UNIT SEVEN

Contemporary Global Geographical Issues and Concerns

7.1. Climate Change

- Climate change is a major global issue that poses significant threats to people's lives and livelihoods. It requires comprehensive strategies that address social, economic, and environmental consequences.
- The Paris Agreement, endorsed by 195 countries in 2015, aims to curb emissions and strengthen climate risk management.
- However, if greenhouse gas emissions continue without significant reduction, global temperatures are projected to rise by 2.5°C to 4.5°C.

- **Climate change has various effects on the planet, such as**
  - ✓ **Melting Ice and Rising Sea Levels: Melting glaciers and ice sheets contribute to rising sea levels, threatening coastal areas.**
  - ✓ **Impact on Wildlife and Habitats: Changing temperatures disrupt wildlife habitats and endanger species like the Adélie penguin.**
  - ✓ **Change in Weather Patterns: Global precipitation patterns are changing, causing increased risk of droughts and floods in some regions.**
  - ✓ **Emerging Issues: Certain species like pests and jellyfish populations are thriving due to climate change.**
- **Climate change is a subject of extensive academic research worldwide, and it is fundamentally a spatial phenomenon.**

7.2. Desertification

7.2.1. Definition of Desert and Desertification

- **Deserts** are areas of the Earth that **receive very little rainfall**, typically 250mm or less per year.
- **Desertification**, on the other hand, refers to **human-induced land degradation specifically in dry and sub-humid regions**. It does not apply to natural deserts.
- Desertification gained attention after **the extended drought in the West African Sahel in the 1970s** and was discussed in the United Nations Conference on Desertification in **1977**.
- The UN defines desertification as human-induced land degradation in dry and sub-humid regions.

- **According to the IPCC, desertification is land degradation in arid, semi-arid, and dry sub-humid areas resulting from various factors, including human activities and climate change.**
- **The extent and intensity of desertification have increased in some dryland areas over the past few decades.**
- **Drylands cover about 46.2% of the global land area and are home to 3 billion people, are vulnerable to desertification.**
- **Land degradation due to desertification is a serious problem impacting millions. Since the 1980s, nearly 10% of drylands have become more desert-like, affecting roughly 500 million people by 2015.**

- **The regions most affected by desertification are South and East Asia, the Sahara region including North Africa, and the Middle East.**

7.2.2. Characteristics and Surface Area of the World's Drylands

- **Drylands, encompassing arid, semi-arid, and sub-humid areas, cover almost half (47%) of Earth's land surface, roughly 6.45 billion hectares. These regions experience harsh conditions due to limited rainfall and a combination of climatic factors.**
- **Drylands are categorized into hyper-arid (real deserts like the Sahara), arid, semi-arid, and sub-humid regions, with the latter three types vulnerable to desertification.**

- **Around 70% of the 5.2 billion hectares of drylands used for agriculture are already degraded.**
- **Desertification in drylands affects roughly one-quarter of the Earth's surface and two-thirds of all countries.**
- **Key characteristics/features of drylands include:**
  - ✓ **Low and unpredictable precipitation**
  - ✓ **Extreme temperature fluctuations between day and night**
  - ✓ **Soil that is poor in organic matter**
  - ✓ **Water scarcity(Lack of water for consumption)**
  - ✓ **Plant and animals adapted to arid conditions(heat resistance, lack of water).**

7.2.3. Causes of Desertification

- **Desertification, the process of land degradation and the transformation of fertile land into desert-like conditions, is caused by various factors. These include:**
- **(1)Population growth: The increase in the global population, from 1 million in the Stone Age to 6 billion in the 1990s, has put pressure on land resources.**
- **Rapid population growth leads to increased agricultural pressure on land, resulting in soil degradation and decreased productivity.**

- **(2) Over-exploitation of natural resources: Farmers often exploit natural resources such as food crops, water, and firewood to meet their survival needs.**
- **This persistent exploitation leads to the depletion of soil nutrients and organic matter, making it difficult for the soil to regenerate naturally.**
- **Over-cultivation and overgrazing further exacerbate soil degradation and vegetation loss.**
- **The principal causes aggravating land degradation derives from the farmers' determination to maximize soil productivity, which include:**
  - ✓**Crops cultivated in areas at high risk from drought.**

- ✓ **Shortening of crop cycles and the reduction of fallow periods.**
- ✓ **Insufficient use of fertilizer after harvesting.**
- ✓ **Inadequate crop rotation or worse, monoculture.**
- ✓ **Intensive labor.**
- ✓ **Overgrazing by livestock removes vegetation that protects the soil, making it vulnerable to erosion.**
- ✓ **Deterioration of terraces and other soil and water conservation techniques.**
- ✓ **Deforestation.**

- ➢ **(3) Deforestation and energy use: The use of firewood as a primary source of energy for cooking and lighting, especially in arid areas, contributes to deforestation.**
- ➢ **Deforestation disrupts the natural balance of ecosystems and contributes to desertification.**

- **Encouraging the use of renewable energy sources can help reduce the need for deforestation.**
- **(4)Climate change: Historical climate variations have occurred, and arid and humid climates have shifted over time.**
- **Human activities, such as over-exploitation of forest resources and greenhouse gas emissions, can influence the climate and contribute to desertification.**
- **Changes in temperature and rainfall patterns can lead to desert-like conditions in semi-arid areas.**

7.2.4. The Consequence of Desertification

- **Desertification, which is the degradation of land in arid, semi-arid, and dry sub-humid areas, has had significant consequences on the environment, economy, and society.**
  - ✓ **Reduced land resilience: Desertification weakens the land's ability to withstand natural climate change. This impacting soil, vegetation, freshwater, and other resources.**
  - ✓ **Soil degradation: Soil becomes less productive as a result of topsoil erosion by wind and rain.**
  - ✓ **Downstream flooding: Desertification can cause downstream flooding, leading to decreased water quality due to sedimentation in rivers and lakes. Reservoirs and navigation channels can also be affected by silt sedimentation.**

- ✓ **Food production decline: desertification reduced food production. This can lead to malnutrition, hunger, and famine, especially in poverty-stricken areas with conflict.**
- ✓ **Societal consequences: Desertification can trigger mass migration, wars, and conflicts over scarce freshwater resources.**
- ✓ **Economic impact: Desertification leads to a significant economic loss, with an estimated annual income loss of over 42 billion USD in affected regions.**
- ✓ **Other consequences: includes farming difficulties, decreased crop yields, biodiversity loss, habitat destruction, and endangered/extinction of species as additional consequences of desertification.**

7.2.5. Desertification in Eastern Africa

- **Desertification in East Africa is a critical issue affecting the region's development.**
- **Two-thirds of Africa's land is dry. Approximately 319 million hectares of land in Africa are vulnerable to desertification. These areas are concentrated in the Sahelian region, Horn of Africa, and Kalahari in the south.**
- **Desertification is a major threat to Africa's development, with 41% of the sub-Saharan drylands' population living in extreme poverty due to desertification.**
- **Eastern Africa, which includes countries like Djibouti, Eritrea, Ethiopia, Kenya, Somalia, Sudan, South Sudan, Uganda, and Tanzania, is influenced by the Sahara Desert, making it relatively dry.**

- **Eastern Africa experiences high temperatures and low precipitation, with some areas being very arid or semi-arid.**
- **Other areas, like Ethiopia and the mountains of Kenya, have mountain climates with higher rainfall.**
- **Coastal regions of Eritrea, Uganda, and Tanzania have a very humid climate, while the rest of Tanzania, Kenya, and Uganda have a typical tropical climate with a long dry season.**
- **Causes of Desertification: Rapid population growth, deforestation, and large-scale environmental projects are contributing to desertification in East Africa's semi-arid areas.**

- **Desertification has already had a significant impact on the livelihoods of the region's poor population, who rely heavily on the land for their traditional peasant lifestyles.**
- **The governments in this region often rely on exporting limited resources to earn foreign exchange, leaving little revenue for the development and provision of the growing population's needs. As a result, the population of East Africa is growing faster than their economies can support.**

Features of desertification in Eastern Africa

- **Desertification in Eastern Africa is a significant issue with several notable features.**

- **In Tanzania, the combined population pressure from human and animal populations has led to moderate to high land degradation.**
- **Approximately 45% of the country's territory has already been affected, and an additional 35% is at risk. Specifically, the semiarid regions of Sukumaland Sindiga, Gogoland, and Masai steppe are the most impacted areas.**
- **In Sudan, desertification is primarily caused by overpopulation and the demand for extensive millet cultivation. Additionally, tree cutting for various domestic purposes contributes to the problem. Each settled household in Sudan utilizes around 200 trees or bushes annually.**

- **The expansion of agriculture in the 450-650 mm rain zone has accelerated desertification in the Western Sudanese region.**
- **Ethiopia shares a similar experience to Sudan, particularly in the north, northeast, and southeast regions. However, Ethiopia faces additional challenges due to political instability and recurring conflicts in marginal areas.**
- **Uganda, known as the "Pearl of Africa," has experienced significant forest loss, leading to environmental destruction. The primary cause of this loss is rapid population growth.**
- **In Kenya, desertification poses a threat, particularly in grazing marginal lands, which account for 85% of the country's area.**

- **The most severely affected areas include the Kerio Valley Development Authority regions, Eastern and North Kenya, and the Kajiado areas of South Kenya.**
- **The sedimentation of manmade dams, especially along the Tana River, presents a significant challenge, jeopardizing the effectiveness of hydropower plants. These issues contribute to climate change and the destruction of natural vegetation in Kenya.**

Attempts to combat desertification in Eastern Africa

- **Efforts to combat desertification in Eastern Africa involve both national and international initiatives.**
- **At the national level, countries like Kenya and Ethiopia have taken steps to address the issue.**

- **Kenya, a Presidential Commission on Soil Erosion and Afforestation has been established to lead the fight against desertification.**
- **Tree nurseries have been set up in each district, and a national tree planting day has been designated.**
- **Local agricultural extension officers have also been tasked with promoting proper agricultural practices.**
- **Ethiopia's "green legacy" initiative stands as an example of national efforts, focusing on tree planting and afforestation.**
- **Internationally, UNESCO's Integrated Project on Arid Lands, which started in Kenya in 1976, aimed to research, train, and demonstrate solutions for urgent environmental problems caused by desert encroachment and ecological degradation.**

- **The project wanted to develop strategies for pastoral land management and regional development.**
- **Its objective was to apply scientific management principles to improve agricultural and forestry production, enhance productivity, and increase stress tolerance in the region.**
- **These national and international efforts are aimed at combating desertification in Eastern Africa and improving the living conditions of the affected populations.**

7.3. Drought

7.3.1. Definition of Drought

- **Drought is a phenomenon closely related to desertification and famine.**

- **Drought refers to a temporary reduction in water or moisture availability that falls significantly below the normal or expected amount for a specified period.**
- **Drought is characterized by a lack of regular rainfall over an extended period of time.**
- **The areas most frequently affected by drought include the Sahelian and Sudanese ecosystems in Africa.**
- **There are four key assumptions in the definition of drought.**
- **1.Temporary reduction: a drought is a temporary reduction in water or moisture availability significantly below the normal or expected amount for specified period.**

- **2. Significant reduction(deficit): the reduction in water availability must be significant, typically below 80% of the average availability over the preceding 20 years.**
- **3. The reduction is defined in relation to norms: drought are defined in relation to a 'norm' or normal expectation, which can be either technically or culturally determined.**
  - ✓ **Technically, a reduction of water availability below about 80% of the average availability over the preceding 20 years may qualify as a drought.**
  - ✓ **Culturally, the perception of drought may be based on the level of water availability that a society has come to expect.**
- **4. Specified period: the period taken as the basis for the norm must be specified, as a droughts can vary in duration and severity.**

7.3.2. Location of Drought-Prone Regions

- **Drought-prone regions are found in five main diagonal zones of drylands on our planet. These zones include:**
- **The Sonoran Desert in northwest Mexico and its extension in the dry basins of the southwestern United States(North America).**
- **The Atacama Desert along the western foot of the Andes from south of Ecuador to Central Chile (South America).**
- **The vast diagonal running from the Atlantic ocean to china, including, Sahara, Arabian Desert, Rajasthan Desert of Pakistan and India, deserts of Iran and the former USSR, Taklimakan and Gobi in China and Mongolia.**

- **The Namib-Kalahari and its surroundings in Southern Africa.**
- **Most of the Australian continent.**
- **These regions are further divided into different categories based on their rainfall levels:**
  - ✓ **Arid zones receive rainfall below about 100mm-150mm per year, which is insufficient to support cropping.**
  - ✓ **Drylands receive rainfall below about 200mm-250mm per year, where vegetation can be sufficient to support pastoralism.**
  - ✓ **Semi-arid zones receive rainfall between 250mm-300mm and 600mm per year, allowing for the cultivation of drought-resistant crops.**
  - ✓ **Dry-sub humid zones with rainfall between 600mm-1200mm and a maximum of 6 months growing season.**

7.3.3. Types of Drought

- There are three main types of droughts: meteorological, hydrological and agricultural.
- Meteorological Drought: This type of drought refers to a reduction in rainfall below a specified amount for a given period of time.
- It is based solely(only) on precipitation statistics and can occur in different seasons or locations.
- The word "drought" is most commonly used to refer meteorological drought.
- Meteorological droughts are commonly associated with climatic abnormalities and deviations from long-term average rainfall.

- **Hydrological Drought: Hydrological drought occurs when water resources such as streams, lakes, and groundwater fall below a certain level for a specific duration.**
- **It is measured by comparing the availability and usage of water in relation to the normal system requirements for domestic, industrial, and agricultural purposes.**
- **Hydrological droughts can be caused by meteorological drought (reductions in precipitation within the catchment area of the river or aquifer system) or other factors like changes in groundwater levels or overutilization of aquifers.**
- **Thus, irrigated agricultural areas alongside the River Nile in Egypt may experience a hydrological drought as a result of a meteorological drought the Ethiopian highlands.**

- **Agricultural Drought: Agricultural drought is characterized by a scarcity of water supply specifically for agricultural purposes.**
- **Agricultural drought occurs when there is a consistently high soil moisture deficit over the growing season.**
- **It depends on the expected rainfall and the water's usage in farming activities.**
- **Agricultural droughts can result from both meteorological and hydrological factors.**
- **Insufficient water for agriculture due to human activities can lead to disruptions in the rural economy, crop failures, and even loss of life.**
- **Agricultural drought can be aggravated by substitution of a traditional dry area crop with a more water-demanding cash crop.**

7.3.4. Ratio and Indices Drought

- **There are several indices that are commonly used to quantify drought. These indices include:**

Palmer Drought Severity Index (PDSI)

- **Developed in United States in 1965, it considers precipitation, temperature, and soil moisture.**
- **Range: -6 to 6, with negative values indicating drought.**
  - ✓ **Strength: Comprehensive, historical perspective, best for long-term drought and homogeneous area.**
  - ✓ **Limitation: Slow response, excludes snowpack, requires specific climate data.**

Crop Moisture Index (CMI)

- **It is a simpler index developed by Palmer that responds more rapidly than the PDSI. It is a simple water balance index.**
- **It is effective for calculating short-term abnormal dryness or wetness affecting agriculture.**
  - ✓ **Strengths: Reflects soil conditions for agriculture quickly.**
  - ✓ **Limitations: Only for growing season, not for long-term drought monitoring.**

Satellite Vegetative Health Index (VHI)

- **This index uses satellite data to assess vegetation health and temperature.**
- **The Satellite VHI combines chlorophyll and moisture content in vegetation with surface thermal changes to assess vegetative health.**

- **Range: 0 to 100, indicating vegetative condition from poor(0) to excellent(100).**
  - ✓ **Strengths: It's beneficial for early drought detection in agricultural areas.**
  - ✓ **Limitations: It is only applicable during growing season.**

Percentile of Normal Precipitation (PNP)

- **The PNP calculates the ratio of actual precipitation to normal precipitation, expressed as a percentage.**
  - ✓ **Strengths: Easy to calculate and understood by the public.**
  - ✓ **Limitations: it does not take into account the non-normal distribution of precipitation.**

Standardized Precipitation Index (SPI)

- **The SPI uses long-term precipitation data to calculate the probability of drought.**
- **The SPI range: -2 to 2, with negative values indicating drought.**
  - ✓ **Strengths: It provides an early warning of droughts and captures different drought durations.**
  - ✓ **Limitations: Only uses precipitation, excludes temperature and soil moisture, based on preliminary data.**

7.3.5. Causes of Drought

- **Droughts in Africa result from a combination of natural weather patterns and human activities.**

➢ Natural Causes:

- **El Nino and La Nina: In Africa, drought occurs most frequently during the warm El Nino period. In Southern and Eastern Africa regions, droughts have occurred during cold La Nina time. In some cases, a powerful La Nina event have been the main cause of the drought in the Horn of Africa in 2010–2011.**

❖ **El Nino often leads to increased rainfall in east Africa, particularly in the Horn of Africa region. While La Lina can leads to reduced rainfall in east Africa, particularly in the Horn of Africa. This can result in drought, water scarcity and agricultural challenges.**

- **Ocean Warming: Warming oceans, particularly in the Atlantic and Indian Oceans, can contribute to droughts in the Sahel region.**
- **Shifting Intertropical Convergence Zone (ITCZ): The southward movement of the ITCZ reduces rainfall in some areas.**

➢ Human(Anthropogenic) Causes:

- **Land Use Change: Deforestation and changes in land management can worsen droughts by reducing soil moisture retention.**

- **Greenhouse Gas Emissions: Human activities that release greenhouse gases contribute to ocean warming, potentially intensifying droughts.**

7.3.6. The Impact of Droughts

- **Drought have a significant economic and social impact, affecting a large number of people than other natural disasters. This is because they cover large areas for extended periods (months or years).**
- **The severity of a drought's impact depends on several factors, including:**

- **Economic Structure: Developed economies with a smaller agricultural sector are less affected than developing economies reliant on rain-fed agriculture.**
- **Water Availability: Reliable water sources like aquifers can buffer the impact compared to regions solely dependent on rainfall.**

➢ Economic Impacts:

- Reduced income for farmers and agricultural workers.
- Decreased spending on agricultural inputs and local businesses.
- Increased unemployment due to lower production.
- Higher food prices due to scarcity.
- Investment needed for alternative water resources.

➢ Social Impacts:

- Food insecurity and malnutrition.
- Increased illness due to water scarcity and poor sanitation.
- Stress, disease, and mortality related to migration.
- Water conflicts due to competition for limited resources.
- Disrupted education for children involved in water collection or income generation.
- Breakdown of families and communities due to migration.

7.4. Famine

7.4.1. Definition of famine

- **Famine is often associated with mass starvation and images of communities on the brink of death. However, famine is not a single event but a process that can be difficult to differentiate from other conditions like chronic hunger.**
- **It is characterized by a series of events that is caused by reduced food availability, resulting in widespread suffering and increased mortality rates among the world's poor.**
- **The concept of food security has gained importance in the last few decades. It focuses on the relationships between food production, distribution, and consumption.**

- **Food security is defined as the access to enough food for an active and healthy life at all times. It consists of the availability of food and the ability to acquire it.**
- **Food insecurity, on the other hand, refers to the lack of access to sufficient food. There are two types of food insecurity: chronic and transitory.**
- **Chronic food insecurity is an ongoing inadequate diet caused by a household's persistent inability to buy or produce enough food.**
- **Transitory food insecurity is a temporary decline in a household's access to sufficient food, often resulting from factors like unstable food prices, declining food production, or household incomes. In its most severe form, transitory food insecurity leads to famine.**

7.4.3. Incidence of Famine

- Famines have been a recurring occurrence throughout history in various societies worldwide.
- In Europe, famine was common during the Middle Ages. However, agricultural innovations and the Industrial Revolution in Western Europe have significantly reduced the frequency of famines since then.
- One prominent exception was the "Great Famine" in Ireland from 1846 to 1851, which was particularly catastrophic.
- The most recent famine in Western Europe occurred in the Netherlands during the winter of 1944 due to food shortages resulting from a military stalemate between the advancing Allied Forces and the retreating German Army.
- In modern history, the Ethiopian Famine of 1984-1985 stands out as one of the most disastrous famines.

7.4.3. Causes of Famine

- **Famines are caused by a combination of factors: a decline in food availability and a reduction in people's access to food.**
- **The causes of food availability decline can be categorized as either "natural" or human-induced factors.**
- **Natural factors include agricultural drought, floods, high winds, unseasonable cold spells, crop disease, and pest invasions such as locust and army worm.**
- **Human-induced factors include conflicts that hinder farming activities, external economic shocks like sudden increases in oil or fertilizer prices, internal macro-economic mismanagement such as poor agricultural pricing policies and overtaxing of export commodities.**

7.4.4. Measures to Maintain Food Security

- **There are several key measures that can be taken to maintain food security. These include:**
  - ✓ **Stabilizing food prices to prevent drastic spikes.**
  - ✓ **Subsidizing food to make it more affordable for those in need.**
  - ✓ **Employment creating programs that provide people with jobs and income to buy food.**
  - ✓ **Distributing food directly to those who are struggling.**
  - ✓ **Offering special feeding programs for vulnerable groups like children.**
  - ✓ **Implementing programs to support livestock and nomadic communities.**
  - ✓ **Providing clean water alongside food assistance.**
  - ✓ **Offering healthcare programs alongside food assistance.**

Choose the Best Answer from the Given Alternative

1. **What was the primary goal of the Paris Agreement signed by 195 Parties at the end of 2015?** **Q1**

   A) To promote the use of fossil fuels

   B) To curb emissions and manage climate risks.

   C) To increase global temperatures

   D) To reduce the funding for climate research

1. **According to current estimates, how much could global temperatures rise if major actions are not taken to reduce emissions?** **Q2**

   A) 0.5°C to 1.5°C

   B) 2.5°C to 4.5°C.

   C) 1.5°C to 2.5°C

   D) 5°C to 6°C

1. **What is the UN definition of desertification? Q3**
   A. **Natural expansion of existing deserts**
   B. **Human-induced land degradation in dry and sub-humid regions.**
   C. **The process of land turning into desert due to excessive rain**
   D. **A decrease in the Earth's overall land area**
2. **Why is climate change considered a spatial phenomenon? Q4**
   A. **Because it affects different species in various locations.**
   B. **Because it is a hot topic for academic debate**
   C. **Because it is mainly caused by human actions in space**
   D. **Because it only impacts the Earth's poles**

1. **According to the IPCC special report, desertification results from:** **Q5**

   A) Only human activities

   B) Only climatic changes

   C) Both human activities and climatic changes.

   D) Neither human activities nor climatic changes

1. **Which regions have the highest number of people affected by desertification?** **Q6**

   A) North and South America

   B) South & East Asia, the Sahara region, & the Middle East.

   C) Europe and Central Asia

   D) Australia and Oceania

1. **As of the data provided, approximately what percentage of the global land area do drylands cover? Q7**

   A) 25% B) 46.2% C) 55% D) 75%

1. **What is the main difference between deserts and desertification? Q8**

   A. Deserts are areas that receive very little rain, while desertification refers to human-induced land degradation.

   B. Deserts have low precipitation, while desertification is characterized by unpredictable weather patterns.

   C. Deserts are always arid regions, while desertification can occur anywhere on Earth.

   D. Deserts can support life, while desertification leads to the loss of vegetation and biodiversity.

1. **What human activities contribute to desertification? Q9**

   A. **Afforestation and sustainable water management practices**

   B. **Overgrazing, over cultivation, deforestation, and unsustainable water management practices.**

   C. **Conservation efforts and reforestation**

   D. **Sustainable agriculture and responsible land use practices**

1. **What adaptation strategies are needed to ensure food and water security in regions affected by climate change? Q10**
   A. **Planting drought-resistant crops and improved irrigation systems.**
   B. **Clearing forests for agricultural expansion**
   C. **Increasing water usage without conservation**
   D. **Ignoring the need for adaptation strategies**

1. **Which of the following is a potential impact of rising sea levels due to climate change? Q11**
   A. **Increased agricultural productivity**
   B. **Enhanced biodiversity**
   C. **Coastal flooding and displacement.**
   D. **Reduced carbon emissions**
2. **What adaptation measures are necessary to mitigate the impacts of rising sea levels? Q12**
   A. **Building sea walls.**
   B. **Constructing underground tunnels**
   C. **Promoting deforestation**
   D. **Encouraging coastal development**

1. **What percentage of drylands used for agriculture around the world are already degraded? Q13**

   A) 30% B) 50% C) 70% D) 90%

1. **Which one of the following is NOT major characteristic of dryland that affected by desertification? Q14**

   A. Low and unpredictable precipitation

   B. Soil that is poor in organic matter

   C. Large variations between day and night temperatures

   D. Sufficient of water for consumption

1. **How does population growth contribute to desertification? Q15**
   A. **It leads to more sustainable farming practices**
   B. **It reduces the need for intensive agriculture**
   C. **It increases the pressure on land for food production.**
   D. **It promotes natural regeneration of soil nutrients**
2. **How are climate change and deforestation linked to the process of desertification? Q16**
   A. **Climate change has no impact on desertification**
   B. **Deforestation is the sole cause of desertification**
   C. **Climate changes impact rainfall patterns, leading to desertification.**
   D. **Forests play no role in the prevention of desertification**

1. **Which of the following is a consequence of melting ice at the Earth's poles? Q17**

   A) Decrease in sea levels
   C) Increase in sea levels
   B) Stabilization of sea levels
   D) No impact on sea levels

1. **When did desertification gain widespread attention? Q18**

   A. 1977
   B. 1980
   C. 1990
   D. 2000

1. **What are the three types of areas that make up the drylands? Q19**

   A. Arid, semi-arid, and humid
   B. Arid, semi-arid, and sub-humid
   C. Arid, humid, and sub-humid
   D. Arid, semi-humid, and sub-humid

1. **Which of the following is NOT a fundamental feature of the world's drylands? Q20**
   - A. Low precipitation that is infrequent, irregular, and unpredictable
   - B. Large variations between day and night temperatures
   - C. Rich soil with high organic matter content.
   - D. Lack of water for consumption
2. **The transformation of arid and semi-arid areas into desert-like conditions known as Q21**
   - A. Overgrazing
   - B. Over cultivation
   - C. Desertification.
   - D. Deforestation

1. **Which of the following is NOT a cause of desertification related to over-exploitation of natural resources? Q22**
   - A. **Shortening of crop cycles and reduction of fallow periods**
   - B. **Insufficient use of fertilizer after harvesting**
   - C. **Adequate crop rotation and diverse farming practices**
   - D. **Intense breeding and overgrazing by livestock**
2. **Which of the following regions in Africa is NOT mentioned as being vulnerable to desertification? Q23**
   - A. **Sahelian region**
   - B. **Kalahari**
   - C. **Horn of Africa**
   - D. **Congo basin**

1. **Which one of the ff. principal causes of deforestation and desertification? Q24**
   - **A. Excessive rainfall in tropical arid areas**
   - **B. Use of hydraulic, wind, and solar energy sources**
   - **C. Overgrazing and over cultivation on grasslands**
   - **D. Increase in fallow periods and rest periods from grazing**
2. **Which of the following is NOT listed as a major cause of desertification? Q25**
   - **A. Overgrazing**
   - **B. Poor irrigation practices**
   - **C. Over cultivation**
   - **D. Excessive rainfall**

1. **What is the recommended approach to limit the need for deforestation? Q26**
   - **A. Encouraging the use of renewable energy sources**
   - **B. Increasing the use of firewood for cooking and lighting**
   - **C. Expanding deforestation activities in arid regions**
   - **D. Promoting the use of gas and petrol for energy consumption**
2. **Which country in East Africa is known as the "Pearl of Africa" and has experienced significant forest loss? Q27**
   - **A. Sudan**
   - **B. Tanzania**
   - **C. Kenya**
   - **D. Uganda.**

1. **What is one of the societal consequences of desertification? Q28**
   A. **Population stabilization**
   B. **Conflict over freshwater resources**
   C. **Increase in food security**
   D. **Promotion of social harmony**
2. **What are some of the contributing factors to desertification in East Africa? Q29**
   A. **Rapid population increase and deforestation**
   B. **Heavy rainfall and sustainable agriculture**
   C. **Political stability and foreign investment**
   D. **Urbanization and industrialization**

1. **What are the key assumptions of the generally accepted definition of drought?** **Q30**

   A. **The reduction is permanent, significant, and based on the society's expectations.**

   B. **The reduction is temporary, significant, and based on the society's expectations.**

   C. **The reduction is temporary, significant, and based on a specified period.**

   D. **The reduction is permanent, significant, and based on a specified period.**

1. **A temporary reduction in water or moisture availability significantly below the normal or expected amount for a specified period known as: Q31**

   A. Desertification B. Famine C. Hunger D. Drought

2. **Which ecosystems are most often affected by drought in Africa? Q32**

   A. Sahelian and Sudanese ecosystem

   B. Tropical rainforest

   C. Coastal regions

   D. Savannah grassland

1. **Which desert is located along the western foot of the Andes from south of Ecuador to Central Chile? Q33**

   A. Sahara Desert
   C. Atacama Desert
   B. Gobi Desert
   D. Kalahari Desert

2. **Which continent has most of its landmass classified as drylands? Q34**

   A. Europe B. South America C. Australia D. Europe

1. **In which type of zone can vegetation support pastoralism? Q35**

   A. Arid zones
   C. Drylands
   B. Semi-arid zones
   D. Dry-sub humid zones

1. **What is the characteristic of arid zones in terms of rainfall? Q36**
   A. **Rainfall below 100mm-150mm per year**
   B. **Rainfall between 250mm-300mm per year**
   C. **Rainfall between 600mm-1200mm per year**
   D. **Rainfall above 2000mm per year**
2. **Which type of drought is based solely on precipitation statistics? Q37**
   A. **Meteorological drought**
   B. **Hydrological drought**
   C. **Agricultural drought**
   D. **All of the above**

1. **What is the main characteristic of hydrological drought? Q38**

   A. Reduction in water resources below a specified level

   B. Reduction in rainfall below a specified amount

   C. Reduction in agricultural water supply

   D. Reduction in precipitation statistics

1. **How can hydrological drought be caused? Q39**

   A. By reductions in precipitation within the catchment area

   B. By reductions in groundwater levels only

   C. By reductions in surface water levels only

   D. By reductions in precipitation within a specific country

1. **What is the impact of an extreme agricultural drought? Q40**
   - **A. Crops fail and animals die**
   - **B. Reduction in water resources below a specified level**
   - **C. Reduction in precipitation below a specified amount**
   - **D. Disruption of the urban economy**

1. **Hydrological Drought involves: Q41**
   - **A. Soil moisture deficit over the growing season**
   - **B. Precipitation significantly below expectations**
   - **C. Reduction in water resources like stream flows and lake levels**
   - **D. Stress on plant life unconnected with human activity**

1. **Which type of drought is most commonly referred to by the term "drought"? Q42**

   A. **Hydrological Drought** C. **Agricultural Drought.**

   B. **Meteorological Drought** D. **Ecological Drought**

2. **An Agricultural Drought occurs when: Q43**

   A. **There is a significant temperature increase during summer months**

   B. **Precipitation is below the long-term average**

   C. **There is a consistently high soil moisture deficit over the growing** season**.**

   D. **Geological changes cut off parts of an aquifer system**

1. **Agricultural drought can be exacerbated by:** **Q44**
   - A. **Substitution of a traditional dry area crop with a more water-demanding cash** crop**.**
   - B. **Reduction in rainfall for a single day**
   - C. **Geological changes in the catchment area**
   - D. **Below normal temperatures during winter months**
2. **Which of the following indices provides a comprehensive assessment of drought conditions and places them in a historical perspective?** **Q45**
   - A. **Palmer Drought Severity Index (PDSI).**
   - B. **Crop Moisture Index (CMI)**
   - C. **Satellite Vegetative Health Index (VHI)**
   - D. **Percent of Normal Precipitation**

1. **Which drought index is most suitable for calculating short-term abnormal dryness or wetness affecting agriculture? Q46**

   A. Palmer Drought Severity Index (PDSI)

   B. Crop Moisture Index (CMI).

   C. Satellite Vegetative Health Index (VHI)

   D. Standardized Precipitation Index (SPI)

1. **The Satellite Vegetative Health Index (VHI) is useful for: Q47**

   A. Long-term drought monitoring

   B. Early drought detection.

   C. Assessing soil moisture content

   D. Calculating normal precipitation levels

1. **Which of the following indices is based solely on precipitation data? Q48**

   A. Palmer Drought Severity Index (PDSI)

   B. Crop Moisture Index (CMI)

   C. Satellite Vegetative Health Index (VHI)

   D. Standardized Precipitation Index (SPI).

1. **The Palmer Drought Severity Index (PDSI) does NOT consider: Q49**

   A. Snowpack.

   B. Temperature

   C. Available water content of the soil

   D. Climate state

1. **Which drought index is easy to calculate, regularly generated by climate software packages, and is generally useful and easy to understand by the media and the public? Q50**

   A. Palmer Drought Severity Index (PDSI)

   B. Crop Moisture Index (CMI)

   C. Percent of Normal Precipitation.

   D. Standardized Precipitation Index (SPI)

1. **Which index is designed to respond more rapidly to changing soil conditions and is effective for short-term agricultural applications? Q51**

   A. PDSI **B. CMI .** **C. VHI** **D. SPI**

1. **The Palmer Drought Severity Index (PDSI) is best used for: Q52**

   A) Short-term agricultural changes

   B) Immediate response to rainfall deficits

   C) Long-term drought assessment in homogeneous areas.

   D) Evaluating snowpack levels

1. **The Percent of Normal Precipitation (PNP) is calculated by: Q53**

   A. Dividing actual precipitation by normal precipitation and multiplying by 100.

   B. Multiplying actual precipitation by normal precipitation

   C. Dividing normal precipitation by actual precipitation

   D. Adding actual precipitation to normal precipitation

1. **Which climate phenomenon can disrupt the Horn of Africa, resulting in reduced rainfall, drought and agricultural challenges? Q54**

   A. El Nino B. La Lina.

1. **Chronic food insecurity is characterized by: Q55**

   A. Temporary decline in a household's access to enough food

   B. A continuously inadequate diet caused by persistent lack of ability to buy or produce enough food.

   C. Instability in food prices, declining food production, or household incomes

1. **Transitory food insecurity refers to:** **Q56**

   A. **A lack of access to enough food for an active, healthy life**

   B. **Persistent inability to buy or produce enough food**

   C. **Temporary decline in a household's access to enough food resulting from various factors.**

   D. **Access by all people at all times to enough food for an active, healthy life**

2. **Which of the following is NOT a "natural" factor that can cause famine or a decline in food availability?** **Q57**

   A. **Crop disease**

   B. **Conflict**

   C. **Pest invasion**

   D. **Unseasonable cold spells / frosts**

1. **Which of the following is a human-induced factor that can cause a decline in food availability?** **Q58**

   A. **Agricultural drought**
   B. **external economic shocks.**
   C. **Floods**
   D. **High winds**

2. **Which of the following is NOT a measure to maintain food security?** **Q59**

   A. **Supplementary feeding programs**
   B. **Price destabilization**
   C. **Providing clean water alongside food assistance.**
   D. **Employment creation programs**