a very thin surface skin, the mantle is a thick shell that extends half the radius down into the earth, and the core occupies the central part. Each layer has its own properties and compositions.

The Crust

This is the outermost layer of the earth and is made of solid rock, cooled part of the earth layer in depth from approximately 5-70 km make less than 1% of the entire volume. Mostly composed of **basalt** and **granite.** There are two type of crust;

- **Oceanic crust**: is denser and thinner and mainly composed of basalt. Sometimes it is also known as **sima**(silicate and magnesium). It has average thickness of 6 to 10 kms.
- **Continental crust:** is less dense, thicker and mainly composed of Granite. Sometimes it is also called **sial** (silicate and aluminum) approximate thickness can be up to 70kms.

The Mantle

The mantle lies below the crust and up to 2900k.m. thick. It makes up 80 - 84 percent of the earth's volume. It consist of silicate rocks rich in hot, dense, **iron** and **magnesium**. The crust and the upper part of the mantle make up the lithosphere. The temperature that may reach 5000^0c. It is usually found in a molten state. The earth's temperature and pressure increase with depth. These changes cause the strength of mantle rock to vary with depth, and thus they create layering within the mantle.

The Core

The core is the innermost layer of the earth. It is a sphere with a radius of about 3470 kilometers, and is composed largely of **iron** and **nickel**. The outer core is molten because of the high temperature at the center of the core. The extreme pressure compresses the inner core into a solid, despite the fact that it is even hotter than the molten outer core. The core's temperature is estimated at about 6000^oC. It constitutes about 15 percent of Earth's volume.

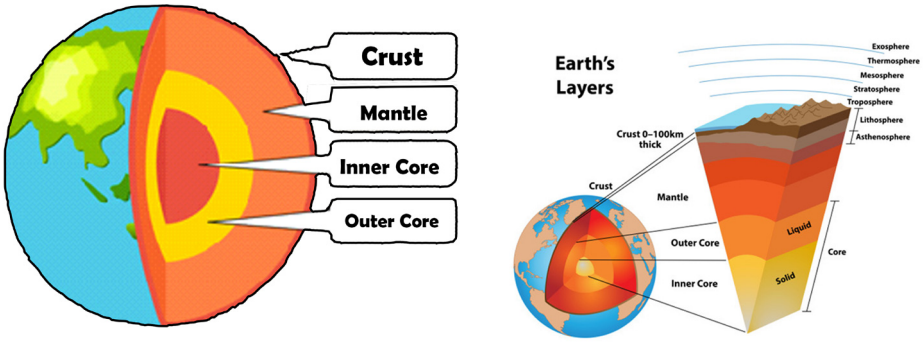


Figure 1.2 layer of the Earth

Sources of information about the internal parts of the earth

How do you know about inside parts of the earth?

The inside of the earth can be described as being made up of layers, in a sequence of concentric shells as illustrated on the cover. Human being has actually looked into the earth in deep mines and drill holes only a very small distance to the earth's center. Furthermore, human being will likely never be able to make a hole into the deep interior, so what we learn about the interior has to be from direct and indirect evidence? There are limited direct evidence access to understand the interior parts of the earth. So indirect method of observation help you to understand how scientists gather information about interior parts of the earth. Evidence on the structure and composition of the earth's interior comes from:

1. *Observation of rocks at the surface,*
2. *Secondary observations based on geophysical phenomena (including waves through the earthquakes and explosive sources, planetary motions of the earth, flow of heat from the interior (volcanism), the magnetic field, and gravitational attraction)*
3. *Laboratory experiments on surface rocks and minerals, and*
4. *Comparison of the earth with the other planets, the sun, stars, and meteorites, which may be Fragments of a disintegrated former*

planet. Our present understanding of the structural features and the composition of the earth is obtained from all these sources.



Activity 1.3

Answer the Following Questions

1. Name the three layers of the earth.
2. Which layer of the earth is largely composed of iron and nickel?
3. The outermost and thinnest layer of the earth is_____
4. How do you get information about internal parts of the earth?
5. What are the direct and indirect evidences of the information about internal part of the earth?

1.3. MATERIALS FORMING THE CRUST OF THE EARTH

Competencies

After completing this lesson, you will be able to

- *Identify major elements, minerals and rocks forming the crust of the earth; and*
- *Point out the different types of rocks and their importance.*

Key Terms

- Mineral
- Lava
- Element
- Rock
- Magma

What are the main materials forming the crust of the earth?

1.3.1. Major Elements

Elements are substance made from atoms. The earth's crust is made up of about eight major elements; Oxygen (46.5%), silicon (27.7%) aluminum (8.1%), Iron (5.0%), Calcium (3.6%), Sodium (2.8%), Potassium (2.6%) and Magnesium (2.1%).

1.3.2. Major Minerals

The earth's crust is made up of different types of minerals. Minerals are made up of elements. The most important minerals are silicate minerals which make up 90% of the earth's crust. A mineral consists of one or more chemical elements and has definite physical state and chemical composition. Some minerals are found in combination with other minerals, while other found as a single elements. Some mineral are organic or inorganic in nature.

1.3.3. Major rocks forming the crust

What is rock? How rocks are formed?

Rocks are naturally aggregates of one or more minerals. Based on their formation and characteristics rocks are classified into three: Igneous, Sedimentary and Metamorphic.

A. Igneous

What do you know about the term igneous?

The term igneous rocks are derived from the Latin word "*ignis*" which means

'*fire*'. Igneous rocks are formed when hot, molten rocks are crytallized and solidified. This molten rock is called **Magma**. Magma sometimes forced out to come on the surface and solidify is known as **Lava**.

When Lava flow on the surface it gets cool and become hard because of the cool temperature on the surface. Magma comes out and gets cool fast or slowly, This result in the formation of different type of Igneous rock.

Based on their texture, igneous rocks are divided into two namely; intrusive and extrusive.

Intrusive Igneous rocks (plutonic rocks): are rocks which have cooled and solidified in the interior of the earth.These rock have large crytal which can be seen by our naked eye. They are also coarse textured because are solified slowly beneath the earth's crust.

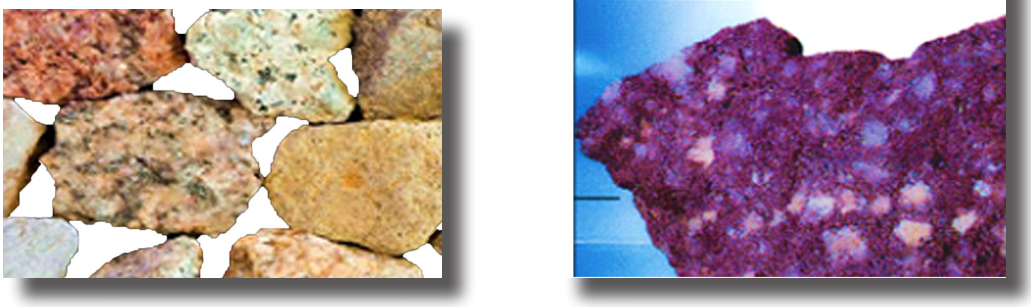
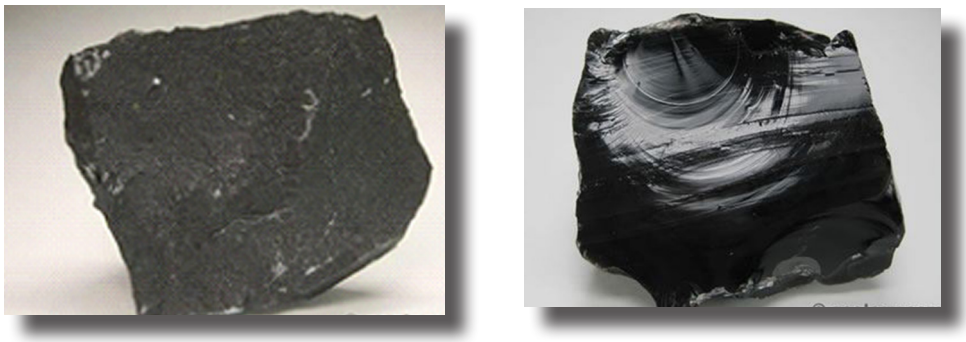


Figure 1.3 Intrusive Igneous rocks

Extrusive igneous rocks (volcanic rocks): are rocks which have cooled and solidifies on the surface of the earth. These rocks are fine textures and contain microscopic crytal which cannot be seen by our nacked eye. This is because of quick solidification after eruption.



a. Basalt b. Obsidian

Figure 1.4 Extrusive igneous rocks

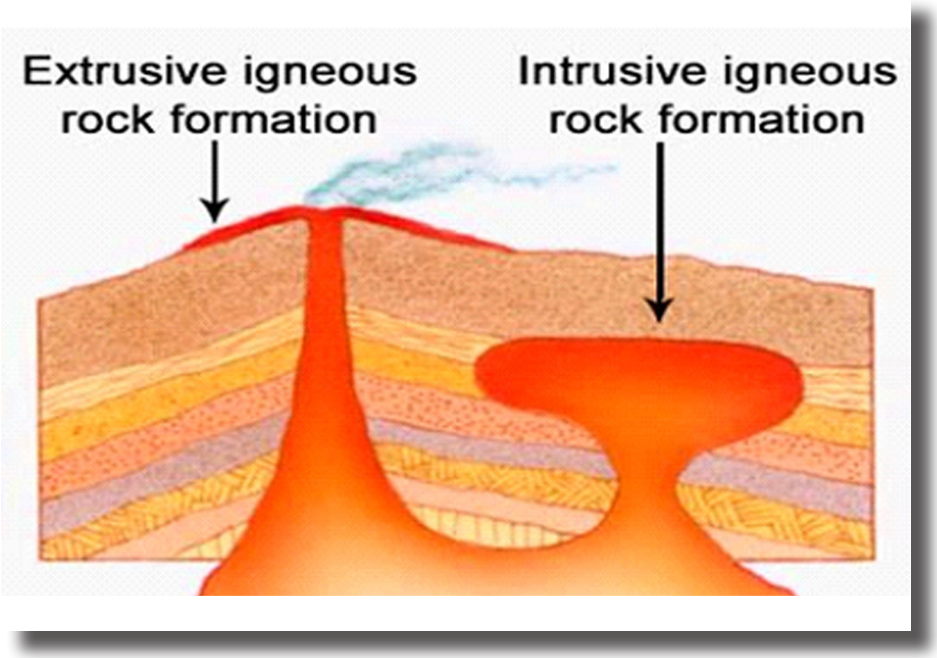


Figure 1.5 The formation of Igneous rock

B. Sedimentary rocks

What are sedimentary rocks?

These rocks are formed by the accumulation of small to large sediment particles derived from igneous, sedimentary and metamorphic rocks. The sediments in the sedimentary rocks are cemented by cementing materials ,such as calcite, sulfate, silica, clay, iron oxide, etc. Sedimentary rocks are usually deposited in

a series of layers, which are differentiated from one another by color, grain size or composition. The oldest layer is found at the bottom and the youngest at the top. Sedimentary rocks are classified as:

1. Organic sedimentary rocks: These rocks are formed from the decomposition of plants and animals remain. Examples of organic sedimentary rocks include coal, oil, etc.
2. Clastic sedimentary rocks: Formed from the transportation and accumulation of materials, such as rocks, grains of minerals and even crushed shells. Examples of such rocks include clay, conglomerate, shale, sandstone, etc.
3. Chemical sedimentary rocks: These rocks are formed from the evaporation and precipitation of a solution that is saturated with mineral compounds. Examples of chemical sedimentary rocks include rock gypsum, rock salt(halite), limestone(calcite),etc.

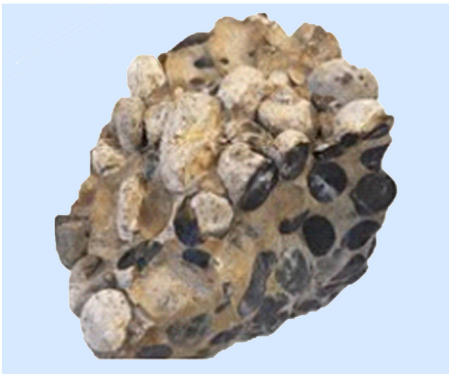




Figure 1.6 Layer of sedimentary rock

C. Metamorphic rock

What are metamorphic rocks?

Metamorphic rocks are changed rocks. They are formed from pre-existing rocks of igneous, sedimentary and even other metamorphic rocks through heat and pressure inside the earth's crust.

Metamorphism: is the process of transformation of pre-existing Igneous and sedimentary rock through heat and pressure. The following are some example of metamorphic rock;

- *Marble from lime stone*
- *Slate from clay*
- *Genesis from Granit*
- *Quartz from sand*



Figure 1.7 Metamorphic rock

The rock components of the crust are slowly but constantly being changed from one form to another by the presence of great heat and pressure and the processes involved as summarized in below the rock cycle

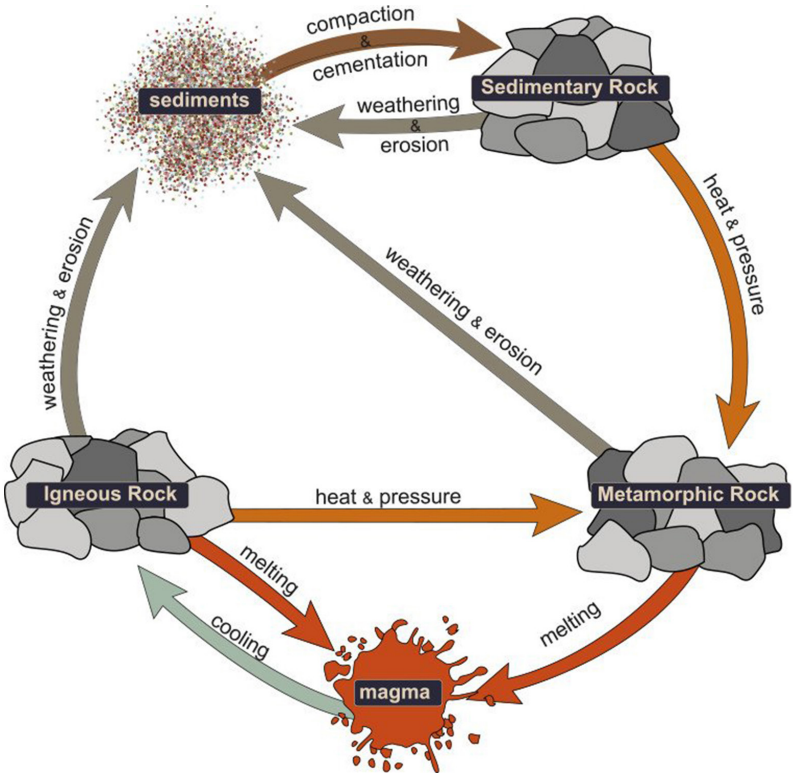


Figure 1.8 Rocks formation processes (Rock Cycle)



Activity 1.4

Answer the Following Questions

1. What makes Sedimentary rocks different from other rocks?
2. Discuss major types and formation of rocks.

1.4. DISTRIBUTION OF MAJOR ROCKS AND THEIR ECONOMIC VALUES IN ETHIOPIA

Competencies

After completing this lesson, you will be able to

- *Describe the distribution of the different rock types in Ethiopia; and*
- *Explain the economic importance of rocks in Ethiopia.*

Distribution of different rock types in Ethiopia

Major rocks that are found in different parts of Ethiopia include igneous, sedimentary and metamorphic rocks. These rocks are found exposed at the surface in different parts of the country. Igneous rocks are mainly found in central parts of Ethiopia. Eastern parts of Ethiopia are covered by Sedimentary rocks. Metamorphic rocks are exposed in Northern, Southern and Western edges of Ethiopia.

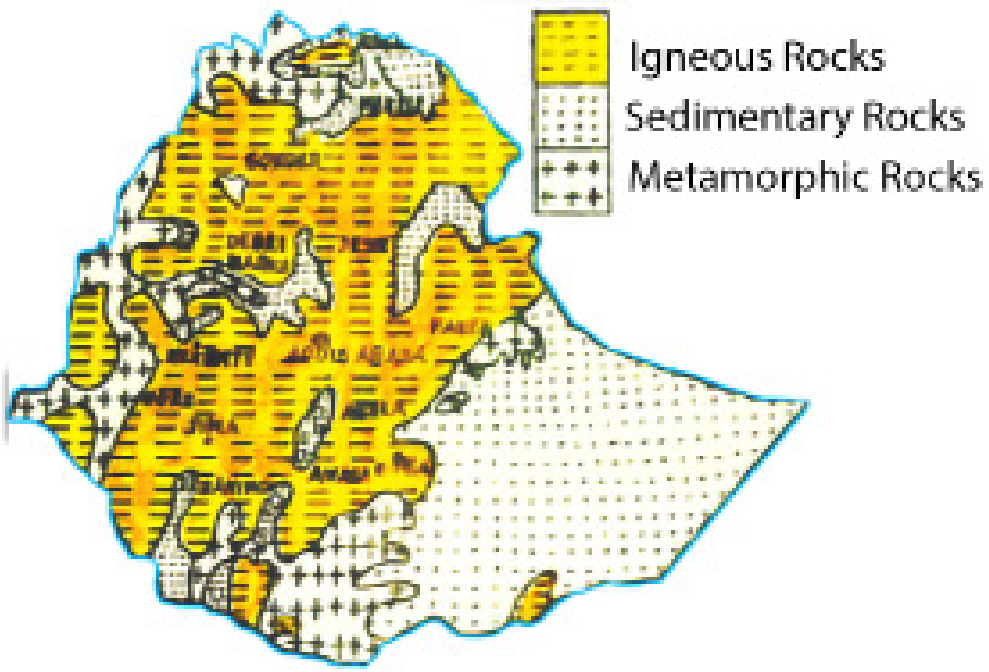


Figure 1.9 Major type of rock

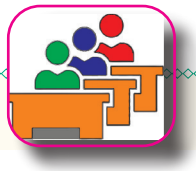
Economic value of rocks in Ethiopia

Rocks have different uses. Some of their uses are;

- **Sources of minerals:** Example Gold, diamond, limestone and petroleum which can be exported to provide for foreign exchange to a country. Petroleum, coal and limestone derived from sedimentary rock, while gold, diamond and tin derived from igneous and metamorphic rocks.
- **Sources of fuel:** Example sedimentary rocks like petroleum and coal.
- **Construction purpose:** Example Granite and limestone are quarried and used for road, bridge and building construction.
- **Ornament:** Example some beautiful rock such as marble can be polished as for decorating floors, wall of building, churches and tombstones.
- **Sources of food nutrient;** Example salt such as sodium chloride from sedimentary rock used for in cooking.

- **Sources of metal:** Example iron, aluminum etc.

Rocks	Associated minerals	Uses
Igneous Rocks	• Basalt, Granite, Sands	Building and construction
Sedimentary Rocks	• Mineral fuels - Coal - Natural gas - Petroleum • Salt, Gypsum etc.	Energy sources, construction and writing materials
Metamorphic Rocks	• Metallic minerals - Gold - Nickel - Diamond - Copper - Uranium - Iron - Platinium - Lead	• Decorative, jewelry, materials • Construction • Electrical wire making, • Industrial machinery production.



Activity 1.5

Answer the Following Questions

1. Work with your group and write a report about the major rock types samples from your locality.
2. Discuss the difference between igneous, sedimentary and metamorphic rocks and show their sample?
3. Eastern parts of Ethiopia is largely covered by _____ types of rocks.
4. Central parts of Ethiopia covered by _____ types of rocks.
5. Explain the economic importance of rocks in Ethiopia.

UNIT SUMMARY

- The earth's origin is associated with the process of formation of the solar system about 4.5 billion years ago.
- External components of the earth are divided in to four main parts. These are; Lithosphere, Biosphere, Hydrosphere and Atmosphere.
- Internal structure of the earth is made up of three layers with different thickness: These are; crust, mantle and core. The crust is outer most layer of the earth ; which is made up of manly sedimentary rock Mantle consist of silicate rocks rich in hot, dense, iron and magnesium. The core is innermost layer of the earth and consists of iron and nickel. It has two parts: the outer core and the inner core.
- The earth's crust is made up of about eight major elements; Oxygen (46.5%), silicon (27.7%) aluminum (8.1%), Iron (5.0%), Calcium (3.6%), Sodium (2.8%), Potassium (2.6%) and Magnesium (2.1%). Elements are substance made from atoms.
- Minerals are made up of one or more chemical elements and has definite physical state and chemical composition. Silicate is the most important minerals make up over 90% of earth's crust and largest mineral group.
- The rocks are natural aggregates of one or more minerals and it classified in to three: Igneous, Sedimentary and Metamorphic. Igneous rock is made up of molten material due to the presence of great heat and pressure and it has two parts: Intrusive Igneous rock (plutonic rock) and Extrusive igneous rock (volcanic rock). Sedimentary rocks are derived from existing rocks by the process of weathering and erosion and in classified in to three: Clastic, chemical and organic based on its composition. Metamorphic rocks are changed rock i.e change from one or the other form of Igneous or Sedimentary rocks.

GLOSSARY

Atmosphere: is Earth's gaseous envelope

Biosphere: is totality of all plant and animal life

Core: is the central layer of the earth.

Crust: is the outer most and thinnest layer of the earth.

Element: are substances that are made up of atoms.

Galaxy : is a large group of stars

Gravity: is natural force that tends to cause physical things to move or attract towards each other.

Hydrosphere: is water portion of the earth.

Lava: when molten rocks magma reaches on surface is called lava.

Lithosphere: is the solid Earth

Magma: is molten rock

Mantle: is intermediate layer of earth, which found between the crust and core.

Minerals: are made up of element

Rocks: are natural aggregates of one or more minerals

Solar system: is the smaller group of the heavenly bodies, which includes the sun at the center and the nine planets and their satellites and asteroids.

Universe: is the totality of space and cosmos, in which everything is found.

REVIEW EXERCISE

Part I Determine whether each of the sentences below is True or False.

1. The formation of the earth is different from other solar system members.
2. Observation of rocks at the surface is one of the indirect evidence to know about interior of the earth.
3. All planets have their own light and heat.
4. The earth's crust is relatively thicker than the mantle.
5. Minerals are made up of one or more elements.

Part II Match items in column 'B' with items in column 'A'

A	B
1. Core	A. Nitrogen and oxygen
2. Lithosphere	B. Plants and animals
3. Mantle	C. Sima
4. Atmosphere	D. All water bodies
5. Biosphere	E. Solid earth
6. Hydrosphere	F. Consisted Iron and magnesium
7. Oceanic crust	G. Consisted largely iron and Nickel

Part III: Choose the correct answer from the given alternatives

1. The totality of space where everything is found _____

   A. Solar system
   B. Universe
   C. Planets
   D. Milky way

2. Which of the following is the largest member of solar system?

A. Saturn
B. Sun
C. Pluto
D. earth

3. Which layer of the earth has maximum temperature?

A. Mantle
B. Core
C. Crust
D. M – Layer

4. Which layer constitute about 84% of the total volume of the earth?

A. Mantle
B. Crust
C. Core
D. Inner core

5. The inner core is solid, this is because of;

A. The nature of nickel and iron
B. The maximum temperature
C. The highest pressure
D. Its thickness

6. The two major gases of earth's atmosphere which account 78% & 21% are respectively;

A. Nitrogen & Hydrogen
B. Helium & Hydrogen
C. Oxygen & Carbon dioxide
D. Nitrogen & Oxygen

7. All are true about Biosphere **Except.**

A. It is found in the uppermost parts of lithosphere
B. It is found in the upper atmosphere
C. It includes the hydrosphere
D. In habitable by life

8. Sedimentary rocks are differ from the other type of rocks because;

A. They are changed rock
B. They contain fossil and layers
C. They are volcanic rock
D. They form in the crust

9. Which parts of Ethiopia are mainly covered with igneous rock?

A. Central
B. Eastern
C. Northern
D. Southern

10. Which one of the following is the metallic rocks are changed from limestone under the influence of heat and pressure ?

A. Schist
B. Marble
C. Shale
D. Quartzite

11. As Lithosphere is for rock , Biosphere is for _____

A. Air
B. Water
C. Minerals
D. Plants

12. Which type of igneous rock has a large texture?

A. Intrusive rock
B. Extrusive rock
C. Organic rock
D. First rock

Part IV- Fill in the blank space with the correct word or phrase.

1. When a magma is forced out on the surface and become solidified is known as_____
2. Based on their formation and characteristics, rocks are classified as _____, _____ & _____.
3. Basalt rocks that are found in the high land of Ethiopia are example of _____

Part V. Give Short answer.

1. What is solar system?
2. Explain the difference between intrusive and extrusive igneous rocks.
3. Describe the major elements and minerals makeup of the earth crust.

UNIT TWO

2. HUMAN EVOLUTION AND WORLD POPULATION

Unit Outcomes

At the end of this unit, learners will able to:

- *Explain the origin of human beings;*
- *Point out the archeological sites that show the origin of earlier human beings;*
- *Discusses world population growth distribution;*
- *Calculate different demographic rates;*
- *Evaluate the role of different mode of transportation;*
- *Identify and show significant road signs.*

Introduction

In the previous unit, you have learned about physical characteristics of the earth such as the origin of the earth and solar system, external components of the earth, internal structure of the earth, distribution and economic values of the rock and the like. This unit deals with human evolution and world population. You will learn about the human evolution, trends of world population, components of population dynamism, population structure and characteristics, population distribution and factors, population movement and settlement, people and developments of transport, mode and roles of transport, road safety, road traffic accident and its economic implication.

2.1. HUMAN EVOLUTION

Competencies

After the study of the lesson, you will be able to

- *Point out archeological sites that show the origin of earlier human beings;*
- *Examine the historical routes humankinds have passed through over time.*

Key Terms

- Archeology
- Archeological sites
- Artifacts
- Cave
- Creationist
- Evolutionist
- Evolution
- Excavation
- Fossil
- Hominids
- Mesolithic age
- Neolithic age
- Paleolithic age
- Stone Age

2.1.1. Archeology and Archeological works

What is archeology? What are artifacts and fossils?

Archeology is the study of past human history through the analysis of artifacts and other physical and material remains. It studies human remnants and artifacts to know about the past human life and activities. Examples of material remains are tools, pottery, jewelry, stone walls, ruined buildings, weapons, arrowheads, rock paintings, carvings and monuments. These remains are called **artifacts**.

Artifacts are objects made and used by people. Artifacts can tell us what happened in the past and when it happened.

Fossils are the remains of dead plants, human beings and animals. The study

of fossils and other material remains of the past help us to reconstruct what happened before writing started.

There are many branches of archaeology. Some of them are prehistoric and historical archeologies.

- **Prehistoric archaeology** refers the time or a period before the invention of writing.
- **Historical archaeology** refers to the time or a period after invention of writing and studies both physical remains and texts or written materials.

Archaeologist is specialist or scientist in archaeological investigation. They excavate and interpret materials remains to understand the past event and life.

What is archaeological excavation?

Archaeological excavation is systematic and scientific method to explore and dig out buried remains (fossils) from underground of the past societies. Archaeological excavation method helps to find out the material remains from the surface.



Figure 2.1 Archaeological Excavations

Material Dating systems

Archaeologists have used different methods to determine date of artifacts or material remains.

There are mainly two types of dating methods: relative dating and absolute dating techniques.

- **Relative Dating Methods**: *identify the order in which sites or artifacts were used in a sequence from earliest to latest. Determining how old something is compared to something else. Example: Rock A is older than rock B.*
- **Absolute Dating:** *try to establish an exact or approximate calendar date for a site or artifacts. It includes Radio carbon dating, Potassium argon method, Uranium series method, etc.*

Archaeological sites

An **archaeological site** is a place in which evidence of past human activity or artifacts is found. An archaeological site is a filled with historical and cultural artifacts with valuable information. Sites may range from those with few or no remains visible above the ground, to buildings and other structures still in use. A site may be as small as the place, or as large as a town.

There are many archaeological sites in Ethiopia. The domestication of plants and animals took place in parts of Ethiopia about 6000 years ago. These archaeological sites for the domestication of plants and animals are found near Aksum, around Lalibela, near Chercher in Hararghe and near Metehara in Shawa. Other archaeological sites are found in Afar Regional State, Melka-Kunture in Oromia, Awash Valley, Omo Valley, and near Dire Dawa.

The major archaeological sites for the domestication of plants and animals are found in Palestine and Mesopotamia in the Near East, the Nile valley in Egypt, in parts of Tropical Africa, the Yangtze Kiang valley in China, the Indus valley in India and parts of the Americas.

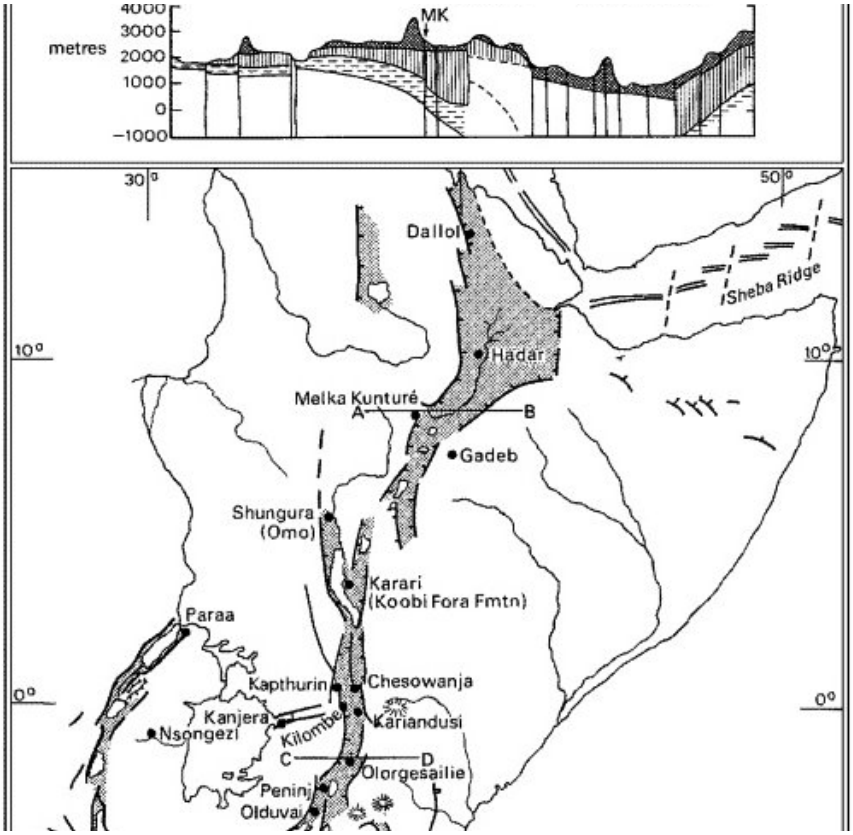


Figure 2.2: The Rift Valley in East Africa with key early human sites (J.D. Clark 1982)

2.1.2. Origin of the First Human Beings

What do you think about the origin of human beings? Discuss.

There are two theories concerning the origin of human beings. These are Creationist and Evolutionist or Scientific view.

- **Creationist view**: *human beings were created by Supernatural force (God) with all complete physical shape and structure.*
- **Evolutionist view**: *human beings developed from lower beings through a gradual and natural process of change.*

Hominids



Hominids were the common ancestors of human beings. They appeared about 25-40 million years ago. Hominids were found in different groups. One group of hominids was called Australopithecines (Southern ape). They were the first human species that appeared in Africa around 6 million years ago.

Figure 2.3 Lucy

Australopithecines had small brains and large faces and jaws.

- *The oldest of Australopithecines is called* **Sahelan tchadnsis** *in Northern Chad in 2001. It estimated to be between 7.6 million years old.*
- *In 1994 the fossil remains of Australopithecus ramidus, known as Ardi aged 4.4 million years were discovered in Afar in Ethiopia.*
- *In 1974 the fossil remains called Australopithecus afarensis, known as Lucy (Dinknesh) was found at Hadar in the Afar region. It is estimated to be 3.18 million years old. Lucy's fossils are the most complete so far found.*
- *Australopithecus afarensis was bipedal (walked on two feet with upright position).*
- *The remains of Australopithecus Africanus, aged 2.5 million years, were discovered at Taung, South Africa 1924.*

2.1.3. Historical Paths of humankind

Scientists verify that human beings and apes shared common ancestor. Do you agree or disagree? Discuss.

According to the scientific / evolution theory the human beings passed through different stages. Scientists considered that East African Rift Valley as cradle of human beings. The oldest Australopithecines connected with the origin of human beings are African hominids that appeared around 5 million years ago. The oldest members of the genus homo originated in African about 2.5 million years ago.

There are three different species of Genus homo. They are: **Homo habilils, Homo erectus and Homo sapiens.**

- **Homo habilils:** was a handy man that had developed manipulative hand. Homo habilils lived about 2 million years ago in eastern and southern part of Africa. Remains of these species were found in Omo Valley in Ethiopia, Lake Turkan in Kenya, Tanzania and South Africa.
- **Homo erectus:**were the first upright (erect) walking human beings. Homo erectus had slightly smaller brain and larger teeth. They appeared around one million years before present. The fossils of these species were found in lower Omo, Melka-Kunture, Konso-Gardula, Middle Awash and Gadeb. Fossils of these species were also found Java-Indonesia, Germany and Peking in China.
- **Homo sapiens**: were wise, thinking human being and very similar to modern man. Homo sapiens appeared at about 100,000years ago. The fossils of this species were found Awash and Omo valley, and near Dire Dawa.

The Homo genus was the direct ancestor to modern man. Modern human beings appeared about 40,000 year ago they are different in many ways from their ancestors.

Focus

Modern human beings:

- have large brains
- are bipedal and walk erect
- think and perform complicate ideas
- use language
- develop culture
- create tools and use effectively
- transfer their knowledge from generation to generation

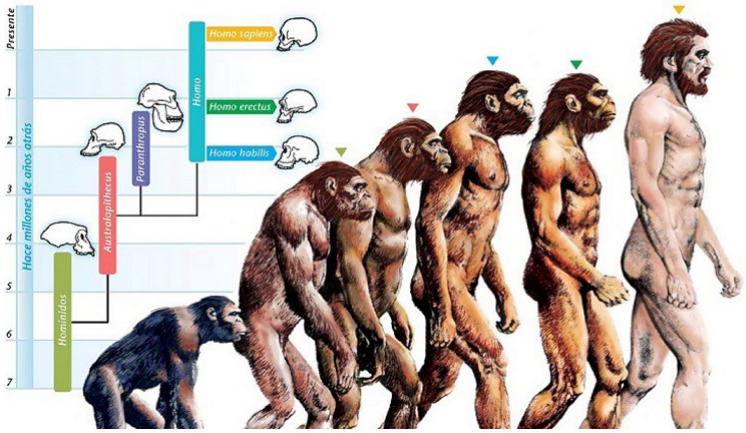


Figure 2.4 Human evolution

Stone Age

Human beings passed through several stages of development. The life of human beings in general is divided in to two:

- *The period of hunting and gathering and*
- *The period of civilization*

For long time, human beings got their food by hunting and gathering. But this was solved during time of civilization.

The period from 2 million years ago to about 4000 BC is called the Stone Age because people made most of their weapons and tools from stones. The Stone Age is divided in to three periods: **Paleolithic period, Mesolithic period and Neolithic period.**

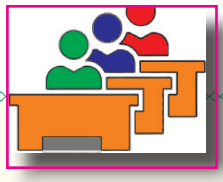
Paleolithic period or Old Stone Age: the longest age of all and lasted around 9000BC. During this period, human beings :

- *Used language*
- *Made first crude stone tools called hand- axes*
- *Discovered fire*
- *Lived in cave*
- *Painted pictures in cave*
- *Used clothes from animal skins*

Mesolithic Age or Middle Stone Age: Started from around 9000 and lasted about8000 BC. It was transitional period. Human beings made first pottery and domesticated dogs.

Neolithic Age (New Stone Age): started from 8000 and lasted about 4000 BC. A great revolution took place in this period. Domestication of plants and animals started and human beings became food producers. During this period:

- *Sedentary life started*
- *Stone houses were built*
- *Religion was started*
- *Fire were used for cooking purposes*
- *Clay pots and baskets were made; and pottery was used for cooking purpose.*
- *New and better tools like hoe, yoke and wheel were made.*



Activity 2.1

1. What is archaeological site?
2. What are difference between relative dating and absolute dating?
3. List out archaeological sites in Ethiopia.
4. Compare and contrast different species of Genus homo
5. Compare and contrast Stone Age development periods.

2.2. TRENDS OF WORLD POPULATION

Competencies

After the study of the lesson, you will be able to

- *Predict future world population growth pattern on the basis of present and past population growth rate;*
- *Calculate different demographic rates such as growth rates, mortality, fertility, net-migration, sex ratio, age dependency ratio,etc.*
- *Identify types and causes population movement;*
- *Locate densely and sparsely populated regions on world population map;*
- *Evaluate growth trends of Ethiopian population in line with world population growth; and*
- *Identify types of settlement.*

Key Terms

- Dependency ratio
- Emigration
- Fertility
- Growth rate
- Immigration
- Migration
- Population pyramid
- Rural
- Settlement
- Sex ratio
- Urban

What factors have contributed to the growth of world population?

For most of our history, human populations have been small, compared to those of other species. Studies on hunting and gathering societies (before 5000 BC) suggests that total world population was probably only a few million people. A major change occurred about 10,000 years ago, when humans began to domesticate plant and animals. At the dawn of agriculture, about 8000 B.C., the population of the world was approximately 5 million. Over the 8,000-year period up to 1 A.D. it grew and reach to 200 million (some estimate as 300 million or even 600), suggesting how imprecise population estimates of early historical periods can be), with a growth rate of under 0.05% per year.

It is obvious and known slow growth of human history occurred until around 1800 for world population to reach one billion, a tremendous change occurred with the industrial revolution. Such rapid and dramatic growth rate of the world population is known as ***population explosion***. The second billion was achieved within 130 years (1930), the third billion in 30 years (1960), the fourth billion in 15 years (1974), and the fifth billion within 13 years (1987).

During the 20th century alone, the population in the world has grown from 1.65 billion to 6 billion. In 1970, there were roughly half as many people in the world as there are now. Because of declining growth rates, it will now take over 200 years to double again. Population in the world is currently estimated (2020) about 7.8 billion with growing at a rate of around **1.05%** per year (down from 1.08% in 2019, 1.10% in 2018, and 1.12% in 2017).

The current average population increase is estimated at **81 million people per year**. Annual growth rate reached its peak in the late 1960s, when it was at around 2%. The rate of increase has nearly halved since then, and will continue to decline in the coming years. So that World population will therefore continue to grow in, a slower rate . It has seen that population growth has doubled (100% increase) in 40 years from 1959 (3 billion) to 1999 (6 billion). It is now estimated that it will take another nearly 40 years to increase by another 50% to become 9 billion by 2037. The latest world population projections indicate that world population will reach 10 billion in the year 2057.

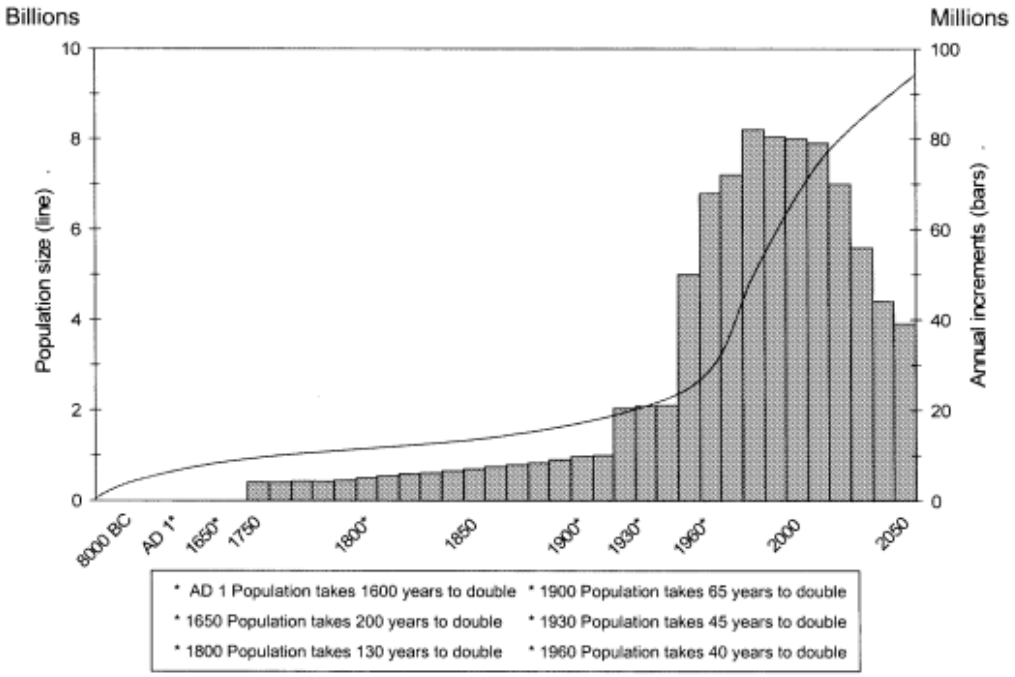


Fig. 2.4 World population growth rate

Table 2.1 World Population trend and projection by Region in 1950-2050

Region	1950		2050	
	Population	World share	Population	World share
Asia	1,404,909,021	55.4%	5,290,263,118	54.3%
Africa	227,794,136	9%	2,489,275,458	25%
Europe	549,327,883	21.7%	710,486,313	7.3%
North America	172,602,624	6.8%	425,200,365	4.4%
Latin America	168,820,620	6.7%	762,432,366	7.8%
Oceania	12,975,865	0.5%	57,376,367	0.6%

(source: UNDP, 2019)

2.2.1. Component of population change

What are components of population change?

Population number changes over time, influenced by births, deaths and migration. The population size of a particular area is the result of collective effects of **birth, death** and **migration**("migration" is the net balance of immigration and emigration). Immigration and birth are positive factors, which tend to increase population size, while emigration and death are negative factors that reduce population size. The birth and death are natural (biological) factors, while migration is non-biological factor.

A. Fertility

What is fertility?

Human fertility is the actual occurrence of ***live births*** in a given population. It is the beginning of life. Specifically, fertility refers to the actual ***reproductive performance*** of a population. Responsible for biological replacement and maintenance of the population of the human race. The growth of world population depends largely on human fertility. **Births** - usually measured using the birth rate (number of live births per 1,000 of the **population** per year).

Measures of fertility

Fertility can be determined by using different methods, but it is measured most commonly in terms of;

- *Crude Birth Rate (CBR),*
- *General Fertility Rate (GFR)*

Crude Birth Rate (CBR): is the most common and simplest index of fertility. It is simply the number of live births observed in one year among one thousand people in a given region. It can be expressed as a number of live births per thousand people.

$$CBR = \frac{B}{P} * k$$

where B is the total number of live births during a year, P is mid-year total population and k is a constant, conventionally 1000.

Example

If a number of the live birth in a population of 50,876,000 was 150,200 the crude birth rate is

$$CBR = \frac{150,200}{50,876,000} * 1000$$

$$= 2.9 \text{ births per } 1000 \text{ per year}$$

This means that there were 2.9 live birth per 1000 peaple within specified years.

This measure is simple to compute, but it is crude because its denominator includes all persons, regardless of their contribution to fertility (birth). For example all unmarried persons and children including. This is the weakness of the CBR as a measure of fertility.

General Fertility Rate (GFR): The easiest method of refining the weakness of CBR is by expressing live births, not in terms of total population, but as a percentage of the number of adults or, even better, of the number of women of reproductive age (typically defined as between the ages of 15 and 49). GFR measures the number of live births in a year per thousand women of

reproductive age. It is calculated:

$GFR = \frac{B}{P_1} * k$

where **B** is the total number of live births during a year, $\mathbf{P_1}$ is mid-year population of women between 15 and 49 years age and **k** is a constant, conventionally 1000.

Example

The estimated mid-year population of a given country in 2018 was 50,000,000, of which women in their reproductive ages constituted 2 million. In the course of the year, there were 500,000 live births. Calculate the general fertility rate of this population.

Given Number of live birth 500,000

Number of Reproductive ages 2,000,000

$$GFR = \frac{B}{P1} * k$$

$$= \frac{500,000}{2,000,000} * 1000 \qquad = 250 \text{ per } 1000.$$

This shows that 250 children were born for every 1000 women in their reproductive years .



Focus

Fertility rates differ greatly among continents, regions and countries. Generally, fertility rate is much higher in developing countries than in the developed countries. The number of children born to women in developing regions is much larger than to women in the developed regions.

B. Mortality

What is mortality? What are the factor that made mortality differ in developed and developing Countries?

Mortality is the occurrence of death. It is higher in the developing countries than in the developed ones. This difference is caused by variations in standards of living, nutrition, medical services, personal hygiene, environmental sanitation and etc.

Measurement of Mortality

Mortality can be measured in a number of ways, including the use of crude death rate and infant mortality rate.

- *Crude death rate &*
- *Infant mortality rate*

Crude death rate (CDR): is the ratio of the total registered deaths of a specified year in a region to the total mid-year population, multiplied by 1000. It is calculated as follows:

$CDR = \frac{D}{P} xk$

where CDR is crude death rate, **D** stands for total observed deaths, **P** is total mid-year population, and **k** is a constant, 1000.

Example

In a hypothetical region, the total number of deaths observed in 2018 was 60,000, and the total mid-year population was 12,000,000.

$$CDR = \frac{D}{P} * k = \frac{60,000}{12,000,000} * 1000$$

$$=5 \text{ per } 1000$$

Therefore, the resulting CDR was 5 per 1000 people. This number indicates that the deaths of 5 persons were observed for each 1000 people.

Infant mortality rate (IMR): is the number of deaths of infants under the age of one year, per 1000 live births, in a given year.

$$IMR = \frac{Number\ of\ death\ below\ the\ age\ of\ 1\ year}{Number\ of\ live\ birth\ in\ the\ year} * 1000$$

Example

Given that a total of 400,000 babies were born in a certain region in 2018. Deaths below age one year were 60,000 babies. Calculate IMR of that regions.

$$IMR = \frac{60,000}{400,000} * 1000$$

$$= 150 \text{ per } 1000$$

This indicates that out of 1000 children born in the year 2018, about 150 infants died before celebrating their first year of life.



Focus

Infant mortality rate is a good indicator of the level of development of any country. In countries with better living conditions, for example, countries in Europe, mortality is comparatively low. In contrast, the less developed countries (example, most African countries, including Ethiopia), infant mortality is quite high, due to malnutrition, various diseases and poor environmental sanitation. **Life expectancy** is the number of years a newborn is expected to live. It tends to increase with standard of living.

C. Migration

How does migration influence on population change?

Migration involves movement of people and thereby influences both the rate of growth and distribution of population just like the other two components of population change. Emigration is leaving one country to move to another. Immigration involves moving into a new country. The most common measures of migration that can affect population growth of an area include;

Immigration Rate: it is the number of people arriving at a destination per 1000 people in a given year.

$$Immigration\ rate = \frac{Number\ of\ immigrants}{Total\ population\ of\ destination} * 1000$$

Example

In a hypothetical region, the total number of immigrants were 40,000 and the total population at destination area were 5,000,000 in 2018. What is the rate of immigrants?

$$Immigration\ rate = \frac{Number\ of\ immigrants}{Total\ population\ of\ destination} * 1000$$

$$= \frac{40,000}{5,000,000} * 1000$$

$$= 8 \text{ per } 1000$$

Emigration Rate: it is the number of departing people from an area of origin per 1000 people of the area of origin in a given year.

$$Emigration\ rate = \frac{Number\ of\ emigrants}{Total\ population\ of\ origin} * 1000$$

Example

In a hypothetical region, the total number emigrants were 60,000 and the total poplation at origin area were 12,000,000 in 2019. What is the rate of emigrants?

$$Emigration\ rate = \frac{Number\ of\ emigrants}{Total\ population\ of\ origin} * 1000$$

$$= \frac{60,000}{12,000,000} * 1000$$

=5 per 1000

Net Migration Rate (NMR): shows the net effect (balance) of immigration(in migrant) and emigration(out migrant) an area. It can be expressed as an **increase** or **decrease** per 1000 people in the area in a given year.

$$NMR = \frac{Number\ of\ Immigrants - Number\ of\ Emigrants}{Total\ number\ of\ population} * 1000$$

Example

Suppose the number of emigrants and immigrants of country 'A' are 30,000 and 435,000 respectively. If the total population is 105,000,000 what is the NMR of country 'A'?

$$NMR = \frac{Number\ of\ Immigrants - Number\ of\ Emigrants}{Total\ number\ of\ population} * 1000$$

$$= \frac{435,000 - 30,000}{105,000,000} * 1000$$

= 3.8 per 1000 population

Measures of Population Change

In order to calculate the change in the total population size of a particular nation or place one has to use the following formula;

Rate of Natural Increase (RNI): it is the difference between birth and death rates. Hence, it is a naturally caused numerical change of a population which results from the interplay between ***fertility*** and ***mortality***. The rate of natural increase is given as a **percentage**. It is expressed as:

$$RNI = BR - DR$$

Example

If the birth rate and death rate of a certain country were 14 per thousand and 8 per thousand, respectively, what was the rate of natural increase (RNI)?

$$RNI = BR - DR$$
$$= \frac{14}{1000} - \frac{8}{1000} = \frac{6}{1000} = 0.6\%$$

Population Growth Rate (PGR): in order to find the growth rate of a population, we consider **net migration rate** and **rate of natural increase**.

$$PGR = BR - DR \pm NMR$$
$$or$$
$$PGR = RNI \pm NMR$$

Example

If the RNI of place is 0.6% and the NMR is 4/1000, find the population growth rate for place.

$$PGR = RNI \pm NMR = \frac{6}{1000} + \frac{4}{1000} \; or \; \frac{6}{1000} - \frac{4}{1000} = \frac{10}{1000} \; or \; \frac{2}{1000}$$

PGR = 1% or 0.2%

2.2.2. Population Characteristics

What do you know about population structures?

The population characteristics means structure of a population, the distribution of males and females within different age groups. Sex and age structures are basic characteristics and biological attributes of a population. The number and proportion of males and females in each age group have considerable impact on the population's current and future socio-economic situation.

Most developing countries have a large proportion of their population in the young age group. But in developed countries, people in the adult and old age group account for the largest proportions of the population. As a result, the shape of the population pyramids of the two groups of countries is not the same.

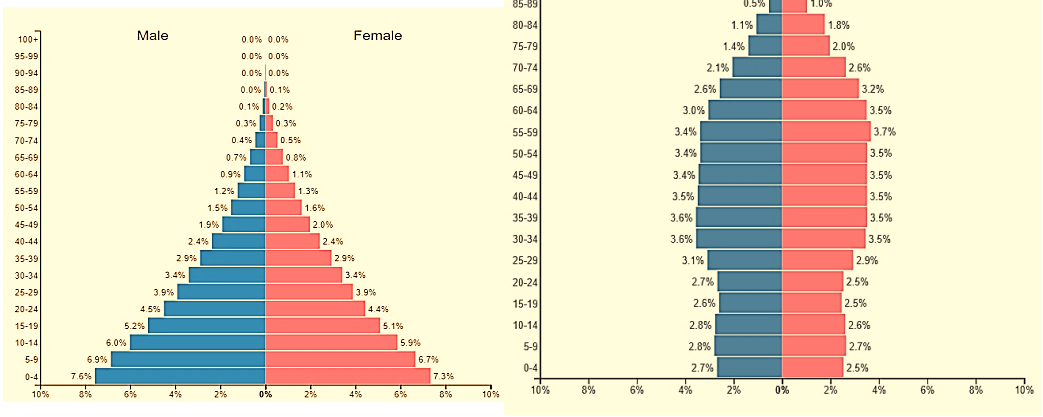
Data on population age-sex structure is ideally collected through census, reflecting a complete population count and illustrate by age-sex structural diagram which is known as **population pyramid**. It normally forms the shape of a pyramid and shows the distribution of various age groups of each sex in a human population. It typically consists of two back-to-back bar graphs, with the population plotted on the x-axis and age on the y-axis, one showing the number of males on the left and the other showing females in the right a particular population of five-year age groups (also called cohorts).

The above pyramid shown on figure 2.5 indicates the following different characteristics of a population as below.

Width of the base of the pyramid: birth rate varies with the width of the base. A wide base indicates a high birth rate, and a narrow base indicates a low birth rate. The previous is typical of populations of developing countries.

Symmetry: statistically speaking, pyramids are relatively symmetrical. Any asymmetry indicates a size difference between males and females.

Shape of sides: concave sides indicate a high death rate, and convex sides indicate a low death rate.



Population (in million) Population (in million)

a, developing countries b, developed countries

Fig, 2.5 Population pyramid in developing and developed countries (2020)

Focus

Developing countries	Developed countries
Low standard of living	*High standard of living*
High birth rate	*Low birth rate*
Limited medical resources	*High facility of public service*
Faster rate population growth	*Lower rate population growth*
High dependency ratio	*Low dependency ratio*
Predominantly young population	*Predominantly adult population*
High death rate	*Low death rate*

Age

The age structure of a population is one of the basic demographic characteristics. It is helpful for demographic analysis and for socio-economic development planning. Generally, less developed countries have predominantly young populations, while more developed countries have adult populations. The relative numbers of different age groups have a significant impact on social and economic policies and on the way people live their lives.

Dependency ratio

What is dependency ratio? Why do we need to know about dependency ratio?

The ratio of the number of people in dependent age groups compared to the economically productive age groups. The population of a given country can be further grouped into three categories (segments): The young age group (0-14 years) and the old age group (65+ years) are economically dependent, while adult age group (15 to 64 years) age group are economically active. The age dependency ratio is often used as an indicator of the economic burden of the countries. If countries with high dependency ratios there is a large number of elderly and young people who are dependent on the economically active (working age group) of the people in the middle age group. The percentage of the three age groups varies from region to region and among countries. The age dependency ratio (ADR) of a population indicates how many people are dependent upon every 100 workers.

$$ADR = \frac{Young + Elder}{Adult} * 100$$

Where: ADR (Age Dependence Ratio), population 0-14 years are young, population between age 15-65 are adults and population above 65 years old age are elder

Example

In country "X", the number of young population were 300,000, the number of old age population were 60,000 and the number of adult population were 440,000. What is ADR?

$$ADR = \frac{Young + Elder}{Adult} * 100 = \frac{300,000 + 60,000}{440,000} * 100$$
$$= 82\%$$

Sex ratio

What is sex ratio?

Sex ratio refers to the number of male population for every 100 females. Population pyramid also tells how many people of each sex live in an area. This statistic is typically defined in terms of what is called **sex-ratio (SR)**. Sex ratios may vary due to different patterns of death and migration for males and females within the population.

$$SR = \frac{P_m}{P_f} * 100$$

Where SR is sex ratio which may also be referred to as *masculinity ratio* Pm stands for the total number of males, and Pf stands for total number of females.

$$SR = \frac{P_f}{P_m} * 100$$

This is also possible and gives the number of females per 100 males. This can be called femininity ratio as well as sex ratio.

Example

The total number of students in a given School was 6000. Out of this 4000 were females and 2000 were males. What is sex-ratio of student population?

$$SR = \frac{P_m}{P_f} * 100 = \frac{2,000}{4,000} * 100 = \frac{50_m}{100_f}$$
$$SR = \frac{P_f}{P_m} * 100 = \frac{4,000}{2,000} * 100 = \frac{200_f}{100_m}$$



Activity 2.2

Answer the Following Questions

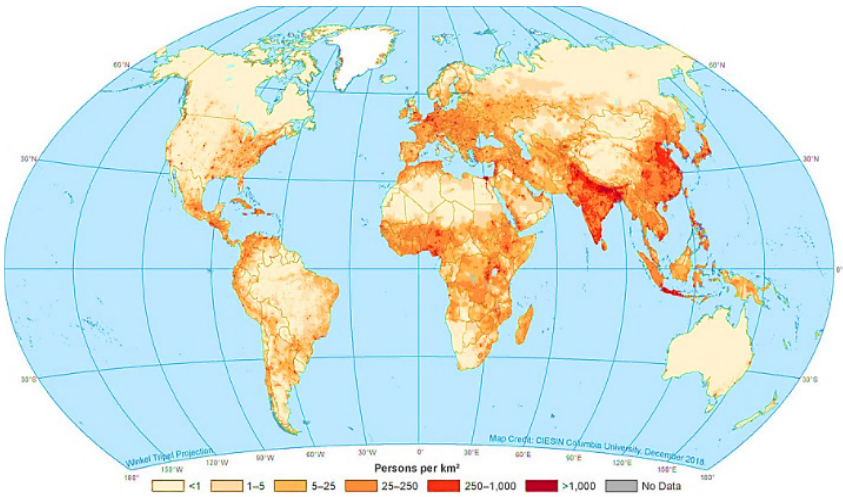
1. If the death rate for certain area is higher than birth rate , the result of rate of natural increase will be _____.
2. What are some of the weaknesses of crude birth rate (CBR)? Describe them.
3. The total population in a certain area in 2018 was 250,000 and live birth are 5,000 Then, Calculate crude birth rate (CBR).
4. A total live birth in a certain area in 2018, was 50,000 of which death under age 1 is 4,000 .then, calculate Infant mortality rate (IMR).
5. By mid-2019, the total population of hypothetical region was 1,000,000 of which 500,000 young age group, 100,000 old age group and 400,000 working age group. Then, age dependency ratio (ADR).

2.2.3. Population distribution

Why is the distribution of world population uneven?

Population distribution is the way that population is spread out over a given area. For several reasons, human population spread uneven over the earth's surface. Some areas are densely populated, others are sparsely populated.

NB; The most important features of current world population distribution is its extreme unevenness.



Data source: international earth science information network (CIESIN)

Fig 2.6 Global population distribution.

Table 2.3 Populous continent (2021)

Continent	Population	Density (per/ Km²)	World share
Asia	4,641,054,775	150	59.5%
Africa	1,340,598,147	45	17.2%
Europe	747,636,026	34	9.6%
Latin America	653,962,331	32	8.4%
North America	368,869,647	20	4.7%
Oceania	42,677,813	5	0.5%

Source ; United Nations Population Division estimates (2020)

Table 2.2 Populous countries of the world (2020)

Country	Population	Density (per/km²	World shape
China	1,439,323,776	153	18.47%
India	1,380,004,387	464	17.70%
United state	331,002,651	36	4.25%
Indonesia	273,523,615	151	3.51%

Pakistan	220,892,340	287	2.83%
Brazil	212,559,417	25	2.73%
Nigeria	206,139,589	226	2.64%
Bangladesh	164,689,383	1,265	2.11%
Russia	145,934,462	9	1.87%
Mexico	128,932,753	66	1.65%
Japan	126,476,461	347	1.62%
Ethiopia	114,963,588	115	1.42%

Source ; United Nations Population Division estimates.(2020)

Factors of population distribution

Numerous factors have positively and negatively influenced population distribution. The extreme current unevenness in population distribution is due to these factors:

- *Ecological (physical) factors*
- *Socio-economic factors*
- *Political factors.*
- *Demographic factors*

Ecological (physical) factors: Some factors, for example, favorable climate, fertile soil, rich natural resources, adequate water supply, and industrial development positively influence population concentration Others, such as unfavorable climate (for example, extremely hot or cold and dry climates), mountainous regions of very rugged topography with poor soils, and inhospitable areas where communication and trade are difficult, discourage largely human settlements.

Socio-economic factors: Socioeconomic factors affect the distribution of human population on the earth's surface. Socioeconomically population distribution of a certain area is influenced by the level of technology attained by society and types of economic activities as well as social organizations.

Political factors: unstable political conditions, ethnic conflicts and discrimination or religious persecution, and governmental policies concerning the distribution and growth of population are some of political factors.

Demographic factors: includes fertility, mortality& migration which gives rise of regional differences on the distribution of population.





Figure 2.7 Most fertile soil area and inhospitable

Spatial distribution of world population

Densely Populated Regions

There are three main belts of high population density and concentration in the world. These areas are also called "**Population Clusters"** or ''**Population Nodes"**. The three belts alone account for well over two-thirds of the total world's population. These regions are

1. **Asiatic Population Belt:** this belt is confined to the river basins of Monsoon Asia. The region accounts for about 59.5 percent of the world's total population. The belt includes:

   - **East Asia** - *Japan and China are the most populous in the sub-region.*
   - **South Asia** - *India, Pakistan and Bangladesh are densely populated.*

2. **Peninsular Europe**: Europe makes up 9.6 percent of the world's total population. It is the most developed cluster, in both economic and demographic terms globally.

3. **Northeastern North America**: this part of North America (mainly the USA) is highly urbanized and industrialized. It accounts for about 4.7 percent of the world's total population.

Sparsely Populated Regions

In contrast to the above discussed population clusters, there are areas of few population cover. These areas include:

1. **Tundra:** These areas support only a very few nomadic peoples due to their harsh climate and scanty rain.

2. **Hot-dry lands:-** Include many of the tropical desert lands. Shortage of water and high temperature do not encourage permanent settlement. However, in desert areas where water is available, such as oasis and river basins, and mining sites, there are settlements located right in the heart of hot deserts. Example: the Sahara Desert.

3. **Hot-wet lands:-** has unfavorable climate, few people living in these areas.

4. **High relief:-** Includes regions of mountainous areas with high altitude, rugged topography and cold temperature. These areas do not encourage large settlements because the terrain makes movement and interaction difficult.

5. **Areas with poor soil:-** Include very large areas of the world which are covered by infertile soil. Such areas do not support agricultural practices and hence are sparsely populated.

2.3. POPULATION OF ETHIOPIA

2.3.1. Population Size, Distribution and Growth Rate

What are the main reasons for the fast growing of population of Ethiopia? Which parts of Ethiopia is densely populated?

Ethiopian population is growing fast for a century. The total population of Ethiopia reached 114.9 million with the annual growth rate of 2.6 % in 2020. Which share to 1.47% of the total world population and ranked 12th of the world. Now a day Ethiopian population has to show fast growth rate and distributed not equally throughout the country. The growth of rural population

was tremendous and also negligible urban population at the beginning of 20th century. Despite, the rate of population growth is declining, mainly because of contraceptive prevalence; the absolute increment is still high.

Regarding the variation in the rate of population growth in urban and rural, urban population growth is higher as compared to rural. It is worth to note that Ethiopia is the least urbanized country in Sub-Saharan Africa and probably in the world. Despite the population growth rate and proportion of rural population is declining at slow rate (88.8% in 1984, 86.2% in 1994, 83.8% in 2007, 82.4% in 2010, 79.8%, in 2014-2020), the actual size of population in rural area is increasing. The total population is about 79 million by 2010, 94.5 million in 2015, and estimated to be about 118 million by 2025. This trend would make Ethiopia the most populous country in Africa, next to Nigeria. This rapid growth seriously strains socio-economic development.

2.3.2. Components of population change in Ethiopia

Among the component of population change, fertility and mortality strongly affect the population structure of the country. They vary from region to region, and they are also higher in rural area than in urban centers.

Ethiopia is the 2nd most populous country in Africa with high birth rate of 31.6 per 1000 and with declining death rate of 5.9 per 1000. The mortality occur mainly due to poverty and low standard of living, recurrent drought and famine also worsen the situation. The total dependency ratio is very high (82.1%). The population pyramid of Ethiopia indicates that :

Wide base shows larger percentage of people concentrated in young age groups, indicating high birth rate. While narrow top shows high death rate and low life expectancy

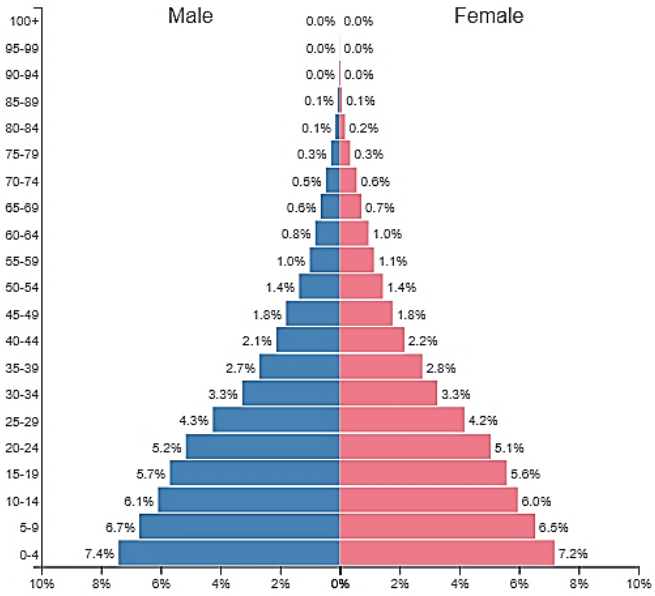


Figure 2.8 Population pyramid of Ethiopia (2020)

Focus

Life expectancy is the number of years a newborn is expected to live. It tends to increase with standard of living.

2.3.3. Spatial Distribution of Population in Ethiopia

Population distribution refers to the arrangement of people over space that is provided for them to settle and make a living through exploiting resources. The distribution of population in Ethiopia is very uneven as a result of physical and human factors.

Physical Factors

The most important physical factors that affect the distribution of population in Ethiopia include climate, mainly rainfall and temperature, soil and vegetation, drainage and slope. In Ethiopia most of these physical factors are influenced by altitude.

These physical factors explain the concentration of population in the highlands, which are endowed with moderate temperatures, rich soil, and adequate rainfall. About 14 percent of the population lives in areas above 2,400 meters (cool climatic zone), about 75 percent between 1,500 and 2,400 meters (temperate zone), and only 11 percent below 1,500 meters (hot climatic zone), although the hot zone encompasses more than half of Ethiopia's territory. Localities with elevations above 3,000 meters and below 1,500 meters are sparsely populated, the first because of cold temperatures and rugged terrain, which limit agricultural activity, and the second because of high temperatures and low rainfall.

About 77.5 percent of the population of the country lives in areas above 1,800 meters above sea level which makes37.6 percent of the total area. The area above 1,400, which makes up 65.7 percent of the total area of Ethiopia, supports 89.0 percent of the population of the country. Lowlands are characterized by scarcity of rainfall, high temperature, and poor vegetation and soil conditions. In addition, the lowlands tend to be infected with tropical diseases like malaria and yellow fever that contribute to the sparse population distribution.

Table 2.4 Spatial population distribution with altitude relationship

Altitude	Percentage of area	Percentage of population
>2,600	5.8	10.4
1,800-2,600	31.8	67.1
1,400-1,800	28.1	11.5
1000-1400	13.4	8.2
<1,000	21.5	2.8
Total	100.0	100.0

Human Factors

A human factor of population distribution in Ethiopia includes access to transportation and communication, economic factors, demographic factor, etc.

- **Economic factors:** *Good job opportunity, money and technology.*

- **Transport accessibility**: *linking different areas*
- **Demographic factors**: *includes fertility, mortality & migration which give rise of regional difference. In terms of migration to sum up the distribution of population in Ethiopia is uneven because of both pull and push factors.*

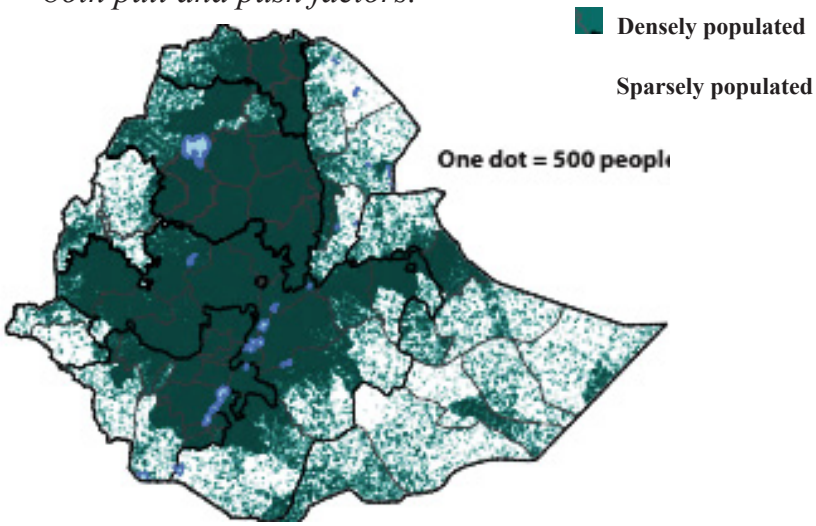


Figure 2.9: Map of population distribution of Ethiopia (Source: CSA, 2007)

Activity 2.3.

1. What are the positive factors of population distribution over the earth surface?
2. What are the factors that strongly affect the components of population change in Ethiopia?
3. Describe the reason of uneven distribution of population in Ethiopia relation with altitude.

2.3.4. Population movement

What is migration? Why do people migrate?

An important aspect of population study is the movement of people from place to place. There are different types of movement (migration). Population movements are responsible for the diffusion of culture, perhaps even a basic form of globalization. There are two main types of population movements

- *International and*
- *National movement*

International Movements (migration): International migration refers to the kind of movement across the international boundary. It could be either between continents or with in the same continent.

Example; Africa to America.(between continents)
Ethiopia to South Africa.(between countries)

Many contemporary migrations are closely related to the economic, political and cultural links being formed between nations due to the process of globalization.

National Movement (migration): moving within a state or country. It takes place within the territorial limit of a country. Example; Addis Abeba to Hawassa.

2.3.5. Population settlement

What does mean settlement?

A **settlement** is defined as a place in which people live, carrying out a variety of activities, to make their livings, such as trade, agriculture and manufacturing. In short, settlement is a place where people live close together. There are varieties of settlements, and they are changing. Settlements differ in their size, complexity and stage of development. Some settlements are extremely large with diversified socio-economic conditions, others are very small and less diversified rapidly over time. Different types of settlements based on their population size and diversity of services, include hamlets, villages, towns, cities, metropolises, megalopolises, etc. Based on the density of human-

made structures, population concentration and dominant economic activity, Settlements broadly divided into two **rural** and **urban**.

Rural Settlement – refers to the name given to all villages and dispersed (scattered) settlement in areas far from urban centers. Such settlements are widely dispersed and are dominated by isolated homesteads. Rural settlements develop in areas where agriculture forms manly the base of the economy. In rural settlement houses made out of simple materials (wood and mud), has no planned streets; has narrow and irregular roads; has no defined shape and covers a small area.

Urban Settlement- refers to town or city settlements. People in urban areas depend on non-agricultural activities. Urban settlement has a group of buildings on vast built-up areas; planned streets and defined shapes of settlement.



a)urban area



b) rural area

Figure 2.10 human Settlement (a represents urban area and b represents rural area



Activity 2.4

1. Explain the difference between international migration and national migration.
2. What is the economic base for rural settlement?
3. What is the difference between urban and rural settlement?

2.4. PEOPLE AND THE DEVELOPMENT OF TRANSPORTATION

Competencies

After the study of the lesson, you will be able to

- *Explain basic terms and concepts related to transport activities*
- *Describe the historical development of means of transportation;*
- *Evaluate the role of transportation by using the different modes of transport system;*
- *Compare the different modes of transportation on the based on their uses*
- *Identify significant road signs in class room;*
- *Explain basic road safety rules.*

Key Terms

- Trails
- Vehicles

2.4.1. The concept and historical development of transport

What does transportation mean? What kinds of transportation systems are available in your locality?

Transportation is the movement of goods and people from place to place by using different modes of transport, for example: buses, trains, horses etc. Before the beginning of all forms of transportation, human beings traveled on foot, donkeys, horses and camels for transportation from 4000 BC to 3000 BC.

In 3500 BC, the wheel was invented in Iraq and the first wheel was made from wood. The use of water to travel and trade dates back to **4000 BC**, with the world's ancient civilizations using their access to rivers and seas to develop the world's first trading networks.

In 3500BC, the marine boat was invented for the first time by Egyptians while the Romans built roads across Europe. Animal-drawn wheeled vehicles where developed in ancient Nearly East in the 4^{th} or 5^{th} millennium BC and China about 1200BC. The development of history of transports largely one of the technological innovations. Advancement in technology have allowed people to travel farther, explore more territory and expand larger area.

During the Industrial revolution, the first modern highway was developed by John Loudon McAdam. In the 17th and 18th century, many new mode of transportation were invented such as bicycles, trains, motor cars, trucks, airplanes, and trains. In 1902, the Wright Brothers invented the world's first controlled, powered aircraft, named the Wright Flyer. The Wright Brothers invention is known as one of the most significant events in the history of transportation. In 1906, the first car was developed with an internal combustion engine.

The transport system developed mainly contributed a lot by;

- **The international trade** was the driving factor for the developments in global transportation in the pre-modern world.
- **Industrial revolution and development of technology** brought dramatic improvement on transport activities in modern world and development of advanced machinery and manufacturing that changed the way the world produced and traded goods.

Nowadays, the types and quality of transportation have made much progress. This has enabled people to travel longer distances in shorter times than ever before, which used to take days or months to cover can be covered in a matter of minutes or hours. The rapid progress in transportation and other forms of communications have made places all over the earth functionally closer to each other. In developed countries there are well-connected transport networks

of high quality than developing countries. The main transportation systems are road, railway, inland waterways, oceans and airways.

2.4.2. The Role of Transport for Socio Economic Development

Explain the importance of transportation development on economic growth?

Transportation system has its own advantages and the ideal situation for a country is to have a network of systematically coordinated transport links. It links economic activities by identifying location which suitable for production. Economic impacts of transportation can be: direct, indirect and induced impacts.

- **Direct impacts**- transport provides employment, added value, larger market, time and cost improvement and demand of an economy is increasing.
- **Indirect impacts**-transport outcome improves accessibility and economy of scale, wide range of indirect value addition and employment effects, linkage of transport with other economic sectors and other business services.
- **Induced impacts-** the outcome of economic multiplier effects, where the price of commodities goods or services drops and their variety increases**.**

Transport increases specialization in the production process, internationally value- added and increasing economic activities of the companies leads to increased transport volume. Transport contributes to economic development through job creation (employment) and drive economic activities producers and consumers to make economic decision on products, increase diversification in the prices of goods and services, market cost (time and cost improvement), location, price based on transport services, availability, and capacity.

Generally, regional development, improve access to different locations for individual and business, facilitate wider range of social and economic interaction are basically the roles of the transport for socio-economic development.

2.4.3. Modes of transport

What are the modes of transport?

The major mode of transportation includes;

1. Land transport:

Land transportation includes: human transport, pack animals, carts, roads (vehicles), railway, foot path etc.

Pack animals- in developing countries pack animals are commonly used as means of transport. For example: horse, donkey, mules, cattle, camel etc.



Fig.2.11 Animal transport

Road (vehicles)-is the most common mode of transportation (the most universal form of transport), relatively cheap to construct and serves for many purposes.





Fig 2.12 Road transport

Foot paths (trails) - transportation is common in rural area and mostly found in the open countryside and in hills or mountains where construction of metaled road surfaces is impossible or extremely expensive.

Cart tracks- with the introduction of wheel, means of transport has developed into carts drawn by animals or used by four or two wheel drive vehicles.



Fig. 2.13 Cart transport

Railway transport-is playing an important role in the national economies of the countries of the world. It avoids congestion, less pollution, cheaper and quicker over relatively long distance and is safe and more comfortable. But some developing countries lack such important modes of transportation. Railway can carry heavy-bulk products such as iron-ore, coal, and petroleum.



Fig. 2.14 Railway transport

2. Water transport

Water transport is the cheapest means of transport and suitable for transporting bulky goods over long distance. Water transport does not need heavy construction

like roads and railway line. It has two types: inland and ocean transport.



Fig. 2.15 water transport

3. Air transport

What advantage does air transport give compared with others?

Air transport is a recent and fastest mode of transport. It is most expensive, valuable and low weight goods are carried by air transport. This new form of transport has great advantages, because it is affected very little by different land forms or ground conditions.



Fig 2.16 air transport



Activity 2.5

Answer the following questions

1. Which transportation systems is the most common one? Why, discuss?
2. Give at least three examples of land transportation system?
3. Explain the importance of transportation development on economic growth?

2.4.4. Road safety, road traffic accidents and its socio economic implication

Key Terms

- Accident
- safety



What do you know about road safety rules?

Road safety; refers to the methods and measures used to prevent road users from being killed or seriously injured. Typical road users include pedestrians, cyclists, motorists, vehicle passengers, horse riders, and passengers of on-road public transport (mainly buses and trains). Road safety education plays an important role in shaping the attitudes and behaviors of children and young people, ensuring they become responsible drivers, passengers, pedestrians and cyclists.

Basic road safety rules:

- *Never drink and drive*
- *Always wear seat-belt*
- *Keep a safe distance from the vehicles ahead*
- *Always avoid destructions*
- *Never break red signal*



Figure 2.17 Road traffic safety.

A traffic accident is defined as an accident involving at least one vehicle on a road open to public traffic in which at least one person is injured or killed. Road traffic accidents have become a huge global public health and development problem killing nearly 1.3 million people a year and injuring or disabling between 20-50 million people worldwide; thus making the loss of US 518 billion dollars globally. In Ethiopia, the number of deaths due to traffic accidents is reported to be amongst the highest in the world. A Road traffic fatality (RTF) is the 8th cause of mortality around the world.



Fig 2.18 Car accident

The chance of death in a road traffic crash vary in different continents; Africa 26.6%, Eastern Mediterranean 19.9%, Western Pacific 17.3%, South East Asia 17.0%, America 15.9% and Europe 9.3%.

Traffic accidents and its socio economic implication

Road accidents cause loss of lives, increase of dependence, destruction of property, increase of poverty, injuries and permanent disabilities. Generally, road accidents caused a great loss of human, physical and natural resources. Road traffic accident is the cause for public health and development crisis.

The majority of such deaths are currently among vulnerable road users: - including foot-travelers, pedal cyclists and motorcyclists.

Number of people injured or killed in one crash in Ethiopia is about 30 times higher than that of US**.** In general, the scale and the severity of the problem are increasing from time to time and adversely affecting the socio-economy of countries in general and the livelihood of individuals in particular road traffic accident. It greatly affects specially developing countries and they accounts for 90% of global road traffic death.

Road traffic accidents are an unplanned, non-communicable and preventable and common risks every day to our life that can happen to almost everyone at any place.

Key facts

Approximately 1.3 million people die each year as a result of road traffic crashes. Road traffic crashes cost in most countries 3% of their gross domestic product.

More than half of all road traffic deaths are among vulnerable road users: pedestrians, cyclists, and motor cyclists. 93% of the world's death on the roads occurs in low and middle-income countries. Road traffic injury death rates are highest in the African region even though these countries have approximately 60% of the world's vehicles. Over 80% of road crashes reported in Africa linked to human errors.

Road traffic injuries are the leading cause of death for children and young adults aged 5-29 years. Considerable economic losses to individuals, their families, and to nations as a whole. These losses arise from the cost of treatment as well

as lost productivity for those killed or disabled by their injuries, and for family members who need to take time off work or school to care for the injured.

From a young age, males are more likely to be involved in road traffic crashes than females. About three quarters (73%) of all road traffic deaths occur among young males under the age of 25 years who are almost 3 times as likely to be killed in a road traffic crash as young females.

The productive parts of population aged 15-44 years accounted for more than half of all road traffic deaths globally. Half of the world´s road traffic deaths occur among motorcyclists (23 %), pedestrians (22 %) and cyclists (5%), Car occupants 31 % and the remaining 19 % among unspecified road users.



Activity 2.6

Answer the following questions

1. What is traffic accidents?
2. Who is more at risk of traffic accident?
3. Describe the road traffic accidents and socio- economic implication.
4. How many people are dying in each year as the result of road traffic crashes?

UNIT SUMMARY

- The study of past human history through the analysis of artifacts and other physical and material remains is called archeology. Relative dating and absolute dating are main two dating methods to determine date of artifacts or material remains. An archaeological site is a place in which evidence of past human activity or artifacts is found.

- There are two theories concerning the origin of human beings: Creationists and Evolutionists. Hominids were the ancestors of human beings who appeared about 25-40 million years ago. There are three different species of Genus homo: Homo habilils, Homo erectus and Homo sapiens.

- Human beings passed through several stages of development. The life of human beings in general is divided in to two: the period of hunting and gathering and the period of civilization. The period from 2 million years ago to about 4000 BC is called the Stone Age. The Stone Age is divided in to three periods: Paleolithic period, Mesolithic Age and Neolithic Age

- During early period, world human populations have been small, compared to those of other species. Population in the world is currently (2020) reached 7.8 billion with growing at a rate of around 1.05% per year. The current average population increase is estimated at 81 million people per year. Developing countries have higher growth rates.

- The first three populous continents may include Asia, Africa and Europe, and then followed by L. America, N. America and Oceania according to their size of population. The four leading populous countries in the world are China, India, North America and Indonesia and Nigeria, Ethiopia and Egypt are the most populous countries in Africa.

- Population is unevenly distributed across the earth's surface. This distribution is controlled by positive and negative factors. Favorable climate, fertile soil, adequate water supply and industrial development positively influence population concentration. Whereas unfavorable climate (extremely hot or cold and dry climates) mountainous regions of very rugged topography with poor soil, and inaccessible areas discourage

large human settlements.

- The population number of any area can be changed by fertility, mortality and migration.
- Fertility refers to the actual reproductive performance of a population. It measured by CBR and GFR.
- Mortality refers to the occurrence of death, are higher in the developing countries than in the developed ones.
- The difference between birth and death rates is known as rate of natural increase.
- Migration involves movement of people and there by influences the rate of growth and distribution of population and measured by Immigration, Emigration and Net migrating Rate.
- Population structure is age-sex structure. The three main age groups that determine population structure are young, adult and old age. Population pyramids show considerable differences in population age and sex structures between developed and developing countries.
- There are three main belts of high population density and concentration in the world. These areas are also called "Population Clusters" or ''Population Nodes''. They account for over two-thirds of the total world's population. These regions are, Asiatic population belt, Peninsular Europe & Northeastern North America.
- The sparsely populated regions of the world includes tundra, hot - dry land, hot-wet land, high relief and area with poor soil.
- Ethiopian population is growing fast for a century. The total population of Ethiopia reached 114.9 million with the annual growth rate of 2.6 % in 2020, Which share to 1.47% of the total world population and ranked 12th of the world.
- Ethiopian population pyramid shows that wide base and narrow top which indicate high birth rate, high death rate, low life expectancy and

high dependency ratio.

- A settlement is defined as a place in which people live, carrying out a variety of activities, to make their livings, such as trade, agriculture and manufacturing.
- Transportation is the movement of goods and people from place to place by using different modes of transport (land, water and air). International trade, industrial revolution and technological innovation brought dramatic improvements on transport activities. The roles of transport on socio-economic development may direct, indirect and induced: increasing specialization , job creation, regional development e.t.c
- A traffic accident is defined as an accident involving at least one vehicle on a road open to public traffic in which at least one person is injured or killed. It is killing nearly 1.3 million people a year and injuring or disabling between 20-50 million people worldwide.

GLOSSARY

Accident: is a sudden event such as a car or other crash that causes damage or injury.

Age distribution: is also known as age composition, showing the proportionate number of a person**s** in successive age categories in a given population.

Archeology: The science in which archeologists dig out material objects and fossils of the past.

Archaeological sites: Place in which evidence of past human activity or artifacts is found.

Artifacts: Objects made and used by people and tell us what and when happened.

Cave: a natural underground space in hill side or cliff

Creationist: The theory explains that human beings were created by supernatural force or God with complete shape and structure.

Dependency ratio: refers to the total number of people too young or old to work, divided by those of Working age (15-64 years old).

Emigrant: leave one's own country in order to settle permanently in another.

Evolution: a process of gradual change that takes over many generations.

Evolutionist: The theory explains that human beings were developed from lower beings through a slow and natural process of changes.

Fertility: refers to the actual reproductive performance of population, and it is the beginning of life.

Fossils: the remains of dead plants, human beings and animals.

Growth rate: refers to annual average rate of change of population size for given country during a specific period**.**

Hominids: an ancestor of human beings.

Immigration: come to live permanently in a foreign.

Mesolithic Age: The Stone Age middle period that from 9000 to 8000 BC.

Migration: refers to movement of people from one country or place to other in order to live or work.

Mortality: refers to the occurrence of death.

Neolithic Age: The New Stone Age period from about 8000 BC To about 4000 BC.

Paleolithic period: The longest Stone Age period that lasted around 9000 BC.

Population change: refers to any change of population size due to the impacts of fertility, mortality and migration.

Population pyramid: is a diagrammatic representation of the age-sex composition of a given countries population.

Rural: refers to all villages and dispersed (scattered) settlement in area far from urban centers

Safety: refers to the methods and measures used to prevent road users from being killed or seriously injured.

Settlement: is a place where people live close together

Sex ratio: refers to the number of male population for every 100 females.

Stone Age: The human beings development period from 2 million years ago to about 4000 BC.

Trail: is a path, track or paved lane on road .

Urban: settlement refers to town or city settlement

Vehicle: is a means of carrying or transporting something.

REVIEW EXERCISES

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

1. Fertility rate is much higher in developed countries than in developing countries.
2. Large proportion of developing countries population are young age group.
3. Rail way is the recent and fastest mode of transport.
4. Ecology is one the physical factor that influences population distribution over the globe.
5. Lucy belonged to a species called Australopithecus Afarensis.
6. The remains of dead plants, animals and human beings are called artifacts.
7. Relative dating methods establishes exact date of fossil or remains.
8. Prehistoric archaeology refers time periods before the invention of writing.

Match column 'B' with column 'A'. Write the letter of the correct term.

A	B
1. Creationist	A. Originated in African about 2.5 million years ago
2. Genus Homo	B. Handy human beings
3. Homo erectus	C. Wise human beings
4. Homo Habilils	D. Human beings were created by Supernatural force
5. Homo sapiens	E. Appeared at about 1 million years ago
	F. Human beings developed from lower beings gradually

Choose the correct answer from the given alternative

1. Population pyramid wide shows wide as the base and narrow at the top is
   - A. .High birth
   - B. B. High death
   - C. Low life expectancy
   - D. .All

2. The age structure diagram of the developing countries implies that
   - A. There is low dependency ratio
   - B. There is low death rate
   - C. Old age group higher than children
   - D. High proportion of young age group

3. Among the measures of population dynamics which can be regarded as a good indicator of Development?
   - A. .Birth rate
   - B. Infant mortality rate
   - C. Death rate
   - D. Migration

4. An increase in birth over death is the result of
   - A. Improved sanitation
   - B. Effective birth control
   - C. Improved medical care
   - D. A and C

5. Among the following one is **not** the components of population change
   - A. A. Fertility
   - B. B. Mortality
   - C. C .Migration
   - D. D. Literacy

6. The actual reproduction performance of a population refers to
   - A. Death rate
   - B. Fertility
   - C. Population density
   - D. Mortality

7. Which one of the following a negative factor in population change?
   - A. Birth
   - B. Immigration
   - C. Emigration
   - D. Fertility

8. From Question 8-12 Refer to the Demographic Data of a certain area given in below
   - *mid- year total population* — *20 million*
   - *population 0-14 age* — *10 million*

- *population 65 & above* — *4 million*
- *Total live birth* — *120,000*
- *Total death* — *40,000*
- *Emigrants at the origin* — *90,000*
- *Immigrants at the destination* — *90,000*
- *Women age 15-49 year* — *1,600,000*
- *Number of infant death* — *20,000*

9. The general fertility rate of (GFR)of the region is
   - **A.** 36 /1000
   - **B.** 75 /1000
   - **C.** 32 /1000
   - **D.** 25/1000

10. The rate of natural increase (RNI) of the country
   - **A.** 0.4%
   - **B.** 0.5 %
   - **C.** 4 %
   - **D.** 5 %

11. The Infant mortality rate (IMR) of the region is
   - **A.** 125/1000
   - **B.** 280/1000
   - **C.** 120/1000
   - **D.** 167 /1000

12. The crude birth rate (CBR) of the country is.
   - **A.** 4/1000
   - **B.** 2/1000
   - **C.** 6/1000
   - **D.** 8/1000

13. The crude death rate (CDR) of the country is
   - **A.** 6/1000
   - **B.** 2/1000
   - **C.** 7/1000
   - **D.** 3/1000

IV. Fill in the blank space with the correct word or phrase

1. _____and _____ are brought dramatic improvement on transport activities in modern world.
2. The rapid increase in number of world's human population is known as_____.
3. The economic impact of transportation can be _____; _____ and _____.
4. V, Give Short answer the following
5. Describe the effect of road traffic accident on economic development.
6. Discuss the driving factor for the development in global transportation in thepre-modern world?
7. Discuss the factors that affect the distribution of population in Ethiopia.
8. Identify the features of urban and rural settlement.

UNIT THREE

3. HUMAN AND NATURAL RESOURCES

Unit Outcomes

After completing this unit, students will be able to:

- *Describe the reciprocal relationships between humans and nature;*
- *Describe what is meant by over population, optimal population and under population*
- *Categorize natural resources on the basis of their degree of permanency;*
- *List factors affecting the utilization of natural resources;*

Introduction

In the previous unit, you have learned about human evolution, trends of world population, components of population dynamism, population structure and characteristics, population distribution and factors, population movement and settlement, people and developments of transport, mode and roles of transport, road safety, road traffic accident and its economic implication. This unit deals with human and natural resources. You will learn about the Human-Environment relationships (reciprocal relationship), Population- resource relationship (over population, optimal population and under Population), types of natural resources and factors affecting natural resources in Ethiopia.

3.1. HUMAN AND NATURAL RESOURCES

3.1.1. Human-Environment relationships (reciprocal relationship)

Competencies

After the study of the lesson, you will be able to

- *Examine the reciprocal relationships between human and the environment*

Key Terms

- Human
- Environment
- Reciprocal-relations
- ecosystem



What do we mean by reciprocal human-environment relationship?

Human beings are inseparable from their environment. There are two-ways relationships between human beings and their environment. The relationship can be positive or negative, . For example; the natural environment can influence human style of living and activities such as economic activities, cultural practices and social structures. On the other hand, people can influence the environment by using technologies to enhance their way of life. Human beings need to interact with the environment to obtain their food, water, fuel, medicine, building materials and many other things. For example, humans have been cutting down forests to clear land to grow crops for centuries and by doing so they have changed the environment.

Advance in science and technology has helped us to use the environment for our benefit, but we have also introduced pollution and caused environmental

damage. Excessive use of natural resources is one of the biggest causes of resource degradation and environmental damage and production of wastes on the earth. Over-exploitation of natural resources can result in damage to or the loss of entire ecosystems.

An ecosystem- includes all the living organisms (humans, plants, animals, micro-organisms) and their physical environment (soil, water, air, land) and the interactions between them.



Activity 3.1

Answer the Following Questions

1. Discuss how human beings can affect the environment and how the environment also affects human beings?
2. Why do human beings need to interact with the environment?

3.2. POPULATION- RESOURCE RELATIONSHIP (OVER POPULATION, OPTIMAL POPULATION AND UNDER POPULATION)

Competencies

After the study of the lesson, you will be able to

- *Describe over, optimal, and under population with respect to natural resources;*

Key Terms

- Over population
- under Population
- Optimal population

What does overpopulation, optimal population and under population mean?

Understanding the concepts of overpopulation, optimal population and under population of a country must be viewed in relation to its natural resources.

Each and every individual and social groups has different capability and attitude towards the use of resources.

Over-population

Overpopulation is a condition when an organism's numbers exceed the carrying capacity of its ecological place. Carrying capacity is the Maximum number of individuals of a species that can exist in a habitat indefinitely without threatening other species in that habitat. Over population has a great demand on resources. Therefore, over population determined using the ratio of population to available resources.

Effects of over population: depletion of resources especially fossil fuels, problem of water shortages, increased levels of air pollution, water pollution, soil erosion and noise pollution, deforestation and loss of ecosystems, etc are some of the major effects of over population. Changes in atmospheric composition and consequent global warming, permanent loss of arable land and increases in desertification, migration, mass species extinctions, starvation, malnutrition or poor diet with ill health and diet-deficiency diseases (e.g. rickets),low life expectancy, high crime rate, conflict over scarce resources. Over-utilization of infrastructure, such as mass transit, highways, and public health systems and higher land prices.



Figure 3.1 Effects of overpopulation on infrastructure mass transportation.

Optimal population

Optimum population is where the amount of resources available in a country is equal to the country's population needs. The optimum population means the best and the most desirable size of a country's population. Thus it yields highest quality of life, which means each person has access to adequate food, water, energy and air of highest quality, adequate medical care, recreational facilities and cultural outlets. The optimum size of population is which along with the existing natural resources and a given state of technology, yields the highest income per capita in a country.

Under population

Under population is when there are more resources in an area (for example, food, energy and minerals) than can be used by the people living there. The number of people is not sufficient to utilize the resources of the country, the resources are vast, much can be produced, but the consumers are not sufficient. Most areas considered under-populated today are large in area and rich in resources. Examples include Canada, Australia and Mongolia.

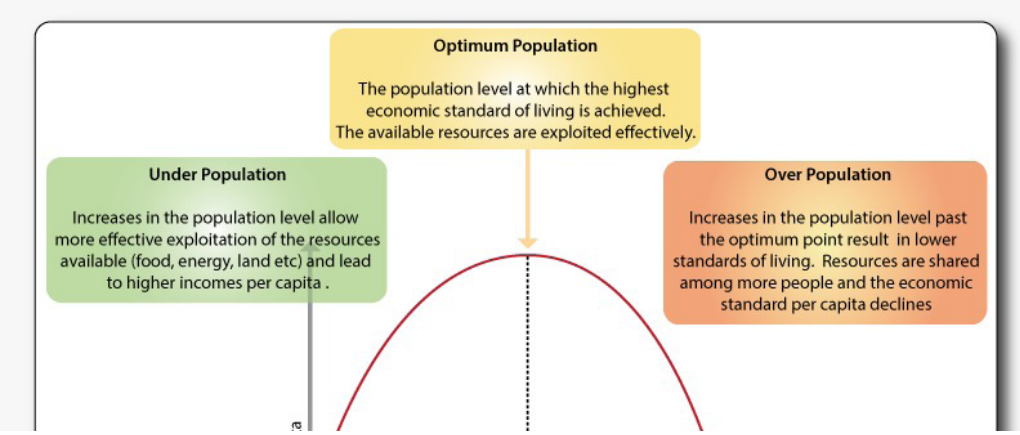


Figure3.2 population- natural resource relationships



Activity 3.2

Answer the Following Questions

1. Discuss what do we mean by overpopulation? What are the effects of overpopulation with respect to natural resources?
2. Define the under population with regards to resources.
3. _____ is the best and the most desirable size of a country's population.

3.3. TYPES OF NATURAL RESOURCES

Competencies

After the study of the lesson, you will be able to

- *Distinguish between renewable and non-renewable natural resources;*

Key Terms

- Non-renewable
- Natural Resources
- Renewable
- Natu-

What is Natural Resource? What are the Different Types of Natural Resources?

Natural resources can be defined as the resources that exist (on the planet) independent of human actions. These are the resources that are found in the environment and are developed without the intervention of human beings. Natural resources are also known as natural capital, including all of the earth's organisms, air, water, soil, sunlight, stone etc and the materials which are extracted from the grounds, like a coal, oil, and other mineral types supplied by nature.

Some of the most important natural resources are:

- **Air**: a clean air is important for all the plants, animals, humans to survive on this planet. So, it is necessary to take measures to reduce air pollution.
- **Water**: 71% of the Earth is covered by water and only 2 % of it is fresh water. Initiative to educate and regulate the use of water should be taken.
- **Soil:** Soil is composed of various particles and nutrients. It helps

plants to grow.

- **Iron:** It is made from silica and is used to build strong weapons, transportation and buildings
- **Forests**: As the population increases, the demand for housing and construction projects also increases. Forests provide clean air and preserve the ecology of the world.

Based on the availability, there are two types of natural resources:

- **Renewable:** resources that are available in infinite quantity and can be used repeatedly that can grow again or replenish themselves. Example: Forest, wind, water, etc.
- **Non-Renewable:** resources that are limited in abundance due to their non-renewable nature. Examples are; fossil fuels such as coal, crude oil, and natural gas. Minerals that are taken out of the Earth through mining such as diamonds, gold, silver and copper are also considered as non-renewable. All these resources exist in a fixed amount in nature and they cannot be replaced as fast as they are being used up.

The time will come in the near future when the world's oil reserves will be exhausted. It is for this reason that countries around the world are looking at alternative and renewable sources of energy. For example energy from the sun or solar power, wind power, and power from the movement of water.

Table 3.1 Difference between Renewable and Non-Renewable Resources

Renewable resource	Non-renewable resource
It can be renewed as it is available in infinite quantity	Once completely consumed, it cannot be renewed due to limited (finite)stock
Sustainable in nature(inexhaustible)	Exhaustible in nature
Low cost and environment-friendly	High cost and less environment-friendly
Replenish quickly	Replenish slowly or do not replenish naturally at all



Activity 3.3

Answer the Following Questions

1. What is a nonrenewable natural resource?
2. What is a renewable natural resource?

3.4. FACTORS AFFECTING NATURAL RESOURCES IN ETHIOPIA

Competencies

After the study of the lesson, you will be able to

- *State major human activities affecting the natural resources in Ethiopia;*

Key Terms

- Resettlement
- urbanization
- population
- sustainable
- Degradation
- global warming
- Deforestation

What are the main human activities affecting the natural resources in Ethiopia?

In Ethiopia natural resources are under the influence of various interconnected factors like population pressure, agriculture, migration, rapid urbanization, resettlement, climate change and environmental pollution. Overwhelmingly

rapid population growth had been putting a great burden on the sustainability of almost all types of natural resources. Which result, serious degradation of land, water, forest, rangeland, and wildlife etc.

The Ethiopian government has taken several steps to address these problems, like launching soil and water conservation campaign, tree planting program and others, success to date, however, has been limited.

Population pressure

High growth rate of population causes negative impact on natural resources. Increased population translates to increased demand for food and space for settlement. The rising of population also leads to enormous production of wastes; and thus, increased pressure on arable lands, losses of biodiversity, pollution of air and water are becoming common occurrences. All these are putting remarkable pressure on the environment from which natural resources are primarily derived.

Agricultural expansion

The expansion of agricultural land at the expense of taking other lands indicate increase pressure on agricultural lands. In recent decades, the acceleration of agricultural expansion has resulted in a significant negative impact on forest land; leading to deforestation, loss of biodiversity and ecosystem services.

Agriculture in Ethiopia is foundation of the country's economy, account for half of gross domestic product (GDP), 83.9% of export, and 80% of total employment.

Agricultural expansion and livestock population pressure in Ethiopia is forced by the deteriorating natural resource base, especially in the highlands where 80% of the population lives. This has led to further possible consequences of degradation, such as biodiversity loss, deforestation, soil erosion and soil quality, massive release of carbon dioxide from land clearing and tilling depletion and degradation of vegetation cover of the country.

Rapid Urbanization

Nowadays, the world is getting more urbanized than ever in the history of the planet Earth. Rural individuals in many countries had been migrating towards urban areas in search of a better livelihood, job opportunities, education, and well-being. This has led to the unplanned and rapid expansion of small cities creating huge pressure on natural resources.

Urbanization in Ethiopia has always been related to remarkable environmental problems in almost all towns and emerging urban centers. It demands intensive and extensive exploitation of natural resources such as a huge amount of fuel wood for energy consumption, large scale quarrying and excavation of sand, gravel, and other building materials as well as over-extraction and inefficient use of water resources. The impact is not only limited to the local environments but it also has large ecological footprint beyond its immediate locality.

Resettlement

In nations with a continuously rising population, human mobility is highest. Human mobility is the term that encompasses all aspects of the population movement. It is understood to cover involuntary internal or cross-border population displacement, voluntary internal migration, and agreed relocation or resettlements. Such mobility is facilitated mostly due to the consequential effects of climate change, drought, flooding, deforestation, pollution, resource scarcity, and environmental degradation. Regarding to the environment-human mobility link, there is unanswered question, and yet a debatable issue as to whether human mobility is causing environmental degradation or degraded environments are causing human mobility.

- *Resettlement programs in Ethiopia had been considered as a viable solution to the persistent poverty of the rural populations. Nevertheless, it had brought and still originating significant impacts on natural resources of the environment specifically at the destination areas. There had been legal resettlement programs implemented by the agreement of the government, and the illegal ones executed arbitrarily often causing the degradation of various environmental resources. The main objective of government*

resettlement programs was to support food insecure households get access to productive farmlands and achieve food self-sufficiency. This strategy, in most cases, was taking place through the clearing of natural vegetation particularly in the areas covered by dense forests. For Example, in the resettlement programs implemented between 2000 and 2004, about 1.2 million people (220,000 household heads) were resettled in Amhara, Oromiya, Southern Nations Nationalities and Peoples (SNNP) Regional States. These households had settled by clearing areas which were originally covered by forests causing unprecedented deforestation, land degradation, and associated environmental consequences.



Activity 3.4

Answer th Following questions

1. What are the impacts of Rapid urbanization on natural resources?
2. What was the main objective of Ethiopian government resettlement program?
3. State major human activities affecting the natural resources in Ethiopia;

Project work

You will go with your team to your local area, visit the forest coverage condition and identify the soil in terms of fertility level, and write report based on your observation. Then finally make sketch map with your group about the visited area and illustrate the all features on sketch map.

UNIT SUMMARY

- Human and environment has a strong relationship. The relationship between people and the environment runs in two ways, which are; humans influence their environment and how the environment influences us, both positively and negatively.

- An ecosystem includes all the living organisms (humans, plants, animals, micro-organisms) and their physical environment (soil, water, air, land) and the interactions between them.

- Over population is when there are too many people, to be supported to a good standard of living, by the resources of a region or country

- Optimum population is where the amount of resources available in a country is equal to the country's population needs

- Under population is when there are more resources in an area (for example, food, energy and minerals) than can be used by the people living there.

- Natural resources are also known as natural capital, including all of the earth's organisms, such as air, water, soil and the materials which are extracted from the grounds, like a coal, oil, and various ores supplied by nature.

- Based on the availability there are two types of natural resources, Renewable and non-renewable. Renewable resources that are available in infinite quantity and can be used repeatedly that can grow again or replenish themselves. Example: Forest, wind, water, etc. Non-Renewable: resources that are limited in abundance due to their non-renewable nature and whose availability that can be used up or finished and cannot be produced, re-grown or replenished in a reasonable amount of time. Examples include fossil fuels such as coal, crude oil, natural gases and minerals.

- In Ethiopia natural resources are under the influence of various interconnected factors like population pressure, Agriculture, migration,

rapid urbanization, resettlement, climate change and environmental pollution.

GLOSSARY

Degradation: refers to the general lowering of the surface of land by erosive processes

Ecosystem: includes all the living organisms (humans, plants, animals, micro-organisms) and their physical environment (soil, water, air, land) and the interactions between them

Natural resource: is material or substance occurring in nature which can be exploited for economic activity.

Non-renewable resources: are limited in abundance due to their non-renewable nature and whose availability that can be used up or finished.

Optimal population: where the amount of resources available in a country is equal to the country's population needs

Over population: when there are too many people, to be supported to a good standard of living, by the resources of a region or country

Reciprocal-relationship: The relationship between people and the environment runs two ways, which humans influence their environment and how the environment influences, us, both positively and negatively

Renewable resource: available in infinite quantity and can be used repeatedly that can grow again or replenish themselves

Resettlement: a place which people, carrying out a different of activities of their living such as trade, agriculture and manufacturing.

Sustainable: capable of continuing for a long time at the same level.

Under Population: when there are more resources in an area than can be used by the people living there.

Urbanization: the process of concentration of people in areas whose function are non-agricultural.

REVIEW EXERCISES

part I- Write "True" if the statement is correct and "False" if the statement is incorrect

1. The relationship between people and the environment runs one ways.
2. Deforestation is the loss of forest by cutting down all the trees
3. Overpopulation means the amount of resources available in a country is equal or balances to the country's population needs
4. Populaton pressure and rapid urbanization affects the natural resources of Ethiopia.
5. Non-renewable natural resources are available in infinite quantity.

Part II Match items in column 'B' with items in column 'A'

A	B
1. Renewable resource	A. Deforestation and loss of biodiversity
2. Non-renewable resource	B. Surroundings in which people, plants, or animals live
3. Environment	C. Natural capital
4. Effect of population pressure	D. Inexhaustible in nature
5. Natural resource	E. Exhaustible in nature.

Part III: Choose the correct answer from the given alternative

1. One of the following is **not** effects of overpopulation?
   - A. Low life expectancy
   - B. Yields highest quality of life.
   - C. Deforestation
   - D. Depletion of resources

2. Which one of the following natural resource is non-renewable?
   - A. Forest
   - B. Wind
   - C. Natural gas
   - D. Water

3. Why do human beings need to interact with the environment?
   - A. To obtain food
   - B. To get building materials
   - C. To obtain fuel and water
   - D. all of the above

4. One is true about renewable natural resources?
   - A. replenish quickly.
   - B. high cost
   - C. replenish (recycle) very slowly
   - D. once completely used it cannot be renewed due limited quantity

5. When there are more resources in an area than can be used by the people living there is_____.
   - A. Optimal population
   - B. Under population
   - C. Overpopulation
   - D. None of the above.

6. One is the impacts of under population?
   - A. Shortage of workers
   - B. Fewer people to pay tax
   - C. Conflict over scarce resources
   - D. A and B

7. The place where concentration of people in areas whose function are non-agricultural is _____.
   - A. Resettlement
   - B. Globalization
   - C. Urban
   - D. Rural

Part IV: Fill in the blank space with the correct words or phrases

1. Elements of natural environment which includes organic substances is known as_____.
2. _____ is increase in the average temperature of earths near surface air and oceans.

Part V: Short answer questions

1. Explain the reciprocal relationship between human and environment.
2. Describe the difference between renewable and non-renewable natural resources.
3. Discuss impacts of overpopulation on natural resources.

Part VI: Things to do

Draw an up

Develop sketch map to locate natural resources in your locality and write short reports showing their conditions and factors that affecting them on the basis of your observation.

Social Studies
Student Textbook
Grade 7



Federal Democratic Republic of Ethiopia
Ministry of Education

Sidaama National Regional State
Education Bureau