CHAPTER ONE
INTRODUCTION TO
ETHIOPIAN GEOGRAPHY AND THE HORN

Meaning of Geography

- **Geography is the scientific study of the Earth that describes and analyses spatial and temporal variations of physical, biological and human phenomena, and their interrelationships and dynamism over the surface of the Earth**

- Geography can be approached by considering two continuums: a human-physical continuum and a topical-regional continuum
- The **topical** (systematic) fields of Geography view particular categories of physical or human phenomena as distributed over the Earth while **regional geography** is concerned with the associations within regions of all or some of the elements and their interrelationships.

The Scope, Approaches and Themes of Geography

- Geography is a holistic and interdisciplinary field of study contributing to the understanding of the changing spatial structures from the past to the future
- Thus, the scope of Geography is the surface of the Earth, which is the very thin zone that is the interface of the **atmosphere**, **lithosphere**, **hydrosphere** and **biosphere,** which provides the habitable zone in which humans are able to live.

- Geography has five basic themes namely location, place, human-environment interaction, movement, and region.

Location

- Location is defined as a particular place or position
- Location can be of two types: **absolute** location and **relative location**.. The location of a place is defined by its latitude and longitude or its exact address.

Place

- Place refers to the **physical and human** aspects of a location
- Each place in the world has its unique characteristics expressed in terms of **landforms, hydrology, biogeography, pedology**, characteristics and size of its human population, and the distinct human cultures

- The concept of “place” aids geographers to compare and contrast two places on Earth.

Location, Shape and Size of Ethiopia and the Horn

- The Horn of Africa, a region of eastern Africa, is a narrow tip that protrudes into the northern Indian Ocean, separating it from the Gulf of Aden
- It is the easternmost extension of African land defined as the region that is home to the countries of Djibouti, Eritrea, Ethiopia, and Somalia, whose cultures have been linked throughout their long history.

- In terms of size, Ethiopia is the largest of all the Horn of African countries, while Djibouti is the smallest.
- **Vicinal location**

- Sudan to the west and northwest
- South Sudan to southwest
- Djibouti to the east
- Somalia to the east and southeast
- Eritrea to the north and northeast
- Kenya to the south

In relation to water bodies & land masses

- In the Horn of Africa
- Southwest of the Arabian Peninsula
- South of Europe
- Northwest of the Indian Ocean
- In the Nile Basin

The implications of the location of Ethiopia are described as follows:

- a) **Climate: The fact that Ethiopia is located between 3ºN and 15ºN (between the Equator and Tropic of Cancer) implies that the country has a tropical climate, though modified by its altitude.**

- The location of Ethiopia relative to the Indian Ocean, the Atlantic Ocean and the African and Asian landmass has also various bearings on the climate of Ethiopia

- **<u>b) Socio-cultural</u>: Ethiopia is one of the earliest recipients of the major world religions namely Christianity, Islam and Judaism due to its proximity to the Middle East, which was the origin of these religions**

- The linguistic and other cultural relationships, which Ethiopia shares with its neighbors, reflect the influence of location.

c) **Political**: The political history of Ethiopia has been considerably influenced by:

- Geopolitical considerations of superpowers.
- Adjacency to the Red Sea (a major global trade route).
- The Middle East geopolitical paradigms.
- As a result, Ethiopia has been exposed for external invasions in a number of times

1.2.2. Size of Ethiopia

- Ethiopia with a total area of approximately 1,106,000 square kilometers is the 8th largest country in Africa and 25th in the World.
- It extends about 1,639 kilometers East-West, and 1,577 kilometers North-South. About 0.7% of the country is covered by water bodies.
- The size of Ethiopia also affects both the natural and human environment of the country.

Advantages

- Possess diverse agro- ecological zones
- Variety of natural resources
- Own extensive arable land
- Have larger population size
- Home for diverse cultures
- Greater depth in defense external invasion

Disadvantages

- Demands greater capital to construct infrastructural facilities
- Requires large army to protect its territory
- Difficult for effective administration
- Difficult for socio-economic integration

The shape of Ethiopia and its Implication

- Countries of the World have different kinds of shape that can be divided into five main categories: compact, fragmented, elongated, perforated, and protruded
- These shapes have implications on defense, administration and economic integration within a country

- **Compact shape countries: The distance from the geographic centre of the state to any of the borders does not vary greatly. It is easier for defense, socioeconomic and cultural integration.**
- ***Fragmented shape countries**: They are divided from their other parts by either water, land or other countries*

- *Elongated shape countries: They are geographically long and relatively narrow like Chile.*
- *Perforated shape countries: A country that completely surrounds another country like the Republic of South Africa*

- ***Protrude shape countries***: *Countries that have one portion that is much more elongated than the rest of the country like Myanmar and Eritrea.*

1.3. Basic Skills of Map Reading

What is a Map?

- A map is a two-dimensional scaled representation of part or whole of the Earth surface on a flat body such as piece of paper, black board, wood or cloth.
- Map reading encompasses a systematic identification of **natural features** and **manmade features**.

- **Natural features** include mountains, plateaus, hills, valleys, river, ocean, rocks, plain etc.
- **Manmade features** include roads, railway, buildings, dam etc.
- Since these features cannot easily be observed and interpreted in real landscapes, maps are essential to Geographers.

Importance of maps

- Provide the basis for making geographical details of regions represented i.e. the geographical facts of an area such as **relief, drainage, settlement** etc.
- Maps are useful for giving location of geographical features by varied methods of grid reference, place naming etc.

- Map makes storage of the geographical data of areas represented.

Types of Map

- **Topographical maps:**
- depict one or more **natural** and **cultural features** of an area
- Contents of topographical maps depend on purpose of a map, scale of a map, date of compilation, and nature of the land represented.

Special purpose/statistical maps:

- show distribution of different aspects such as temperature, rainfall, settlement, vegetation etc

Marginal Information on Maps (Elements of Maps)

Title: It is the heading of the given map which tells what the map is all about.

- **Key (legend): It is the list of all convectional symbols and signs shown on the map with their interpretation.**
- **Scale: It is the ratio between the distance on the map and the actual ground distance.**
- Scales enable the map user to interpret the ground measurement like road distance, areal sizes, gradient etc.

- **North arrow: It is indicated with the north direction on a map; used to know the other important directions of the mapped area like east, west, south, and west.**
- **Margin: Is the frame of the map. It is important for showing the end of the mapped area**

Date of compilation: It is a date of map publication. This enables map users to realize whether the map is updated or outdated

Basic Principles of Map Reading

- Map Readers must have ideas about the symbol and also the real World (landscapes).
- Every map symbol must be visualized by the reader to read a map.
- Map symbols should be introduced as needed
- **Secondly**, knowledge of directions is an important principle in reading maps.

- One of the basic functions of maps is to help us to orient ourselves and to locate places on the earth

CHAPTER TWO
THE GEOLOGY OF ETHIOPIA AND THE HORN

- **Geology** is an Earth science that studies the evolution of the earth, the materials of which it is made of, and the processes acting upon them.
- There are many such clues not only the rocks and landforms which can be observed and studied at the Earth's surface,
- but also those provided by indirect methods such as geophysics

- The earth’s continents were once bunched up together in to a single huge continent called ***Pangaea.***
- The large super continent was then split into Gondwanaland where Africa is a part and Laurasia; and later into smaller fragments over the last million years.
- These then drifted apart to form the present arrangement of continents.

- continents were once assembled together as a supercontinent, called the **Continental drift theory.**
- Wegener‟s principal observations were:
- ***Fit of the continents: The opposing coastlines of continents often fit together.***
- ***Match of mountain belts, rock types: If the continents are reassembled as Pangaea, mountains in West Africa, North America, Greenland, and Western Europe match up.***

- ***Distribution of fossils: The distribution of plants and animal fossils on separate continents forms definite linked patterns if the continents are reassembled***
- ***Paleoclimates: rocks formed 200 million years ago in India, Australia, South America, and southern Africa all exhibited evidence of continental glaciations.***

2.2. The Geologic Processes: Endogenic and Exogenic Forces

- Geology studies of how Earth's materials, structures, processes and organisms have changed over time.
- These processes are divided into two major groups**: *internal and external processes.***
- **The internal processes** (**endogenic)** include **volcanic activity** and all the **tectonic processes** (folding, faulting, orogenesis (mountain building), and epeirogenesis (slow rising and sinking of the landmass).

- These processes result in building of structural and volcanic features like plateaus, rift valleys, Block Mountains, volcanic mountains, etc.
- **The external (exogenic**) processes are geomorphic processes.
- They include weathering, mass transfer, erosion and deposition.
- They act upon the volcanic and structural landforms by modifying, roughening and lowering them down.

2.3. The Geological Time Scale and Age Dating Techniques

- The geological history is divided in to **Eras.**
- Each Era is divided into **periods**
- The Eras are given names that indicate the kind of life that existed in them.
- **The Paleozoic Era** (ancient life) is the age of invertebrates,
- **The Mesozoic Era** (the middle life) is the age of reptiles

- **The Cenozoic Era** (recent life) is the age of mammals.
- The Earth is believed to have been formed approximately 4.5 billion years ago
- the earliest forms of life were thought to have originated approximately 3.5 billion years ago.
- The span of time before life appeared was termed the **Precambrian Era**.

- To describe the geology and history of life on Earth, scientists have developed the geological time scale.
- The geological time scale measures time on a scale involving four main units:
- An ***epoch*** *is the smallest unit of time on the scale and encompasses a period of millions of years.*

Geological Processes and the Resulting Landforms of Ethiopia and the Horn

- **The Precambrian Era Geologic Processes (4.5 billion - 600 million years ago)**
- It covers 5/6th of the Earth's history
- Due to its remoteness in time and the absence of well-preserved fossils, our knowledge of the events is limited
- The major geologic event of the Precambrian Era was *Orogenesis.*

- the land was subjected to intense folding.
- This was accompanied by intrusive igneous activity
- The result was the formation of huge mountain ranges.
- In between the ***orogenic periods and after the last orogenesis, there were long periods of denudation, which finally reduced these mountains to near-level (peneplained) rock surfaces.***

- the original rocks (both *sedimentary and igneous) were altered into metamorphic rocks of varying stages of metamorphism.*
- Since these same processes have allowed mineralization and crystal formation, the rocks are also collectively described as *crystalline rocks.*
- they are found exposed in the following areas:

- In the northern part: Western lowlands, parts of northern and central Tigray.

- A. In the western Part: Gambella, Benishangul-Gumuz (Metekel and Asossa), western Gojjam, western Wellega, Illuababora, and Abay gorge.
- B. In the southern Part: Guji, southern Omo, and parts of southern Bale and Borena.

- C. In the eastern part: Eastern Hararghe.

The Paleozoic Era – Geologic Processes (600 million - 225 million years ago)

- lasted for about 375 million years.
- The major geological process of this Era was denudation.
- gigantic mountain ranges were reduced to a “peneplained” surface.
- The sediments were transported southward and eastward to form continental (in Africa) and marine deposits, respectively.

- Because of the limited deposition within Ethiopia, rocks belonging to this Era are rare in the country.

The Mesozoic Era Geologic Processes (225-70 million years ago)

- It was an Era of alternate slows sinking and rising (epeirogenesis) of the landmass.
- This process affected the whole present-day Horn of Africa and Arabian landmass.
- the land was tilted eastward and therefore lower in the southeast and higher in the northwest
- As the land sank slowly the sea invaded it starting from Somalia and Ogaden and slowly spreading northwestward.

- This was in late Triassic.
- This phenomenon continued up to Jurassic period
- As the shallow sea spread towards the land, sands were deposited over the peneplained Precambrian rock surface
- As the depth of the sea increased, mud (shale), gypsum and later lime were deposited.

- Mesozoic rocks are considered to have the greatest potential for oil and gas deposits.

- These are known as the Adigrat sand stone and Hintalo limestone layers.
- In the Horn of Africa and Ethiopia, the slow rise of the land and consequently the regression of the sea began in the Upper Jurassic
- It continued throughout the Cretaceous period

- By the end of the Mesozoic Era, when the land emerged out of the sea, three major sedimentary formations were laid and formed upon the Precambrian rock surface. These were the Adigrat or lower sandstone, Hintalo limestone and Upper Sandstone
- The Adigrat sandstone is older and thicker in the southeast and progressively decreases in age and thickness northwestward.

The Cenozoic Era Geologic Processes (70million years ago - Present)

- The Cenozoic Era is the most recent of the geologic Eras.
- major geologic events and other geologic processes include:-
- a. Uplifting of the Arabo-Ethiopian landmass and outpouring of huge quantity of lava.
- b. Formation of the Rift Valley.
- c. Quaternary volcanism and deposition.

- This immense tectonic force also fractured the crust at many places.
- Huge quantity of lava came out through these fractures.
- The out pouring of this flood of basalt spread widely and extensively and covered a large part of the Mesozoic sedimentary layer to form the Ethiopian plateau surface and also the floor of the present-day Rift Valley.

- the lava comes out through vents, huge volcanic rocks were piled up to form many and huge Volcanic Mountains‟ towering the flat basaltic plateau
- This volcanic material is known as Trappean lava or Trap Series lava.
- Where it is not dissected by erosion, the Ethiopian plateau had flat and nearly horizontal surface.

The Formation of the Rift Valley

- lateral movement of the crust in opposite directions producing *tensional forces that caused parallel fractures or faults on the sides of the up-arched swell.*
- As the tension widened the fractures, the central part of the landmass collapsed to form an extensive structural depression known as the *Rift Valley*

- The major faulting movement probably began in the late Oligocene and Miocene Epochs of the Cenozoic Era.
- This rifted the Red Sea trough, which began to be flooded from the north.
- At the same period (Pliocene), the Afar depression (including the Gulf of Zula) was down-faulted allowing the Red Sea water to penetrate far inside

- As a result, thick saline materials accumulated. During the same period, the area between the Danakil Depression and the Red Sea was uplifted to form the Afar Block Mountains.

- The Ethiopian Rift Valley is part of the Great East African Rift system
- The Rift Valley region of Ethiopian is the most *unstable part of the country.*
- There are numerous hot springs, fumorales, active volcanoes, geysers, and frequent earthquakes.

Quaternary Deposition

- During the Quaternary period of the Cenozoic Era, the Earth experienced a marked climatic change, where warmer and dry periods were alternating with cooler and wet periods.
- This was the time of the last „“Ice Age““ in the middle and high latitude areas and the time of the „„Pluvial Rains““ in Africa.

- The heavy Pluvial Rains eroded the Ethiopian plateau and the eroded materials were deposited in the Rift Valley lakes.
- Lake and marshy areas became numerous and deep.
- Many were enlarged and covered much area and even merged together. For example, Ziway-Langano-Shalla; Hawasa-Shallo; Chamo-Abaya; and Lake Abe and the nearby smaller lakes and marsh basins formed huge lakes.

- Today, there are lacustrine deposits of continental origin around many of the Ethiopian lakes, river valleys and lowlands.
- According to the place and manner of deposition and depositing agents these deposits are divided as follow.

a. *Lacustrine deposits*: *Deposits on former lakebeds, and swampy depressions.*

b.*Fluvial deposits:Deposits* *on the banks of rivers, flood plains both in plateau, foothills etc.*

c. *Glacio-fluvial deposits and erosional features:* *These are occurred on high mountains, such as Bale and Kaka Mountains.*

d. *Aeolian deposits*:*Are windblown deposits*.

e. *Coastal and marine deposits*: *Deposits on sea invaded and sea-covered places.*

- The quaternary deposits are mainly found in the Rift Valley (Afar and Lakes Region), Baro lowlands, southern Borena, and parts of northwestern low lands

Rock and Mineral Resources of Ethiopia

- The occurrence of metallic minerals in Ethiopia is associated with the Precambrian rocks.
- These rocks contain most of the metallic deposits known at present.
- presently mineral production from Ethiopia has been negligible by World standards.

Current State of Main Minerals in Ethiopia

- Geological surveys proved that Ethiopia has abundant mineral resources of metals and precious metals, coal, and industrial minerals.

Gold

- Gold has been mined in Ethiopia for quite long time, mainly from Benishangul-Gumuz (Metekel) and Adola.

- **Platinum**

➢ The Yubdo area in Wellega, is the only active Ethiopian Platinum mine.

Tantalum

➢ Significant deposit of tantalum and niobium is found in southern Ethiopia.

➢ The sedimentary and volcanic rock activities are also resourceful.

- **Gemstones**

➢ Gemstones, including amethyst, aquamarine, emerald, garnet, opal, peridot, sapphire, and tourmaline occur in many parts of Ethiopia, mainly in Amhara and Oromia Regional States.

Potash

➢ The potash reserve in the Danakil (Dallol Depression) of the Afar region is believed to be significant.

- **Gypsum and Anhydrite**

➢ A limited amount of gypsum is produced for domestic consumption in Ethiopia, mainly for the cement industry, but very large deposits are known to occur in sedimentary formations of the Red Sea coastal area, Danakil Depression, Ogaden, Shewa, Gojjam, Tigray, and Hararghe

- **Clay**

➢ Ethiopia is endowed with industrial clay material. Alluvial clay deposits for bricks and tile, pottery and pipe industry occur in Adola, Abay gorge, and the Rift Valley lakes region.

Marble

➢ Crystalline limestone is widespread in the basement rocks of Ethiopia. Marble has been quarried in such localities as west of Mekelle and south of Adwa in Tigray.

- In the east in Galetti, Soka, Ramis, Rochelle, Kumi and other valleys of Chercher Mountain in West Hararghe.
- **Construction stones**

➢ Basalt, granite, limestone and sandstone are important building stones

➢ For the surfacing of roads and compaction, basalt, scoria and other volcanic rocks are extensively used.

- Mesozoic limestone is an important raw material for cement and chalk production.
- The earlier cement works at Dire Dawa and the recent ones at Muger Valley, Abay gorge (Dejen), Tigray (Messebo) are using similar raw materials from these rock formations.

CHAPTER THREE
THE TOPOGRAPHY OF ETHIOPIA AND THE HORN

- The Ethiopian landform is characterized by great diversity.
- There are flat-topped plateaus, high and rugged mountains, deep river gorges and vast plains.
- Altitude ranges from 125 meters below sea level (Kobar Sink) to the highest mountain in Ethiopia, Mount Ras Dashen (4,620 m.a.s.l), which is the fourth highest mountain in Africa.

- It is sometimes described as the Roof of East Africa
- The Ethiopian Highlands are rugged mass of mountains, situated in the Horn of Africa.
- Most of the country consists of high plateau and mountain ranges that are sources of many rivers and streams
- that made the country to be described as the “Water Tower of East Africa”

- The diversity in topography is accompanied by differences in other natural features such as soil, climate, vegetation and wild life.
- contrasting features between the Ethiopian highlands and lowlands:

Characteristics of Ethiopian highlands:

- Moderate and high amount of rainfall (>600 mm per year).
- Lower mean annual temperature (<200C).
- climate is favorable for biotic life.
- Rain-fed agriculture is possible.
- Free from tropical diseases.
- Attractive for human habitation and densely settled.

The Ethiopian lowlands are characterized by:

- Fewer amounts of rainfall and higher temperature.
- High prevalence of tropical diseases.
- population densities.
- Nomadic and semi-nomadic economic life.
- Vast plain lands favorable for irrigation agriculture along the lower river basins.

The Physiographic Divisions of Ethiopia

1.The Western highlands and lowlands

- This physiographic unit includes all the area west of the Rift Valley.
- It makes up about 44% of the area of the country.
- This region is further subdivided into four groups of highlands

The Western Highlands

a. The Tigray Plateau

- The Tigray plateau is separated from the Eritrean plateau by the Mereb River.
- The right bank tributaries of Tekeze drain this plateau.
- There are high mountains in this plateau with elevations of over 3000 meters, namely Mount Tsibet (3988 m.a.s.l), Mount Ambalage (3291 m.a.s.l), and Mount Assimba (3248 m.a.s.l).

b. North Central Massifs

- The Abay, Tekeze and their tributaries have cut into this region a maze of gorges, steep sided river valleys,
- the physiographic unit also accommodates the Lake Tana basin
- Fifty-eight percent of the region is at an altitude of more than 2,000 meters, making it, next to the Shewan Plateau, the second highest physiographic division

- The region consists of the Gonder, Wello and Gojjam Massifs
- Out of the 26 mountain peaks with altitude of more than 4,000m.a.s.l 33 in Ethiopia, 19 mountain peaks are found in this physiographic region
- Among these, the most popular ones include Mount Ras Dashen (4,620 m.a.s.l), Mount Weynobar/Ancua (4462 m.a.s.l

- Mount KidisYared (4453 m.a.s.l), and Mount Bwahit (4437 m.a.s.l) in the Simen Mountain System. Mount Guna (4,231m.a.s.l)

c. The Shewa Plateau/central highlands

- This plateau occupies a central geographical position in Ethiopia.
- the Shewa Plateau is the smallest of the Western highlands

- The highest mountain in the Shewan plateau is Mount Abuye-Meda (4,000 m.a.s.l) in Northern Shewa, Mount Guraghe in the south is 3,721 meters high.

d. The Southwestern Highlands

- consists of the highlands of Wellega, Illuababora, Jimma, Kaffa, Gamo and Gofa.
- It extends from the Abay gorge in the north to the Kenya border and Chew Bahir in the south.

- The region is the second largest in the Western highlands.
- The southwestern plateau is the wettest in Ethiopia
- It is drained by Dabus, Deddessa (tributaries of Abay), Baro, Akobo and the Ghibe/Omo rivers.
- With a height of 4,200 meters above sea level, Guge Mountain is the highest peak in this physiographic subdivision.

The Western Lowlands

- These are the western foothills and border plains that extend from Western Tigray in the north to southern Gamo-Gofa in the South.
- These are Tekeze lowland, Abay-Dinder lowland, Baro lowland, and Ghibe lowland from north to south.
- With the exception of the *Baro lowland, the region is generally characterized by arid or semi-arid conditions.*

The Rift Valley

- The formation of the Rift Valley has separated the Ethiopian Highlands and Lowlands in to two.
- It opens out in the Afar Triangle, where it is the widest, and narrows down to the south.
- The Rift Valley is further subdivided into three physiographic sub-regions

The Afar Triangle

- The Afar Triangle is the largest and widest part of the Rift Valley
- Quite different is the morphology of the Afar depression
- from approximately 1,000 meters in the southwest to below sea level in the north (**Danakil depression)**
- The depression, which hosts one of the most hostile environments on Earth

- Lakes (*Abe, Asale, and Afrera) occupy some of these basins.*
- A prominent feature in this region is the *Denakil Depression (Kobar Sink).*

The Main Ethiopian Rift/Central Rift

- extends from Awash River in the north to Lake Chamo in the south.
- This part of the Rift Valley is the narrowest and the highest.
- Here rain-fed agriculture is practiced
- the geothermal energy potential.

The Chew Bahir Rift

- This is the smallest and the southern-most part of the Rift Valley.
- Konso and the surrounding highlands separate it from the Main Ethiopian Rift to the north.
- is a marshy area covered by tall grass, into which the Segen and Woito streams empty.

The Impacts of Relief on Biophysical and Socioeconomic Conditions

- The highly dissected character of the landscape over much of the country's territory influence the various socioeconomic aspects

1.Agricultural practices

- Relief influences crop production
- The practice of animal husbandry is also influenced by relief

- The practice of animal husbandry is also influenced by relief

2. Settlement pattern

- free from most of the tropical diseases are densely settled.
- The highlands of Ethiopia are characterized by sedentary life and permanent settlements while lowlands that are inhabited by pastoralists have temporary settlements.

3. Transportation and communication

- The difficult terrain makes infrastructure development and maintenance costly.
- TV and radio communications are also highly influenced by relief.
- the rugged topography rendered rivers less navigable due to the waterfalls,

4. Hydroelectric power potential

- The great difference in altitude coupled with high rainfall created suitable conditions for a very high potential for the production of hydroelectric power in Ethiopia.

Socio-cultural feeling

- rugged terrain resulted in the long-term isolation of communities

6. Impacts on climate

- Highlands with higher amount of rainfall and lower rate of evapo-transpiration tend to be moisture surplus compared to the moisture deficit lowlands.

7. Impacts on soil

- Steep mountain is subject to degradation

CHAPTER FOUR

DRAINAGE SYSTEMS AND WATER RESOURCE OF ETHIOPIA AND THE HORN

Major Drainage System of Ethiopia

- A drainage system is made up of a principal river and its tributaries (the rivers that flow into it)
- The drainage pattern of an area is the outcome of the geological processes, nature and structure of rocks, topography, slope, amount and the periodicity of the flow.

The Major Drainage Systems

The Western Drainage Systems

- are the largest of all drainage systems
- This drainage system comprises four major river basins namely the *Tekeze, Abay, Baro-Akobo, Ghibe (Omo)*
- The *Abay, Tekeze and Baro flow westward ultimately joining the Nile which finally ends at Mediterranean Sea.*

- The largest river both in volumetric discharge and coverage in the western drainage systems is the ***Abay***

The Southeastern Drainage Systems

- The basin which is mainly drained by *Wabishebelle and Ghenale, slopes south-eastwards across large water deficient plains*
- Wabshebelle and Ghenale rivers cross the border into Somalia,

- Ghenale, which has fewer tributaries but carries more water than *Wabishebelle, reaches 44* the Indian Ocean
- In Somalia it is named the ***Juba*** *River.*
- Wabishebelle is the largest river in terms catchment area.
- It is the longest river in Ethiopia.
- Wabishebelle fails to reach the Indian Ocean

The Rift Valley Drainage System

- The Rift Valley drainage system is an area of small amount of rainfall
- The only major river basin is that of the **Awash**
- It finally ends in a maze of small lakes and marshy area; the largest of which is Lake Abe on the Ethio-Djibouti border.

Water Resources: Rivers, Lakes and Sub-Surface Water

- **The Ethiopian Rivers**
- **General Characteristics of Ethiopian Rivers**

➢ Almost all major rivers originate from the highlands

➢ Majority of Ethiopian rivers are trans-boundary,

➢ are characterized by extreme seasonal fluctuation

➢ they have rapids and waterfalls along their course,

- Some of the rivers *serve as boundaries, both international and domestic administrative units.*

The Ethiopian Lakes

- are result of tectonic process
- Lake *Tana, the largest lake in Ethiopia* occupies a shallow depression
- Ethiopia is also gifted with crater lakes

- These include the lakes at and around *Bishoftu, Wonchi (near Ambo), Hayk (near Dessie) and the Crater Lake on top of Mount Zikwala*
- *Lake Abaya is the largest of all the lakes in the system.*
- Shala and Ziway are the shallowest and the deepest lakes in the central Ethiopian Rift

Subsurface (Ground) Water Resource of Ethiopia

- Ethiopia has lower ground water potential
- Climatic and geophysical conditions determine the availability of groundwater resource.
- Ethiopian potential of groundwater is believed to range between 12-30 BMC.

Water Resources Potentials and Development in Ethiopia

- *The potential of exploitable water in Ethiopia is huge*
- The enormous water resource potential of Ethiopia is underutilized due to so many factors.
- The followings are some of potential development uses of water resource of Ethiopia.

a) Hydro-electric Potential

- Ethiopian rivers have a very high potential for generating electricity
- The first hydroelectric power generation plant was installed on Akaki River (Aba Samuel) in 1932
- Grand Ethiopian Renaissance Dam
- Gilgel Gibe III

- Currently Ethiopia is administering 14 hydroelectric power plants constructed on Lake Aba Samuel, Koka, Tis Abay, Awash, Melka Wakena, Sor, Fincha, Gibe/Omo, Tana Beles and Tekeze, generating close to 4000 megawatts of energy.
- The severe erosion from the highlands and sedimentation in the reservoirs is also a critical problem for hydroelectric power generation.

b) Irrigation and Transportation

- The terrain in Ethiopia is so rugged that it limits the uses of Ethiopian rivers both for irrigation and transportation.
- The *Baro-Akobo and Genale Dawa river systems have large irrigation potential*
- Majority of Ethiopian rivers are not suitable for transportation

- The *Baro at its lower course is the only navigable river.*
- Lake Tana and Abaya are relatively the most used for transportation.

c) Fishing and Recreation

- The majority of Ethiopian lakes are rich in fish.
- Currently Lake Tana leads the potential
- There are a variety of fish, birds and other aquatic life forms in the lakes.
- Ethiopian rivers and lakes important recreational and tourist attractions

CHAPTER FIVE
THE CLIMATE OF ETHIOPIA AND THE HORN

- Ethiopia is characterized by a wide variety of altitudinal ranges and diverse climatic conditions.
- ***Weather is the instantaneous or current state of the atmosphere composing temperature, atmospheric pressure, humidity, wind speed and direction, cloudiness and precipitation***
- ***Climate refers the state of the atmosphere over long time periods, decades and more.***

- It is the composite of daily weather conditions recorded for long periods of time.

Elements and Controls of Weather and Climate

- **Elements**

1. Temperature

2. Precipitation and humidity

3 Winds and air pressure

- **Controls**

1 Latitude/angle of the Sun

2 Land and water distribution

3 Winds and air pressure

-

4 Altitude and mountain barriers

5 Ocean currents

Controls of Weather and Climate

a. Latitude

- ***Latitude is the distance of a location from the equator.***

Latitudinal location of Ethiopia and the Horn resulted in;

- *high average temperatures,*
- *high daily and small annual ranges of temperature,*

c. *Altitude*

- Altitude is the height of location above the sea level.
- Under normal conditions there is a general decrease in temperature with increasing elevation.

Spatiotemporal Distribution of Temperature

- Altitude is an important element in determining temperature of Ethiopia and the Horn.
- The major controls determining its distributions are latitude and cloud cover.

Seasonal or Temporal Variabilities

- The temporal variabilities of rainfall are characterized by;
- ***i. Summer (June, July, August)***

ii. Autumn (September, October and November

- ***Autumn is the season of the year between summer and winter.***

iii. Winter (December, January and February)

- In winter, the overhead sun is far south of equator

iv. Spring (March, April and May)

- In this season, the noonday sun is shining directly on the equator while shifting north from south.

Agro-ecological Zones of Ethiopia

The Wurch Zone

- The Wurch-zone is an area having altitude higher than 3,200 meters above sea level and mean annual temperature of less than 10oC.
- mountain systems of Ras Dashen, Guna, Megezez in North Shoa, Batu, Choke, Abune Yoseph etc.

Dega Zone

- In Ethiopia, the Dega-zone is long inhabited and has dense human settlement due to reliable rainfall for agriculture and absence of vector-borne diseases such as malaria.

Weyna Dega Zone

- This zone has warmer temperature and moderate rainfall. It lies between 1500-2,300 meters above sea level.

Kolla Zone

- In Ethiopia, the geographic peripheries in south, southeast, west and northeastern part are mainly in this category.
- Kolla is the climate of the hot lowlands with an altitudinal range of 500 to 1500 meters above sea level.

Bereha Zone

- Bereha is the hot arid climate of the desert lowlands

- The Bereha agro-climatic zone is largely confined to lowland areas with altitude of lower than 500 meters.
- Strong wind, high temperature, low relative humidity, and little cloud cover usually characterize Bereha.

Climate Change/Global Warming

Causes, Consequences and Response Mechanisms

- Climate change refers to a change in the state of the climate that can be identified
- It refers to any change in climate over time, due to either natural variability or human activities.

Current Trends of Climate in Ethiopia

- Ethiopian climate experiences extremes such as drought, flood etc
- Ethiopia ranked 5th out of 184 countries in terms of its risk of drought.
- Over the last decades, Ethiopia has experienced climatic changes.

Trends in Rainfall Variability

- In some regions, total average rainfall is showing decline.
- Changes in temperature and rainfall increase the frequency and severity of extreme events
- Major floods have been a common occurrence, leading to loss of life and property in numerous parts of the country.
- Warming has exacerbated droughts, and desertification in the lowlands of the country is expanding.

Causes of Climate Change

A. Natural Causes

- ***Earth orbital changes:***

- Changes in the tilt of the earth can lead to small but climatically important changes in the strength of the seasons.
- More tilt means warmer summers and colder winters.

Energy Budget:

- Although the Sun's energy output appears constant, small changes over an extended period of time can lead to climate changes.
- the star has been very gradually increasing its amount of radiation

Volcanic eruptions:

- volcanic eruption releases large volumes of sulphur dioxide, carbon dioxide, water vapor, dust, and ash into the atmosphere.

- The release of large volume of gases and ash can increase planetary reflectivity causing atmospheric cooling.

B. Anthropogenic Causes

- The warming of earth planet in the past 50 years is majorly driven by human activities.
- The industrial activities that our modern civilization depends upon have raised atmospheric carbon dioxide
- The decomposition of wastes in landfills, agriculture, ruminant digestion and manure management, synthetic compounds manufacturing, clearing of land for agriculture,

- industrial activities, and other human activities have increased concentrations of greenhouse gases
- major gases that contribute to the greenhouse effect include *Water vapor, Carbon dioxide (CO2), Methane, Nitrous oxide, Chlorofluorocarbons (CFCs).*

Consequences of Climate Change

Impacts on human health:

- greater frequency of infectious disease epidemics
- Climate change also raises the incidence malaria.

Impact on water resources

Climate change is leading to melting of snow and glaciers that increases rise in sea level

- floods, distorts wind flow pattern, decreases water table.
- More frequent and longer droughts reduce the amount of run-off into rivers, streams and lakes
- **Impact on Agriculture**
- changes in temperature and rainfall patterns as well as significantly affect agricultural production.

Impact on Ecosystem

- climate change affects the success of species, population, and community adaptation.
- species could be seriously affected or even disappear because they are unable to resist.

Climate Response Mechanisms

- **Mitigation and its Strategies**

➢ Mitigation measures are those actions that are taken to reduce and control greenhouse gas emissions changing the climate through:-

➢ Practice Energy efficiency

- Increase the use of renewable energy such as solar
- Efficient means of transport implementation: electric public transport, bicycle, shared cars etc.

Adaptation and its Strategies

building flood defenses,

plan for heat waves and higher temperatures,

improve water storage and use are some of measures taken by cities and towns.

landscape restoration and reforestation,

flexible and diverse cultivation to be prepared for natural catastrophes

preventive and precautionary measures (evacuation plans, health issues, etc.)

SOILS, NATURAL VEGETATION AND WILDLIFE RESOURCES OF ETHIOPIA AND THE HORN

Ethiopian Soils: Types, Degradation and Conservation

- Soil is a delicate but highly varied composition of mineral particles, organic matter and living organisms in dynamic equilibrium.
- *It consists of weathered mineral materials (45%), organic matter (5%), air (20-30%) and water (20-30%).*

- Soil formation is a long-term process
- The formation of a particular type of soil depends on parent material, climate, topography, living organism and time
- Weathering disintegrates the inorganic substances (rocks) of soils
- There are three types of weathering involving in soil formation. These are:

A. Mechanical (physical) weathering

- Differential stresses due to heating and cooling or expansion of ice break the rock.
- Abrasion (erosion by friction) due to water containing sediment or wind carrying debris is another type of physical weathering.

B. Biological weathering

- the weakening and subsequent disintegration of rock by plants, animals and microbes.

- the pressure is exerted by a biological process (*i.e., growing roots). Microbial activity breaks down rock minerals by altering the rock‟s chemical composition*

C. Chemical weathering

- Involves the modification of the chemical and mineralogical composition of the weathered material.

- The most common chemical weathering processes are hydrolysis, oxidation, reduction, hydration, carbonation, and solution.

Soils have two basic properties:

Physical properties

- Soil physical properties are influenced by composition and proportion of major soil components.

- Properties such as texture, structure, porosity etc. are categorized under physical soil properties.
- These properties affect air and water movement in the soil, and thus the soil‟s ability to function

Chemical Properties

- Soil chemistry is the interaction of various chemical constituents

- Soil properties like availability of minerals, electrical conductivity, soil pH, etc.

Major Soil Types in Ethiopia

1. Nitosols and Acrisols

- ***Nitosols develop on gently sloping ground***
- They are strongly weathered soils but far more productive than most other tropical soils

- Due to the high rainfall, there is considerable soil leaching which makes the ***nitosols to be poor in soluble minerals like potassium, calcium etc.;***
- The reddish-brown color of these soils is because of high concentration of *iron (ferric) oxides due to leaching*
- widely found on cultivated areas and on mountain grasslands.

- ***Nitosols are dominantly found in western highlands***
- ***Acrisols***
- have very low resilience to degradation and moderate sensitivity to yield decline
- are found along with *nitosols mostly in some pockets of southwestern highlands of Ethiopia where there is high rainfall.*

2. *Vertisols*

- Vertisols are heavy clay soils with a high proportion of swelling clays when wet, and cracks when dry.
- These soils are extremely difficult to manage (hence easily degraded), but has very high natural chemical fertility
- In Ethiopia, they are commonly found in parts of *Northwestern, Central and Southeastern highlands (*

3. ***Lithosols, Cambisols and Regosol***

- These soils are mostly found in rugged topography and steep slopes.
- As a result, they are young, shallow and coarse textured and so have low water holding capacity
- they are found in areas of low rainfall.
- most of the areas covered by these soils have limited agricultural use

- They are, in most cases, left under the natural plant cover and used for grazing.
- these soils are found in different parts of rugged and steep slopes of Central Highlands, on the *Rift Valley Escarpments and highlands in of western Hararghe. Regosol and Lithosols are also found in the Danakil and eastern Ogaden.*

4. *Xerosols, Yermosols and Solanchaks*

- These are soils of desert or dry steppe soils majorly available in arid and semiarid areas
- desert soils are characterized by high salt content and low organic content, because of the scanty vegetation.
- Xerosols are soils of the deserts, has low organic content

- These soils are extremely subjected to wind erosion and concentration of soluble salts.
- Yermosols are even drier and more problematic than Xerosols.
- Solanchaks are saline soils which develop in areas of high evaporation and capillary action.
- Badly managed irrigation schemes may turn soils into solonchaks.

- In Ethiopia, Xerosols are found in Ogaden and northeastern escarpments, whereas the Yermosols and Solonchaks cover the Ogaden and Afar plains
- The Solonchaks are majorly located in salty plains of Afar.

5. *Fluvisols*

- Fluvisols develop on flat or nearly flat ground, on recent alluvial deposits
- These soils are associated with *fluvial (river), marine (sea) and lacustine (lake) deposits.*
- These are soils formed due to deposition of eroded materials from highlands
- The deposition takes place in depressions, lower valleys and lowlands

- Fluvisols are highly variable, but much prized for intensive agriculture because:
  - they develop on flat ground, deposition sites,
  - they are associated with rivers and ground water, making them important for large-scale irrigation
  - they are fertile and their fertility is always renewed as a result of deposition of new soil materials.

6. *Luvisols*

- Luvisols develop mainly in areas where pronounced wet and dry seasons
- Luvisols have good chemical nutrients and they are among the best agricultural soils
- they are intensively cultivated.
- However, when luvisols are found on steep slopes (stony) and on flat areas (waterlogged) they are avoided and left for grazing

- In Ethiopia, places with luvisols include *Lake Tana area, parts of Northern, Central and Eastern Highlands and Southern lowlands.*

Soil Degradation

- Soil degradation is defined as a change in any or all of soil status resulting in a diminished capacity of the ecosystem to provide goods and services.

- It could also be the deterioration of the physical, chemical and biological properties of soil
- It is a critical and growing global problem
- soil degradation undermines the productive capacity of an ecosystem.
- it affects global climate through alterations in water and energy balances and disruptions in cycles of carbon, nitrogen, sulfur, and other elements

There are three major types of soil degradation

i. Physical Degradation

- refers to the deterioration of the physical properties of soil. These include:-

A. *Compaction*: *densification of soil is caused by the elimination or reduction of structural pores. Soils prone to compaction are susceptible to accelerated runoff and erosion.*

B. Soil erosion: is a three-phase process consisting of the detachment of individual soil particles, transportation and deposition.

ii. Biological Degradation

- Reduction in soil organic matter content, decline in biomass carbon, and decrease in activity and diversity of soil fauna are ramifications of biological degradation.

iii. Chemical Degradation

- Nutrient depletion is a major cause of chemical degradation.
- Chemical degradation is also caused by the buildup of some toxic chemicals and an elemental imbalance that is injurious to plant growth.

Causes of soil degradation

- Soil degradation may result from natural and human-induced causes
- Topographic and climatic factors such as steep slopes, frequent floods and tornadoes, storms and high-velocity wind, high-intensity rains and drought in dry regions are among the natural causes

- Deforestation and overexploitation of vegetation, overgrazing, indiscriminate use of agrochemicals and lack of soil conservation practices, and over extraction of ground water are some anthropogenic causes of soil degradation.

Soil Erosion Control Measures

- The aim of soil conservation is to reduce erosion
- We have two major soil erosion control mechanisms. These are:

A.Biological Control measures

- These types of soil erosion control mechanisms include vegetative strips, plantation, and reforestation.

B. Physical control measures

- The major types of physical erosion control measures commonly applied in Ethiopia includes terracing, check dams, gabion, trenches, contour ploughing, soil bunds etc.

Natural Vegetation of Ethiopia

- *Natural vegetation refers to a plant cover that develops with little or no human interference.*
- The characteristics of Ethiopia's natural vegetation are to a large extent determined by elevation (and temperature) and rainfal
- **Major Natural Vegetation Types of Ethiopia**

1. Afro-alpine and Sub-afro alpine Region

- This vegetation type, also known as high mountain vegetation is similar to the Alpine vegetation in temperate regions.
- These ecosystems are found on mountains having an elevation ranging between 3,200 and 4,620 meters above sea level
- **The Afro-alpine region is found at very high altitudes (4,000 – 4,620 m).**

2. Forest Region

- Forest is a complex ecosystem consisting predominantly of trees that shield earth and support numerous life forms.
- These wide variations in rainfall and altitude result in two broad classification of forests
- Highland forests include Hagenia Abyssinia (*Kosso),*

Juniper procera (*tid), Arundinaria Alpina(kerkha), Podocarpus falcatus (zigba), Aningeria adolfi-friedericii (keraro) and Olea africana (Weyra)* forests

- while Baphia are classified as lowland forests
- Moreover, there are also *Gallery (Riverine) Forests****. These are forests that stretch along the banks of the lower courses of rivers***

- Riverine forests are classified as lowland forests and are found in some places such as the banks of Awash, Wabishebelle, Ghenale etc
- Dominant species include Ficus sur (*sholla) and different kinds of acacia trees.*

3. **Woodland Savannah Region**

- woodland savannahs are also found in areas of wide altitudinal ranges (250 to 2,300 m)
- The plants in the woodland savannah are known for their xeromorphic characteristics like shading of leaves during the dry season.
- Vegetation types with intermediate characteristics between savannahs and woodlands are shrublands and bushlands

- Woodland savannah region can be broadly classified into three divisions:

- ***Juniper procera (tid) is dominant species for both the Junipers Forests and Junipers Woodlands.***
- ***Acacia woodlands are dominated by both trees and shrubs, which belong to the same genus 'Acacia'.***

- ***Mixed deciduous woodlands: As the name implies, most of the trees in mixed deciduous woodlands shed their leaves during the dry season.***

4. ***Steppe and Semi Desert Regions***

- These are regions in the arid and semiarid parts of the country
- In these regions xerophytic (i.e. drought-resisting plants) are the dominant vegetations.

- Xerophytic plants such as short shrubs, scattered tufts of grass species and a variety of acacias are some of the examples.

Natural vegetation Degradation

- Ethiopia's forest resources have been disappearing at an alarming rate.
- Major causes for the gradual disappearance of the natural vegetation in Ethiopia are:

- Clearing of forests for cultivation
- Timber exploitation practices
- Charcoal burning and cutting for fuel
- Extensions of coffee and tea production areas
- Overgrazing
- Expansion of settlements both rural and urban, and clearing for construction

Natural Vegetation Conservation

- Conservation of biodiversity is protection and management of biodiversity so as to maintain at least its current status and derive sustainable benefits for the present and future generation
- There are three main approaches of biodiversity conservation:

, and community conservation areas.

<u>Protection</u>: through designation and management of some form of protected area. Protected areas include sanctuaries, national parks

Sustainable forest management: involving sustainable harvesting of forest products to provide a source of financial income

- ***<u>Restoration or rehabilitation</u>: is the process of assisting the recovery of a forest ecosystem that has been degraded, damaged, or destroyed.***

<u>Wild Life/wild animals in Ethiopia</u>

- Ethiopia is one of the few countries in the world, which possess unique and characteristic fauna with a high level of endemicity

- A total of 279 mammalian species of which 31 are endemic are known to occur in Ethiopia
- Walia Ibex (Capra walie), Gelada Baboon (Theropithecus gelada), Mountain Nyala (Tragelaphus buxtoni), Ethiopian Wolf (Canis simensis), Starck‟s Hare
- Generally speaking, the main wild life concentrations in the country occur in the southern and western parts.

The wild animals in Ethiopia can be classified into five major groups:

1. Common wild animals (those animals that are found in many parts of the country (e.g. *hyenas, jackals)*
2. Game (lowland) animal, (which include many *herbivores like giraffes, wild asses, zebras etc. and carnivores like lions, leopards, and cheetahs)*
3. Tree animals or arboreals (which include *monkeys, baboons)*

4. A variety of *birds in the Rift Valley lakes*

5. Rare animals (*gelada baboon and Semien fox) scattered in highlands; walia- ibex in the Semien Massifs, Nyala in the Arsi Bale massifs).*

Wildlife Conservation

- The importance of wildlife can be categorized as ecological importance, economic importance, investigatory importance, conservation of biological diversities etc.

Wild animals can be used for:

- scientific and educational researches (valuable information for medical purposes and environmental studies)
- physical and mental recreation (aesthetic value)
- promotion of tourism (economic value)
- its potential for domestication
- maintaining ecological balance

- To prevent the destruction of wildlife, wildlife reserves etc. have been established in different part of the country.
- Hence in Ethiopia there are:
- 21 major national parks (see Table 6.2),
- 2 major wildlife sanctuaries,
- 3 wildlife reserves,
- 6 community conservation areas,

- 2 wildlife rescue centers,
- 22 controlled hunting areas,
- 2 botanical gardens, and 3 biosphere reserves
- Some of the national parks are unique in their wild animals they have. E.g.

1.Abiyatta-Shalla lakes National Park is predominantly bird sanctuary

2. ***Omo, Mago, and Gambela National Parks have hippopotamus and crocodiles in rivers and lakes.***
3. ***Semien and Bale Mountains National Parks have rare animals like Walia ibex, Semien fox, gelada baboon and Nyala***

Challenges of wildlife conservation in Ethiopia

- Here are some of the major challenges that Ethiopian protected areas are facing;
- Limited awareness on the importance of wild life
- Expansion of human settlement in protected areas.
- Conflict over resource
- Overgrazing (fodder and wood)

- Illegal wildlife trade
- Excessive hunting
- Tourism and recreational pressure
- Mining and construction material extraction
- Forest fire

CHAPTER SEVEN
POPULATION OF ETHIOPIA AND THE HORN

Population Data: Uses and Sources

- Regular and reliable population data are vital for effective socioeconomic development planning and administration.
- Therefore, it becomes inescapable to have population information as the demography influences production, distribution, consumption, defense and administrative services at any administrative or natural unit considered.

- There are three conventional sources of obtaining population data. These are:-

A. Census

- Is the total process of collecting, compiling and publishing demographic, economic and social data pertaining at a specified time (s) to all persons in a defined territory. Its major characteristics include:

- **Universality:** inclusion of all persons in a given area during the count,
- **Periodicity:** census undertaking at regular time intervals with reference to a defined point of time usually 10 years and 5 years,
- **Simultaneity:** undertaking census in a very limited time duration called the census day/night,
- **Government sponsorship** being an expensive endeavour, and publication

B. Sample Survey

- This is a method in which a defined population/sample/ is selected with the view that information acquired would represent the entire population
- This method is advantageous over census as costs can be greatly reduced

- Data from most censuses and sample surveys include geographic location, age, sex, marital status, citizenship, and place of birth, relationship to the head of household, religion, educational characteristics, occupation, fertility, income, language, ethnic characteristics, disabilities and migration.

C. Vital Registration

- Vital registration is a system of continuous, permanent, compulsory and legal recording of the occurrence and the characteristics of vital events like births, deaths, marriages, divorces, and adoption

Population Dynamics: Fertility, Mortality and Migration

- The population of any particular region (country) grows/declines as a result of the combined effect of the three demographic variables: fertility, mortality and migration.
- Based on projected data from CSA, Ethiopia has an estimated 2019 population of 112 million, which ranks 12th in the world, and the current growth rate is about 2.6%.

- The largest part of the population (80%) is rural based. Like many other developing countries, Ethiopia has a youthful population where about 65 percent of the population is below 24 years of age. The population is also unevenly distributed.

Demographic Measurements

- In Ethiopia, fertility and mortality are the two principal determinants of population growth as international migration is insignificant.
- Some of the basic demographic measurements include:

1. **Crude Birth Rate refers to the number of live births per 1000 population**

CBR = Total Annual life birth

_____ X 1000

T0tal mid year population

2. General Fertility Rate refers to the total number of live births per women of reproductive age

GFR= Total Annual Life birth

_____ X 1000

Total Women 15--49

_

3. Total Fertility Rate (T.F.R.) refers to the average number of children that a woman would have at the end of her reproductive period if the current age specific fertility rate remains unchanged.

4. Crude Death Rate refers to the number of deaths per one thousand population in a year

$$CDR = \frac{\text{Total Annual birth}}{\text{Total Mid year population}} \times 1000$$

5. Infant Mortality rate refers to the total number of deaths of infants per one thousand live Birth

IMR= Total annual infant death

$$\frac{\text{Total annual infant death}}{\text{Total life birth}} \times 1000$$

6. Maternal Mortality Rate: refers to death of mothers in connection from pregnancy and birth complications per hundred thousand live birth.

$$MMR = \frac{\text{Total Annual maternal death due to birth complications}}{\text{Total life birth}} \times 100000$$

7. Life Expectancy at birth: refers to the average number of years that a newly born baby is expected to live. It is used as a summary measure of the mortality experience of the whole population.

8. Natural Rate of Increase: is the difference between crude birth rate and crude death rate expressed in percentage.

NRI= (C.B.R. - C.D.R.)

Levels and trends in Fertility and Mortality rates in Ethiopia

- Birth and death rates show significant spatiotemporal variation

- Urban areas have lower birth and death rates compared to rural areas implying that living and health conditions are better and, perhaps, family planning programme is gaining ground.
- Looking at TFR by region, in 2016 fertility was the lowest in Addis Ababa
- Similarly, mortality rates are also showing a declining trend.

- by 2011 infant mortality in all regions was lower than 100, except for Benishangul Gumuz.
- Life expectancy at birth in Ethiopia increased from about 36.7 years in the 1960s to 62.6 years in 2016.
- Female life expectancy (65.4 years) is about four years higher than male life expectancy (61.2 years

- Life expectancy at birth is greater for urban areas than for rural areas.
- Even among the five neighbouring countries as part of the developing world, Ethiopia's infant mortality rate is higher than Kenya, Eritrea and Djibouti, giving Ethiopia the lowest life expectancy among the counties.
- As opposed to declining death rates, birth rates have remained high due to:

- Little family planning practices and lack of population education;
- Lower status of women
- Early marriage, particularly of females;
- Parents consideration of children as assets
- The relatively high infant and child mortality rates, that trigger couples to have more births to compensate for the loses and

- Perhaps religious influences.
- Some of the consequences of this rapid population growth under conditions of slowly growing economy include:
- low per capita GNP
- increased unemployment and under – employment

mounting social ills such as destitution, begging, theft, prostitution

- continuous inflation that erodes purchasing power of the currency
- shortage of cultivated land and food shortages
- overcrowding of infrastructural and social facilities; housing problems and increase in urban slums and squatter settlement

Environmental problems such as deforestation, soil erosion, loss of biodiversity and pollution.

Migration in Ethiopia and the Horn

- Migration is an old and inevitable phenomenon, although human mobility has accelerated these days
- Some of the multifaceted implications of migration are indicated hereunder:
- Migration yields an increased level of urbanization;
- It enhances rural-urban linkages in creating an integrated economy

- It influences spatial population distribution
- Migration negatively influences human fertility and mortality patterns and levels; and affects age and sex composition of the population.
- It is a means of achieving economic efficiency.
- It can also be a cause and consequence of inequality and unequal development

- It is regarded as a cause and consequence of diversity; and a mechanism of spreading cultures
- It is a necessary condition for the creation and strengthening of a sense of nationhood and national unity
- It creates a creative and open society to new ideas than a homogenous group of people.

A. Internal Migration in Ethiopia

- Population movement in Ethiopia accelerated in the early twenty century
- voluntary and individual rural out migration during the Derg Regime was low for the following reasons.
- The 1976/77 „land to the tiller“ granted land to the rural landless farmers, which in turn reduced their motivation for out migration.

- The 1975 urban land nationalization that dispossessed landlords‟ rights
- The high level of urban unemployment and underemployment coupled with declining real incomes and growing poverty was a disincentive for potential migrants
- However, landlessness of emerging rural youth; drought and rainfall unreliability

- Internal migration in Ethiopia is, therefore, among the highest in Africa.

B. International migration

- the independence struggle of Eritrea from 1961-1991 that led to violent clashes in the North; and the period of Red Terror between 1976-79 generated massive emigration from Ethiopia.

- Today, Ethiopia could be considered as one of the countries that has a large number of emigrants overseas.
- Ethiopia’s diaspora, estimated to be about four million, is also considered one of the largest of all African countries
- The causes of cross-border migration include:

- Lack of employment and livelihood opportunities, and negative attitudes attached with low paying and informal job and poor work ethics amongst the youth.
- Rural underemployment and lack of resources
- Unfavorable political context and insecurity, civil war and political turmoil,
- Misinformation and false promises by brokers/traffickers;

- Emergence of culture of migration and migration networks
- Demand-side factors of migration (shortage of labour in low-paying, informal, and perilous jobs,
- International Labour Organization/ILO/ in 2016 identified the following migration source areas of Ethiopia with high and growing incidence of emigration

a. Dessie (North and South Wollo) area:

b. Shashemene (Western Arsi and Bale) area:

c. Jimma (Western Ethiopia) area

d. Mekelle/Tigray area

- As a major destination country, Ethiopia hosts the second largest number of refugees in Africa.

Population Distribution in Ethiopia

- Population distribution refers to the arrangement of people over space
- The distribution of population in Ethiopia is very uneven as a result of physical and human factors operating together.
- The most important physical factors that affect population distribution include climate, soil, vegetation, drainage and slope

- the type of economic activity, urbanization, industrialized and the demographic variables are important human influences.

Measures of Population Distribution

Population Density

- Population density refers to the number of people per unit area
- There are several ways of expressing population density,

A. ***Crude Density***

- Crude density is found by dividing total population to total area
- it does not show variations in population distribution within a given area.
- Nationalities and Peoples (SNNP) region is the administrative area with the largest population density (173 people/km2) followed by Amhara region.

Physiological Density

- is a ratio between total population and arable part of a country.

Agricultural Density

- is a kind of density, which takes only agricultural population as a numerator and cultivated land as a denominator.
- It is also called rural density

- Rural population per square kilometer of cropland is the highest for Somali Afar and Gambella.
- The large ratio is due to the smaller proportion of land that is appropriate for agriculture relative to the large landmass and small population.
- The smallest agricultural density lies in Benishangul (3.8), Amahra (5), Oromia (5.6) and Tigray (5.9)

Factors Affecting Population Distribution in Ethiopia

Physical Factors

- The most important physical factors that affect the distribution of population in Ethiopia include climate, mainly rainfall and temperature, soil and vegetation
- The other physical factors include drainage and slope.
- High temperatures in combination with low and irregular rainfall diminish habitability I the lowlands of Ethiopia.

- Steep slopes and surface ruggedness play their own part
- Lowlands are characterized by scarcity of rainfall, high temperature, and poor vegetation and soil conditions.

Human Factors

- **The Historical Pattern of Population Movement**

- After the decline of the Axumite Empire, there was southward movement of the Tigre, Amhara, Agew and Guraghe populations starting from the 7th century.
- one from the north, and the other from the south, offer a significant explanation of denser population distribution in and around the central highlands.

Economic Activities

- Types of productive activities strongly influence the carrying capacity of land;
- The arid and semi-arid lowlands of Ethiopia that are inhabited by pastoralists
- Hence, with pastoral herding, population densities are extremely low.
- Compared to areas of pastoral herding, cultivated lands have greater carrying capacity

- The development of commercial farms in some parts of Ethiopia like the Awash valley is also a significant factor in causing population movements and changes in the population concentration.

Socio-cultural Aspects of Ethiopian Population

Education

- High level of education correlates with higher incomes, better health, longer life span, and lower mortality
- Hence, human capital development is a cause and consequence of development.

- in Addis Ababa more females are attending school than males
- Lower female participation is found in Somali and Harari regions.

Health

- The Government of Ethiopia has been investing heavily in health system
- Some of the root causes of the poor health status of the population are:

- Lack of access to clean water
- Disease related to beliefs
- Lack of adequate nutrition
- Disease related to beliefs like early marriage etc
- Lack of health services:

- The health care infrastructure of the country had suffered from under funding;

- The major killer diseases accounting for about ¾ of all deaths include prenatal-maternal conditions, acute respiratory infection, malaria, nutritional deficiency for children under 5 years, diarrhea, AIDS and Tuberculosis
- Despite significant improvements, Ethiopia's health situation is still at a staggering situation

- the country adopted a strategy to train the health extension workers (HEP) and midwives as well as scaling up family planning.
- There are variations among the regions of Ethiopia in population per hospital and per hospital bed.
- there could be many people with no chance of seeing a doctor or having an access to a hospital bed even if they wished to.

Languages Families and Languages of Ethiopia

- Ethiopia is a country where about 80 languages are spoken.
- Afan Oromo and Amharic were the major mother tounges in the country
- The Ethiopian languages belong to two Supper Families: Afro-Asiatic and Nilo-Saharan.
- Most Ethiopian languages belong to the Afro-Asiatic Supper Family.

A. Afro-Asiatic

- The Afro-Asiatic Supper Family, is divided into three families, namely: **Semitic, Cushitic and Omotic.**

Cushitic

- Cushitic languages are predominantly spoken in central, southern, eastern and northeastern parts of Ethiopia mainly in Afar, Oromia and Somali Regional States

- It has the largest number of speakers and the widest spatial coverage.
- This family of languages consists of many individual languages such as Oromigna, Somaligna, Sidamigna, Afarigna, Kembatigna, Hadiyigna, Alabigna, Gedeogna, and others.

Semetic

- The Semitic languages are spoken in northern, central and eastern parts of Ethiopia particularly in the regional states of Tigray, Amhara, Harari and northern Southern Nations, Nationalities and Peoples' Regional State
- Some of the Semitic Languages include Amarigna, Tigrigna, Guragigna, Siltigna, Aderigna, and Argobigna.

Omotic

- The Omotic languages are predominantly spoken in the south–central and south-western parts of Ethiopia mainly between the Lakes of southern Rift Valley and the Omo River.
- Wolaitigna, Gamogna, Kullogna, Kefigna, and Kontigna are some of the languages in this family

B. NiloSaharan

- are spoken in the western lowlands of Ethiopia along the border with Sudan, in Gambella and Benishangul Gumuz Regional States.
- These Languages are spoken by small numbers of people
- Supper Family include Kunamigna, Bejigna, Gumuzigna, Maogna, Kewamigna, Nuerigna, Annukigna, and others

Settlement Types and Patterns

Types of Settlement

- Settlements are places that are inhabited by people more or less on a permanent basis, as distinct for example from camps, and where people carry out a variety of activities such as agriculture, manufacturing and commerce.
- Settlements are divided into two, namely, rural and urban

- on the bases of the dominant economic activity, population densities and availability of socioeconomic and infrastructural facilities

Rural Settlement

- The vast majority of the Ethiopian population still lives in rural settlements
- Rural settlements can be temporary or permanent

Temporary / Mobile Settlements

- The lowlands are characterized by pastoral herding and mobile settlements searching for new sites for water and pasture for their livestock.
- The major problem often mentioned about mobile settlements is that of providing social services like clean water, schools, hospitals, electricity etc to the people.

Permanent Settlements

- Settlements are considered as permanent if there are no frequent changes in their locations.
- Most Ethiopian rural highland settlements where crop cultivation is practiced are permanent.
- Permanent settlements are of two types
- One of them is scattered

- while the other one is known as grouped/ clustered or nucleated.
- dispersed settlements homesteads are separated by relatively long distances
- Grouped settlements, on the other hand, are characterized by concentration of large number of homesteads and households

Urban Settlements and Urbanization in Ethiopia

- Urbanization refers to the increase in the percentage of the population living in urban centers.
- Urbanization is crucial to sustain the pace of economic development and improve the quality of life for both urban and rural populations.
- Linkage between urban and rural areas could foster efficiency of value chains in agro-industry,

- if the rapid urbanization is not properly managed, it is presumed to bring with it a number of development challenges such as unemployment, housing shortages and informal settlements, infrastructural and service shortages, poverty and social distress.
- The major criteria used to classify settlements as urban in Ethiopia are:

i. Minimum of 2,000 people;

ii. Two-thirds of the population engaged in non-agricultural activities;

iii. Chartered municipality;

iv. The presence of social services and amenities

An overview of the History of Urbanization in Ethiopia

- The only prominent urban centers were Axum, Lalibela and Gondar.
- Modern urbanization in Ethiopia is associated with the establishment of Addis Ababa as a capital by Emperor Menelik II in the late 19th century.
- factors that contributed to the growing and permanency of Addis Ababa as a capital city that are indicated as follows.

- Introduction of the fast-growing Australian eucalyptus tree which satisfied the firewood needs of the ever-growing urban population
- Water supplies improved due to the introduction of wells and reservoirs.
- Introduction of modern schools, hospitals and health centres, hotels, cafes, bars, bakeries,
- The construction of roads that radiate from Addis Ababa

.

- The Italian occupation had also intensified the establishment of small-scale industries and institutions,
- Today, Addis Ababa is not only the capital of Ethiopia; it is also the diplomatic capital of Africa
- Ethiopia is a least urbanized country even by African standards.

- Ethiopia is regarded as a „vast urban desert
- The country‟s low level of urbanization can be attributed to:
- The self-sufficiency of agriculture which reinforced rural peasant life;
- Low level of industrialization
- Lack of employment, and housing shortage
- Political instability, ethnic conflict and social unrest

Drivers of and Opportunities for more Urbanization in Ethiopia

- urbanization is proceeding at a much faster rate in Ethiopia.
- urban population is growing at about 5% a year, primarily driven by migration to urban areas
- 2035.Some of the conditions which have been contributing to expansion of urban areas are
- The establishment of Addis Ababa as a centre of expansion, and its permanency

- The construction of the Ethio-Djibouti railway line along which many stations have developed into important towns.
- The five-year Italian occupation which has contributed to road building
- Political decentralization and provision of administrative status of some urban settlements

- Proximity to existing cities and main transportation corridors
- High Population density and growth rates in the populous highlands
- Presence of new and large commercial farms, mining areas, and agro-industries such as sugar factories;
- Large infrastructure investments such as airports and highways,

- Opening of Universities that support entrepreneurial activity
- Tourism assets and attractions such as parks, resort centres
- Development of border towns with strengthened inter-country trade

Distribution of Urban Centers in Ethiopia

- The distribution of urban centers in Ethiopia shows considerable spatial variation
- Ministry of Urban Development and Construction identified the following hierarchy of urban centers:

- i.***The Addis Ababa Metropolitan cluster includes Addis Ababa and its surrounding towns; and Adama and its surrounding towns***

ii.***Secondary city clusters consist of:***

- Lake Tana Urban Cluster: Bahir Dar, Gondar Debre Tabour, Debre Markos
- South Rift Valley Urban Cluster: Hawassa-Shashemene-Dila;
- Eastern Urban Cluster: Dire Dawa, Harar, Jigjiga
- Mekelle Urban Cluster: Mekelle, Adigrat, Shire, Axum

- Dessie- Kombolcha Urban Cluster.
- Jima Urban Cluster: Jima, Agaro, Mizan, Tepi, Gambella
- iii. ***Tertiary urban clusters include:***
- Nekemte Urban Cluster: Nekemte, Dembidolo, Gimbi, Metu, Assosa
- Gode - Kebri Dar oasis city network
- Semera-Mille – Asaita oasis city network

- Like most developing countries, Ethiopia‟s urban population is concentrated in one primate city, Addis Ababa.
- **Growth Rate of Urban Centers**
- Ethiopia‟s towns are characterized by wide range of growth rates that could be classified into one of the following three broad categories:

i. **Declining Towns:**

- it includes towns whose populations are actually declining in absolute numbers
- Some of the towns that have at least once experienced a decline include, Axum, Goba and Maichew.
- ii. **Slow Growing Towns:**

- This category is composed of towns that grow at the rate which is less than the rate of natural increase.
- Towns such as Holeta, Harar and Gore have been indicated to grow slowly in the recent past.
- iii. **Fast Growing Towns:**
- All towns with growth rates of greater than the natural rate of increase make up this group.

- These towns pull large numbers of people from the declining or slowly growing towns

CHAPTER EIGHT ECONOMIC ACTIVITIES IN ETHIOPIA

- Economic activities are highly diversified in their nature and characters
- Geographers classify a nation's economy into primary, secondary, tertiary or the service sectors.
- The primary sector includes the production of raw material and basic foods. Activities associated with the primary sector include agriculture (both subsistence and.

- commercial), mining, forestry, farming, grazing, hunting and gathering, fishing and quarrying
- The secondary sector of the economy manufactures finished goods.
- All of manufacturing activities, and construction lie within the secondary sector.

- The tertiary sector of the economy is the service industry that provides services to the general population and businesses.
- Activities associated with this sector include retail and wholesale sales, transportation and distribution, entertainment, restaurants, clerical services, media, tourism, insurance, banking, healthcare, and law

Mining Activity in Ethiopia

- Mining involves the search for minerals from the crust of the earth
- Mining is important to the economy of Ethiopia
- **Status of the mineral sector investment in Ethiopia**
- The mining stakes in Ethiopia are held by: The Ethiopian Mineral Development Share Company a Government organization

- the Midrock Gold, a subsidiary of Midrock Gold Group,
- Ezana Mining Development
- the National Mining Corporation
- Potash mining has generated lot of interest in recent years
- Allana Potash, a Canadian mining company
- the Indian Sainik Potash has been working in the Dallol depression.

The importance of Mining sector in Ethiopia

- **Economic benefits**
- ***Generates revenue from sales, taxes, royalty***
- ***Generates foreign currency earnings***
- ***Employment opportunity***
- ***Social Benefits***
- Expansion of infrastructures such as roads, electric power, telecommunication etc

- Expansion of social services such as health facilities, schools service, schools, water facilities as well as airstrips for the local communities
- Train local communities to engage in other form of business such as plantation of coffee and other trees, introducing agricultural activities (irrigation)

- .

- Promote small entrepreneur's engagement in the local community by providing services such as hotel, mini-markets, stationeries, etc.

Environmental issues and management related to mining

- It is inevitable that extraction of minerals from the earth leads to disturb the environment

- the surface and ground water system, the physical land management (soil, rock stability, deforestation grass land, farm land, etc), spillage of strange chemicals/metals, air, noise, dust, aesthetic values
- **Forestry**
- It is related to exploiting forest products, which include gathering of fuel wood, production of timber and charcoal, and construction of houses.

Economic significance of forest

- Most of the trees cut in Ethiopia today are used for domestic purposes like for;
- Fuel wood,
- Timber household furniture,
- For building and construction.
- The commercial exploitation of forest resources in Ethiopia is still in its infancy stage.

This is mainly because of the following major factors;

- Rapid deforestation
- Low demand for timer
- Lack of modern lumbering technology
- Inaccessibility of natural forest
- **Fishery**

➢ Fishing is a primary economic activity that involves harvesting of fish resources from water bodies.

- Still fishing is the most widely spread economic activity both in private and modern societies.
- Due to the presence of a number of lakes, river and reservoirs rich in fish resources
- Ethiopia has great potential for fishing.
- **Fishing Grounds in Ethiopia**
- Most fishing activities in Ethiopia take place in fresh waters, such as rivers, lakes and ponds.

- In general, the Ethiopian fishing grounds could be classified as ***Lakes and Rivers***
- ***Lakes fishery:***
- the Ethiopian lakes are estimated to cover a surface area of about 7000 km2
- The most important lakes where much of the fish production comes include Lakes Tana, Ziway, Langano, HawassaAbaya and Chamo

River Fishery:

- Most rivers of Ethiopia have high fish resources
- Most fish production of the river is confined to local consumption by villagers living near and around river banks.
- The fishing potential of Ethiopian rivers has not yet been fully known.

Demand and consumption of fish

- Fish as a source of human food has a long history in Ethiopia.
- People consume large amount of fish in fasting days, in big cities, around production areas and towns, especially in Hawassa, Zeway, Arbaminch, Bahir Dar and Addis Ababa.
- the domestic market for fish is small

factors which account for this low level of local fish consumption are the following.

- fish has not been integrated into the diet of most of the population.
- because of religious influences on consumption patterns,
- limited supply of the product and its high price.
- Long distance of the fish production sites from densely populated areas

Socio-economic contribution of the fishery sector

- ***Role of fisheries in the national economy***
- ***Trade***
- ***Food security***
- ***Employment***
- ***Fish meal as animal feed source***
- ***Sport fishing as a recreational value***

Constraints and opportunities of the fishing sector

- Factories, agriculture and sewage are the sources of major pollutants affecting Ethiopian water bodies and their fisheries
- The extraction of minerals from Lake Abijata could have negative effect on fish stocks,
- Inadequate legal and policy frameworks have largely given rise to poor fishery resource
- Public and private investment in fishery and aquaculture is low and the infrastructure inadequate.

Agriculture in Ethiopia

- Agriculture is defined as the purposeful tending of animals and plants
- The type of agriculture practiced in any area is influenced by physical and socio-economic factors.
- The environmental factors like soil; climate, relief, etc. impose certain limitations on the types of crops that may be cultivated and the type of livestock that may be reared.

- various socio-economic factors like farm size, type of land tenure, capital availability, transport and marketing facilities, price, government polices, etc. also influence farming patterns.
- Agriculture is important for a number of reasons
- It provides: basic food supplies for the population; raw materials like cotton, sugar cane, oil seeds, etc. to industries;

- export crops, from whose sales industries infrastructure and employment for the population.
- Agriculture is the backbone of the Ethiopian economy

The contributions of agriculture in Ethiopia

- The Ethiopian economy is an agrarian economy
- Agriculture is the backbone of the economy of the country as the following facts indicate.

- Agriculture accounts for most of (30- *42%)t of the Gross Domestic Product (GDP) of the country.*
- Agricultural products account for more than *90 percent of the foreign exchange*

- Agriculture provides raw materials for the processing industries
- More than *80 percent of the Ethiopian population derives its livelihood directly from agriculture.*
- **The Agricultural Resource Base/potentials of Ethiopia**

➢ The country has no less than *21soil types with varying physical and chemical features*

- The country has also vast grazing land and livestock population
- The country has extensive livestock population, with estimated 30 – 35 million livestock units (TLU) standing first in Africa and 10th in the world and numerous livestock species.

Land Use

- Ethiopia has a total land area of about 113,000,000 hectares.
- Accepting the estimate that some 27.9 million-hectare of land is already cultivated
- At present only about 161,010 ha or 4.6% is irrigated around the major river basins
- irrigation allows to cultivate two or three crops each year instead of a single crop most common under dry farming

- It also enables farmers to grow high value crops, especially fruits and vegetables.

Agricultural Land Use in Ethiopia

- lack of access to land is directly correlated with incidence of poverty in rural areas.
- Quality of land has a direct bearing on the productivity of agriculture

- Land ownership has a social value and serves as a security for credit, natural hazards or life contingencies, and also adds to the social status.
- Agricultural land refers to the share of land area that is arable, under permanent crops, and under permanent pastures.
- Arable land includes land defined by the FAO as land under temporary crops (double-cropped areas are counted once),

- Land under permanent crops is land cultivated with crops that occupy the land for long periods and need not be replanted after each harvest, such as cocoa, coffee, and rubber.
- This category includes land under flowering shrubs, fruit trees, nut trees, and vines, but excludes land under trees grown for wood or timber.

- Permanent pasture is land used for five or more years for forage, including natural and cultivated crops.

Cropping seasons in Ethiopia

- The two main crop seasons in Ethiopia are the *belg and meher seasons* which receive rainfall from February to June and from June to October, respectively.

- *belg crop season is officially defined as any crop harvested between March and August,*
- the *meher crop season is defined as any crop harvested between September and February.*
- The *meher crop season is the main season and produces 90-95 percent of the nation‟s total cereals output, and the belg harvest provides the remaining 5-10 percent of cereal output*

Cropping Pattern in Ethiopia

- The highlands are more diversified than the lowlands. Cereals (*teff, wheat, barley, maize, sorghum, etc,) are the most important crops in Ethiopia*

Animal Husbandry

- Ethiopia has a large livestock population (1st in Africa)
- More than 90% of the livestock population is found in Oromia, Amhara and SNNPR.

- Livestock contribute 30-35% to agricultural GDP
- livestock sector contributes about 13% of the total value of agricultural export.
- Despite a large livestock population, the contribution of the livestock sector to the national economy is limited due to primitive methods of livestock breading, cultural attitudes, higher mortality rates of livestock due to disease and other causes.

Characteristics of Ethiopian Agriculture

1. Subsistence Orientation
2. Fragmentation of farm plots and Small size of Holdings
3. Low Use of Inputs
4. Susceptibility to Disasters
5. Limited practice of irrigation and dependence on rainfed agriculture

Agriculture Systems in Ethiopia

- The agricultural systems of Ethiopia can be classified based on:
- *The Agro-ecological patterns to which the practices have been confined.*
- *Dominant types of crops or animals reared or combinations.*
- *Farming methods and tools used for cultivation*

- *Level of technological input and the disposal of output.*
- **The major farming systems are :**

1.Highland mixed farming system

- Has the integration of crop and livestock production and the components include:-

A.Grain-plough complex

- It is practiced in the central and northern parts of the country.

- Farmers mainly depend on cereals for subsistence which are grown along with pulses and oil corps for some commercial purposes.
- *Barley and wheat dominate in the grain-plough complex of Arsi and Bale, while „teff" is the most important crop in the central and northern highlands*

- Ploughing is practiced many times (2-6) before planting

B. The Horticulture-Hoe complex

- This agricultural system is primarily found in the high rainfall humid regions of southern and southwestern parts of the country.
- The major crops grown include „*enset*" *(false banana), coffee, chat and various other horticultural corps.*

- Horticulture crops such as sweet potatoes/sugar beet, lemon, banana, mango, and avocados are widely grown.
- Horticulture crops such as sweet potatoes/sugar beet, lemon, banana, mango, and avocados are widely grown.
- With increasing population pressure and farmland scarcity, *stall-feeding has become a common practice.*

2. Lowland mixed agriculture

- Lowland agriculture is practiced in the mountain foothills and the lower valleys below 1500m.a.s.1.
- Lowland agriculture is common in the Rift Valley and northern areas of Awash River.
- Drought-tolerant varieties of sorghum, maize, wheat, teff, oil corps and lowland pulses are grown.

- Livestock are also raised on common grazing land and crop residue
- As a response to the shortage and variability of rainfall, farmers diversify their cropping patterns by growing several crop varieties
- In times of serious drought livestock are relied up on for survival

3. Pastoral complex

- This type of agriculture is practiced in the arid and semiarid lowlands of Ethiopia
- In some lowlands, crops are produced along flood plains and river banks.
- About 90% of the live animals exported come from pastoral areas.
- A major constraint to animal husbandry in the pastoral areas is shortage of water especially during the long dry season.

4. Shifting cultivation

- This is the cut-and- burn cultivation system whereby a given plot of land is cultivated after clearing until its natural fertility is exhausted to a level it cannot support plant life any longer and then abandoned for another clearing.

5. Commercial agriculture

- Commercial agriculture is a modern farming practice involving the production of crops or animal products for market by using some degree of mechanization and hired laborers.

Major problems of Ethiopian agriculture

- ***Land degradation***
- ***Variable rainfall***
- ***Land fragmentation***
- ***Land tenure insecurity***
- ***Backward technology***
- ***Poor rural infrastructure***

Manufacturing Industry in Ethiopia

- Manufacturing is a process of changing commodities to consumable forms

Employment in Industries

- a continually increasing trend in the number of employees working in all industries over the last five years.

The value of industrial production

- Gross value of production by manufacturing sector worth about 113 billion Birr

- The Ethiopian large and medium size manufacturing sector is dominated by food and beverages.

Types and characteristics of manufacturing

- **Types of Manufacturing Industries**

- **The Cottage (traditional)industries**
- **Manufacturing Industries**

Industrial parks/zones in Ethiopia

- The agro-processing industries, leather products and the textile and apparel sectors have been designated as top priority manufacturing industries in the latest five-year development plan (2015 to 2020). The main reasons include:

- strong linkages with the agricultural sector
- they are also both labour intensive, thus absorbing labor from the agricultural sector

- they have major export potential and low entry barriers.
- **Contributions of Industrial Parks in Ethiopia**
- Stimulating investment and creating employment
- Facilitating export growth and foreign exchange earnings
- Developing industrial clusters through forward/backward linkages

- Eliciting knowledge transfer and technology spill over
- Establishing connections to global value chain
- Fostering Sustainable Growth and social equality
- Enforcing implementation of national industrialization strategy

The Sugar Sector Mega Projects in Ethiopia

- Sugar Industry is one of the industries which contribute immensely for the industrial transformation of our country
- Until recently, Ethiopia has been a net importer of sugar as the two old sugar factories (Wonji and Metehara) have limited capacity to meet domestic demand

Industrial development in Ethiopia: Challenges and Opportunities

- **Challenges of the Manufacturing Sector**
- High logistics and transportation cost
- Limited research/study and action on export incentives and market
- Low labor productivity
- High cost of imported raw materials
- Underdeveloped rural infrastructure in the potential areas

The Service Sector in Ethiopia

- **Transportation**

a.Traditional Transport

b. Road Transport

c. Railway

d. Waterways

e. Airways

Communications

- Communication is the process of conveying messages to others.

The Contribution of Transportation to Socio-Economic Development

- It creates job opportunity
- It promotes investment sector
- It serves as a source of income
- Plays the role of linking rural areas and rural products to urban centers

Trade in Ethiopia

- Trade is a process of exchange of products involving change in ownership of commodities.
- **Internal trade: This refers to the exchange of goods and services within the country. It can be done between regions or within a region.**
- **External Trade: External trade refers to the exchange conducted between countries. In other words, it is concerned with import-export trade.**

Foreign Trade

- Some countries are rich in capital resources, others are rich in labor resources, and still others are rich in natural resources. Hence, every country must trade with others to acquire what it lacks.

Tourism in Ethiopia:

- Tourism is one of the largest and most important industries in the world in terms of employment creation and generation of foreign revenue.

Types of Tourism

- The common tourism forms in the country include living culture tourism, history tourism, archaeology tourism, palaeontology tourism, park tourism, geo-tourism,

- agro-biodiversity and coffee tourism, rural tourism, conference tourism and sport tourism

Major Tourist attraction sites of Ethiopia

- **The Obelisk of Axum**
- **The Churches of Lalibela**
- **The Castles of Gondar-**
- **The Walls of Harar**

Natural Attraction sites

i. **The Blue Nile Falls**

ii. **Simien Mountains**

iii. **The Rift Valley Lakes**

iv. **The National Parks**

The Role of Tourism in the Economy of Ethiopia

- tourism seems to be the third source of export revenue after agriculture and industry

Challenges of the sector to be addressed

- Weak institutional framework and implementation capacity
- Lack of basic and IT infrastructure
- Weak private sector associations
- Poor visitor management in natural and heritage sites puts sites at risk
- Poor tourism statistics

THE END