

UNIT 8

ECONOMY, ENVIRONMENT AND CLIMATE CHANGE

Introduction to Economy, Environment, and Climate Change

Key Concepts:

- **Economy:** The study of how resources are allocated to meet human needs.
- **Greenhouse Gases:** Gases that trap heat in the atmosphere, contributing to global warming.
- **Environment:** The natural world, including all living and non-living things.
- **Global Warming:** The increase in Earth's average surface temperature due to greenhouse gas emissions.
- **Climate Change:** Long-term changes in temperature, precipitation, and other atmospheric conditions on Earth.
- **Ecosystem:** A system of living organisms interacting with each other and their environment.
- **Environmental Resources:** Resources provided by nature that are essential for human survival and economic activities.
- **Environmental Degradation:** The deterioration of the environment through the depletion of resources, destruction of ecosystems, and pollution.
- **Population:** The number of people living in an area, influencing and being influenced by environmental factors.
- **Green Growth:** Economic growth that is environmentally sustainable and reduces carbon emissions.

8.1 Economy and the Environment

Understanding Economics and Environment:

Economics studies how limited resources are used to fulfill human wants. Resources, such as land, labor, capital, and entrepreneurship, are essential for production. However, these resources are finite, and their scarcity leads to opportunity costs. Natural resources are a subset of economic resources and include both renewable (like forests and fish) and non-renewable (like minerals) resources.

Economic activities often deplete these resources and damage the environment. For instance, urbanization and industrial expansion can lead to environmental degradation. The concept of the "environmental Kuznets curve" suggests that as economies develop, pollution might initially increase but eventually decrease as societies gain the means and willingness to invest in environmental protection.

Historically, global concern for the environment began with events like the Great Smog of London and Rachel Carson's "Silent Spring." The international community has since addressed these concerns through various reports and agreements, such as the Kyoto Protocol and the Sustainable Development Goals (SDGs).

Rural Development and Environment:

Rural development aims to improve the quality of life in rural areas by enhancing agriculture, education, health, and infrastructure. However, rural development can strain environmental resources, leading to issues like soil degradation, deforestation, and pollution. For example, increased agricultural activity can lead to soil erosion and loss of fertility.

Urban Development and Environment:

Urbanization involves the growth of cities and towns, which often leads to environmental challenges such as pollution, inadequate infrastructure, and health issues. Rapid urban growth can strain resources like water and sanitation, and contribute to environmental problems like air and water pollution. Clean technologies and improved urban planning are necessary to mitigate these issues.

Population, Resources, and Environment:

The world population is expected to rise significantly, increasing the demand for resources and putting pressure on the environment. Rapid population growth can lead to overexploitation of natural resources, resulting in issues such as land degradation, reduced agricultural productivity, and increased pollution. Addressing these challenges requires managing resources sustainably and implementing policies to balance population growth with environmental conservation.

8.2 Global Warming and Climate Change

Understanding Global Warming and Climate Change:

Global warming refers to the increase in Earth's average temperature due to greenhouse gas emissions. Climate change encompasses a broader range of long-term changes in the climate, including shifts in temperature, precipitation patterns, and extreme weather events.

Causes and Indicators:

Climate change is primarily caused by human activities such as burning fossil fuels, deforestation, and industrial processes, which increase greenhouse gas concentrations in the atmosphere. Indicators of climate change include rising global temperatures, melting glaciers, and more frequent extreme weather events.

Vulnerability and Impacts:

Vulnerable populations, particularly in developing countries, face severe impacts from climate change, including increased risk of natural disasters, food insecurity, and health problems. These impacts can exacerbate existing inequalities and hinder development efforts.

Addressing Climate Change:

To address climate change, strategies include mitigating greenhouse gas emissions, transitioning to renewable energy sources, and adapting to changing conditions through measures like improved infrastructure and disaster preparedness.

Ethiopia's Policies:

Ethiopia has implemented various policies to combat climate change, including efforts to reduce emissions, enhance renewable energy use, and adapt to environmental changes. These policies aim to protect natural resources, support sustainable development, and improve resilience to climate impacts.

Global Warming, Climate Change, and Mitigation Strategies

1. Global Warming

Global warming refers to the long-term increase in Earth's average air and ocean temperatures. This trend has been particularly noticeable since the mid-

20th century and is largely attributed to human activities such as industrial processes, deforestation, and agriculture, which release greenhouse gases (GHGs) into the atmosphere. Key GHGs include:

- **Carbon Dioxide (CO₂)**
- **Methane (CH₄)**
- **Nitrous Oxide (N₂O)**
- **Water Vapor (H₂O)**
- **Ozone (O₃)**

These gases trap heat in the Earth's atmosphere through the **greenhouse effect**, where they absorb and re-radiate thermal infrared radiation emitted by the Earth's surface and clouds. Since pre-industrial times, the concentration of these gases has significantly increased, contributing to global warming.

2. Climate Change

Climate change refers to significant, long-term changes in the Earth's climate, including shifts in temperature, precipitation, and other atmospheric conditions. It results primarily from increased greenhouse gas emissions, leading to alterations in climate patterns. Unlike short-term weather, which includes daily or weekly atmospheric conditions, climate is the average weather pattern over extended periods.

Impacts of Climate Change:

- **Temperature Rise:** Mean global temperatures have already increased by 1°C since pre-industrial times, with projections of a further increase of 1.5°C to 4°C by 2099 if current trends continue.
- **Precipitation Changes:** Increased frequency of extreme weather events such as floods and droughts.
- **Health Risks:** Emergence of diseases and health issues, including respiratory problems and malaria.

3. Impacts of Climate Change

Climate change affects various environmental and socio-economic systems:

- **Physical and Ecological Environments:** Increased temperatures can lead to more frequent heat waves, floods, and droughts.
- **Agriculture and Food Security:** Changes in temperature and precipitation patterns can reduce agricultural productivity and exacerbate food insecurity.
- **Health:** Rising temperatures and changing weather patterns can increase the prevalence of heat-related illnesses and vector-borne diseases.

4. Vulnerability to Climate Change

Vulnerability to climate change is determined by:

- **Exposure:** The extent to which a system is exposed to climatic hazards.
- **Sensitivity:** How sensitive a system is to climate variations.
- **Adaptive Capacity:** The ability to adjust and respond to climate impacts.

Highly vulnerable groups and regions include:

- **Poor Communities:** Especially those in low-income areas, which are more likely to be exposed to extreme weather and have fewer resources to adapt.
- **Developing Countries:** Often face greater impacts despite contributing less to the problem. They also struggle with limited resources for adaptation.

5. Mitigation and Adaptation Strategies

Mitigation involves reducing or preventing the emission of greenhouse gases to limit global warming. Strategies include:

- **Carbon Markets and Taxes:** Encouraging reduced emissions through economic incentives.
- **Forestry Initiatives:** Programs like REDD+ focus on reducing emissions from deforestation and forest degradation.
- **Technological Innovations:** Development of cleaner technologies and renewable energy sources.

Adaptation involves adjusting systems to minimize the adverse effects of climate change. Strategies include:

- **Planned Adaptation:** Government policies aimed at preparing for and responding to climate impacts.
- **Autonomous Adaptation:** Individual and community efforts to adjust to changing conditions.

6. Green Economy and Green Growth

Green Economy aims to improve human wellbeing while reducing environmental risks. It focuses on low carbon emissions, resource efficiency, and social inclusivity.

Green Growth fosters economic development while ensuring that natural resources and ecosystems continue to provide essential services. Key components include:

- **Renewable Energy:** Sources like solar, wind, and hydro power reduce dependence on fossil fuels and lower carbon emissions.
- **Investment and Innovation:** Promotes the development of new technologies and economic opportunities that support sustainability.

7. Addressing Climate Change in Ethiopia

Ethiopia faces significant climate challenges including drought, soil erosion, and land degradation. To combat these issues, the Ethiopian government has implemented:

- **National Adaptation Programme of Action (NAPA):** Identifies vulnerable sectors and strategies for adaptation.
- **Climate Resilient Green Economy (CRGE) Strategy:** Aims for carbon-neutral growth and addresses both adaptation and mitigation.
- **Green Legacy Initiative:** A large-scale tree-planting campaign to counteract deforestation and climate impacts.

Summary: Effective climate action requires both mitigation and adaptation strategies, tailored to the specific vulnerabilities and needs of different regions and communities. In Ethiopia, national policies and initiatives are crucial in addressing climate change and promoting sustainable development.