UNIT THREE
NATURAL RESOURCES AND CONFLICTS OVER RESOURCES

Introduction

In this unit, we explore the vital role of land as a natural resource, its multiple functions, and the strategies for its sustainable management. We'll discuss how resources are classified into renewable and non-renewable categories, and highlight the pressure on common resources due to human activities. We will also examine the concept of transboundary rivers, the importance of regional cooperation for their sustainable use, and the water resource potential of Ethiopia in comparison to neighboring countries like Egypt and Sudan. Finally, we will touch on conflicts that arise over natural resource use.

Importance of Land as a Natural Resource

Land is a fundamental resource that supports all human activities. It is essential for life on Earth, providing us with food, shelter, space for work, and leisure. Beyond being a physical asset, land also holds legal, economic, and cultural significance. As a natural resource, land encompasses the materials we derive from the Earth, including those from the lithosphere (soil and minerals), biosphere (plants and animals), atmosphere, and hydrosphere (water bodies).

Land resources are classified in various ways:

- **Renewable vs. Non-renewable**: Renewable resources like plants and animals regenerate after use, while non-renewable resources like minerals and fossil fuels do not.
- **Origin**: Resources can be biotic (living) or abiotic (non-living).
- **Current use and future availability**: Resources are either stock (stored) or flow (available continuously).
- **Distribution and volume**: Resources may be ubiquitous (found everywhere) or rare.
- **Stage of development**: Resources can be potential, actual, or conditional based on their development and use.

Renewable resources replenish themselves, but can be depleted if used excessively. Non-renewable resources, on the other hand, exist in finite amounts and are not easily replaced once used. Therefore, careful management of both types of resources is crucial.

Functions of Land

Land serves several important functions:

- **Production**: Land is the basis for agricultural and industrial production.
- **Waste Disposal**: It acts as a sink for waste products.
- **Economic Asset**: Land can be developed or sold for economic gain.
- **Cultural Asset**: Land often holds cultural, religious, and historical significance.

Land Management

Land management involves using and protecting land resources to maximize benefits while ensuring the sustainability of ecosystems. Effective land management includes practices like:

- **Soil Protection**: Through proper farming, afforestation, and terracing.
- **Water Management**: Using efficient irrigation and watershed management.
- **Air Quality**: Reducing pollution through renewable energy and fuel-saving technologies.
- **Cultural Sensitivity**: Integrating local knowledge and customs into management practices.

The goal is to balance resource use with regeneration, preventing degradation and ensuring that land continues to provide essential services to humanity and the environment.

Pressures on Natural Resources

Certain renewable and non-renewable resources are under intense pressure due to human activities:

- **Soil Degradation**: Caused by erosion, nutrient loss, and pollution, leading to reduced agricultural productivity.
- **Water Stress**: Overuse and pollution of water resources threaten water availability, especially in arid regions.
- **Forest Depletion**: Deforestation for agriculture, urbanization, and resource extraction reduces biodiversity and carbon storage.

Soil Resources

Soils are essential for agriculture but are increasingly degraded due to erosion, nutrient loss, and pollution. Soil degradation reduces its capacity to support plant growth and other ecosystem functions. Solutions include proper land use practices, erosion control, and the use of natural fertilizers.

Water Resources

Water is essential for life, agriculture, and industry. However, water resources are under pressure from pollution, overuse, and climate change. Water scarcity is a growing concern, particularly in arid regions. Effective water management strategies include safe waste disposal, recycling, and watershed management.

Forest Resources

Forests are vital for biodiversity, climate regulation, and human livelihoods. However, deforestation and mismanagement threaten these resources. Conservation strategies include afforestation, sustainable forest management, and the use of alternative energy sources.

3.3 LAND RESOURCE DEPLETION AND DEGRADATION

Introduction: Land resource depletion and degradation refer to the decline in the quality and quantity of natural resources such as soil, water, and vegetation. This process can be caused by both human activities and natural events, leading to significant environmental and socioeconomic consequences. Understanding the causes, impacts, and management measures of land resource degradation is essential for sustainable development.

Key Concepts:

- **Resource Degradation:** The deterioration of the environment through depletion of resources such as soil, water, and vegetation.
- **Proximate Cause:** Direct or immediate causes of resource degradation, often resulting from human activities.
- **Underlying Cause:** Fundamental factors that drive proximate causes, such as population growth and poor land management.

- **Resource Management:** Practices aimed at conserving and restoring natural resources.

3.3.1 Concepts of Resource Degradation and Their Causes

Definition: Resource degradation refers to the loss of the quality and quantity of land resources, including soil fertility, water availability, and vegetation. This decline is often due to human activities like deforestation, overgrazing, and poor agricultural practices, but can also result from natural disasters such as floods and earthquakes.

Examples of Land Degradation:

- **Atsbi-Womberta, Tigray, Ethiopia:** Land degraded by erosion, resulting in reduced agricultural productivity.
- **Rajasthan, India:** Wastelands caused by soil erosion, leaving the land barren and unproductive.
- **Ghana:** Cotton plantations suffering from severe erosion, leading to loss of fertile topsoil.
- **Bolivia:** 'Badlands' formed over sodic soils due to erosion, making the land unsuitable for farming.

Causes of Land Resource Degradation:

1. **Underlying Causes:**
    - **Rapid Population Growth:** Increases the demand for food, farmland, biomass energy, and timber, leading to overexploitation of land resources.
    - **Climate Change:** Causes unpredictable weather patterns, such as decreased rainfall and increased temperatures, which can lead to desertification and flooding.
    - **Government Policies:** Poor land tenure policies can lead to insecurity and misuse of resources.
2. **Proximate Causes:**
    - **Intensive Land Use:** Overuse of land through practices like repeated tillage and deforestation leads to soil erosion and loss of fertility.
    - **Improper Land Use Practices:** Poor farming methods, such as plowing up and down slopes, and inadequate crop rotation, contribute to soil degradation.
    - **Overgrazing:** Excessive livestock grazing leads to the removal of vegetation, exposing soil to erosion.

Consequences of Land Degradation:

- **Soil Erosion:** Loss of fertile topsoil, reducing agricultural productivity.
- **Deforestation:** Reduction of forest cover, leading to loss of biodiversity and climate stabilization.
- **Desertification:** Expansion of desert-like conditions, reducing arable land and contributing to poverty.
- **Water Pollution:** Contamination of water sources due to runoff from degraded lands, leading to health problems.

3.3.2 Consequences and Controlling Measures of Resource Degradation

Consequences: The degradation of natural resources can have severe environmental and socioeconomic impacts, particularly in developing countries. These include:

- **Reduced Agricultural Productivity:** Loss of fertile land reduces the capacity to grow food, leading to food insecurity.
- **Water and Air Pollution:** Degraded lands contribute to the pollution of water bodies and the atmosphere, affecting human health and ecosystems.
- **Loss of Biodiversity:** Habitat destruction due to land degradation leads to the loss of plant and animal species.
- **Climate Change:** Degraded lands contribute to global warming by releasing stored carbon into the atmosphere.

Controlling Measures: Effective land management practices can help prevent and reverse resource degradation. Some key measures include:

1. **Afforestation and Reforestation:** Planting trees on barren lands and replanting in deforested areas help restore vegetation cover and prevent soil erosion.
2. **Terracing:** Building terraces on steep slopes reduces water runoff and soil erosion.
3. **Check Dams:** Small dams constructed across waterways help slow down water flow, reducing erosion and conserving soil in gullied areas.
4. **Mulching:** Covering soil with plant residue helps retain moisture and improves soil fertility as the residue decomposes.
5. **Shelterbelts:** Planting trees in rows to reduce wind speed and prevent wind erosion.

6. **Diversion Canals and Trenches:** Used to divert floodwaters and trap soil, reducing the impact of water on farmlands.
7. **Proper Irrigation Practices:** Avoiding excessive irrigation to prevent soil salinization and maintaining soil fertility.
8. **Use of Fertilizers and Manure:** Adding organic and chemical fertilizers to replenish lost nutrients and improve soil fertility.
9. **Crop Rotation and Inter-cropping:** Growing different crops in succession to maintain soil health and fertility.

Regional Cooperation for Sustainable Use of Shared Rivers

Introduction: When rivers and lakes cross multiple countries, managing these shared water resources can become complex due to differing priorities and interests. Effective and sustainable management of these shared watercourses requires regional cooperation among the countries involved, often referred to as riparian states.

Importance of Regional Cooperation: Regional cooperation is essential for the sustainable use of shared rivers because it helps:

- **Prevent conflicts:** Without cooperation, countries may compete over water resources, leading to conflicts.
- **Promote equitable use:** Cooperation ensures that all countries sharing a river have fair access to water resources.
- **Enhance environmental protection:** Collaborative efforts can help protect the shared watercourse from pollution and overuse, ensuring long-term sustainability.

Role of Regional Institutions: To manage shared water resources effectively, countries often establish regional institutions or sign agreements that lay down the rules and frameworks for cooperation. These institutions play a crucial role by:

- **Facilitating negotiation and dialogue:** They provide a platform for countries to discuss issues and resolve disputes peacefully.
- **Coordinating resource management:** Regional institutions help synchronize efforts across borders, ensuring that water use in one country does not negatively impact others.
- **Implementing joint projects:** They can manage shared projects like dam construction, water quality monitoring, or environmental conservation efforts.

Examples of Regional Cooperation:

1. **The Nile Basin Initiative (NBI):**
    - **Objective:** Promote sustainable socio-economic development and equitable utilization of the Nile's resources.
    - **Countries Involved:** Ethiopia, Egypt, Sudan, Uganda, and several others.
    - **Role:** The NBI coordinates efforts to manage and use the Nile's water resources efficiently, ensuring all member countries benefit fairly.
2. **Lesotho Highlands Water Project:**
    - **Countries Involved:** Lesotho and South Africa.
    - **Objective:** Transfer water from Lesotho to South Africa's industrial regions while providing Lesotho with infrastructure and economic benefits.
    - **Role:** A Joint Permanent Technical Commission oversees the project to ensure it benefits both nations.
3. **Zambezi River Authority (ZRA):**
    - **Countries Involved:** Zambia and Zimbabwe.
    - **Objective:** Manage the Zambezi River for power generation and other uses.
    - **Role:** ZRA coordinates dam operations, data collection, and new project investigations.

Potential Conflicts and the Need for Cooperation: Disagreements over water use can lead to conflicts, especially in regions where water is scarce. Cooperation is key to preventing such conflicts. For example:

- **Water scarcity:** In regions like Darfur (Sudan) or between Nile riparian countries, competition over limited water resources has led to conflicts.
- **Shared watercourses:** More than 263 shared rivers around the world could become sources of conflict without proper management and cooperation.

Handling Natural Resource Conflicts

People respond to natural resource conflicts in different ways, depending on their cultural, social, and economic backgrounds. These conflicts can be managed through various methods, which may be formal or informal, peaceful or violent, and fair or unfair. Despite the differences in approach, most conflict resolution strategies share common procedural modes. The key strategies used to handle natural resource conflicts include:

1. **Avoidance**:
    - This involves acting in ways to prevent a conflict from becoming publicly recognized. People might avoid discussing the issue or taking actions that could escalate the situation. This strategy can sometimes delay the resolution of the conflict but might also prevent it from worsening.
2. **Coercion**:
    - Coercion involves using threats or actual force to impose one's will on the other party. This method is often aggressive and can lead to further conflict or resentment. It may solve the immediate issue but rarely leads to a long-term resolution.

3. **Negotiation**:
    - Negotiation is a voluntary process where the conflicting parties come together to reach a mutually acceptable agreement. Both sides consent to the terms, making this a peaceful and collaborative approach. Negotiation aims for a win-win solution, where all parties feel satisfied with the outcome.
4. **Arbitration**:
    - In arbitration, the conflict is submitted to a mutually agreed-upon third party who listens to both sides and makes a decision. The decision is usually binding, meaning that the parties must follow it. Arbitration is less formal than a court process but still provides a structured way to resolve conflicts.
5. **Mediation**:
    - Mediation involves a neutral third party (the mediator) who helps facilitate the negotiation process. Unlike arbitration, the mediator does not have the authority to impose a solution. Instead, they guide the parties toward finding their own agreement.
6. **Adjudication**:
    - Adjudication is a formal process where a judge or administrator makes a binding decision on the conflict. This is often used when other methods have failed, and it typically involves a legal process. The decision is enforceable by law.

Unit Summary: Understanding Land and Natural Resources

- **Land** is defined as the area of the Earth's surface that includes all biotic (living) and abiotic (non-living) components. These components include plants, animals, gases in the atmosphere, underlying geology and soils, hydrology (water systems), and human activities.

- The world's useable land resources are under pressure due to the rapidly growing population, leading to excessive use and depletion of resources like soil, forests, and water. Managing these depleting resources and properly utilizing non-renewable materials is crucial.
- There are over 263 transnational rivers and lakes, as well as many trans-state aquifers, which are shared by multiple countries. These water sources are vital for nearly 40% of the global population and cover significant portions of Africa, South America, North, and Central America.
- A key example is the Nile River, shared by Ethiopia, Sudan, and Egypt. Ethiopia contributes over 85% of the Nile's water but faces challenges from Sudan and Egypt regarding the construction of the Grand Ethiopian Renaissance Dam (GERD). These challenges stem from a 1959 agreement between Sudan and Egypt that excluded Ethiopia, leading to ongoing conflicts over water rights.