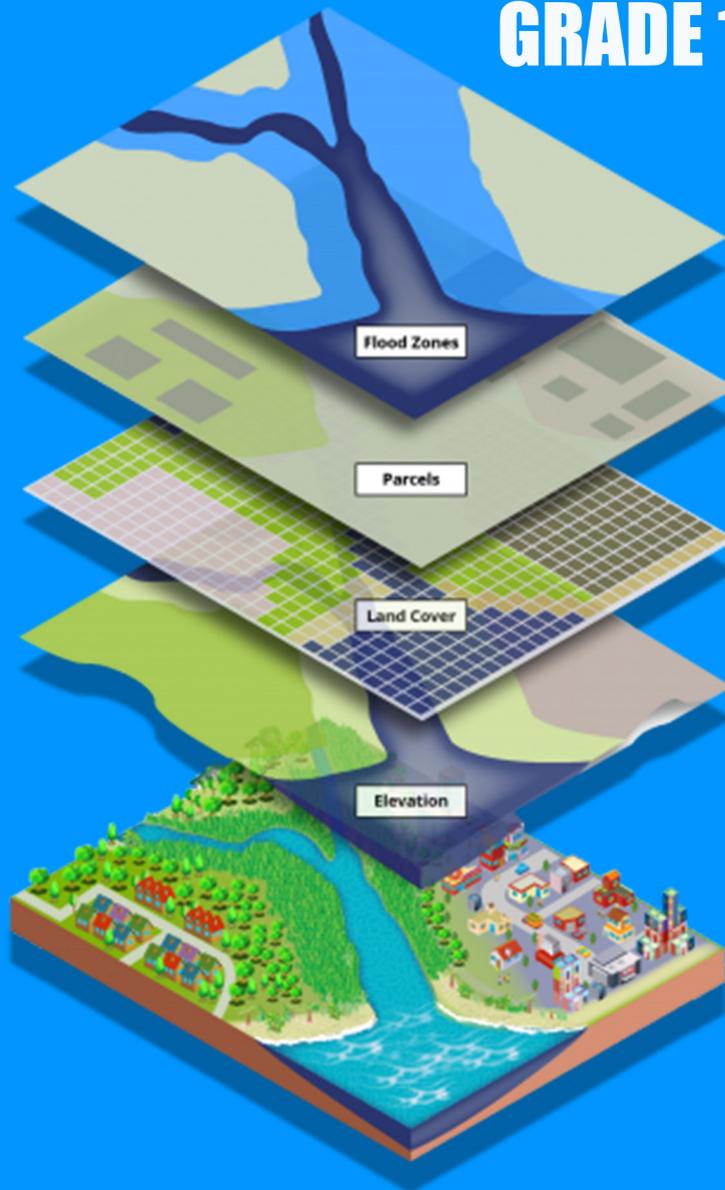




GEOGRAPHY

DISTANCE LEARNING MATERIAL
GRADE 12



MODULE TWO



FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
MINISTRY OF EDUCATION





FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
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DISTANCE LEARNING MATERIAL

MODULE TWO

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TABLE OF CONTENTS

Module Introduction.....	I
Module Contents.....	I
Module learning outcomes.....	I
Module Assesement Method.....	II

UNIT FIVE

ISSUES OF SUSTANABLE DEVELOPMENT III	1
Section One: Multiple Faces of Poverty.....	3
Section Two: Advantages and Disadvantages of Globalization	10
Section Three: The Growing Imbalance Between Regions & Countries	18
Section Four : Corruption	25
Section Five: Global Health Crises.....	34
Unit Summary	41
Unit Review Exercises	42
Reference	44

UNIT SIX

ISSUES OF SUSTANABLE DEVELOPMENT IV.....	45
UNIT INTRODUCTION.....	45
Section One: Enviromenal Problems.....	47
Section Two: Sustanability Challenge	58
Section Three: Enviromental Education.....	66
Section Four : Enviromental Movements.....	73
Section Five : Enviromentally Friendly indiginious pratices	80
Unit Summary	86
Unit Review Exercises	87
Reference	90

UNIT SEVEN

CONTEMPORARY GLOBAL GEOGRAPHIC ISSUES & CONCERNS	91
UNIT INTRODUCTION.....	91
Section One: Climate Chagne.....	93
Section Two: Desetification.....	99
Section Three: Drought and Famine	110
Unit Summary	123
Unit Review Exercises	124
Reference	126

UNIT EIGHT

GEOGRAPHIC ENQUIRY AND MAP MAKING..... 127

UNIT INTRODUCTION..... 127

Section One: Fundamental of Research in Geography..... 128

Section Two: GIS Data and Map Making Using GIS 143

Unit Summary 158

Unit Review Exercises 159

Reference 161

Module Introduction

Dear learner; we hope that you enjoyed learning the units provided in module one. Now, we are going to acquaint you with the units and contents you are required to learn in Module two. Accordingly, you are going to enjoy learning about the challenges of economic development and the resulting poverty in unit five. In unit six, you will study about the solutions of environmental and sustainable development issues. Unit seven focuses on the contemporary global and environmental public concerns. Finally, you are required to study lessons related to geographical enquiry and map making skills. Hence, please prepare yourself for the lesson.

Module Contents

1. Issues in Sustainable Development III: Challenges of Economic Development
2. Issues in Sustainable Development IV: Solutions to Environmental and Sustainability Problems
3. Contemporary Global Geographic Issues and Public Concerns
4. Geographical Enquiry and Map Making

Module learning outcome

-  identify the major global economic challenges by assessing global risks and priorities;
-  analyze the advantage and limitations of globalization to the developing world;
-  explain why and how trade imbalance occurs between developing and developed world;
-  describe the impact of corruption on economic development;
-  explain the major global health issues and problems;
-  recognize the major cause and effects of poverty;
-  evaluate environmental and sustainability problems at global, national and local scales; and reflect critically their roles and responsibilities as environmental actors in an interconnected world;
-  assess the historical background of environmental movements suggest models worth emulating to address environmental issues and problems in their locality and country at large;
-  identify indigenous environmental protection, knowledge, practices, and assess their strengths and limitations.
-  explain why climate change is perceived as a contemporary global issue;
-  recognize the cause and effects of desertification;
-  describe and explain the major causes and effects of drought;
-  describe and explain the major causes and effects of famine;
-  identify and explain the key strategies to address desertification, drought and famine.
-  acquire basics research knowledge and skills to undertake geographic research;
-  select and use different approaches in geographic research; and
-  make different types of map and interpret them;

Module assessment methods

A. Formative assessment

- Open-ended questions
- Portfolios
- Essays
- Self-test exercises
- Diagnostic test at the beginning of the class term
- Feedback on learning-in-process
- Peer and self-evaluation

B. Summative assessment

- Mid-term examination
- Assignment
- Portfolios
- Final examination

UNIT FIVE

ISSUES IN SUSTAINABLE DEVELOPMENT III, CHALLENGES OF ECONOMIC DEVELOPMENT

Unit Introduction

Hello, dear distance learner, almost 50 percent of the geography course for the twelfth grade has been completed by you. We hope your second semester of courses has started by this point. How were the first four units in the first module for you? Have you seen any advantages of them? This unit comes after the preceding unit. It emphasizes on the challenges of economic development as a part of issues in sustainable development. Sustainable development is a concept that denotes the relationship between economic growth, society and the environment. Sustainable development analysis differs from the standard economics of growth and development by incorporating natural resources as a form of natural capital. This may refer to the value of the existing stock of natural resources such as forests, fisheries, water, mineral deposits, and the environment in general. Natural capital provides goods and services to people, just as do financial capital, manufactured capital, and human capital. Actually, the human capital can be developed by investments in education and health.

There is unequal distribution of resource utilization. Large proportions of the world populations are consuming too little, particularly less developed countries. In 2015, approximately 10% of the world's population (736 million) lived in extreme poverty with incomes of less than \$1.90 per day. In 2017, 821 million people were malnourished, an increase in the number reported malnourished compared with 2016. In addition, rising inequality resulting in increasing polarization of society. Therefore, the weakness of the real world process is complicating the problem and challenging the sustainability of the resource utilization. The welfare of the citizen also endangers. This unit therefore deals with the related socioeconomic issues such as multiple faces of poverty, globalization, the growing imbalance of regions and countries, corruption, and global health crises. There is an urgent need for further economic development to lift people out of poverty.

Unit learning outcome

At the end of this unit you will be able to:

-  identify the major global economic challenges by assessing global risks and priorities;
-  analyze the advantages & limitations of globalization to the developing world;
-  explain why and how trade imbalance occurs between developing and developed world;
-  describe the impacts of corruption on economic development;
-  explain the major global health issues and problems; and
-  analyze the major causes and effects of poverty.

Unit Contents

- 5.1 Multiple Faces of Poverty and Implication to Development
- 5.2 The Advantages and Disadvantage of Globalization
- 5.3 The Growing Imbalance Between Regions and Countries
- 5.4 Corruption
- 5.5 Global Health Crises

The Required Study Time: 25 hours

Learning Strategies

In the unit, the suggested learning strategies are:

- ◇ written brainstorming questions;
- ◇ Problem-solving method;
- ◇ individual project;
- ◇ report writing;
- ◇ observation;
- ◇ written activities;
- ◇ practical activities; and
- ◇ self-test assessments.

SECTION ONE

Multiple Faces of Poverty and Implication to Development



Section Overview

This section addresses multiple faces of poverty and implication to development. You will read about the important concepts and issues of poverty in this subsection. Poverty in the midst of wealth is one of the most pressing issues confronting today's global economy and society. The situation is made worse by the structure of societies and institutions that tend to exclude the poor from participating in decision-making over the direction of social and economic development. Combating poverty is both a moral responsibility and a necessity for a stable world. As a result, in the 1990s, the international community developed International Development Goals. Poverty is the focus of much public policy and government investment, whether directly or indirectly. The federal and provincial governments each also have a number of anti-poverty programs. However, other countries have a sort of health-care and public education system that focuses on the broad dimensions of poverty. Poverty goes beyond lack of income, it encompasses economic, social, and governance dimensions.

This section is primarily concerned with the definition and basic notion of poverty, the causes of poverty, and the relationship between conflict and poverty. In order to help your learning these components, follow the the instructional guide suggested below

Section Learning Outcomes

At the end of this section, you will be able to:

-  identify the causes of poverty and their link to economic development; and
-  explain the relationship between conflict and poverty.

KEY TERMS:

- Absolute poverty,
- Relative poverty,
- Income security,
- Opportunity,
- Empowerment



Dear student, Do you now understand what poverty means?, Can you describe it in your own words? How do you express poverty in your local context? What are the main dimensions and indicators of poverty?

5.1.1 Concepts of Poverty

Dear student, compare your responses to the preceding question with the lesson note presented next. Poverty is generally considered to be a measure of deficiency of the basic needs that a person, household or community required to meet as a basic standard of living. This deficiency can be measured in terms of a lack of resources such as income, assets, capabilities (e.g. Skills, knowledge, technology or both). Basically Poverty could be divided into two much known parts; absolute and relative poverty.

Absolute poverty is when household income is below a certain level, which makes it impossible for the person or family to meet basic needs of life including food, shelter, safe drinking water, education healthcare etc. In this state of poverty, even if the country is growing economically, it has no effect on people living below the poverty line. Absolute poverty compares households based on a set of income level, and this level varies from country to country depending on its overall economic conditions.

Relative poverty is when households receive 50% less than average household incomes, so they do have some money but still not enough money to afford anything above the basic need. This type of poverty is, on the other hand, changeable depending on the economic growth of the country.

- Relative poverty is sometimes described as “relative deficiency” because the people falling under this category are not living in total poverty, but they are not enjoying the same standard of life as everyone else in the country. It can be expressed in terms of having internet, clean clothes, a safe home (a healthy environment, free from abuse or neglect), or even education.
- Relative poverty can also be permanent, meaning that certain families have absolutely no chance of enjoying the same standards of living as other people in the same society currently have access to. They are basically “trapped” in a low relative income box. student, from your experience which one of the indicated poverty type is obvious and serious in your local context, reflect on for more comprehension.

When the relative approach is used to measure poverty, there is another concept that needs to be explored, namely, persistent poverty. This is when households receive 50 or 60% less income than average incomes every 2 out of 3 years. Since long-term poverty has more impactful consequences on economic and social conditions, persistent poverty is an important concept to bear in mind. There are also other measures of the dimensions of poverty and their indicators used in different researches works (Table 5.1).

Table 5.1. The selected dimensions and indicators

Dimension	Indicators
Income	Net income per capita
Education	Child school attendance & adult illiteracy
Health care	Health service, health status & health insurance
Standard of living	Electricity, drinking water, toilet, cooking fuel, transportation & housing
Social security	Work status, pension insurance, consumer durables & social insurance

5.1.2. Causes of Poverty

The causes of poverty are divided into two parts. These are the structural reasons of poverty as well as the behavioral or cultural explanations for poverty.

The structural approach points to systemic reasons for poverty: such things as racial and gender discrimination embedded in our markets and institutions; the profit motive and consequent low wages making it difficult for some families to escape poverty; and the failure to invest sufficiently in education, health care, and social insurance. According to this view, all of these factors reduce opportunity and increase economic insecurity. The failure to correct and accommodate the natural differences between people results in an uneven playing field and promotes the creation of poverty. Structural approaches to poverty point to patriarchy, capitalism, white privilege, and racism as the fundamental causes of most of the poverty in Western economies. Thus, the structural approach has come to be associated with those on the political left.

Behavioral or cultural approach: Without dismissing the fact that our structures, institutions, and systems might help explain poverty, especially the enabling of poverty, there are other researchers who emphasize culture, behavior, and personal differences as the source of much of the poverty that we observe in modern societies. Their argument is that there is a poverty culture or a set of attitudes and behaviors that tends to get passed along from parents to children and tends to perpetuate bad, self-defeating decisions, and hence poverty. Those attitudes (fatalism and the rejection of common societal norms like hard work, rationality, and non-violent dispute resolution) make many of the poor less attractive in the labor and marriage market and less capable parents. This perspective does not suggest that it is easy for low income people to resist these attitudes, but insists that each person has free will and is ultimately responsible for their own life.

The behavioral or cultural approach to explaining poverty is typically favored by those who describe themselves as conservative or libertarian.

Examining the features emphasized by poor people is one approach to examine the causes of poverty. Some of these features are:

- ◆ Lack of income and assets to attain basic necessities food, shelter, clothing, and acceptable levels of health and education.
- ◆ Sense of voicelessness and powerlessness in the institutions of state and society. Vulnerability to adverse shocks, linked to an inability to cope with them.
- ◆ To understand the determinants of poverty in all its dimensions, it helps to think in terms of people's assets, the returns to (or productivity of) these assets, and the volatility of returns. These assets are of several kinds:
 - ◆ Human assets, such as the capacity for basic labor, skills, and good health.
 - ◆ Natural assets, such as land.
 - ◆ Physical assets, such as access to infrastructure. Financial assets, such as savings and access to credit.
 - ◆ Social assets, such as networks of contacts and reciprocal obligations that can be called on in time of need, and political influence over resources.

As stated clearly in various literatures, poverty is mainly caused by labor market issues, education, demographic characteristics (age and family structure), race, poverty-related policies and cultural factors. Concluding/summing task can be stated for learner here.

5.1.3. Relationship between Conflict and Poverty

Dear student, Can you state how poverty and conflict are related? There is increasing recognition among researchers, social activists as well as policy makers that violent conflict and poverty are inter-linked. In some instances, poverty can be identified as a factor directly contributing to conflict and in other instances conflict could be seen as creating poverty. Poverty has traditionally been a concern of development. Violent conflict on the other hand has been considered a peace and security issue. It is only relatively recently that these ideas have begun to converge around the issue of violent conflict and poverty.

The literatures on conflict and chronic poverty examine three hypotheses of relationship:

1. Conflict causes poverty
2. Poverty causes conflict
3. Resource wealth causes conflict

Conflict causes poverty

There is some consensus around the proposition that conflict causes poverty. Recently; however, partly due to the problems of getting reliable data, there have been mainly descriptive accounts of the costs of conflict. The direct impacts including battlefield deaths, disablement and displacement have long-term costs for societies.

Chronic poverty is likely to increase due to higher dependency ratio caused by an increased proportion of the old, women and disabled in the population. In a global analysis of conflict affected countries found similar patterns of macro-economic effects including a fall in GDP per capita, food production and exports, a fall in gross investment, government revenue and expenditure. War can lead to entitlement collapse and famine. Drawing upon the literature on famine and conflict, one can distinguish a continuum from vulnerability to external shocks to starvation and death.

Therefore, a sole focus on destruction, poverty and people as victims provide only a partial reading of war. But it has outlined the political, economic and social dimensions of conflict which are likely to have an impact on chronic poverty. Moreover, the protracted, collapsed-state conflicts are likely to lead to intergenerational exclusion and chronic poverty.

Poverty causes conflict

The hypothesis that poverty causes conflict is more contentious. Currently, conflicts are multi causal with a range of short term and long term factors coming into play, including a sudden economic slowdown in the face of rising expectations, external shocks and state crises. Isolating and weighting the different 'risk factors' is difficult. Is poverty a permissive or causal factor? Is it a structural cause, a trigger or an accelerator of violent conflict? Searching for root causes may have limited value given the capacity of conflicts to mutate over time. Few would argue for a deterministic link between poverty and conflict and the challenge is to understand how poverty may interact with a range of other factors in certain contexts and at certain times to produce violent conflict. A body of empirical work has emerged which examines poverty's role as one of a number of causal factors behind violent conflict.

Resource wealth causes conflict

Recent research works of the World Bank questions the view that conflicts are driven by grievance. The study also argues that popular perceptions are shaped by the discourse which conflicts themselves generate. War cannot be fought just on hopes and hatreds. Civil wars occur when rebel organizations are financially viable. Therefore, it is the feasibility of predation which determines the risk of conflict. Rebellion is motivated by greed, so that it occurs when rebels can do well out of war.

Resources

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Suwedi, Louis. Multiple Faces of Poverty in Malawi. YouTube, 4 Feb. 2013, <https://www.youtube.com/watch?v=mCu5MPVEZLY>.

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Activity 5.1

1. How can you express poverty that isn't based on a monetary indicator? Use a real-life case study from your region to demonstrate this.
2. describe how government policies impact a country's increasing pattern of multilayered poverty. Have you noticed any attempts in your area?
3. What criteria do you use to assess it?

Poverty is generally considered to be a measure of deficiency of the basic needs that a person, household or community required to meet as a basic standard of living

Poverty could be divided into two much known division; absolute and relative poverty.

Absolute poverty is when household income is below a certain level, which makes it impossible for the person or family to meet basic needs of life.

Relative poverty is when households receive 50% less than average household incomes, so they do have some money but still not enough money to afford anything above the basic need.

The causes of poverty are divided into two parts. These are the structural reasons of poverty as well as the behavioral or cultural explanations for poverty.

Violent conflict and poverty are inter-linked each; Conflict causes poverty and Poverty causes conflict.



Self-test Exercise 5.1

Dear learner; hopefully you enjoyed reading the notes and doing the activities. Do you found them interesting and relevant? Now, attempt the questions 1-5 that are given below to evaluate how far you have understood the lesson you studied.

For the following questions choose the best answer among the given alternatives.

- Poverty is a state in which a person is: –
 - Poor
 - Does not have proper home
 - not able to fulfill the basic requirements
 - None of these
- People who are always below poverty line are termed as
 - Chronic poor
 - Seasonal poor
 - Always Poor
 - None of these
- The poverty across other people, regions or countries is known as
 - Urban poverty
 - Rural poverty
 - Relative poverty
 - Absolute poverty
- What is the cause of poverty?
 - Low Rate of Growth
 - Increasing Population
 - Underemployment
 - All of these
- Which of the following are characteristics of poor people?
 - Hunger starvation
 - Limited economic opportunities
 - Poor health
 - All of the above
- In Absolute poverty, a person fails to reach the: –
 - Standard minimum level of consumption
 - Standard maximum level of consumption
 - Minimum level of consumption
 - Maximum level of consumption



Checklist

Dear learner! Now it is time to check your understanding of the meaning, scope, and branches of geography. Read each of the following questions and answer them by putting a tick (✓) mark in one of the boxes under alternatives 'Yes' or 'No'.

No	Items	Yes	No
1	Can you define the concept of poverty?		
2	Can you explain the two important known division of poverty?		
3	can you describe the meaning of absolute poverty?		
4	are you able to explain the essence of relative poverty?		
5.	Can you describe two important causes of poverty?		
6	are you able to explain the relationship between poverty and conflict?		

SECTION TWO

The Advantages and Limitations of Globalization



Section Overview

Globalization basically refers to the increasing interconnection of the world's countries in terms of economics, culture, politics, and infrastructure. Thus, interconnectedness makes the world a global village which brings both advantages and disadvantages to the developing countries. The word became more popular in the 1980s, reflecting technical developments that made international transactions of both commerce and financial flows easier and faster to execute. It refers to an expansion of the same market forces that have existed for millennia at all levels of human economic activity used to take place in village marketplaces, metropolitan industries, or financial centers beyond national lines. Economic "globalization" is a historical process, that is, the consequence of human ingenuity and technical advancement. It refers to the rising globalization of economies, notably the flow of commodities, services, and capital across borders. The word is also used to describe the movement of people (labor) and information (technology) across international borders. Globalization also has larger cultural, political, and environmental implications.

This section focuses on the fundamental notion of globalization, globalization and the economic development of developing countries, and the benefits and drawbacks of globalization. As a result, student, be focused and study the contents of the section lesson.

Section Learning Outcomes

At the end of this section, you will be able to:

-  describe the interrelationship of globalization and economic development in developing countries; and
-  explain the advantage and disadvantage of globalization.

KEY TERMS:

- Multinational Corporation,
- mass media,
- global south,
- global north



How do you interpret whether the states of the globe are integrating more and more or disintegrating? Is economic globalization a new form of imperialism, or does it encompass the entire world?

5.2.1. Basic concept of globalization

Globalization has become one of the world's most contentious issues, the idea has been defined in a various way, but the following is the most common one. Globalization is the process through which the world becomes more linked as a result of greater commerce and cultural interaction. Globalization has increased the production of goods and services. The biggest companies are no longer national firms but multinational corporations with subsidiaries in many countries. Globalization has been happening for hundreds of years, but it has accelerated dramatically in the last half century. Currently the term itself is used to describe the trend towards countries joining together economically, through politics, and education. Countries joining together economically view themselves not just through their national identities, but as part of the world as a whole.

However, a wide range of negative connotations were also given to globalization particularly in the context of developing countries. Local businesses and brands in developing nations can go bankrupt as huge corporations in developed nations can dominate the economy of their country. Local traditions and cultures may change. People in poor counties may no longer wear their cultural costumes as they would want to look like the stars in Hollywood. More and more schools in developing nations are teaching their students how to speak this global language etc. Globalization, thus, has many benefits and disadvantages and they are here to stay. Basically, people from the developed World have benefited from globalization, as they can sell more goods and products to the Global South. Dear learner, in your view, can developing societies maintain their respective advantages without harming/ disrupting the relationship they have with the developed regions or counter parts. Reflect on this and move on to the next content.

5.2.2. Globalization and Developing Countries

Globalization in the developing countries is manifested in the following three important fields: economic and trade processes, education and health systems, and culture effects. Economic and Trade Processes Field: Globalization helps developing countries to deal with the rest of the world, to increase their economic growth, and to solve the poverty problems in their country. In the past, developing countries were not able to tap on the world economy due to trade barriers. They could not share the same economic growth that developed countries had. However, with globalization, the World Bank and International Management encourage developing countries to go through market reforms and radical changes through large loans. Many developing nations began to take steps to open their markets by removing tariffs and free up their economies. The developed countries were able to invest in the developing nations, creating job opportunities for the people. For example, rapid growth in India and China has caused world poverty to decrease. However, countries in Africa still have the highest poverty rates, in fact, the rural areas of China which do not tap on global markets also suffer greatly from such high poverty.

On the other hand, developed countries set up their companies and industries to the developing nations to take advantages of low wages and this causing pollution in countries with poor regulation of pollution. Furthermore, setting up companies and factories in the developing nations by developed countries affect badly to the economy of the developed countries and increase unemployment.

Education and Health Systems: Globalization contributed to develop the health and education systems in the developing countries. We can clearly see that education has increased in recent years, because globalization has a catalyst to the jobs that require higher skills set. This demand allowed people to gain higher education. Health and education are basic objectives to improve any nations, and there are strong relationships between economic growth, health and education systems.

Through growth in economic, living standards and life expectancy for the developing nations certainly get better. With more fortunes, poor nations are able to supply good health care services and sanitation to their people. In addition, the government of developing countries can provide more money for health and education to the poor, which led to decrease the rates of illiteracy. This is seen in many developing countries whose illiteracy rate fell down recently. It is truth that, living standards and life expectancy of developing countries increase through economic gains from globalization. An important drawback of globalization is that a globalized competition has forced many minds, skilled workers, highly educated and qualified professionals, such as scientists, doctors, engineers and IT specialists migrate to developed countries to benefit from the higher wages and better lifestyle prospects for themselves and their children. This leads to decrease skills labor in the developing countries.

Culture Effects: Globalization affected the developing countries culture in various ways. Not few cultural traits have been enormously changed through globalization, as the people are simply imitating others cultures like America and European countries. On the other hand, many developing countries extreme dependence and emphasis to globalization might lead to destroying of their own culture, traditions, identity, customs and even their languages. It was witnessed in some Arab countries (Iraq, Syria, Lebanon and Jordan) that their cultures have been affected negatively. A kind of clothes they wear and a sort behavior they show are totally changed. Furthermore, globalization leads to disappearance of many words and expressions from local languages because many people use English and French words. In addition, great changes have taken place in the family life, young people are trying to leave their families and live alone when they get 18 years old. As a result, the extended family tends to become smaller than before. These kinds of changes are also observed in many urban areas of Ethiopia.

5.2.2. Globalization and Developing Countries

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5.2.3. Advantages of Globalization

Globalization increases free trade: Globalization has increased the free trade between countries. The increased capital liquidity has allowed investors in well developed nations to invest in developing countries. Huge corporations from developed nations have great flexibility to operate in other countries.

Global mass media ties the world together: The increased flow of communication has allowed global mass media to tie the world together. Besides, global mass media has allowed vital information to be shared between corporations and individuals around the world. Globalization has also contributed to greater speed and ease of transporting goods and people.

Eradicates Cultural Barriers: Countries joining together economically, through politics and education have reduced and can even eradicate cultural barriers, and increase the global village effect. Globalization has proven to be the medium for the spread of democratic ideals to well developed nations and greater independence to developing countries in the Global South. Reduction of War: Reduction of war between well developed nations is probably one of the primary benefits of globalization.

The following is a list of benefit that could be gained from globalization, both by the countries of global south and north.

- ◆ Increased free trade between nations,
- ◆ Increased liquidity of capital allowing investors in developed nations to invest in developing nations,
- ◆ Corporations have greater flexibility to operate across borders,
- ◆ Global mass media ties the world together,
- ◆ Increased flow of communications allows vital information to be shared between individuals and corporations around the world,
- ◆ Greater ease and speed of transportation of goods and people,
- ◆ Reduction of cultural barriers increases the global village effect,
- ◆ Spread of democratic ideals to developed nations,
- ◆ Reduction of likelihood of war between developed nations, and
- ◆ Increases in environmental protection efforts in developed nations.

5.2.4. Disadvantages of Globalization

Decreased environmental integrity: Globalization has the potential to decrease environmental integrity as polluting corporations from well developed countries can take advantage of developing nations weak regulatory rules.

Seeking for cheap labor: Globalizations increase jobs for non-skilled and skilled peoples of the developing nations as huge corporations of developed countries seek for cheap labor. This condition also creates further inequality between developed and developing countries. Thus, the economic trend can also increase the likelihood of economic disrupt in a single nation, which could affect all nations socioeconomic condition, particularly in the impoverished developing nations.

Limits cultural expressions: Globalization imposes limits on free expression as most of the mass media tends to be controlled by huge corporations. This means that mass media can be used by handful corporations to pose risks in the cultural heritage of both well developed and developing nations. The following are some of the general disadvantages of globalization.

Increased flow of skilled and non-skilled jobs from developed to developing nations as corporations seek out the cheapest labor,

- ◆ Increased likelihood of economic disruptions in one nation affecting all nations,
- ◆ Corporate influence of nation-states far exceeds that of civil society organizations and average individuals,
- ◆ Threat that control of world media by a handful of corporations will limit cultural diversity,
- ◆ Greater chance of reactions for globalization being violent in an attempt to pre-serve cultural heritage
- ◆ Greater risk of diseases being transported unintentionally between nations,
- ◆ Spread of a materialistic lifestyle and attitude that sees consumption as the path to prosperity,
- ◆ International bodies like the World Trade Organization infringe on national and individual sovereignty, and
- ◆ Increase in the chances of civil war within developing countries and open war between developing countries as they vie for resources.

Globalization is an ongoing trend in the economy. It has advantages and disadvantages, and these things will not disappear. People just need to know how to reap its benefits and reduce its risks. People must understand its impact globally, and work altogether to remedy the problems that may arise in the future. All countries in the Global North and Global South must work altogether to spread its benefits.

Resources

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Activity 5.2

Student, critically think back about what you have learned in this section and complete the following questions first individually and then discuss with your friends.

1. Can you find an element of globalization in your locality?
2. How do you evaluate it?
3. Explain the impact of globalization on developing countries by taking Ethiopia as an example.

Globalization is the process through which the world becomes more linked as a result of greater commerce and cultural interaction.

Globalization in the developing countries is manifested in the following three important fields: economic and trade processes, education and health systems, and culture effects.

The advantages of globalization is expressed in terms of increases in free trade, and the global mass media that ties the world together.

The disadvantages of globalization can be expressed by the decreased environmental integrity, the search for cheap labor, the limitations of cultural expressions.



Self-test Exercise 5.2

Part I

Multiple choice: Choose the best answer from the given alternatives

1. What is globalization?
 - A. the movement of goods, labor, and ideas more freely around the globe
 - B. the growth of the internet
 - C. the increase in wealth of multinational corporations
 - D. cheap goods
2. Globalization is beneficial for firms because:
 - A. it protects them against foreign competition.
 - B. it insulates them from the impact of events in other countries.
 - C. It opens up new market opportunities.
 - D. It increases the risk and uncertainty of operating in globalizing world economy.
3. Globalization can be challenging for business because:
 - A. it can result in more competition.
 - B. It reduces vulnerability to political risk and uncertainty when operating internationally.
 - C. it means that prices can be increased.
 - D. all of the above.
4. Which one of the following is the disadvantage of globalization?
 - A. Globalization encourages friendly relationships between countries.
 - B. Globalization can cause other cultures to lose their traditions.
 - C. Globalization encourages free trade.
 - D. Globalization brings our world together.

Part II Give short answer

1. What do you suggest to improve local products so that they will be more competent with foreign products in the domestic markets of Ethiopia?



Checklist

Dear learner! Now it is time to check your understanding of the meaning, scope, and branches of geography. Read each of the following questions and answer them by putting a tick (✓) mark in one of the boxes under alternatives 'Yes' or 'No'.

No	Items	Yes	No
1	Can you define the concept of globalization?		
2	are you able to explain the effects of globalization in developing countries?		
3	can you describe the main advantages of globalization?		
4	are you able to explain the major disadvantages of globalization?		

SECTION THREE

The Growing Imbalance Between Regions and Countries

Section Overview

Basically, growth need not take place in a balanced way. Situations that countries are in at any one point in time reflect their previous investment decisions and development. Accordingly, at any point in time desirable investment programs that are not balanced investment packages may still advance welfare. Unbalanced investment can complement or correct existing imbalances. Once such an investment is made, a new imbalance is likely to appear, requiring further compensating investments. There are wide varieties of economic inequality, most notably measured using the distribution of income (the amount of money people are paid) and the distribution of wealth (the amount of wealth people own). Besides economic inequality between countries or states, there are important types of economic inequality between different groups of people. While you refer to the highlighted parts in this section, keep your attention on the indicated learning outcomes.

This section discusses the main idea of country and regional inequalities, the cause and effect of trade imbalance, the measurement of countries and regional inequalities, and the Widening current global imbalance, to understand why and how countries and regions' economies are becoming more unequal. Therefore, in order to achieve this purpose, it is advisable to carry out the instructional process logically in the forthcoming stages.

Section Learning Outcomes

At the end of this section, you will be able to:

-  demonstrate why and how trade imbalance occurs between developing and developed countries; and
-  evaluate the level of countries or regional inequalities.

KEY TERMS

- per capita GDP,
- trade balance,
- McLoone Index,
- Gini Coefficient and Lorenz



Student, attempt the following question [and then compare your ideas to the note described next.

1. Is the economy of countries getting more balanced or imbalanced as time passes? Please explain why you choose each side of your response
2. how do you relate this concept to your local context?

5.3.1. The concept of economic inequality between regions and countries

The idea of inequality is both very simple and very complex. At one level it is the simplest of all ideas and has moved people with an immediate appeal hardly matched by any other concept. At the same time, it is a very complex notion that has been the subject of much research outputs by philosophers, statisticians, political theorists, sociologists and economists.

From the ancient period to the present, theories have seen trade as a key instrument in determining the trend of regional and country economic inequality. Both the convergence and divergence hypotheses take it into account with their distinct assumptions and methodologies. The available evidence on trends in global economic inequality comes mainly from two types of studies. Studies of the first type have been concerned with empirically testing the catching-up or convergence hypothesis. This states that less developed countries and regions should be expected to grow faster than more developed ones.

The hypothesis clearly refers to what we have called inter-country inequality and proposes that we should expect this to decline over time. Three main arguments have been advanced in support of the hypothesis.

First, the latecomers into the world of modern economic growth enjoy an advantage because they can simply adopt and exploit technologies, which the pioneers had to develop through their own efforts.

Second, assumption reflects there are diminishing returns to inputs factor. This implies less developed economies have an advantage of low production cost because of low labor wage and the price of other factor input. Thus, for equivalent rates of investment, the less developed economies should be able to achieve higher growth.

Third, the shift of large amounts of labor from farm to industry boosts labor productivity in general. The importance of this source of productivity growth, however, declines with development as productivity tends to equalize across sectors and activities, and fewer and fewer workers remain in low-productivity activities.

Nevertheless, widening income inequality is the defining challenge of our time. In advanced economies, the gap between the rich and poor is at its highest level in decades. Inequality trends have been more mixed in emerging markets and developing countries. Thus, the Second view investigates the divergent trends in inequality developments across advanced economies and developing countries, with a particular focus on the poor and the middle class. The pro-divergent notion primarily highlighted the rationale for this divergence as the countries' current experience. They practically demonstrate a diverging pattern of inequality.

The following are some of the evidences that support the greater divergent pattern of inequality.

Inequality has been exacerbated by technological development and the associated increase in skill, as well as the collapse of various labor market institutions in both advanced economies and developing countries.

The growing skill premiums are related with expanding income inequalities in advanced nations, whereas financial deepening is associated with rising inequality in developing countries.

5.3.2. Cause and effect of trade imbalance

An important indicator of regional and national inequality is measuring the trade balance. A trade imbalance occurs when the cost of a country's imports exceeds the cost of its exports. It is one approach to measure international commerce, and it's also known as a negative trade balance. A country's trade deficit may be calculated by subtracting the entire value of its exports from the total value of its imports. The major causes and effect of this imbalance are stated below.

Causes: A trade imbalance happens when a country does not produce what it requires and must borrow from other countries to pay for imports. This is referred to as a current account deficit. A trade deficit also occurs when companies manufacture goods in other countries. The raw materials for manufacturing that are shipped overseas for factory production count as an export. The finished manufactured goods are counted as imports when they're shipped back to the country. The imports are subtracted from the country's gross domestic product even though the earnings may benefit the company's stock price, and the taxes may increase the country's revenue stream.

Effects: A trade can enhance a country's standard of living since citizens can access a broader range of goods and services at a lower cost. It can also reduce the threat of inflation since it creates lower prices. However, a trade imbalance may result in more job outsourcing to foreign countries over time. As a country imports more goods than it buys domestically, then the home country may create fewer jobs in certain industries. At the same time, foreign companies will likely hire new workers to keep up with the demand for their exports.

5.3.3. Measurement of countries and regional inequalities

Economic inequality, in this context, measures the inequality between a percentage of population and the percentage of resources (such as income) received by that population. Inequality studies explore the levels of resource disparity and their practical and political implications. Though there are number of measures, the most often used metrics for evaluating global economic disparity is per capita GDP.

The major characteristics or features that were considered in such assessment are listed below.

- Physical attributes – distribution of natural ability is not equal
- Personal Preferences – Relative valuation of leisure and work effort differs
- Social Process – Pressure to work or not to work varies across particular fields or disciplines
- Public Policy – tax, labor, education, and other policies affect the distribution of resources.

Most people believed that economic disparity in Africa was quite modest and, at best, wasn't a significant barrier to reducing poverty until recently. Mostly because they are all generally impoverished. However, there was a general sense of concern when it was found that inequality in Sub-Saharan Africa was among the greatest in the world. The discrepancy can be seen in both income and non-income circumstances.

Income inequality of sub-Saharan Africa is one of the most unequal, despite low levels of per capita income. Inequalities in non-income dimensions of welfare are also high, particularly between men and women and between regions, and have remained persistent over time. Furthermore, although income inequalities are typically more of an urban phenomenon, asset-based and capability-based inequalities in fact tend to be higher in rural than urban areas. In countries where there is a significant initial income difference, economic growth is less effective at alleviating poverty. Economic expansion and inequality reduction must go hand in hand to significantly reduce poverty. Figure 5.3, which is based on data from the World Bank gathered between 2011 and 2018, shows the level of inequality in a chosen number of sub-Saharan African countries. According to the data, a country's index value rises when levels of economic disparity among its citizens' decline. [Student, refer to figure 5.3 below and identify and analyze the status of countries involved and the disparities prevailing among them]

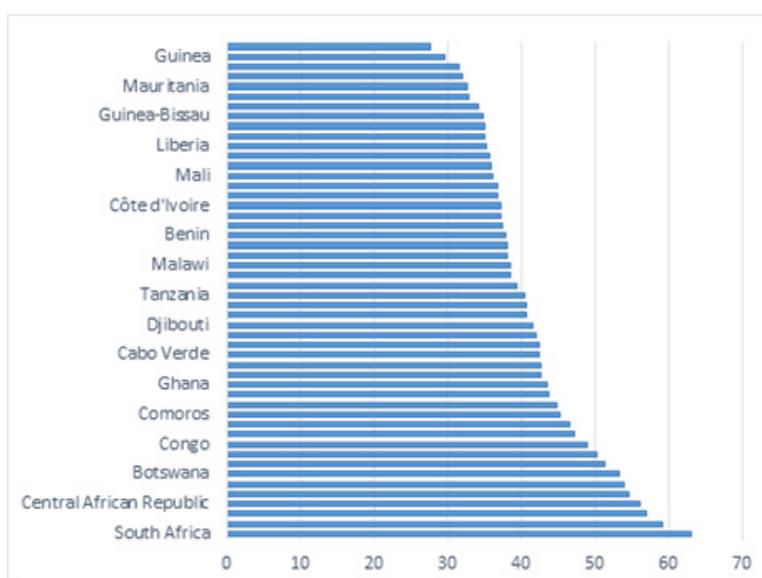


Figure 5.3: Selected Africa Country Ranking in inequality
(World Bank estimate of GINI index)

5.3.4. The Widening current global imbalance

Measures of inequality based on Gini coefficients of gross and net incomes have increased substantially since 1990 in most of the developed world (see figure 5.8). Inequality, on average, has remained stable in developing countries, although at a much higher level than observed in advanced economies. However, there are large disparities across developing countries, with Asia and Eastern Europe experiencing marked increases in inequality, and countries in Latin America exhibiting notable declines (although the region remains the most unequal in the world). During 1990–2012, market income inequality in advanced economies increased by an average of 50 Gini points compared to a 3 Gini point increase in the net Gini coefficient.

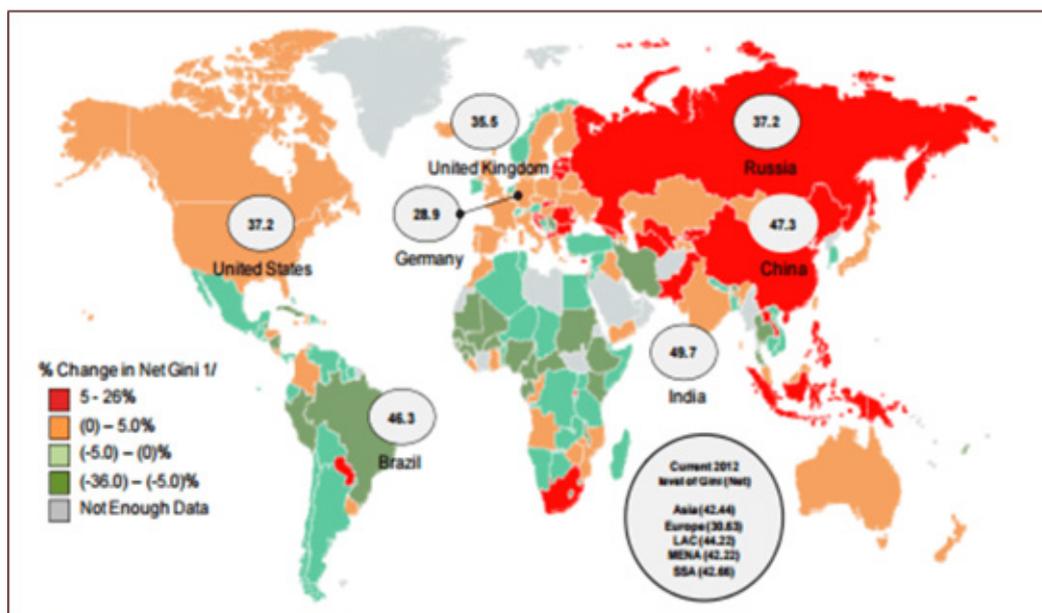


Figure 5.4. Change in Net Gini Index, 1990–2012 Source: Dabla-Norris (2015)

Resources

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Activity 5.3

Dear students, attempt the following questions

1. Why some countries with abundant natural resources remain destitute, while others are becoming more prosperous while having less natural resources.

Try to think about the role of poor and rich countries in bringing about global trade imbalance and reflect on it critically.

The idea of inequality is both very simple and very complex. At one level it is the simplest of all ideas and has moved people with an immediate appeal hardly matched by any other concept. At the same time, it is a very complex notion that has been the subject of much research outputs by philosophers, statisticians, political theorists, sociologists and economists.

Important studies depicted that the catching-up or convergence hypothesis by indicating three main arguments in support of the hypothesis. These are the advantage of the beginners, prevalence of diminishing returns to inputs factor, the shift of labor productivity.

A trade imbalance happens when a country does not produce what it requires and must borrow from other countries to pay for imports.

A trade can enhance a country's standard of living since citizens can access a broader range of goods and services at a lower cost.

The major characteristics or features that were considered to measure the countries and regions economic inequality like Physical attributes, Personal Preferences, Social Process, Public Policy.

The measure of countries economic inequality is showing widening trend during 1990-2012.



Self-test Exercise 5.3

Multiple choice: Choose the best answer from the given alternatives (6 points)

1. What is regional disparity?
 - A. Differences or inequalities between the geographic regions (focusing on economic disparity)
 - B. A way of describing characteristics of the geographic regions
 - C. Social interaction between regions
 - D. Economic reforms apply in one regions
2. What is the most typically used measure of a country's level of development?
 - A. Technological innovation
 - B. Mobility
 - C. Income
 - D. Gender equity
3. Which of the following would typically be considered "human capital"?
 - A. Gender and race
 - B. Health and education
 - C. Prime ministers and presidents
 - D. Religious world views and trust
4. What does the Gini coefficient measure?
 - A. General efficiency of the economic system
 - B. Rule of law
 - C. Poverty
 - D. Inequality
5. Assume that the countries below have the Gini coefficients as indicated. Which is the most unequal country?
 - A. South Africa-0.63 correct
 - B. China-0.42 incorrect
 - C. UK-0.33 incorrect
 - D. Sweden-0.26 incorrect



Checklist

Dear learner! Now it is time to check your understanding of the meaning, scope, and branches of geography. Read each of the following questions and answer them by putting a tick (✓) mark in one of the boxes under alternatives 'Yes' or 'No'.

No	Items	Yes	No
1	Can you describe the idea of countries economic inequality?		
2	are you able to explain the theory of regional economic convergence?		
3	can you describe the main causes of countries trade imbalance?		
4	are you able to explain the effects of trade in regions or countries development?		
5	Can you describe the different methods used to measures the country's economic imbalance?		
6	are you able to explain the trend of regional and countries economic development?		

SECTION FOUR

Corruption



Section Overview

Corruption is a worldwide issue in that no country is immune to it. It has been widely acknowledged that the traditional notion of corruption as affecting mainly less developed countries is incorrect. Even though developing countries do score systematically worse in corruption ratings, these indices also show that more than two thirds of the countries of the world suffer significantly from corruption including the middle income countries.

The section, thus, mainly addresses the basic concepts, and types of corruption, the geographical distribution and its causes and consequences, and finally the remedial measures of it. Thus, student, be focused to learn the contents indicated.

Section Learning Outcomes

At the end of this section, you will be able to:

-  explain the different type of corruption; and
-  demonstrate how corruption affects economic development by taking concrete examples.

KEY TERMS

- Bribery,
- patronage,
- petty corruption,
- grand corruption and
- Corruption Perceptions Index



Student, please attempt the following questions

1. Do you think that corruption is one of the major factors that hamper the growth of your country?
2. Explain why or why not depending on your response.

5.4.1. The Concept of Corruption

Dear learner, to What extent your guess approaches evidence based ideas? You may get the response from the lesson note presented next Currently critical geography examines corruption as an objective collection of deviant actions predominantly affecting states, particularly in the Global South. It also illustrates how corruption explanations get politicized and interrelated with material, and geographical power regimes. For instance, urban informality is regarded as a significant linked issue in both the North and South.

The term corruption involves a wide range of behaviors differing in their causes and effects in different spatiotemporal contexts. Corruption may be defined in different ways, occurs in varying levels of severity, and takes various forms in time and space, depending on local political cultures and institutional frameworks. There is no one single definition of corruption that can be applied to all circumstances, for example, corruption can be petty or large-scale, systemic or occasional, implicit or explicit, committed by individuals. Similarly, Transparency International defines corruption as the abuse of entrusted power for private gain. It also more commonly defined as evil, a disastrous personal failing. Legally, however, judicial systems punish acts, not character. In this view, corruption is a source of injustice and inequality. corruption is simultaneously a political, economic, legal, and moral phenomenon.

The relationship between corruption and economic growth has been debated. Many studies have found evidence that corruption has harmful effects on economic growth. Corruption shows a negative correlation with economic growth after controlling for institutional efficiency. Furthermore, corruption causes uncertainty for investors and raises investment risk in nations with high levels of corruption.

5.4.2. Types of corruption

Corruption can be categorized in various dimensions to facilitate the understanding of how corruption affects economic performance. The concept includes three broad categories of human action; bribery, theft of public assets, and patronage.

Bribery is the most familiar among corrupt processes. It consists of payments by individuals or firms to public officials in order to influence administrative decisions under their responsibility. Bribery covers a wide range of administrative decisions, determined by the scope of government regulations and activity. It frequently overlaps with the other two corruption categories through the collusion of briber and bribe.

Theft of public assets can occur as unilateral embezzlement by public officials or through the collusion of public officials and private agents. Apart from the illegal transfer of real or financial public assets at below-market prices, it includes evasion of taxes and other legal payments to the public sector, as well as diversion of public funds from their intended use into private pockets.

Corruption in the form of patronage (sometimes called favoritism, nepotism, clienteles) consists of the preferential treatment of firms and/or individuals by public officials regarding the compliance with government rules for the allocation of government contracts or transfer payments. The private sector counterpart consists of "special favors" in the form of financial rewards or professional opportunities granted to the public official involved. Another distinction is that an act of corruption, which can be characterized by the value of the transaction concerned.

Although this is a continuous variable, the analytical distinction usually made is between low value (“petty”) and large value (“grand”) corruption. Typically, the larger the value of the corrupt transaction, the higher the position in the public hierarchy of the public official(s) involved.

Various combinations of the characteristics detailed above have given rise to specific types of corruption. Thus systematic theft at a grand scale by high public officials is called “kleptocracy”, while systematic patronage with large stakes has been labelled “crony capitalism” or “government capture”. “Kick-backs” describe acts of bribery that involve theft of public assets or patronage.

5.4.3. Geography of Corruption

Corruption has got a geographical essence because social processes are always distributed unevenly across space. The causes, nature, and consequences of corruption differ from place to place, depending on the context of historical, cultural, legal and political organization. The incidence of corruption is difficult to determine empirically because its committers are often adept at keeping it hidden.

Analyses of corruption in different regional contexts rely heavily on the corruption indicator of Transparency International, which is a global nongovernmental organization dedicated to monitoring and combatting public and private sector corruption.

The group is involved in a variety of tangled activities, including measuring corruption, exposing inexcusable cases, offering advice to companies to minimize corruption, and developing tools for combatting it. The organizations produce annual corruption report with Corruption Perceptions Index (CPI) of government misconduct, issued since 1995. The CPI is a composite indicator based on surveys and interviews with public and private sector officials in each country and expert assessments by 13 sources, including the different global, regional and national organizations. A minimum of three of these units contributed to the assessment of corruption in each country. Scores were normalized on an ordinal scale of zero (most corrupt) to 100 (least corrupt).

Table 5.3 provides an overview of how the magnitude of corruption varies over the world. Only a very small number of countries (including Canada, Singapore, Australia, and New Zealand) have relatively uncorrupt governments, with CPI numbers of 80 or higher; however, this groups comprises a minuscule 1.7% of the world's population. A secondary tier of slightly corrupt states (indices of 60–79), including several European countries, the United States, Japan, Botswana, Israel, Taiwan, and the United Arab Emirates) includes an additional one-eighth of the planet. Moderately corrupt governments (scores of 40–59) include a diverse array of European, African, Middle Eastern, and a few Asian states such as South Korea. By far the largest group almost three-fourths of humanity consists of very corrupt governments: 82 states with scores ranging between 20 and 39 account for more than 5.2 billion people.

By this measure, corruption is the norm in most societies in the world. Finally, a small group of 14 states with scores below 20 may be said to be extremely corrupt; this group includes “failed states” such as Somalia, Afghanistan, and Yemen, which are incapable of delivering basic public services as well as several with long histories of extreme poverty (Haiti), war (Iraq), and totalitarian governments (Uzbekistan, Turkmenistan, and North Korea). Fortunately, this group includes less than 2% of the world’s population.

Table 5.3.

The world’s population distribution by degree of state corruption, 2016

Level of corruption	Corruption index	Population	% of world pop
Least corrupt	>80	118.6	1.7
Slightly corrupt	60 – 79	854.4	12.0
Moderately corrupt	40 - 59	694.2	9.7
Very corrupt	20 - 39	5210.2	72.9
Extremely corrupt	<20	267.7	3.7
Total		7145.1	100

Figure 5.5 also represents this distribution in more geographically sensitive terms using the categories deployed in Table 5.3. Clearly most countries in the world exhibit moderately high to severe levels of corruption. The worst offenders (scores under 20) are found primarily in Africa and the Middle East; and others like North Korea, and in the Western hemisphere, Haiti and Venezuela. The second-most corrupt group (scores 20–39) include almost all of East, South, and Southeast Asia, with the exceptions of Japan, South Korea, Singapore, and Malaysia as well as most of Africa and a broad swath of Spanish-speaking countries in Latin America. The third most-corrupt group (scores 40–59) includes wealthier countries in the developing world, including Brazil, South Africa, Turkey, Saudi Arabia, and several Balkan states. The fourth-most-corrupt cluster (scores 60–79) includes the United States, Japan, most of Europe, and, notably, Botswana, Africa’s least-corrupt country. Finally, the least corrupt (scores 80 and above), and smallest, group includes Canada, the Scandinavian states, Australia, and New Zealand.

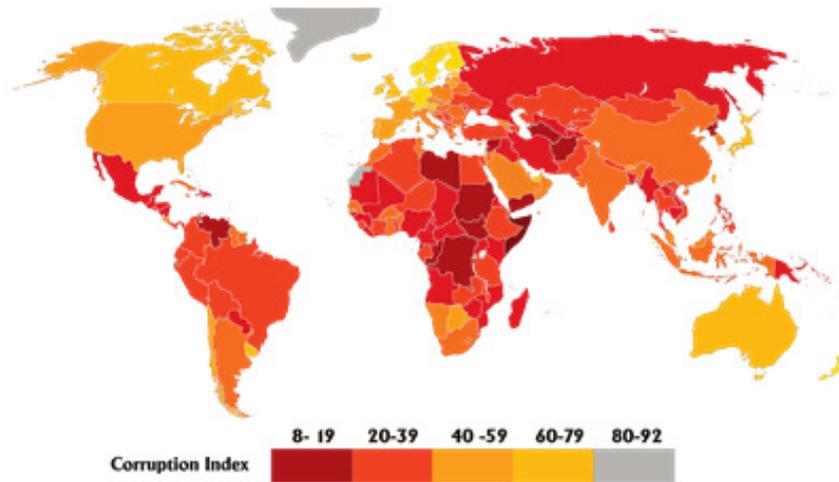


Figure 5.5 Distribution of transparency international corruption scores, 2016

5.4.4. Causes and consequences

Though corruption differs from country to country, it is possible to identify some of the key common driving forces that generate it. The following are some of the attributes of the most corrupt countries

- With rare exceptions, they are low-income countries,
- Most countries have a closed economy,
- The influence of religion is visible,
- Low media freedom and,
- a relatively low level of education.

The effects of corruption were presented in different forms. Some of the very serious impacts of corruption on public finances could be illustrated as follows.

1. Corruption increases the volume of public investments (at the expense of private investments), as there are many options that allow for public expenditure manipulation and are carried out by high-level officials so as to get bribes. That means, as government expenditures increase, opportunities for corruption is also increased.
2. Corruption redirects the composition of public expenditure from the expenditure necessary for basic functioning and maintenance to expenditure on new equipment.
3. Corruption tends to pull away the composition of public expenditure from the necessary fixed assets for health and education, as there is less chance of getting commissions than from other, perhaps unnecessary projects.
4. Corruption reduces the effectiveness of public investments and the infrastructure of a country.
5. Corruption can reduce tax revenues by compromising the ability of the state administration to collect taxes and fees, although the net effect depends on how the nominal tax and other regulatory burdens were selected by the officials, exposed to corruption.

Therefore, the influence of corruption on the economy operates through several factors:

- Through the impact of corruption on investments;
- Through the influence of corruption on the allocation of talents;

- Through the impact of corruption on public spending; and
- Through the impact of corruption on taxes.

Hello, student, Is corruption a visible social issue in your community? If so, how serious is it and what specific instances come to your mind?

5.4.5. Remedial measures

Some ideas and suggestions that have been put forth to fight system level corruption are as follows:

Leadership: the top leadership must set a good example with respect to honesty, integrity and capacity for hard work. Since fighting corruption will involve taking difficult decisions, the leadership must also display firmness, political will and commitment to carry out the required reforms. But honest and dedicated leaders are a necessary.

Credibility: The investigation and punishment must start from your group; it doesn't bypass those who are within the leader's party. For success, the offenders both on the demand and supply side of a corrupt deal must be convinced that the government is serious about fighting corruption.

Involving people: A publicity campaign to create greater awareness on the adverse effects of corruption. Ordinary citizens have a lot of firsthand experience with corruption, they are a good source of information and their help and cooperation should be solicited for the successful launch of an anti-corruption drive. Once people are convinced that a sincere and genuine effort to combat corruption is underway, they will respond and extend their full cooperation in resolving the problem.

Responsible press: A responsible press to gather, analyze, organize, present and disseminate information is considered vital to create greater public awareness and to provide the momentum for undertaking reforms to overcome corruption.

Oversight bodies: Views on the effectiveness of anti-corruption oversight or watchdog bodies are mixed. There are instances where they have proved useful. Otherwise, the oversight bodies will be rendered useless or worse, misused for political gain. An unwelcome situation can then arise and the country may have to appoint a watchdog to watch over the watchdog body.

Improving institutions: This involves such things as improving the legal framework; smoother, less time-consuming and less burdensome ways to conduct business in the functioning of law courts and in the administration of justice; promoting efficiency of the police force; strengthening the auditor general's office; and appointment of a responsible inspector general empowered to investigate and prosecute corruption.

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Activity 5.4

Student, complete the exercise given below.

1. How do you evaluate Ethiopia's degree of corruption? Please use figure 5.9, CPI representation, to elucidate on the Ethiopian instance.
2. Write a detailed visit report, after you go to your local anti-corruption commission office and collect data about what their major duties are, what types of corruption are more common there, and what method they follow in investigating the suspected individual.

The term corruption involves a wide range of behaviors differing in their causes and effects in different spatiotemporal contexts. It is simultaneously a political, economic, legal, and moral phenomenon.

Corruption can be categorized in various dimensions to facilitate the understanding of how corruption affects economic performance. The concept includes three broad categories of human action; bribery, theft of public assets, and patronage.

Though it is difficult to measure, Corruption has got a geographical essence because social processes are always distributed unevenly across space. countries including Canada, Singapore, Australia, and New Zealand have relatively uncorrupt governments, with a measure of corruption known as Corruption Perceptions Index (CPI) numbers of 80. On the other hand, countries which are categorized as "failed states" such as Somalia, Afghanistan, and Yemen scores below 20 may be said to be extremely corrupt.

Corruption has diverse causes and consequences. The main characteristics of countries that contribute to the prevalence of corruption are income level of the countries, openness of the country economy, the dominant religion the country has, media freedom and level of education.

To fight against corruption, various methods can be put forward such as; Leadership, Credibility, Involving people, Responsible press, Oversight bodies, Improving institutions.



Self-test Exercise 5.4

Multiple choice: Choose the best answer from the given alternatives (5 points)

1. According to the Corruption Perception Index of 2010, the country with the highest score is —

- A. Singapore B. Afghanistan C. Ethiopia D. Somalia

2. What is an example of Corruption?

- A. Sharing B. Theft C. Donations D. Taxes

3. What is Bribery

- A. It is paying someone for personal gain.
 B. When you get married; husband and bribe.
 C. To cook pastries and cake.
 D. To help others.

4. One of the main economic issues with corruption is that

- A. not everyone has the same power to bribe.
 B. there are no rules for setting the price of a bribe.
 C. bribes do not redistribute income as taxes do.
 D. only rich people have the economic power to bribe.

5. Corruption affects growth if it affects

- A. the level of population.
 B. accumulation of physical or human capital.
 C. total factor productivity.
 D. All of the above.



Checklist

Dear learner! Now it is time to check your understanding of the meaning, scope, and branches of geography. Read each of the following questions and answer them by putting a tick (✓) mark in one of the boxes under alternatives 'Yes' or 'No'.

No	Items	Yes	No
1	Can you describe the concept of corruption?		
2	are you able to explain various types of corruption?		
3	can you describe how to measure the countries level of corruption?		
4	are you able to explain the geographical characteristics of corruption?		
5	Can you identify the most corrupt and uncorrupt countries of the world?		
6	are you able to explain the main characteristics of countries contributing for the prevalence of corruption?		
7	can you identify some of the important remedial measures to fight against corruption?		

SECTION FIVE

Global Health Crises



Section Overview

Hello student, you may be quite interested in learning more about this area after seeing the recent experience of health crises, the world has had with the COVID19 pandemic. From the response to the threat of pandemic flu to attempts to prevent the spread of HIV/AIDS, the world has come to recognize that global health concerns affect all citizens, regardless of nationality, location, or status. Despite improvements in the world's collective ability to battle disease with advances in medicine and technology, global health needs remain unmet, making the entire world vulnerable to health crises. In particular, poor countries continue to suffer disproportionately from inadequate public health systems and resources, exacerbating their struggle out of poverty.

This section focuses on global health concerns as one of the most pressing topics. The major themes discussed in this section are the global context of health crises, historical global health problems, and contemporary global pandemic experience.

Section Learning Outcomes

At the end of this section, you will be able to:

-  explain the major crises of global health and their impact on economic development; and
-  discuss the causes of global health crises.

KEY TERMS

- HIV/ AIDS,
- Covid-19,
- Ebola and Malaria



Student, please attempt the following question individual and then share with your friends and family members.

1. Why are malaria, HIV/AIDS, and Ebola more prevalent in Africa than in any other region?
2. Why couldn't we eradicate them until the present?

5.5.1. The Global Context of the Health Crises

Globally, an estimated 2 billion individuals do not have access to basic health services. The result is a shocking level of preventable prevalence. For example, malaria infects more than 500 million people a year and kills more than a million, equating to approximately one death from malaria every 30 seconds. The disease has the greatest impact in Africa, where it is the leading cause of mortality among children and costs the continent around \$12 billion in lost productivity each year.

Also, residents of poor nations must pay the highest proportion of their health-care costs out of pocket, because poor governments lack the financial resources to provide a functional, accessible health-care system. Globally, an estimated 150 million people and 25 million households are unable to pay for health care due to financial constraints. Only 12% of the \$3.2 trillion spent on health care worldwide in 2002 was spent in low- and middle-income nations, which account for 90% of the world's illness burden.

A health sectors aid increased by over 50 percent from 2002 and 2005, reflecting major increases by donor countries, including the United States, and the creation of new financing partnerships like the Global Fund to Fight AIDS, Tuberculosis and Malaria and the Global Alliance for Vaccines and Immunization. Even with these notable increases, the level of funding for global health remains significantly below estimated needs. Faced with these tremendous financing challenges, policymakers are turning to innovative solutions to provide more and more effective aid for health.

5.5.2. Historical global health problem

Basically, in the realm of infectious diseases, a pandemic is the worst case scenario. When an epidemic spread beyond a country's borders, that's when the disease officially becomes a pandemic. Communicable diseases existed during humankind's hunter and gatherer days, but the shift to agrarian life 10,000 years ago created communities that made epidemics more possible. Malaria, tuberculosis, leprosy, influenza, smallpox and others first appeared during this period. As people got more civilized, they began to establish cities and develop international trade routes to connect with other cities, as well as wage battles with them. As cities in many regions contact each other more, the conditions for the occurrence of worldwide pandemics become more likely.

The Great Plague of Athens in 430BC, during the Peloponnesian War, was one of the key historical times where the first recorded pandemic occurred. After the disease passed through Libya, Ethiopia and Egypt, it crossed the Athenian walls as the Spartans laid siege. As much as two-thirds of the population died. The symptoms included fever, thirst, bloody throat and tongue, red skin and lesions. The disease, suspected to have been typhoid fever, weakened the Athenians significantly and was a significant factor in their defeat by the Spartans. Following this time and up to the 1918 Spanish Flu pandemic, which was the most famous pandemic in history, around 11 vastly accelerated pandemics were reported.

In 1918, Spanish Flu; The avian-borne flu that resulted in 50 million deaths worldwide, the 1918 flu was first observed in Europe, the United States and parts of Asia before swiftly spreading around the world. At the time, there were no effective drugs or vaccines to treat this killer flu strain. Wire service reports of a flu outbreak in Madrid in the spring of 1918 led to the pandemic being called the “Spanish flu.” By October, hundreds of thousands of Americans died and body storage scarcity hit crisis level. But the flu threat disappeared in the summer of 1919 when most of the infected had either developed immunities or died.

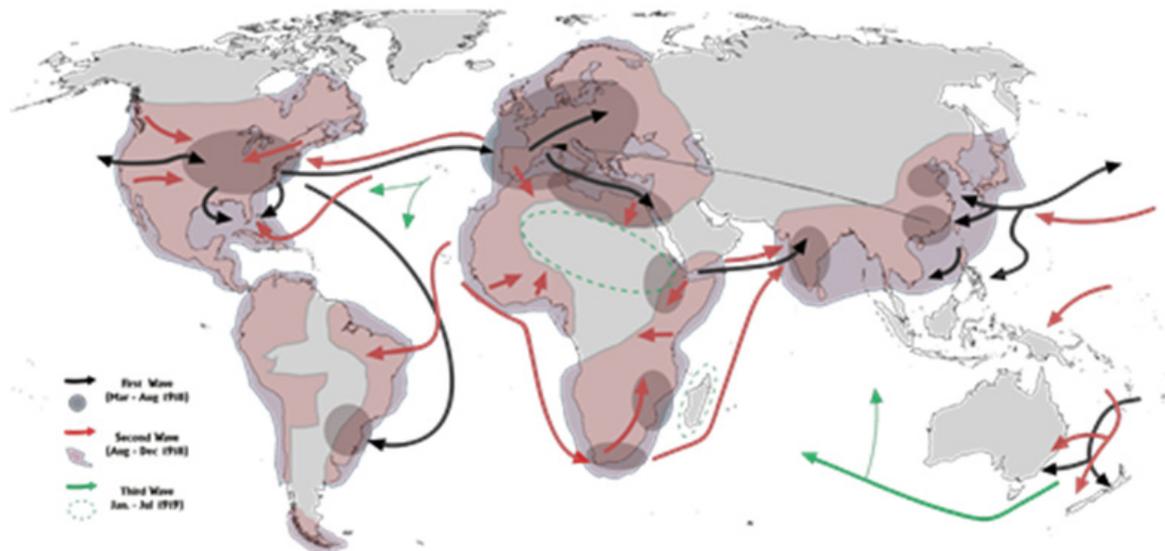
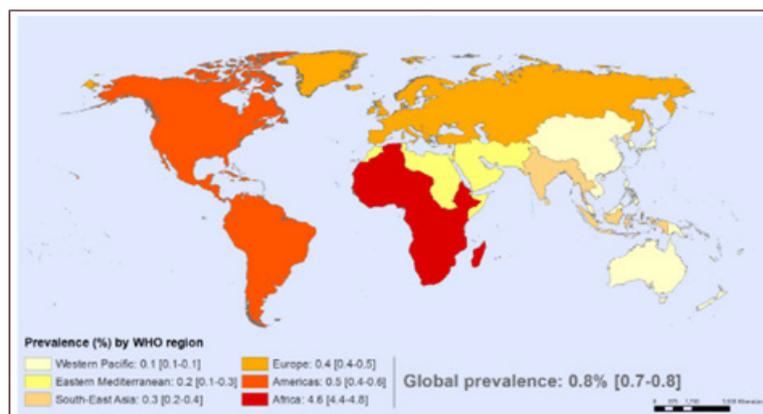


Figure 5.6. The global trajectory of Spanish flu

5.5.3. Current experience of global pandemic

Currently, various health crises are occurring in several states, putting county governments and citizens under stress. Among the concerns with wider spatial distribution and deeper socio- economic consequences include HIV/AIDS, Ebola, and the more recent Covid-19. HIV/AIDS: First identified in 1981, AIDS weakens a person's immune system, resulting in death from illness that the body would typically be able to combat. When symptoms subside, carriers become highly infectious through blood and genital fluid, and the disease destroys t-cells. AIDS was first observed in America. Treatments have been developed to slow the progress of the disease, but 35 million people worldwide have died of AIDS since its discovery, and a cure is yet to be found.

Figure 5.7.
Adult HIV
prevalence
2011



Ebola: The initial case, or index patient, was reported in December 2013. An 18-month-old boy from a small village in Guinea is believed to have been infected by bats. Ebola highlighted the implications for when a country does not have the minimum core capacity to detect, re- port, and rapidly respond to outbreaks. The three most affected states, Guinea, Liberia, and Sierra Leone had a historically vulnerable public health infrastructure, and were in the aftermath of a civil war that had devastated the healthcare system and access to basic sanitation. While the WHO declared the epidemic to be a Public Health Emergency of International Concern, the impact this epidemic had on the world, and particularly West Africa, is significant. A total of 28,616 cases of EVD and 11,310 deaths were reported in Guinea, Liberia, and Sierra Leone. There were an additional 36 cases and 15 deaths that occurred when the outbreak spread outside of these three countries.

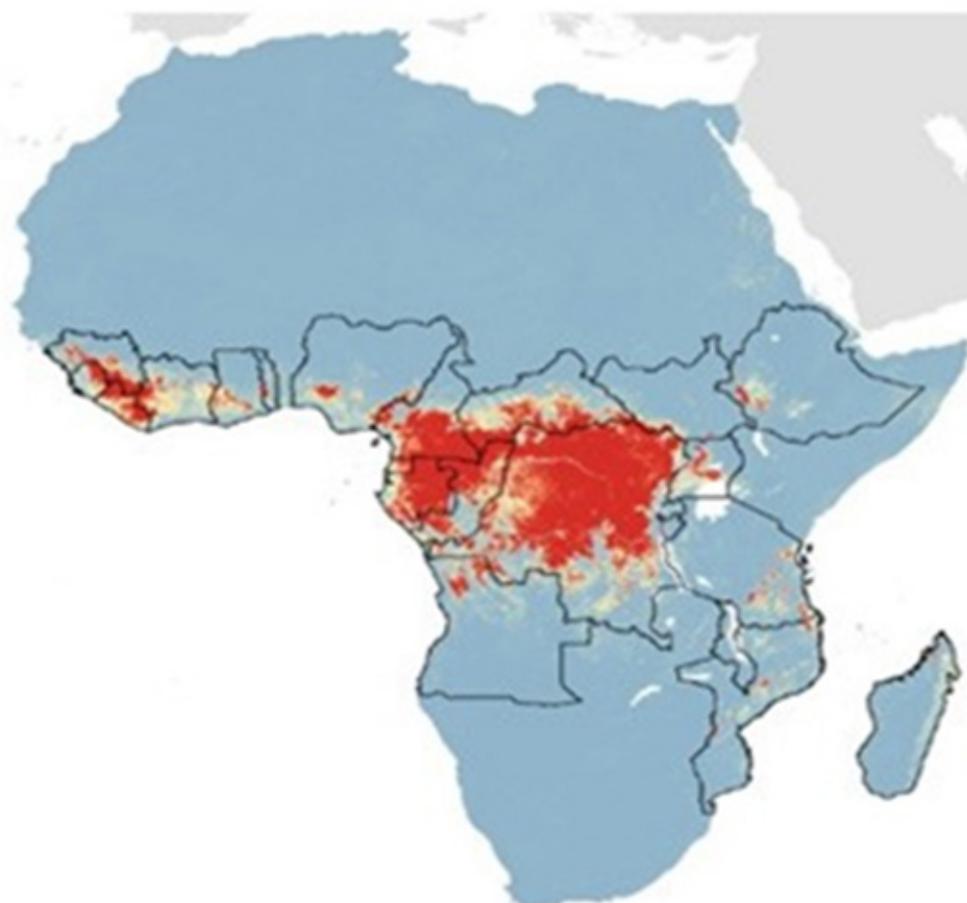


Figure 5.8. The spread of Ebola in Africa

COVID-19: On March 11, 2020, the World Health Organization declared the COVID-19 virus to be a pandemic after it infected over 118,000 individuals in 114 nations in three months. And the spread wasn't anywhere near finished. Symptoms include respiratory problems, fever and cough, and can lead to pneumonia and death. It spreads through droplets from sneezes. The first reported case in China appeared November 17, 2019, in the Hubei Province. Without a vaccine available, the virus spread beyond Chinese borders to nearly every country in the world. By December 2020, it had infected more than 75 million people and led to more than 1.6 million deaths worldwide. The number of new cases was growing faster than ever, with more than 500,000 reported each day on average.

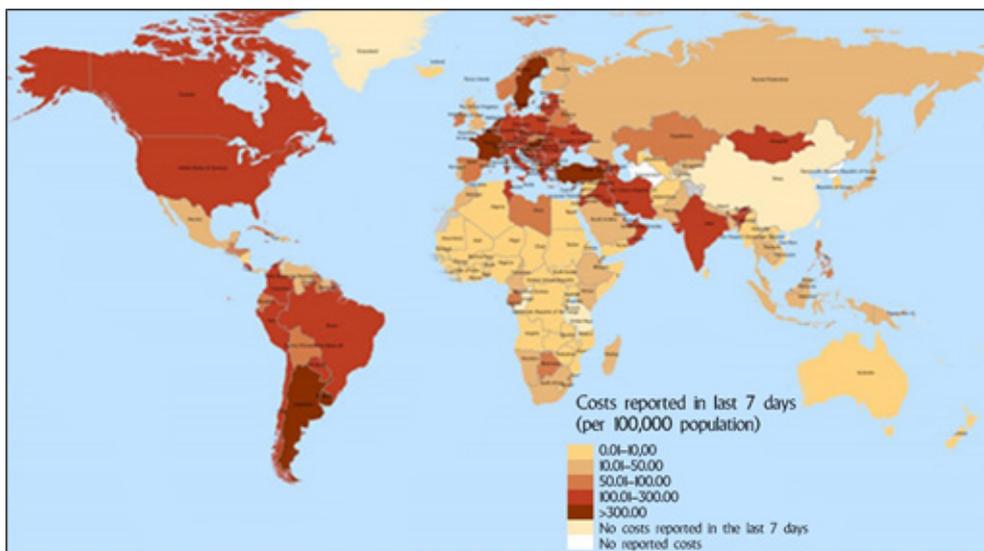


Figure 5.9. COVID-19 cases per 100 000 population reported by countries, and areas, 2021

Resources

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Activity 5.5

Student, complete the exercise given below.

1. Talk about the 1918 Great Ethiopian Influenza (Ye Hedar Beshita) Epidemic and identify which sort of historic health problem it was connected to.
2. Examine the impact of Global health crises on the socio-economic functions of societies.
3. Outline the major global health problems induced by known pandemics and describe their consequences both at international and national context.

Facts related to global health conditions indicated that there is a shocking level of preventable prevalence. These diseases have the greatest impact in Africa, and other developing countries, where it is the leading cause of mortality and costs billions of productivity lost each year.

The prevalence of wide range of communicable diseases goes back to during humankind's hunter and gatherer days, but the shift to agrarian life 10,000 years ago created communities that made epidemics more possible. Malaria, tuberculosis, leprosy, influenza, smallpox and others first appeared during this period. The oldest historical pandemic having a wider global coverage are The Great Plague of Athens in 430BC and Spanish Flu of 1918.

Currently, various health crises are occurring in several states, putting county governments and citizens under stress. Among the concerns with wider spatial distribution and deeper socio-economic consequences include HIV/AIDS, Ebola, and the more recent Covid-19.



Self-test Exercise 5.5

Multiple choice: Choose the best answer from the given alternatives (5 points)

- Which of the following diseases is the oldest one which goes back to the human history?
 - Ebola
 - HIV/AIDS
 - Malaria
 - Covid-19
- Scientists blamed stressed-out bats and their habitat loss for this 21st century pandemic.
 - COVID-19
 - Ebola
 - SARS
 - All of the above
- The plague which was one of the key historical times where the first recorded pandemic occurred
 - A war of Antonius
 - A war of Peloponnesian
 - A war of Justinian
 - A war of Cyprian
- An epidemic that becomes unusually widespread and even global in its reach is referred to as a _____.
 - Pandemic
 - Hyperendemic
 - Spanish flu
 - Plague
- Which of the following can be considered a health inequality issue?
 - Health differences arising from childhood disabilities.
 - Health differences arising from health insurance coverage.
 - Health differences arising from cultural exclusion.
 - Health differences arising from poor governance.



Checklist

Dear learner! Now it is time to check your understanding of the meaning, scope, and branches of geography. Read each of the following questions and answer them by putting a tick (✓) mark in one of the boxes under alternatives 'Yes' or 'No'.

No	Items	Yes	No
1	Can you describe the status the world countries to prevent potential pandemic?		
2	are you able to state some historical diseases that affect a wide range of world?		
3	are you able to state the currently prevailing pandemics spread over in the world?		

Unit Summary

The various faces of poverty are observed in the conditions of all types of barrios that maintain an unfavorable change resistant status quo. In this regard, four primary elements of poverty may be identified: economic, cognitive, normative, and power politics. Globalization is a process that brings together world nations and creates the essence of a global citizen. The notion is a very contentious subject, and both proponents and opponents have claimed their own scientifically verified benefits and drawbacks of it. As a result, when we act as global citizens and Ethiopians, we must weigh the above mentioned benefits and downsides.

Growing regional/national disparities are a contemporary and pressing worldwide issue. Theoretically, trade should provide a solution, but trade is increasing inequality between nations in the global north and south, owing to current account deficits and import-export imbalances.

Corruption includes a wide range of erratic behavior that is primarily caused by a weakness in the governing structure. Also, it is impossible to establish a single definition of corruption that can be applicable to all situations, whether it is small or grand corruption, systematic or sporadic corruption, implicit or explicit corruption perpetrated by individuals.

Global inequalities, as well as a chronic lack of effective governance, have an impact on countries' capacity to deal with global health problems, particularly in poor countries. Despite the fact that health crises occur in both poor and developed nations, they are dealt with differently, with impoverished countries always suffering more than developed countries. Malaria HIV/AIDS and Ebola are among the most serious instances.

Unit Review Exercise

Multiple Choices: Choose the best answer from the given alternatives for the following statements and questions.

1. Which of the following countries has a greater prevalence of absolute poverty?
 - A. Developed countries
 - B. Communist countries
 - C. Developing countries
 - D. Capitalist countries
2. Which of the following is a characteristic of people below the poverty line?
 - A. Debt trap
 - B. Gender inequality
 - C. Poor health
 - D. All of the above
3. Poverty is a state in which a person is : –
 - A. Poor
 - B. Does not has proper home
 - C. Inability to fulfil basic requirements
 - D. None of these
4. Globalization results in:
 - A. lesser competition among producers
 - B. greater competition among producers
 - C. no change in competition among producers
 - D. none of the above
5. Having insufficient income to provide a minimum standard of living is
 - A. Absolute poverty
 - B. Relative poverty
 - C. Both
 - D. None
6. According to UN, countries are considered relative poor where per capita income is less than
 - A. Four dollar
 - B. Three dollar
 - C. One dollar
 - D. Two dollar
7. Globalization involves...
 - A. A stretching of social, political, and economic activities across political frontiers.
 - B. A growing magnitude of interconnectedness in almost every sphere of social existence
 - C. An accelerating pace of global interactions and processes associated with a deepening enmeshment of the local and the global.
 - D. All of the answer options given are correct
8. Which of the following are not negative effects of Globalization?
 - A. Less employment in developed countries
 - B. Increased air, land and water pollution in developing countries
 - C. MNC'S gain power in a country and influence decisions
 - D. Profits made by a MNC's are given to the country where factory is located
9. Which one of the following is not the cause of trade imbalance in a given country?
 - A. When the country borrows from other countries to pay for imports.
 - B. When a country imports finished goods while exporting raw materials
 - C. When a country's industrial activity exceeds its extractive activity
 - D. When the country is in current account deficit

10. All are the advantage of a Gini Coefficient measure of countries or regional inequalities except: -
- Incorporates all data
 - Requires comprehensive individual level data
 - Allows direct comparison between units with different size populations
 - Attractive intuitive interpretation
11. According to the corruption perception index which country has the highest score?
- Singapore
 - China
 - USA
 - Sudan
12. What is bribery?
- Giving money to someone in exchange for a favor
 - A form of insider trading
 - Any fraudulent activity
 - A legal but unethical activity

Answer Key for Self-test Exercises

Section 1

1C 2C 3C 4D 5D 6A

Section 2

1A 2C 3A 4B

Short answer

The local products can be competent by:

- Improving their quantities
- Providing technical and management training to the workers o manufacturing industries.
- Creating incentive backed competition atmosphere among workers.
- Wise use of resources
- Producing environmentally friendly products, etc.

Section 3

1A 2C 3B 4D 5A

Section 4

1A 2B 3A 4B 5D

Section 5

1C 2D 3B 4A 5A

Answer Key for Unit Review Exercise

1C 2D 3C 4B 5A
 6D 7D 8D 9C 10B
 11D 12A

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UNIT SIX

ISSUES IN SUSTAINABLE DEVELOPMENT IV: SOLUTIONS TO ENVIRONMENTAL AND SUSTAINABILITY PROBLEMS

Unit Introduction

Dear learner, this unit is an extension of Unit 3, 4 and 5 comprising the issues of sustainable development. This unit specifically deals with solution to environmental and sustainability problems. For several decades, human beings have mistreated and contaminated the very environment that sustains them. But the broad concern for the environment can be so overwhelming that people do not know what to do or where to start making a difference. The achievement of sustainable development necessitates a holistic effort in all areas of society to meet the appropriate criteria. The world is increasingly recognizing that environmental challenges have a significant impact on economies and the people. Economies are under increasing pressure to reduce human and ecological risk factors like resource scarcity.

In addition, the environment stands as highly potent in providing solutions for accelerated socio-economic transformation to solve leading challenges of food insecurity, poverty, unemployment, food waste, migration and implementation of global commitments, to solve leading challenges of food insecurity, poverty, unemployment, food waste, migration and implementation of global commitments. For effective implementation of global commitments and solutions to environmental challenges, there is a need to re-focus our development pathways. If the existing approach continues, countries will not be able to respond to the environmental challenges, thereby undermining the effective implementation of SDGs and other related global commitments. This Unit discusses about environmental problems, sustainability challenges, environmental education, environmental movement, and some of environment friendly indigenous knowledge. Hence, student, you are advised to focus on the details of the unit and make effort to construct your understanding progressively.

Unit Contents

- 6.1. Environmental Problems
- 6.2. The Challenge of Sustainability
- 6.3. Environmental Education
- 6.4. Environmental Movements
- 6.5. Environmentally Friendly Indigenous Practices
- Unit Summary
- Unit Review Exercise

Unit learning outcome

At the end this Unit, you will be able to:

-  evaluate environmental and sustainability problems at global, national and local scales; and reflect critically on your roles and responsibilities as environmental actors in an interconnected world;
-  analyze the historical background of environmental movements, and suggest models worth emulating to address environmental issues and problems in your locality and country at large; and
-  discuss indigenous environmental protection knowledge and practices, and assess their strengths and limitations.

The Required Study Time: 13 hours

Unit Learning Strategies

In the unit, the suggested learning strategies are:

- ◇ written brainstorming questions;
- ◇ Problem-solving method;
- ◇ individual project;
- ◇ report writing;
- ◇ observation;
- ◇ written activities;
- ◇ practical activities; and
- ◇ self-test assessments;

SECTION ONE

Environmental Problems



Section Overview

Dear learner, this section addresses environmental problems and its varied manifestation. The important concepts and issues will be highlighted next. Environmental problems are described as the negative consequences of human activity on the Earth and its natural systems. Although environmental problems can also occur from natural causes, human behavior has led to an increase in greenhouse emissions. While climate change is discussed frequently these days, it has been occurring since the Industrial Revolution. All of us are not directly affected by it. However, it is crucial to be 'aware' of what is going on in our environment presently. By being aware, we are in a better position to do something about it. It inspires us to lead a responsible and sustainable life.

Furthermore, a wide range of environmental issues have evolved, including human induced climate change, stratospheric ozone depletion, acidification of surface waters, loss of tropical forests, species depletion, and biodiversity loss. Yet, while all of these problems have physical manifestations, their causes and their potential solutions are invariably bound up with human attitudes, beliefs, values, needs, desires, expectations, and behaviors. Thus, the symptoms of the environmental crisis cannot be regarded purely as physical problems requiring solutions by environmental 'specialists'; instead, they are intrinsically human problems, and they are intimately related to the question of what it means to be human. This section aims to familiarize you with various environmental challenges; once again, you are urged to pay close attention to the information provided.

Section Learning Outcomes

At the end of this section, you will be able to:

-  explain the major environmental problems; and
-  identify the major implication of environmental problems.

KEY TERMS

- footprints,
- Ozone Depletion,
- Biodiversity Loss,
- pollution



1. What are the most serious environmental issues you have noticed in your locality?
2. How do they affect the global environment?

Currently, environmental problems have become globalized in terms of their existence, impacts and socioeconomic factors that generate them. This subsection discusses the nature of environmental problems and their global reach. Yet, while the problems are clearly global and affect human societies worldwide, it is obvious that some societies have contributed a hugely disproportionate share to our current problems and demands on the global ecosystem. Environmental analysts emphasize that the ecological footprints of poorer nations, and particularly the individual footprints of their citizens, are vastly lower than those of wealthy nations and their citizens.

In both the academic and practical senses, interest in global environmental concerns has grown significantly in the aftermath of the United Nations Conference on Environment and Development in Rio de Janeiro in 1992.

This might be due to the rising strain caused by unsolved issues. More significantly, it might be linked to the realization that even the strongest national environmental policy cannot tackle all of these challenges on its own. The long-term character of the consequences, as well as the possibility of irreversible ecological harm, are to be sought in the diversity of political players, their competing interests, and so on.

Globally or universally occurring environmental problems can be approached in entirely different ways. The globally interlinked environmental conditions are essentially evaluated as a function of population, consumption and technology and the relationship of these factors are often shown by the equation called "environment formula".

$$I = f (P,A,T)$$

Where; I is global environmental impacts,

P is an impact caused by world population growth,

A is an increasing affluence /consumption of goods and services, and

T is an environmentally unsound technology

This formula, in fact, had little effect on the formulation of practical policy, even though it does take into account the demographic, economic, and technological forces driving the degradation and destruction of the global environment (such as the ozone layer, climate, biodiversity, soils, water, and oceans). What has happened instead is that a medial structure of international environmental policy has emerged which more or less markedly integrates these driving forces or the intermedia link.

Some of the major Global Environmental Problems discussed in this section include climate change, ozone depletion, biodiversity loss, air and water pollution, and land degradation.

6.1.1 Climate Change

The environmental problem most discussed at the moment is climate change (see also unit 2 for details). Climate change already has observable ecological and social effects, and its projected impacts could potentially result in profound changes in global mean surface temperature, sea level, ocean circulation, precipitation patterns, climatic zones, species distributions and ecosystem function. The climatically active Green House Gases are disrupting the earth's thermal balance by partially blocking thermal radiation into outer space thus, intensified greenhouse effect. As you learned in Unit 2, governments all around the globe have proposed various mitigation and adaptation measures that have to be practiced by industries and each citizen of them to prevent the devastating impacts of climate change.



Figure 6.1 Climate change, environmental degradation, consequent recurrent drought and human misery

6.1.2. Ozone Layer Depletion

The ozone (O₃) layer forms a barrier in the stratospheric layer (approximately 15 to 30 kilometers above the Earth's surface) thereby protecting humanity from the sun's damaging Ultraviolet UV rays. It became clear that the ozone layer is being depleted by ozone layer depletion substances such as chlorofluorocarbon (CFC). When an ozone layer is depleted, harmful ultra violet rays reach the Earth's surface, causing health hazards such as skin cancer or cataracts. Ozone layer is being depleted globally except over tropical areas and the rate of depletion is higher in the highest latitude regions (Please take three and a half minutes to watch the accompanying video, (<https://www.youtube.com/watch?v=aU6pxSNDPhs>)).

Epidemiological studies show that UVB promotes non-melanoma skin cancer. It has a significant influence in the development of malignant melanoma. Furthermore, UVB has been related to the formation of cataracts, a clouding of the lens of the eye. UVB radiation also has impacts on plant physiological and developmental processes.

Therefore, by reducing emissions of ozone-depleting substances, the Montreal Protocol has protected both the ozone layer and the climate at the same time.

The approach used to reduce ozone depletion substances (ODS) is to replace them with fluorinated gases known as F-gases, which include hydrofluorocarbons (HFCs), perfluorocarbons (PFCS), and sulfur-hexafluoride (SF6). Despite the fact that they are not ODS, these gases have been recognized as greenhouse gases that contribute to climate change. In reality, F-gases are considerably smaller than CO₂ and are rising in the atmosphere on a regular basis.

6.1.3. Biodiversity Loss

The "United Nations Convention on Biological Diversity" was adopted by 154 states during the UN conference in Rio de Janeiro in 1992 and came into effect in December 1993. This conveys the global community's recognition that environmental protection requires a far-reaching paradigm shift. The concept of biological diversity or biodiversity embraces all animal and plant species, including microorganisms, the genetic variability within the species, and the earth's ecosystems in which these species live together.

Despite several international agreements on the conservation and wise use of biodiversity, natural ecosystem degradation and the loss of species linked with it continue rapidly. The main reason no doubt is that the approaches to international protection of nature and species previously adopted do not go far enough; and the situation is exacerbated by the lack of political will and of financial commitments needed to address it. The Biodiversity Convention raises the claim to change this situation. Table 6.1 shows that the type and number of species threatened by environmental problems.

Table 6.1 Numbers of threatened species by major groups of organisms

Types of species		Estimated Number of described species 1	Number of species evaluated by 2018 (IUCN Red List version 2018-1)	Number of threatened species ² in 2018 (IUCN Red List version 2018-1)
VERTEBRATES	Mammals	5,677	5,677	1,210
	Birds	11,122	11,122	1,469
	Reptiles	10,711	6,669	1,236
	Amphibians	7,866	6,682	2,100
	Fishes	33,900	16,406	2,385
INVERTEBRATES	Insects	1,000,000	7,908	1,478
	Molluscs	85,000	8,442	2,195
	Crustaceans	47,000	3,180	730
	Corals	2,175	864	237
	Arachnids	102,248	250	171
	Velvet Worms	165	11	9
	Horseshoe Crabs	4	4	1
	Others	68,658	839	146

Types of species		Estimated Number of described species 1	Number of species evaluated by 2018 (IUCN Red List version 2018-1)	Number of threatened species ² in 2018 (IUCN Red List version 2018-1)
PLANTS	Mosses	16,236	102	76
	Ferns and Allies	12,000	479	246
	Gymnosperms	1,052	1,012	401
	Flowering Plants	268,000	23,788	12,049
	Green Algae	6,050	13	0

6.1.4. Air and Water Pollution

Air Pollution

Dear learner, hopefully you have prior information about air pollution. Do you have exemplary condition in your locality? Air pollution is defined as the intrusion of chemicals, particles, or biological elements into the atmosphere that cause discomfort, sickness, or death in people, harm other living creatures such as food crops, or harm the natural or built environment.

Pollutants are divided into two types: primary and secondary For example refer to figure 6.2. The following are some of the significant air pollutions identified in the given category:

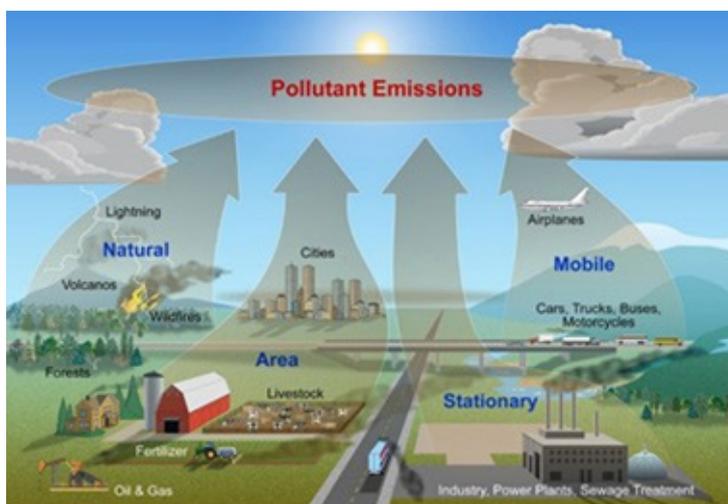


Figure 6.2 Air pollution caused by different actors



Dear learner, from your experience how do you differentiate the primary pollutants from the secondary pollutant? Reflect on these points before reading the lesson notes.

Primary pollutants: These are Pollutants that are formed and emitted directly from particular sources.

Sulphur dioxide (SO_2) is a chemical compound produced by volcanoes and in various industrial processes. Since coal and petroleum often contain Sulphur compounds, their combustion generates sulfur dioxide. The interaction of sulfur with oxygen produces acid rain, which can cause significant environmental harm.

Nitrogen dioxide (NO_2) is expelled from high temperature combustion, and is produced naturally during thunderstorms by electric discharge. They can be seen as the brown haze dome above or plume downwind of cities. It is one of the several nitrogen oxides. This reddish-brown toxic gas has a characteristic sharp, biting odor, and it is one of the prominent pollutants.

Carbon monoxide (CO) - is a colorless, odorless, non-irritating but very poisonous gas. It is produced by incomplete combustion of fuel such as charcoal, natural gas, coal or wood. Vehicular exhaust is a major source of carbon monoxide. For example, have you heard of individuals dying or suffering from significant cardiovascular problems as a result of incomplete burning of charcoal in a confined room? This is an important tangible example of the consequences of CO pollution.

Volatile organic compounds - VOCs are important outdoor air pollutants. They are often divided into the separate categories of methane (CH_4) and non-methane (NMVOCs). Methane is an extremely efficient greenhouse gas which contributes to enhance global warming.

Other hydrocarbon VOCs are also significant greenhouse gases via their role in creating ozone and in prolonging the life of methane in the atmosphere, although the effect varies depending on local air quality. Within the NMVOCs, the perfume compounds benzene, toluene and xylene are suspected chemicals and may lead to leukemia through prolonged exposure.

Particulates, alternatively referred to as particulate matter (PM), atmospheric particulate matter, or fine particles, are tiny particles of solid or liquid suspended in a gas. In contrast, aerosol refers to particles and the gas together. Sources of particulates can be manmade or natural. Some particulates occur naturally, originating from volcanoes, dust storms, forest and grassland fires, living vegetation, and sea spray. Human activities, such as the burning of fossil fuels in vehicles, power plants and various industrial processes also generate significant amounts of aerosols. Averaged over the globe, anthropogenic aerosols currently account for about 10 percent of the total amount of aerosols in our atmosphere. Increased levels of fine particles in the air are linked to health hazards such as heart disease, altered lung function and lung cancer.

Secondary Pollutants: These are Pollutants that are formed in the lower atmosphere by chemical reactions.

Particulates are created from gaseous primary pollutants and compounds in photochemical smog. Smog is a kind of air pollution; the word "smog" is a combination of smoke and fog. Classic smog results from large amounts of coal burning in an area caused by a mixture of smoke and Sulphur dioxide. Modern smog does not usually come from coal but from vehicular and industrial emissions that are acted on in the atmosphere by ultraviolet light from the sun to form secondary pollutants that also combine with the primary emissions to form photochemical smog.

Ground level ozone (O₃) is formed from NO_x and VOCs. Ozone (O₃) is a key constituent of the troposphere; it is also an important constituent of certain regions of the stratosphere commonly known as the Ozone layer. Photochemical and chemical reactions involving it drive many of the chemical processes that occur in the atmosphere by day and by night. At abnormally high concentrations of pollutant smog brought about by human activities generate largely the combustion of fossil fuel.

Water Pollution and Ocean Exhaustion

Water pollution occurs when harmful substances often chemicals or microorganisms contaminate a stream, river, lake, ocean aquifer or other water body that damage the quality and rendering it toxic to humans or other environment. Basically, water is able to dissolve more substances than any other liquid, this is the main reason why it is easily polluted. Toxic material emitted from farmyards, urban areas and industries simply mix with it thereby causing water pollution. When the contaminant is originated from a single source, we call the pollution point source pollution. When the pollutant comes from diffused sources, we call it nonpoint source pollution. Chemicals and heavy materials from industrial and municipal wastewater contaminate water ways as well. These contaminants are toxic to aquatic life most often reducing an organism's life span and the ability to reproduce. Student, refer to figure 6.3 presented below to comprehend how water environment is contaminated by human activities when caring measure is not taken.

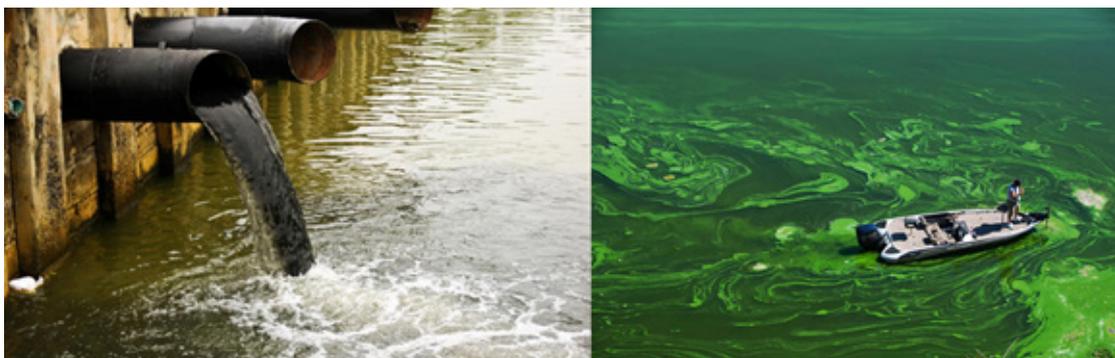


Figure 6.3: Examples of water pollution

Damage and depletion of the marine environment, which covers roughly 70% of the earth's surface and more than 95% of the water system, has a substantial impact on the overall environmental balance. Pollutants from the land along the edge and interior portion of the continent have severely harmed the world's oceans and seas. Though chemicals, fertilizers, and heavy metals are the most common contaminants, plastic debris carried by rivers and winds is also a significant pollutant. Ocean "dead zones" regions of the sea where oxygen is severely or entirely depleted and most forms of life cannot survive are becoming more numerous, and scientists warn that they will continue to increase unless we curb the factors driving global climate change, which is fueling this alarming shift in ocean chemistry. Even outside these near-lifeless ocean regions, rising global temperatures and invasions of nutrient pollution are regulating oxygen levels in the open ocean and in coastal areas, threatening communities of sea life around the world. Over the past 50 years, the ocean suffered from a loss of about 85 billion tons of oxygen, affecting an accumulated area approximately the size of the European Union. Globally, the amount of zero-oxygen ocean water has quadrupled, while the area occupied by low-oxygen zones has increased by 10 times. In coastal areas and seas that are semi-enclosed, once low-oxygen conditions are established, they can persist for thousands of years, according to some studies.

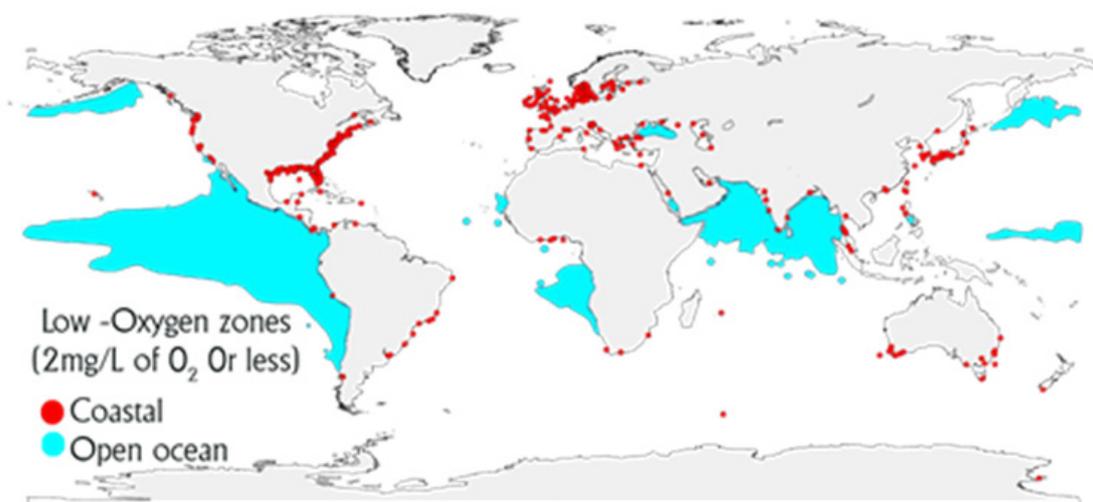


Figure 6.4: Oxygen Zones

In Figure 6.4, the red dots mark coastal locations where oxygen has plummeted to 2 milligrams per liter or less, and the blue areas mark zones with the same low-oxygen levels in the open ocean.

Resources

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Activity 6.1

1. Consider the scope or magnitude of environmental problems confronting human beings then, describe its severity and suggest what is expected from each of us to curb the problem

Currently, environmental problems have become globalized in terms of their existence and impacts as well as the socioeconomic factors that generate them.

Climate change already has observable ecological and social effects, and its projected impacts could potentially result in profound changes in global mean surface temperature, sea level, ocean circulation, precipitation patterns, climatic zones, species distributions and ecosystem function.

The ozone (O₃) layer forms a barrier in the stratospheric layer. When an ozone layer is depleted, harmful ultra violet rays reach the Earth's surface, causing health hazards such as skin cancer or cataracts. several international agreements and attempts on the conservation and wise use of biodiversity were done, but natural ecosystem degradation and the loss of species is continuing rapidly.

Air pollution is defined as the intrusion of chemicals, particles, or biological elements into the atmosphere that cause discomfort, sickness, or death in people, harm other living creatures such as food crops, or harm the natural or built environment.

There are two types of pollutants primary and secondary pollutants. Primary pollutants are Pollutants that are formed and emitted directly from particular sources. Secondary pollutants are Pollutants that are formed in the lower atmosphere by chemical reactions. Water pollution occurs when harmful substances often chemicals or microorganisms contaminate a stream, river, lake, ocean aquifer or other water body that damage the quality and rendering it toxic to humans or other environment.



Self-test Exercise 6.1

Match the following description stated under column “A” with the corresponding different type of environmental problems listed under column “B”

“A”

1. Pollutants that are formed and emitted directly from particular sources
2. the intrusion of chemicals, particles, or biological elements into the atmosphere
3. layer forms a barrier in the stratospheric layer thereby protecting humanity from the sun's damaging Ultraviolet UV rays
4. a chemical compound produced by volcanoes and in various industrial processes.
5. regions of the sea where oxygen is severely or entirely depleted and most forms of life that cannot survive are becoming more numerous,

“B”

- A. Climate Change
- B. Ozone Layer Depletion
- C. Biodiversity Loss
- D. Primary pollutant
- E. Air pollution
- F. Sulphur dioxides (SO₂)
- G. Carbon monoxide (CO)
- H. Secondary Pollutant
- I. Ocean "dead zones"


Checklist

Dear learner! Now it is time to check your understanding of the meaning, scope, and branches of geography. Read each of the following questions and answer them by putting a tick (✓) mark in one of the boxes under alternatives 'Yes' or 'No'.

No	Items	Yes	No
1	are you be able to describe the current characteristics of environmental problems?		
2	can you explain the effect of climate change on the socioeconomic conditions?		
3	can you define the essence of Ozone?		
4	are you able to describe the effect of biodiversity loss?		
5	can you explain the main types of air pollution?		
6	are you able to explain the cause and effects of air pollutions?		
7	can you describe how water is polluted?		

SECTION TWO

Sustainability Challenge



Section Overview

Sustainability is increasingly viewed as a desired goal of development and environmental management. Global sustainability defines the conditions under which humans and nature, societies and the biosphere, the world and the Earth can co-exist in ways that enable productive harmony, stability and resilience to support present and future generations.

There are, however, immense challenges that threaten the very sustainability of our global society, let alone individual businesses or developments. A few of the most important of these challenges are population growth, clean energy supply, fresh water availability, and global climate change. As humanity forms its collective response to these threats, it is concluded that all intelligent people, but especially scientists, have important roles to play, not only in technical innovation, but also in catalyzing political action. Consequently, it is essential for students' in-depth reading of this section substances following the procedures suggested.

Section Learning Outcomes

At the end of this section, you will be able to:

-  identify the major environmental and sustainability challenges; and
-  explain the solutions for environmental sustainability problems.

KEY TERMS:

- Challenges of sustainability,
- Urbanization,
- Solar chimney,
- Green buildings



1. What are the main challenges of sustainability?
2. Can you give a specific example in your locality?

Student, it is hoped that you learned about sustainability's foundations in the first section of unit three. Sustainability is making decisions that do not have negative consequences for either current or future generations. Under this broad definition, sustainability impacts on a wide range of ecological and human issues, from the preservation of natural resources to a commitment to human and societal wellbeing. The continuation of current development practices will not be enough to achieve sustainable development, as demonstrated by the following issues:

- a. the impact of climate change threatens to escalate in the absence of adequate safeguards. There is also a need for promoting the integrated and sustainable management of natural resources and ecosystems and take mitigation and adaptation action in keeping with the principle of common but differentiated responsibilities;
- b. hunger and malnourishment, while decreasing in many developing countries, remain persistent in other countries, and food and nutrition security continues to be an elusive goal for too many;
- c. income inequality within and among many countries has been rising and has reached an extremely high level, invoking the spectra of heightened tension and social conflict;
- d. rapid urbanization, especially in developing countries, calls for major changes in the way in which urban development is designed and managed, as well as substantial increases of public and private investments in urban infrastructure and services;
- e. energy needs are likely to remain unmet for hundreds of millions of households, unless significant progress in ensuring access to modern energy services is achieved; and
- f. recurrence of financial crises needs to be prevented and the financial system has to be redirected towards promoting access to long-term financing for investments required to achieve sustainable development. Dear student, from the preceding discussion what did you noted, relate to your local context and try to construct understanding.

6.2.1. The Challenges of Sustainable Development

With what you already know and have learned from earlier chapters, how would you prioritize the major challenges to sustainability? The concept of sustainability, as well as its approach, connects social science, environmental science, and future technology. As a result, the issue of sustainability includes a wide variety of explanations and arguments. The sustainability approaches are also severely challenged by a wide range of elements found in various parts of the world. Population expansion, urbanization, energy usage and global warming, water shortages, and waste management are the most serious challenges to the planet's sustainable development. Let us now go through these threats in a greater detail.

Population Growth

The world population in 2019 was about 7.7 billion with an annual growth rate of about 1.1 percent. To put the recent growth in perspective, the world population in the year 1900 was only 1.6 billion and in 1960 it was 3.0 billion. According to UN, in 2030 the world population will be about 8.5 billion and in 2050 it will be about 9.7 billion. Currently, 80 million people are being added every year in less developed countries, compared with about 1.6 million in more developed countries. Thus, populations are growing more rapidly at places where such growth cannot be afforded in many aspects.

The amount of bio-productive land and sea available to supply human needs is limited. As a consequence of three-quarters of the land area being covered by seas, half of the terrestrial land being desert, and more than a quarter being high mountain ranges, relatively few locations are available for comfortable human settlement. It is believed that just one-eighth of the Earth's surface is suitable for human habitation. Currently, the approximately 11.2 billion hectares of productive earth, divided by the 6.3 billion people who depend on it for their wellbeing, results in an average of approximately 1.8 hectares per person. Collectively, we are currently using approximately 2.2 hectares per person or over 20% more than is produced annually, which means that the population has already exceeded the sustainable limit.

Urbanization

In 1950, New York was the only city in the world with a population of more than 10 million. The number of cities with more than 10 million people increased to 5 in 1975 and 17 in 2001, and 21 cities in 2015. The world's urban population reached 2.9 billion in 2000 and is expected to increase by 2.1 billion by 2030. This will make up roughly 60 percent of the world's population. Population growth coupled with urbanization results in significant impacts on the environment and other problems, which include:

- ◆ increased ambient temperature,
- ◆ decreased air quality,
- ◆ increased water run-off,
- ◆ decreased quality of runoff water,
- ◆ altered weather patterns,
- ◆ loss of natural beauty,
- ◆ reduction in farmlands and subsequent food shortage, and
- ◆ deforestation.

Energy use and global warming

There is a broad relation between wealth and energy consumption. Figure 6.8 shows the contribution of various sources to this worldwide power consumption. The energy consumption in India rose threefold, from 4.16 to 12.8 quadrillion but between 1980 and 2001, putting India next only to the US, Germany, Japan and China in total energy consumption.

According to the international energy outlook projections for 2030 of the US department of energy, China and India account for nearly one-half of the total increase in residential energy use in non-OECD (Organization for Economic Co-operation and Development) countries. The OECD brings together 38 Member countries and a range of partners that collaborate on key global issues at national, regional and local levels.

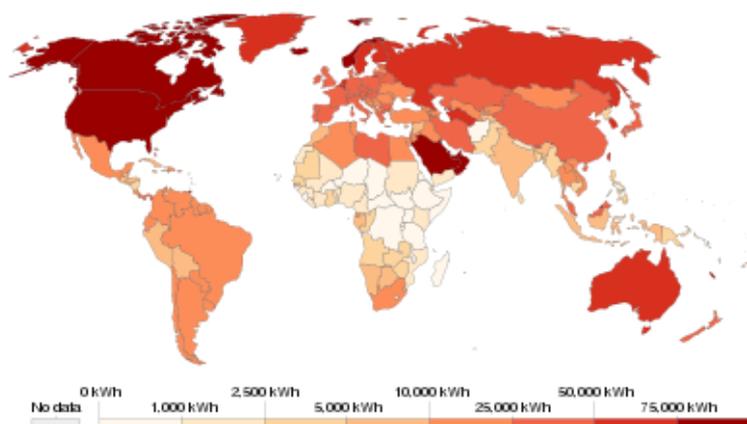


Figure 6.8: Global energy consumption per head (2021)

Though greenhouse effect occurs naturally atmospheric concentrations of some of the gases that produce the greenhouse effect are increasing due to human activity causing global warming. Over one-third of human-induced greenhouse gases come from the burning of fossil fuel to generate electricity. All fossil fuels are made up of hydrocarbons and they release carbon dioxide when burned

Water scarcity

According to the United Nations, one out of every six people does not have access to safe drinking water, and more than double that number does not have access to adequate sanitation. Only approximately 2.5 percent of the Earth's water is fresh water, and three-quarters of it is locked up in glaciers and permanent snow cover

Only 0.3 percent of water is surface water found in rivers and lakes, and therefore easily accessible. Throughout the world, both the ground and surface water is being used at a faster rate than it is being replenished. A country is considered water-scarce when its annual supply of renewable freshwater is less than 1,000 m³ per capita.

Waste management

Waste management is the collection, transport, processing, recycling or disposal of waste materials. The term usually relates to materials produced by human activity and is generally undertaken to reduce their effect on health, aesthetics or as an amenity. Waste management is also carried out to reduce the effect of the material(s) on the environment and to recover resources from them. Waste management can involve solid, liquid or gaseous substances, with different methods and processes for each of them. Various methods are used for waste management which include disposal (landfill and incineration), recycling (physical and biological processing), energy recovery, and avoidance and reduction.

Every year, the globe generates 2.01 billion tons of municipal solid garbage, with at least 33% of that waste not being managed in an ecologically sustainable manner. The amount of garbage created per person every day in the world averages 0.75 kilograms but ranges from 0.11 to 4.54 kilograms.

Despite accounting for only 16% of the worldwide population, high-income nations create 34% or 683 million tons of global garbage. The trend also reveals that global waste is predicted to rise to 3.4 billion tons by 2050. Student, take time and assess your level of understanding of what have been covered up to now and imagine and reflect on what should be done against the challenges identified so far.

6.2.2. Sustainable solutions

Student, in order to improve your understanding, you are recommended to properly tie your reflection points to the instructional note that follows. The aforementioned environmental concerns and sustainability challenges sparked arguments regarding the remedial actions that must be implemented to prevent future deterioration of the environment. Despite the fact that scientists and environmentalists have documented the extent and severity of these environmental problems for decades, little progress has been made in meeting the objectives. Aside from that, sustainable solutions to environmental challenges are frequently neglected in favor of technical processes. A number of solutions have been suggested and some have been successfully implemented in the past in several countries to produce clean energy and to maintain sustainability. Some of these solutions are described below.

Combating climate change

Reduction in change of climate and impacts of global warming is urgently required for present as well as the future. Various types of measures are taken for combating climate change and global warming, and microbes have great potential to do the task.

Though there are various mechanisms to control the greenhouse gases, new developments have been observed in biological and more environmental friendly mechanism. For example, oceans are known as the largest carbon reservoir on the earth and consume about one-third of all human carbon emissions. It is reported that about half of the carbon dioxide on the earth is fixed by cyanobacteria and other ocean microbes' mainly through photosynthesis and can be converted into carbon-rich lipids which can be used for biofuel production. Apart from many governmental and non-governmental groups' attempts at GHG reduction through institutional reasoning, multiple awareness campaigns and local green moments are also significant. Global warming can also be mitigated by preserving ecologically significant regions, developing environmentally friendly energy and waste management systems, and employing biofuels.

Role in sustainable agriculture

The fertility of soil is a parameter not only confined to availability of nutrients but also the microbial flora flourishing in the soil. Soil microorganisms maintain the fertility of agro-ecosystems, and sustain the crop productivity by maintaining the ecological balance. But the problem is that due to heavy input of chemicals in agro-ecosystems, several of these beneficial microbes are getting depleted or extinct from the soil.

Aside from the drawbacks of using chemical fertilizers and pesticides, there is a need to introduce beneficial soil microorganisms into both damaged and unaffected agro-ecosystems in order to increase yields in an environmentally acceptable manner.

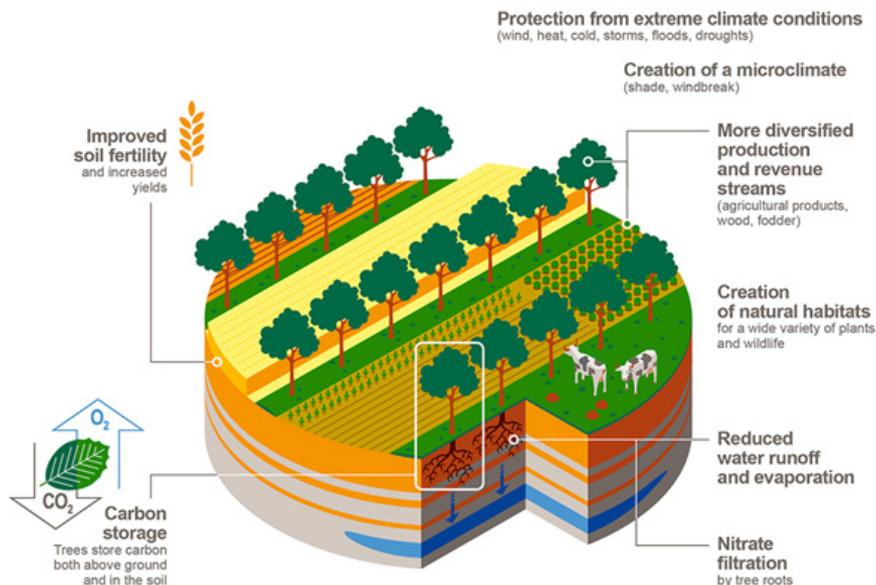


Figure 6. 9 a model show that Sustainable Agriculture responding climate and food challenge

Renewable Energy

Though a number of alternative proposals have been given for meeting the growing energy demands of the world, the renewable energy power plant more appealing one is solar. One of these examples is solar chimney. The solar chimney consists of three essential elements - glass roof collector, chimney and wind turbine. Air is heated in a very large circular structure similar to a greenhouse, and the resulting convection causes the air to rise and escape through a tall tower. The moving air drives turbines, which produce electricity. This type of power plant provides enormous amount of energy with no ecological breakdown at minimal cost (most poor countries cannot afford environmental protection), and without safety hazards (unlike nuclear power plants).

Above all, there is no depletion of natural resources at the expense of future generations. Many countries are excessively provided with solar radiation in their deserts. There are also numerous technologies and schemes that have been created using such renewable energy sources or in an environmentally friendly manner, such as solar, wind farm, hydropower, and geothermal, as well as the waste recycling energy process.

Green buildings

A green/ sustainable building design is one that achieves high performance over the full life cycle, in the following areas:

Minimizing natural resource consumption through more efficient utilization of nonrenewable natural resources

- ◆ Minimizing emissions that negatively impact the indoor and outdoor environment
- ◆ Minimizing discharge of solid waste and liquid
- ◆ Minimal negative impact on site ecosystem.



Figure 6.10: Examples of green buildings as a solution of sustainability challenges

Resources

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Activity 6.2

1. Describe some of the key problems of sustainability, and attempt to provide evidence with local instances.
2. Identify one of the sustainability issues that you have seen in your community, and provide a solution to the issue that you have highlighted and write a brief report about it.

Under this broad definition, sustainability impacts on a wide range of ecological and human issues, from the preservation of natural resources to a commitment to human and societal wellbeing. The current development can't address the essence of sustainability as confirmed on the following major gaps; climate change, hunger and malnourishment, income inequality, rapid urbanization, energy needs and recurrence of financial crises

The sustainability approaches are challenged by a wide range of elements found in various parts of the world.

Population expansion, urbanization, energy usage and global warming, water shortages, and waste management are the most serious challenges to the planet's sustainable development. Let us now go through these threats in a greater detail.

A number of solutions have been suggested and some have been successfully implemented in the past in several countries to produce clean energy and to maintain sustainability. Some of these solutions are combating climate change, role in sustainable agriculture, renewable energy and green building.



Self-test Exercise 6.2

Answer questions 1-5 by writing 'True' for the correct statements or 'False' for the wrong statements

1. the issue of sustainability includes very narrow explanations which is concerned only on the rehabilitation of environmental resources.
2. energy consumption and countries economic development has a broad relation.
3. approximately 65 percent of the Earth's water is fresh water.
4. Green buildings Minimize emissions that negatively impact the indoor and outdoor environment
5. Using Renewable Energy is One of the important sustainability challenge



Checklist

Dear learner! Now it is time to check your understanding of the meaning, scope, and branches of geography. Read each of the following questions and answer them by putting a tick (✓) mark in one of the boxes under alternatives 'Yes' or 'No'.

No	Items	Yes	No
1	can you explain the major reasons for un met sustainability goals?		
2	are you able to describe the major sustainability challenges?		
3	can you describe the major solutions of sustainability?		

SECTION THREE

Environmental Education



Section Overview

students, do you know what environmental education is? What do you think about teaching about the environment? This section mostly deals with this subject. Environmental education refers to coordinated efforts to explain how natural environments work, particularly how humans can control their behavior and ecosystems in order to live sustainably. It is a multi-disciplinary field integrating disciplines such as biology, chemistry, physics, ecology, earth science, atmospheric science, mathematics, and geography. The United Nations Educational, Scientific and Cultural Organization (UNESCO) states that Environmental education is vital in imparting an inherent respect for nature among society and public environmental awareness. UNESCO emphasizes the role of Environmental education in safeguarding future global developments of societal quality of life, through the protection of the environment, eradication of poverty, minimization of inequalities and insurance of sustainable development. The term often implies education within the school system, from primary to post-secondary. However, it sometimes includes all efforts to educate the public and other audiences, including print materials, websites, media campaigns, etc. There are also ways that environmental education is taught outside the traditional classroom. Aquariums, zoos, parks, and nature centers all have ways of teaching the public about the environment. As a result, you are advised to critically examine the available sources and help yourself to learn the content area as suggested.

Section Learning Outcomes

At the end of this section, you will be able to:

-  explain the essence and trend of environmental education;
-  identify the implication of environmental education; and
-  participate actively in the school environmental education protection clubs.

KEY TERMS

- formal education,
- informal education,
- tacit knowledge,
- Lifelong Learning,
- Interdisciplinary



Student, try to relate Environmental Education to the problems you studied and attempt the question stated below individually and tell to your teacher/distant tutor.

1. What is the very essence of environmental education?
2. What are the main implications of improving environmental education?

The primary goals of environmental education are to develop an ecologically educated population that is self-assured and motivated to take action on critical environmental challenges ranging from climate change to habitat protection and from endangered species to water shortages. Environmental education is about engaging students, community members, policy makers, the young and the old in their problem. It is about empowerment, skills development, and providing opportunities for action. At its best, environmental education represents hope and change. It is a strategy by which people can make proactive, informed decisions that honor ecological, economic, and social integrity as the foundations of sustainability. With its emphasis on introducing these values to guide our individual and communal actions, environmental education allows everyone to work toward a better quality of life. Dear student, what is your observation and experience regarding the people-environment interaction in the context of your locality? Reflect on this and get prepared for the next subsection lesson study.

6.3.1. The Essence of Environmental Education

Most simply, environmental education is education in, about, and for the environment. Environmental education, which researchers have described broadly as an “approach, a philosophy, a tool, and a profession,” is built on the following three goals:

- ◆ To foster clear awareness of, and concern about, economic, social, political, and ecological interdependence in urban and rural areas;
- ◆ To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment; To create new patterns of behavior of individuals, groups, and society as a whole toward the environment.

Environmental education has a range of audiences from youth to the elderly, and from families to policy makers and takes place in a range of settings from schools and courthouses to museums to boardrooms. Environmental education is said to be formal or informal (or non-formal), sometimes it could be tacit knowledge where “formal” refers to education that occurs in a traditional school setting and “informal” refers to education in broader public settings such as zoos, aquariums, or community centers and through media outlets such as the Internet or television documentaries. Tacit knowledge refers to learning from the actions of others, or it is a type of information that we may obtain implicitly by living together, contacts or socializing without any teaching.

Environmental education also uses a range of strategies and teaching techniques, which can be used separately but ideally built one upon the other. Education researchers basically describe this continuum as including:

- ◆ information activities, which aim to increase awareness and understanding and are defined as “informal” education;
- ◆ communication activities, delivered in both formal and informal settings, which aim to establish a dialogue between audiences and environmental organizations or agencies for the mutual sharing of experiences, priorities, and planning;

- ◆ education activities, also delivered in both formal and informal settings, which aim to promote knowledge, understanding, an attitude of concern, and the motivation and capacity to work with others in achieving goals;
- ◆ capacity building activities, delivered primarily in informal settings, which aim to increase the capacity of civil society to support and work for environmental preservation;

In practice, environmental education is intended to exemplify sound education principles based on sound pedagogy and sound science. It is hands-on, contextualized, and interdisciplinary, linking natural and social sciences, the arts, and mathematics, among other subjects, to address complex and multifaceted environmental issues.

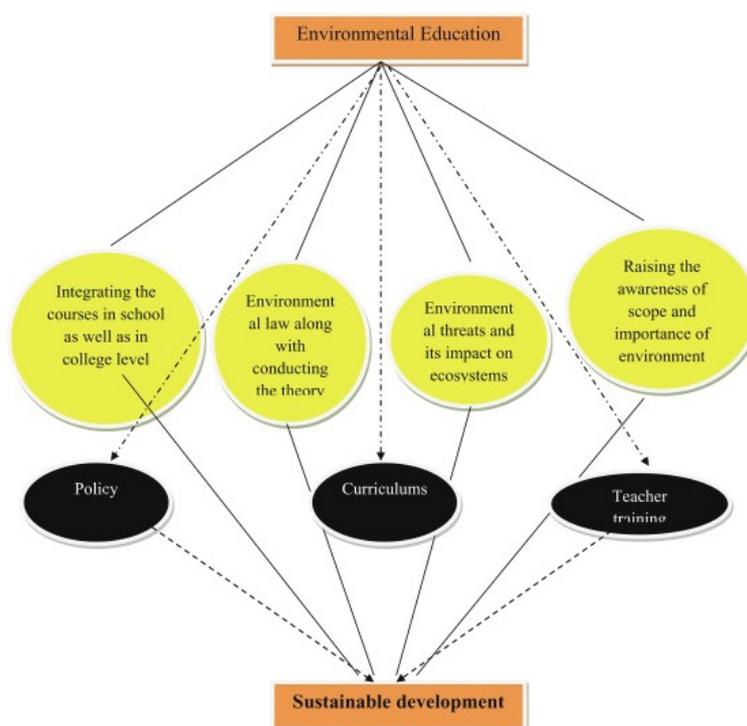


Figure 6.11: The importance of environmental education for sustainable development

6.3.2. Fundamental Characteristics of Environmental Education

Basically, Environmental Education encompasses the following main characteristics: Environmental education is lifelong learning: Environmental education is a life-long strategy that involves everyone, encouraging them to connect with the natural environment and, to take action to safeguard it. While youth undoubtedly represent a critical participant for environmental education, it is equally important to nurture and support environmental literacy among adults whose daily consumer behaviors and political actions can have impressive impacts on the environment and conservation. In recognition of this fact, environmental education involving employees, policy makers, clergy, community activists, parents and grandparents, and members of the media, among others, is on the rise. These groups play important roles in decision-making about environmental conservation both today and in the future.

So, in addition to schools, informal settings such as zoos, aquariums, museums, community centers, and parks, as well as media outlets including the Internet, radio, magazines, and newspapers all are important avenues for environmental education.

Environmental education is interdisciplinary: The science, notably geography, ecology, and others, give vital foundations for understanding environmental concerns, but environmental education is, by definition, social in nature. Environmental education is about human behavior, focusing on human interactions with the world around us, and encouraging people to engage in productive dialogue and decision-making with an emphasis on positive environmental behavior, critical thinking, and citizen participation. In other words, Environmental education is more about altering people's thinking setups, and they learn more by imitating the activities and performances of certain idol individuals around them.

Within a formal, or school setting, environmental education comprises a variety of subjects. Here, social studies, government studies, and history are as important as geography, biology, chemistry, and physics in addressing today's complex environmental problems. The origins of environmental education may be traced back to the 18th century, when Jean-Jacques Rousseau emphasized the necessity of an environment-focused education. As a result of the Great Depression and Dust Bowl in the 1920s and 1930s, conservation education emerged as a new kind of environmental education.

Environmental education is a proven strategy: Most environmental issues characterize complexity and uncertainty. Thus, the policy tools of regulation and market incentives prove insufficient to the task of coping with significant environmental management problems. Managers and policy makers must turn ever more frequently to other policy options, including education, information provision, and voluntary measures. Although increased education does not equate with behavior change, a strong link between the two can often be found, as education plays an important role in increasing knowledge, honing critical thinking skills, and enhancing the capacity and motivation to take action. Thus, supporting environmental education represents an investment in the future. Well-designed environmental education initiatives are built around a theory of change, the idea that a logical series of events may be used to demonstrate how activities in the present may lead to the achievement of goals and objectives in the future. Although it may be easier in the short run to see the direct impact of legislation passed or an acre of trees planted, an environmental-education initiative can make a much longer-term impact on environmental attitudes, knowledge, skills, and action by preparing people to support those policies or become involved in the replanting efforts.

Environmental education is about critical thinking and citizen participation: Good environmental education is about teaching people how to think, not what to think.

Rather than advocating for specific positions, environmental education contextualizes environmental issues within a complex ecological, social, and economic framework. Environmental education encourages people to take an active role in environmental problem-solving by helping to develop citizen-action skills, then providing opportunities for taking action. But, because education around hot-button issues such as the environment can be controversial, developing high quality standards for both teaching materials and professional training is essential to maintaining the integrity of the field.

Resources

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- What is Environmental Education? (2017, September 14). YouTube. <https://www.youtube.com/watch?v=x20dHsTORTg>



Activity 6.3

1. Describe the function and impact of environmental education.
2. Write down some of the sources that have helped you build your knowledge on environment issues, as well as Compare these sources based on the dependability of their information.

Environmental education refers to coordinated efforts to explain how natural environments work, particularly how humans can control their behavior and ecosystems in order to live sustainably.

The primary goals of environmental education are to develop an ecologically educated population that is self-assured and motivated to take action on critical environmental challenges ranging from climate change to habitat protection and from endangered species to water shortages.

Environmental education also uses a range of strategies and teaching techniques, which can be used separately but ideally built one upon the other. Education researchers basically describe this continuum

Basically, Environmental Education encompasses several main characteristics; it is lifelong learning, it is interdisciplinary, environmentally, it is a proven strategy and it is about critical thinking and citizens participation.



Self-test Exercise 6.3

Dear learner; we hope you enjoyed reading the notes and doing the activities. I think you found them interesting and relevant. Now, attempt the questions that are given below to evaluate how far you have understood the lesson you studied.

For the following questions choose the best answer among the given alternatives.

1. The main objective of an environmental education is ____
 - A. To create awareness and knowledge about environmental changes
 - B. To pollute the water
 - C. To increase fuel consumption
 - D. To increase greenhouse gases
2. Environmental education is important only at

A. Primary school stage	C. Collage stage
B. Secondary school stage	D. All stages
3. International environmental education program IEEP has been launched by ____

A. UNESCO	C. UNICAF
B. ULO	D. UNO
4. The area of Environmental Education includes:

A. formal education	C. formal and non-formal education
B. non-formal education	D. None of the above
5. The main aspects of environmental education:
 - A. Environmental awareness
 - B. Environmental consciousness
 - C. A and B
 - D. None of these

 **Checklist**

Dear learner! Now it is time to check your understanding of the meaning, scope, and branches of geography. Read each of the following questions and answer them by putting a tick (✓) mark in one of the boxes under alternatives 'Yes' or 'No'.

No	Items	Yes	No
1	Can you define the meaning of environmental education?		
2	are you able to describe the primary goals of environmental education?		
3	can you explain what kind of strategy environmental education is used?		
4	can you describe the major characteristics of environmental education?		

SECTION FOUR

Environmental Movements



Section Overview

Dear student, note that there is a popular version of recent history that portrays every instance of protest and every social movement as a part or a consequence of the participatory surge of the late 1960s. Environmental movements are networks of informal interactions that may include individuals, groups, and organizations engaged in collective action motivated by shared identity or concern about environmental issues. Environmental movements have their origins in the conservation and public health campaigns and organizations of the nineteenth century. Interest in natural history was stimulated both by the Enlightenment, which encouraged scientific inquiry, and by the great age of European exploration, which brought knowledge of exotic species and, in some cases, their rapid extinction. Therefore, in order to achieve this purpose, it is advisable to carry out the instructional process critically engage in the forthcoming lesson studies.

Section Learning Outcomes

At the end of this section, you will be able to:

-  describe the historical development of environmental movements; and
-  appreciate environmental movements aimed at addressing environmental threats caused by human activities at local or national level.

Key terms

- environmental activism,
- free market,
- Light Greens,
- Dark Greens and
- Bright Greens



1. List some of environmental activism/ movements you observe in your locality or in your country.
2. What kind of environmental movements did you observe in your locality?

6.4.1. The Concept of Environmental Movement

Environmental movement is a type of social movement that involves an array of individuals, groups and coalitions that perceive a common interest in environmental protection and act to bring about changes in environmental policies and practices.

The environmental movements are conceived as broad networks of people and organizations engaged in collective action in the pursuit of environmental benefits. Environmental movements are understood to be very diverse and complex, their organizational forms ranging from the highly organized and formally institutionalized to the radically informal; the spatial scope of their activities ranging from the local to the almost global, and the nature of their concerns ranging from single issue to the full panoply of global environmental concerns. Such an inclusive conception is consistent with the usage of the term amongst environmental activists themselves and enables us to consider the linkages between the several levels and forms of what activists call 'the environmental movement.

The movement may also be initiated by any group or individuals from anywhere. For example, Greta Thunberg is a significant young climate change campaigner whose voice has the potential to impact many worldwide decision-making bodies, both governmental and non-govern- mental (take some about four minutes to watch her emotional and influential speech in one of the international climate action summits, by visiting the next web site: <https://www.youtube.com/watch?v=U9KxE4Kv9A8>).

6.4.2. Types of Environmental Movements

1. Free market environmentalism
2. Preservation and conservation
3. Popular environmentalism
4. Light Greens, Dark Greens and Bright Greens

Free market environmentalism

The idea of free market environmentalism contends that the free market, property rights, and offence law are the greatest tools for preserving the health and sustainability of the environment.

This is in sharp contrast to the most prevalent modern strategy, which is to rely on legislative government action to avoid environmental devastation. Environmental care is regarded as natural, as is the expulsion of polluters and other aggressors by individual and class action.

Preservation and conservation

Environmental preservation is viewed as the strict setting aside of natural resources to prevent damage caused by contact with humans or by certain human activities, such as logging, mining, hunting, and fishing. It differs from conservation in that conservation allows for some degree of industrial growth while keeping it within sustainable bounds. Regulations and laws may be enacted for the preservation of natural resources. Elsewhere in the world the terms preservation and conservation may be less contested and are often used interchangeably.

Popular Environmentalism

Environmental action has recently led to the development of a new subculture. It is mainly composed of the educated middle and upper-class. This subculture often exhibits sustainable consumption patterns, choosing local and organic product over the more conventionally imported products that have been manufactured using chemicals such as pesticides and preservatives. Criticism of this 'green consumerism' comes from some environmentalists who complain of elitism, suggesting that this is nothing more than shopping under the banner of environmentalism without espousing any of its true ideals. Because organic and sustainable items are sometimes more expensive, purchasing them may be perceived as a sign of affluence. It is suggested that this new tendency has diverted attention away from the fundamental issues that 'serious' environmentalists want to tackle. Consumer items offer a deceptively easy, feel-good way to both save the world and one's reputation simultaneously. Others, however, argue that practicing green consumerism does not always imply that these consumers are just trying to save money. Simultaneously, many people believe that the cost of environmentally friendly products should be reduced.

The reality is likely far more complicated, and there are certainly many examples of poorer communities fighting for environmental goals, particularly when these are seen as synonymous with their rights to happiness and health, or where the environment is culturally significant, as is frequently the case. Many people have recently taken up vegetarianism. This offshoot of popular environmentalism is known as environmental vegetarianism, and it emphasizes the fact that the meat business has grown more harmful to the environment. This new vegetarian and vegan "movement" originated the slogan "you cannot be an environmentalist and eat meat."

The reality is likely far more complicated, and there are certainly many examples of poorer communities fighting for environmental goals, particularly when these are seen as synonymous with their rights to happiness and health, or where the environment is culturally significant, as is frequently the case. Many people have recently taken up vegetarianism. This offshoot of popular environmentalism is known as environmental vegetarianism, and it emphasizes the fact that the meat business has grown more harmful to the environment. This new vegetarian and vegan "movement" originated the slogan "you cannot be an environmentalist and eat meat."

Light Greens, Dark Greens and Bright Greens

Contemporary environmentalists are often described as being split into three groups, 'Light',

'Dark' and 'Bright' Greens. Light Greens see protecting the environment first and foremost as a personal responsibility. They fall in on the reformist end of the spectrum introduced above, but light Greens do not emphasize environmentalism as a distinct political ideology, or even seek fundamental political reform.

Instead they often focus on environmentalism as a lifestyle choice. The motto "Green is the new black." sums up this way of thinking, for many. In contrast, dark greens believe that environmental problems are an inherent part of industrialized capitalism, and seek radical political change.

Dark greens think that prevailing political ideas (also known as industrialism) are corrupt and will ultimately lead to consumerism, alienation from nature, and resource depletion. Dark Greens claim that this is caused by the emphasis on growth that exists within all existing ideologies, a tendency referred to as 'growth mania'.

More recently, a third group may be said to have emerged in the form of Bright Green. This group believes that radical changes are needed in the economic and political operation of society in order to make it sustainable, but that better designs, new technologies and more widely distributed social innovations are the means to make those changes and that we can neither shop nor protest our way to sustainability. Bright green environmentalism is less about the problems and limitations we need to overcome than the "tools, models, and ideas" that already exist for overcoming them. Student, this point in time reasonably is when you need to assess your understanding of the key concepts and issues of the unit and involved sections covered till now. Then, critically read the following content note and build your understanding on the prior learning.

6.4.3. Environmental Movements in Ethiopia

Environmental activism or movements are rarely seen in Ethiopia in a well-organized way. In many sociopolitical problems, different trends have been noticed in both contemporary and pre-existing social media and networking that can have significant social and political consequences.

Though several initiatives have been undertaken in various organizations to include environmental problems into the mainstreaming process (such as governmental ministries, religious and other civic organizations), some organizations are particularly concerned with the environment and associated issues only. Lem Ethiopia is an example of a well-known organization in this field.

Lem, the Environment and Development Society of Ethiopia (LEM Ethiopia), was founded in 1992 by 29 prominent Ethiopian professionals working in the fields of environment and development. The Society aims to promote sustainable development, and therefore is involved in areas such as natural resource management and appropriate technology promotion, urban waste management and livelihood security in collaboration with donors, government institutions, local and international NGOs and communities. It engages in capacity building, with special attention given to environmental education and awareness interventions that target school children, teachers, farmers, urban dwellers, men, women and development practitioners to impact climate change and advocate for environmental protection policies.

Some individual based attempts were seen with an ad hoc, and discontinuous patterns. One of such an attempt is the municipal solid waste controlling task of artist Sileshi Demise (Gash Abera Molla) which had great impact in the Addis Ababa community and it might also be taken as the precursor of the current riparian buffer projects of Addis Ababa. The late Prime Minister Meles Zenawi, as a movement leader, was officially assigned by African countries to represent the Continent in global climate change negotiations, and Ethiopia appears to be leading the 'green economy' movement in Africa, both in ideological and practical terms. Another important individual action that influences majorities of the public concern is the current Prime Minister Abiy Ahmed's Green Legacy and the development of big ecotourism projects in different parts of the country. Over four billion seedlings were claimed to have been planted in the First Green Legacy Campaign, which was conducted in 2019 during the Ethiopian rainy season, and this number was raised to five billion seedlings in 2020, which was a significant accomplishment of his effort. Such an individual's attempt can also trigger a broad based environmental and climate change movement particularly among young population group.

Ethiopian youth are increasingly impacted by environmental and climate related issues, yet their perspectives are largely absent from policy arenas. This lack of the voices of youth, who as citizens of tomorrow will inherit the environment created by adults today, highlights the pressing moral need to include their vital perspectives in the environmental and climate change debates. Furthermore, there is a political need to include the voices of amateur people in such debates as these voices inform and contribute to the global activism which in turn forces influential political decision.



Figure 6.12: personalities and the green movement, PM Dr. Abiy Ahmed and LPM. Meles Zenawi and Sileshi Demisse (artist) from left to right.

Resources

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Movements in the Modern World: Environmental Movement since the 1960s. (2020, August 13). YouTube. <https://www.youtube.com/watch?v=6E0dsKeoM8I>

Sills, D. L. (1975). The environmental movement and its critics. *Human Ecology*, 3, 1-41.



Activity 6.4

1. Explain the function of the environmental clubs that have been established at your school in a group setting, and demonstrate your level of involvement, as well as the advantages of being engaged in a club.
2. Take a case of one of your role models who is involved in environmental activities in your community, region, or country at large and write a report about him or her.

Environmental movement is a type of social movement that involves an array of individuals, groups and coalitions that perceive a common interest in environmental protection and act to bring about changes in environmental policies and practices. The movement may also be initiated by any group or individuals from anywhere.

There are different types of environmental activism such as; free market environmentalism, preservation and conservation, popular environmentalism and light Greens, Dark Greens and Bright Greens.

Environmental activism or movements are rarely seen in Ethiopia in a well-organized way. However, there are several attempts, which have been done by different organization and individuals



Self-test Exercise 6.4

Match the following description stated under column “A” with the corresponding different type of environmental movements listed under column “B”

“A”

1. viewed as the strict setting aside of natural resources to prevent damage caused by contact with humans or by certain human activities
2. prevailing political ideas are corrupt and will ultimately lead to consumerism, alienation from nature, and resource depletion
3. see protecting the environment first and foremost as a personal responsibility
4. it is a process of creating subculture, mainly composed of the educated middle and upper-class.
5. property rights, and offence law are the greatest tools for preserving the health and sustainability of the environment

“B”

- A. Free market environmentalism
- B. Preservation and conservation
- C. Popular environmentalism
- D. Light Greens
- E. Dark Greens
- F. Bright Greens



Checklist

Dear learner! Now it is time to check your understanding of the meaning, scope, and branches of geography. Read each of the following questions and answer them by putting a tick (✓) mark in one of the boxes under alternatives ‘Yes’ or ‘No’.

No	Items	Yes	No
1	Can you define what environmental movement mean?		
2	are you able to describe the different types of environmental movements?		
3	can you explain the strategies that different environmental movement types used to influence the community and decision makers?		
4	can you describe the practice of environmental movement in Ethiopia?		

SECTION FIVE

Environmentally Friendly Indigenous Practices



Section Overview

Indigenous knowledge is the unique knowledge confined to a particular culture or society. It is also known as local knowledge, folk knowledge, people's knowledge, traditional wisdom or traditional science. This knowledge is generated and transmitted by communities, over time, in an effort to cope with their own agro-ecological and socio-economic environments. It is generated through a systematic process of observing local conditions, experimenting with solutions and readapting previously identified solutions to modified environmental, socioeconomic and technological situations. Indigenous knowledge is transmitted from generation to generation, usually by words of mouth and cultural rituals, and has been the basis for agriculture, food preparation and conservation, health care, education, and the wide range of other activities that sustain a society and its environment in many parts of the world for many centuries.

Indigenous knowledge has developed a concept of the environment that emphasizes the symbiotic character of humans and nature. It offers an approach to local development that is based on CO_2 evolution with the environment, and on respecting the carrying capacity of ecosystems. Thus, dear student, you need to focus and study the contents indicated.]

Section Learning Outcomes

At the end of this section, you will be able to:

-  identify some environmentally important traditional activities in Ethiopia, as well as your locality; and
-  support indigenous practices proven to be effective in mitigating environmental problems

KEY TERMS

- indigenous knowledge,
- folk medicinal knowledge and skills,
- Terracing,



1. How does indigenous knowledge contribute for combating environmental problems?

6.5.1. Indigenous Knowledge for environmental issues

Dear students, you might find this topic helpful as you look into some widely used environmental protection techniques in your area. Indigenous Knowledge can be conceptualized as the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular geographic area. Indigenous Knowledge as holistic, dynamic and changing community-based knowledge is generated by a process of trial and error through social practice. Some of the most extensive and convincing qualities of indigenous knowledge are listed below.

- ◆ Indigenous knowledge is local. It is rooted to a particular place and set of experiences, and generated by people living in those places.
- ◆ Indigenous knowledge is orally-transmitted, or transmitted through imitation and demonstration.
- ◆ Indigenous knowledge is the result of practical engagement in everyday life, and is constantly reinforced by experience and trial and error.
- ◆ Repetition is an essential characteristic of tradition, even when new knowledge is added.
- ◆ Tradition could be considered as 'a fluid and transforming agent with no real end'.
- ◆ When applied to knowledge it's central concept is negotiation.
- ◆ Indigenous knowledge is characteristically shared to a much greater degree than other forms of knowledge. As a result, it is frequently referred to as "people's science".
- ◆ Although indigenous knowledge may be focused on particular individuals and may achieve a degree of coherence in rituals and other symbolic constructs, its distribution is always fragmentary.
- ◆ Despite claims for the existence of culture-wide (indeed universal) abstract classifications of knowledge based on non-functional criteria; where indigenous knowledge is at its densest and directly applicable, its organization is essentially functional.
- ◆ Indigenous knowledge is characteristically situated within broader cultural traditions; separating the technical from the nontechnical, the rational from the non-rational is problematic.

There is a global concern to safeguard the increasingly dilapidating environment. Environmental degradation needs to be combated to minimize or eradicate its threats to lessen the limit of the earth to meet social and environmental destinations, and needs. These issues require interdisciplinary and multidimensional approaches, which include the use of cultural construct, herein referred to as indigenous knowledge system.

Indigenous knowledge is applied in areas such as:

- ◆ Ecosystem and landscape management,
- ◆ Water management,
- ◆ Soil conservation,
- ◆ Biological control of pests and diseases,

- ◆ Ecological agriculture and livestock practices, and
- ◆ Plant and animal breeding often enhances food security and prevents or alleviates poverty.

Student, what practical experiences can you mention related to the above indigenous knowledge pertinent to environment.

6.5.2. Practices of Environmental Friendly Indigenous Knowledge in Ethiopia

Ethiopia is a country with over 80 ethnic groups and a wide range of languages. Ethiopian society has diverse knowledge that helps to cope up with the natural and human built environment. It is possible to draw examples from a wide range of indigenous knowledge. The following are some of the examples:

Practices in wet highland landscape of the West: The practice of indigenous knowledge has been used as an alternative way of protecting natural environment among the Illuababora, Maccaa Oromo. The scope of their indigenous knowledge comprises attitude towards the universe and natural resources around. They practice this knowledge system in the way of promoting and preserving ecosystem. Specially, their knowledge regarding their folk healing practices to protect the health of their livestock and families is worth mentioning. They have wisdom on identification and classification of medicine and its resources, mode of preparation, mechanism of dose control and spiritual and philosophical aspects of folk medicine. Folk healers and local elders have knowledge on how to protect folk medicinal plants and other sources of remedies from further wiping out and extinction. Folk medicinal practice thus has the great role in keeping natural environment. This includes different conservation measures to cultivating and duplicating folk medicinal animals, plants and other mineral based medicines. The knowledge of community members in general and folk healers in particular is logical and fruitful on conservation of folk medicine in their natural environment.

These days, folk medicine and folk medicinal plants are protected in natural habitats based on their nature. In addition, there is indigenous mechanism to protect the capitals of folk medicine from further damage by planting and growing in their garden in secret. In this sense, local community have original knowledge on protecting folk medicine in their farm land, pilgrimage (ritual sites), scared grooves, around river and home garden.

Furthermore, indigenous beliefs system on folk Medicine shared and exploited grounded on their world view. Culturally, cutting trees and killing animals intentionally will be seen as broken norms and values of the society. Besides, these people can get these medicines so long as they protect their environment. The inherent Geda system and abiding principles provided and obeyed by Oromo community is one of the crystal instance regarding how humans should smoothly co-exist with their natural environment while utilizing its endowments. Subsequently, I suggest adding this dimension to what has been stated above. Similarly, the roles rural population of Ethiopia as a whole play by exhibiting a caring behavior for their natural environment while interact with it, shall be explained.

Practices of dry high land landscape in the south, Terracing: The Konso Cultural Landscape is characterized by extensive dry stone terraces which witnesses hundreds of years of persistent human struggle to harness the hard, dry and rocky environment, which has resulted in the beautifully outlined rows of dry stone terrace. The terraces retain the soil from erosion, collect maximum water and discharge the excess, and create terrace saddles that are used for agriculture. The terraces are the main features of the Konso landscape and the hills are contoured by the dry stone terraces that could reach at some places up to 5-meter high. The dry stone walled towns (Paleta) of the Konso are located on high hills selected for their strategic and defensive advantage. These towns are circled by, between one and six rounds of dry stone defensive walls, built using locally available rock.

The Gedeo people are founded on long-standing regulations (seera) of standards, respect to elders, and oral declarations passed down from generation to generation. Particularly, respect is an important social value among the Gedeo community. Though this regard is usually limited to old men and humans in general, it is critical to understand the essence of this reverence since the value of respect is targeted at all species, including domestic animals and the surrounding ecosystem. Respect is frequently exhibited in the form of reverence for parts of environmental resources because it is linked with traditions and relationship to humans. For instance, songo sacred trees are often seen as ritualistic trees which are maintained and protected by prohibition systems (taboos) and traditional rules of "seera".

In the mores of Gedeo, respect is translated into attitudes such as respecting elder person in villages, not cutting songo sacred trees (Dhadacha), not injuring sacred forests, not felling young and immature plants from farms, not cutting grave trees for house uses, killing birds murdering of human-being, defecation in sacred natural sites, degrading the reputation of cultural elders and mass-cutting of trees (degradation) from indigenous cultural landscapes (agroforestry) have been considered as disrespectful deeds and perjury of ancestral rules of "seera". Practices of western lowland dry lands, The Gumuz have special relationships with their lands and the environment. They possess knowledge about their natural resources and environment based on observation and experience.

Indigenous knowledge is important to the Gumuz systems of natural resource management and it can be best understood along with their traditional belief systems. The Gumuz hold the belief that vital natural/land resources are sacred. They believe that natural resources are the ingenuous gift, blessing and creation of Yamba (the supreme deity), which is the source of life and livelihoods to the past, present and future generations. Yamba provided the Gumuz with knowledge of proper use, management and a responsibility of passing the natural resources to the next generation. The different resources have their respective Missa (poly-spirits) that ensure their proper use and management; violations result in severe punishments and revenge from the respective Missa.

Moreover, the Gumuz perceive their natural resources as an ancestral heritage. Ownership of natural resources is vested upon the whole community. The present generation runs a responsibility of trusteeship over the resources. Since natural resources do not belong to only one generation, they cannot be privately possessed or controlled by any single members of the community, only its fruits. Shifting cultivation is an indigenous agro-ecological knowledge used to maintain the complex agro-ecosystem. The fields are shifted to use the nutrients of the natural vegetation-soil complex. Thus, by skillfully maintaining the natural forest and vegetation ecosystem, the other equally important natural resource components such as soil, water and wild animals are managed in a sustainable way.

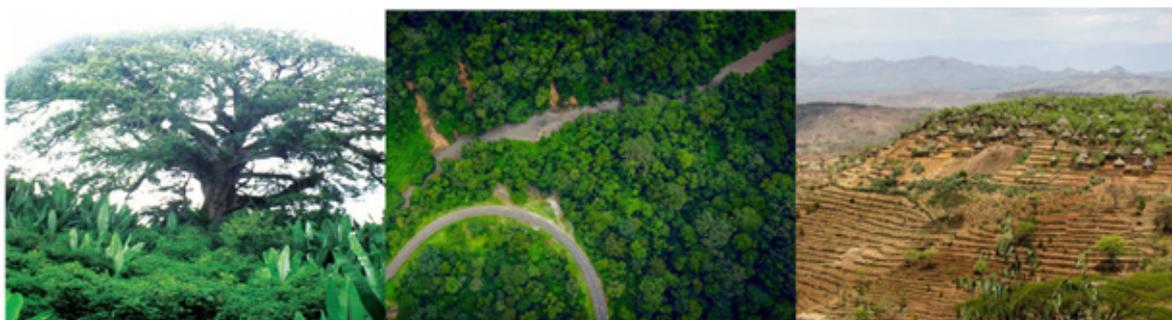


Figure 6.13: Ecofriendly landscapes of Gedeo, Illubabor and Konso, from left to right

Resources

Conservation through tradition: How indigenous knowledge in Uganda can tackle climate change. (2022, July 21). YouTube. <https://www.youtube.com/watch?v=PnZTe3p5xwE>

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Activity 6.5

1. Identify some of the most prevalent indigenous practices for environmental conservation in your area and write them down in your exercise book.
2. Choose one of these ecologically beneficial indigenous practices from your community and describe it briefly.

Indigenous Knowledge can be conceptualized as the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular geographic area.

The most extensive and convincing qualities of indigenous knowledge are; they are local, they are orally-transmitted, they are consequence of practical engagement, they are repetition of actions, they are transforming with no real end, they depend on negotiation, and they are shared.

indigenous knowledge is applied in diverse socioeconomic and environmental concerns.

Ethiopia is a country with over 80 ethnic groups and a wide range of languages. Ethiopian society has diverse knowledge that helps to cope up with natural and human built environment.



Self-test Exercise 6.5

Give short answer for the following questions

1. Write Some of the most extensive and convincing qualities of indigenous knowledge.
2. What are the main application area of indigenous knowledge?
3. What are the main area of concern related to Maccaa indigenous practices of Illuababora?
4. Describe the contribution of the Gedeo (seera) indigenous practices for environmental protections.



Checklist

Dear learner! Now it is time to check your understanding of the meaning, scope, and branches of geography. Read each of the following questions and answer them by putting a tick (✓) mark in one of the boxes under alternatives 'Yes' or 'No'.

No	Items	Yes	No
1	Can you define what indigenous knowledge mean?		
2	are you able to list some of convincing qualities of indigenous knowledge ?		
3	can you describe the major areas indigenous knowledge can be applied?		
4	can you explain the potential varieties of indigenous knowledge and their application for different socioeconomic and environmental problems in Ethiopia?		

UNIT SUMMARY

Environmental problems arise as a result of human activity's harmful impact on the biophysical environment. Environmental protection is a practice of protecting the natural environment on the individual, organizational or governmental levels, for the benefit of both the environment and humans.

The problem of environmental sustainability has proven to be difficult to overcome. The shift to a more sustainable way of life is being hampered by human actions that continue to harm the environment. The modern environmental movement has attempted to solve the problem in a large variety of ways.

Environmental education refers to organized efforts to teach how natural environments function, and particularly, how human beings can manage behavior and ecosystems to live sustainably. It is a multi-disciplinary field integrating disciplines such as biology, chemistry, physics, ecology, earth science, atmospheric science, mathematics, and geography.

Environmental movement, addresses environmental issues via lobbying, education, and activism. It is a broad philosophical, social, and political movement for solving environmental challenges that includes conservation and green politics. Environmentalists fight for just and sustainable resource management and environmental stewardship through public policy and individual behavior changes.

Environmentally friendly indigenous practices describe indigenous and other traditional knowledge about local resources. It is concerned with the interactions between living beings (including humans) and their traditional groups as well as their surroundings. It is important to note that indigenous knowledge is not a universal concept among various societies, but it refers to a set of knowledge traditions or practices that are highly influenced by "location." Such knowledge is employed in natural resource management as a supplement to scientific methods of ecological management or as a substitute for baseline environmental data in circumstances where there is little recorded scientific data.

SELF-ASSESSMENT

Multiple Choices: Choose the best answer from the given alternatives for each of the following statements or questions.

- Which one of the following is not taken as the world's major environmental problem?
 - ozone depletion
 - the quality of fresh water
 - environmental movement
 - waste management
- Which of the following is true about nitrogen dioxide?
 - It is colorless
 - it is odorless
 - Formed by thunderstorms
 - it is an example of particulates
- All are the primary air pollution agents except:
 - Ground level ozone
 - Volatile organic compounds
 - Carbon monoxide
 - Sulphur dioxides
- Ocean "dead zones" refers to
 - a water body containing large amount of oxygen
 - the ocean part polluted by dead plants and animals
 - the ocean part where oxygen is severely or entirely depleted
 - all oceanic body having high concentration of salt
- Which one is not a sustainability challenge?
 - population growth
 - environmental education
 - Urbanization
 - Water scarcity
- All are examples of sustainability solution except:
 - Waste pollution
 - combating climate change
 - Sustainable agriculture
 - Renewable energy
- The objective of environmental education is
 - To raise consciousness about environmental education
 - To teach environmentally appropriate behavior
 - To create an environmental ethics that fosters awareness about ecological inter-dependence of economics, society and politics
 - All of the above
- Which environmental movement is concerned less about the problems and limitations to overcome environment problems rather focuses on the "tools, models, and ideas" that already exist for overcoming them?
 - Free market environmentalism
 - Bright Green environmentalism
 - Light' 'Dark environmentalism
 - Popular environmentalism
- Which of the following environmental concerns may not be solved using indigenous knowledge?
 - Ecosystem management
 - Water management
 - industrial emission control
 - Soil conservation
- The traditional belief system that helps the Gumuz people to control their environment as their communal property is
 - Yamba
 - Paleta
 - Maccaa
 - Gumm

Answer Key for Self-test Exercises

Section 1

1D 2E 3B 4F 5I

Section 2

1False 2True 3False 4True 5False

Section 3

1A 2D 3A 4C 5C

Section 4

1D 2E 3B 4C 5A

Section 5

1. You must write some of the following

- Indigenous knowledge is local. It is rooted to a particular place and set of experiences, and generated by people living in those places.
- Indigenous knowledge is orally-transmitted, or transmitted through imitation and demonstration.
- Indigenous knowledge is the consequence of practical engagement in everyday life, and is constantly reinforced by experience and trial and error.
- Repetition is an essential characteristic of tradition, even when new knowledge is added.
- Tradition could be considered as 'a fluid and transforming agent with no real end'.
- When applied to knowledge its central concept is negotiation.
- Indigenous knowledge is characteristically shared to a much greater degree than other forms of knowledge. As a result, it is frequently referred to as "people's science".
- Although indigenous knowledge may be focused on particular individuals and may achieve a degree of coherence in rituals and other symbolic constructs, its distribution is always fragmentary.
- Despite claims for the existence of culture-wide (indeed universal) abstract classifications of knowledge based on non-functional criteria; where indigenous knowledge is at its densest and directly applicable, its organization is essentially functional.
- Indigenous knowledge is characteristically situated within broader cultural traditions; separating the technical from the nontechnical, the rational from the non-rational is problematic.

2. You should write the following

- Ecosystem and landscape management,
- Water management,
- Soil conservation,
- Biological control of pests and diseases,
- Ecological agriculture and livestock practices, and
- Plant and animal breeding often enhance food security and prevent or alleviate poverty.

3. Maccaa Oromo people's indigenous practice scope comprises attitude towards the universe and natural resources around. They practice this knowledge system in the way of promoting and preserving ecosystem. Specially, their knowledge regarding their folk healing practices to protect the health of their livestock and families is worth mentioning. They have wisdom on identification and classification of medicine and its resources, mode of preparation, mechanism of dose control and spiritual and philosophical aspects of folk medicine.

4. The Gedeo people founded long-standing regulations (seera) of standards, respect to elders, and oral declarations that passed down from generation to generation. Respect is frequently exhibited in the form of reverence for parts of environmental resources because it is linked with traditions and relationship to human beings. For instance, songo sacred trees are often seen as ritualistic trees which are maintained and protected by prohibition systems (taboos) and traditional rules of "seera".

Answer Key for Unit Review Exercise

1 C 2C 3A 4C 5B
6 A 7D 8B 9C 10A

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UNIT SEVEN

CONTEMPORARY GLOBAL GEOGRAPHIC ISSUES AND CONCERNS

Unit Introduction

Dear learner we hope you have studied the distance learning of the last consecutive geography Units well. This unit is focused on the contemporary pressing issues of the world hopefully in your community to you. The study of geography, by its very nature, covers a range of contemporary issues and events. These are the issues and events that are 'in the news'. They are issues and events that are discussed and debated widely in the community. Contemporary geographical issues and events have both a spatial and temporal dimensions. This means that they occur in a particular context and time frame. They might, for example, be a local community-based issues (such as a development proposal) that are the focus of peoples' attention for just a short period of time, or an environmental issue that affect the whole planet (for example, global climate change) which may be of concern for generations.

Because people have different perspectives or points of view on issues, they will often disagree on how they should be addressed. Disagreement is often healthy as long as we respect the rights of others to express their views that we might not necessarily agree with. Being able to identify and evaluate such points of view greatly enhances our own decision-making processes. This is what makes the study of geography so interesting. In this unit, we try to study the issues of climate change, desertification, drought and famine. Actually they are interlinked and sometimes they are of a cause and effect of one another too.

Unit Contents

- 7.1. Climate change
 - 7.2. Desertification
 - 7.3. Drought and Famine
- Unit Summary
Unit Review Exercise

Unit Outcomes

At the end this unit, you will be able to:

-  explain why climate change is perceived as a contemporary global issue;
-  discuss the causes and possible link between draught, desertification and famine;
-  describe the major causes and effects of drought;
-  identify the major causes and effects of famine;

The Required Study Time: 9 hours

Learning Strategies

In the unit, the suggested learning strategies are:

- ◆ written brainstorming questions;
- ◆ Problem-solving method;
- ◆ individual project;
- ◆ report writing;
- ◆ observation;
- ◆ written activities;
- ◆ practical activities; and
- ◆ self-test assessments

SECTION ONE

Climate Change



Section Overview

Dear learner! In this section, you will learn about the climate change as one of global pressing issue. Climate change is having a significant impact in a number of areas, including the global hydrological cycle, ecosystem functioning, coastal vulnerability, forest ecology, food security, and agricultural sustainability. According to the Intergovernmental Panel on Climate Change (IPCC), only quick and sustained action can prevent climate change from causing permanent and perhaps catastrophic environmental damage. Climate change is one of our generation's most pressing issues. It is demonstrated by the rising temperatures, which cause drought and wildfires, fluctuating rainfall, glaciers and melting snow, and the rise in global mean sea level. To begin mitigating climate change, we must first reduce or eliminate human-caused emissions.

Long-term data and model simulations are used to compare the trends of present global and regional climate changes with paleoclimatic reconstructions. The characteristics of climate change in the Arctic and in other Russian areas are discussed, which become at the rate of observable magnitude, showing direct evidence of climate change in the form of shrinking glaciers, diminishing winter sea ice in the Arctic and measurable shifts in ranges of animal and plant species, to name a few. This sub content intends to make you-student familiar with climate change and its impact, thus, in order to achieve this purpose, critically engage you in the upcoming lesson study.

Section Learning Outcomes

At the end of this section, you will be able to:

-  explain why climate change became a global issue and a serious cause for public concern.

Climate change is a hot issue in academics all around the world. Climate change is fundamentally a spatial phenomenon. As a result, geographers deal with it as well. This section attempts to demonstrate how climate change is a contemporary worldwide pressing issue that must be addressed.



1. What are the primary reasons that climate change has become such a big topic all around the world?
2. Can you try to explain the main reasons?

Well. Let you try to think about climate change as a contemporary global issues a while in your and continue to read the given text.

Climate change as one of the most pressing issues of our time, threatens the lives and livelihoods of billions of people. A changing climate requires comprehensive, integrated strategies that simultaneously address social, economic and environmental consequences. At the end of 2015, 195 Parties to the UN Framework Convention on Climate Change endorsed the historic Paris Agreement.

Participants pledged to curb emissions to minimize the rise in temperatures, and strengthen capacities to manage climate risks. The agreement sets the stage for progress in ending poverty, strengthening peace and ensuring a life of dignity and opportunity for all the main tenets of human security. Climate changes mainly caused by human action which have been transpired different socioeconomic and environmental consequences, and more changes still expected. However, if we stopped emitting greenhouse gases today, the rise in global temperatures would begin to flatten within a few years. According to the current estimates, if major actions are not taken to reduce emissions, global temperature is on track to rise by 2.50C to 4.50C (4.50F to 80F). Studies on climate change impacts point out different results with different temperature stabilization scenarios. The findings of this review are summarized in the table below.

Impacted conditions	Within 20C	Within 20C- 2.50C	>30C
Health	a 1.20C temp. change causes an increase in premature mortality of hundred thousand human race excluding extreme cases of heatwave.	a 2.30C increase of temp. by 2080 may put 270 million people in a risk of malaria	a 30C rise of temp. put up to 330million people at risk of malaria
Ecosystem	a 10C temp. change may causes for a change of 10% eco- system damage	1 - 20C temp. rise causes 15 – 20% of the ecosystem worldwide	A rise of 20C temp. responsible for a shift of a 20% global ecosystem and a 10% coastal wetland loss
Agriculture	A rise of temp. up to 20C responsible for a decline of crop yield in EU and US	Heat stress caused by 1.70C temp rise affected the agriculture in the tropics	2.50C temp. increase in 2080 results in 50 million additional people at risk of hanger

Impacted conditions	Within 20C	Within 20C- 2.50C	>30C
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Ecosystem	a 10C temp. change may causes for a change of 10% eco- system damage	1 - 20C temp. rise causes 15 – 20% of the ecosystem worldwide	A rise of 20C temp. responsible for a shift of a 20% global ecosystem and a 10% coastal wetland loss
Agriculture	A rise of temp. up to 20C responsible for a decline of crop yield in EU and US	Heat stress caused by 1.70C temp rise affected the agriculture in the tropics	2.50C temp. increase in 2080 results in 50 million additional people at risk of hanger
	A 1.50C temp. rise puts many regions into the water stress 400800 million people will be in water shortage		

As a result, climate change has been taken as one of the worldwide geographical concerns, with the following effects:

- ◆ Ice is melting worldwide, especially at the Earth's poles. This includes mountain glaciers, ice sheets covering West Antarctica and Greenland, and Arctic sea ice. In Montana's Glacier National Park, the number of glaciers has declined to fewer than 30 from more than 150 in 1910.
- ◆ Much of this melting ice contributes to sea-level rise. Global sea levels are rising 0.13 inches (3.2 millimeters) a year and the rise is occurring at a faster rate in recent years.
- ◆ Rising temperatures are affecting wildlife and their habitats. Vanishing ice has challenged species such as the Aedile penguin in Antarctica, where some populations on the western peninsula have collapsed by 90 percent or more.

- ◆ As temperatures change, many species are on the move. Some butterflies, foxes, and alpine plants have migrated farther north or to higher, cooler areas.
- ◆ Precipitation (rain and snowfall) has increased across the globe, on average. Yet some regions are experiencing more severe drought, increasing the risk of wild- fires, lost crops, and drinking water shortages.
- ◆ Some species including mosquitoes, ticks, jellyfish, and crop pests are thriving. Booming populations of bark beetles that feed on spruce and pine trees, for example, have devastated millions of forested acres in the U.S. Climate change is a hot issue in academics all around the world.

Resources

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Activity 7.1

1. Describe and discuss how climate change affects the current socioeconomic conditions of Ethiopia.

[Dear learner we hope that you have tried to discuss preceding questions well. Subsequently, you will be initiated for in-depth learning.] Climate change is having a significant impact in a number of areas, including the global hydrological cycle, ecosystem functioning, coastal vulnerability, forest ecology, food security, and agricultural sustainability.

Long-term data and model simulations are used to compare the trends of present global and regional climate changes with paleoclimatic reconstructions.

Climate change as one of the most pressing issues of our time, threatens the lives and livelihoods of billions of people. A changing climate requires comprehensive, integrated strategies that simultaneously address social, economic and environmental consequences.

According to the current estimates, if major actions are not taken to reduce emissions, global temperature is on track to rise by 2.50C to 4.50C (4.50F to 80F).

climate change has been taken as one of the worldwide geographical concerns, as a result of: Ice is melting worldwide at the Earth's poles; rising temperatures affecting wildlife and their habitats and moving some species habitat to farther north or higher; cooler areas, an increase of Precipitation across the globe, on average, yet some regions are experiencing more severe drought; thriving some species plants and animals.

Self-test Exercise 7.1

For the following questions choose the best answer among the given alternatives.

- What are the two main actions of average citizens that produce the greatest amounts of greenhouse gas emissions?
 - Burning wood and paper products, and using electricity
 - Burning fossil fuels, and excessive disposal of wastes into landfills
 - Using mass transit and shopping at large grocery stores and malls
 - Using electricity and burning fossil fuels
- Cities & rural communities face some of the same climate issues; these include:
 - Too many people with the same name slows emergency response
 - There are not enough celebrities focused on climate issues
 - The need to upgrade aging infrastructure
 - People can't identify the needed solutions so take no action
- What is a feasible method to reduce the release of the greenhouse gases without decreasing the production of these gases?
 - Eliminating industry
 - Sequestering
 - Adopting new technologies that do not use fossil fuels
 - Mitigating
- Which of the following factors is not to blame for the fact that climate change has become a global geographical issue?
 - melting ice of the worldwide at the Earth's poles
 - effects of the rising temperatures affecting wildlife and their habitats and moving some species habitat to farther north or higher cooler areas
 - an increase of environmental protection awareness in the community
 - thriving some species plants and animals

5. What can you do to help fight climate change?
- Divest from fossil fuel companies
 - Engage yourself in the science behind climate change
 - Vote for political candidates who will advocate for climate-related legislation and policy improvements
 - All of the above



Dear learner! Now it is time to check your understanding of the meaning, scope, and branches of geography. Read each of the following questions and answer them by putting a tick (✓) mark in one of the boxes under alternatives 'Yes' or 'No'.

No	Items	Yes	No
1	Can you describe the reasons that make climate change as one of the worldwide geographical concerns?		
2	Are you able to explain the current and future trend of climate change and its impact?		
3	Can you explain how people can combat climate change at your local context?		

SECTION TWO

Desertification



Section Overview

Dear students in this section you will learn another important global pressing issue; desertification. According to the UN Convention on Climate Change, desertification is a quiet, unseen disaster that is undermining communities on a worldwide scale. Desertification has gained significance as a worldwide concern because desertification extends well beyond the geographical location from which it originates. This highlights the critical need for integrated and coordinated action to identify the places and peoples most vulnerable, as well as the nations that are unable to handle these challenges on their own. Though it should be decreased as human reactions become more forceful and concentrated, the problem of connecting it to research and policy in the real world remains unsolved.

The consequences of human activities are significant, and individuals are supported in generating options and alternatives for preserving the dryland ecosystem. Understanding the mechanisms of social resilience can assist societies in dealing with change. Indeed, we emphasize the need of proactively implementing preventative methods. This sub content intends to make you familiar with desertification and its impact.

Section Learning Outcomes

At the end of this section, you will be able to:

-  explain the causes and effects of desertification;
-  describe the major human induced and natural causes of desertification; and
-  explain the consequences of desertification taking a concrete example from East African countries.

KEY TERMS

- desertification,
- land degradation,
- dryland,
- landscape,
- human induced.



Dear learner attempt the following question

1. What are the main causes of desertification?
2. How does desertification affect our physical and socioeconomic environment?

7.2.1 What is desertification?

Deserts are defined as areas of the Earth that get a little or no rain, often 250mm or less per year which is different from the idea of desertification. Desertification does not concern natural deserts, and can only occur on land which is vulnerable to the desertification process. The phenomenon known as desertification has received widespread attention recently, as witnessed in the United Nations Conference on Desertification in Nairobi in 1977, mainly as a result of the impact of extended drought in the West African Sahel in the early 1970s. Today, the UN definition of desertification is that it is 'human induced land degradation in dry and sub-humid regions' (UNCCD: United Nations Convention to Combat Desertification). By definition, human induced land degradation, refers to how desertification is caused by the actions of people that have a negative impact on the condition of the environment. According to IPCC special report on climate change and land, Desertification is land degradation in arid, semi-arid, and dry sub-humid areas, collectively known as drylands, resulting from many factors, including human activities and climatic change.

Students! do you think occurrence desertification and dry lands escalation has a link? It is explained in the following paragraph

The range and intensity of desertification have increased in some dryland areas over the past several decades. Drylands currently cover about 46.2% of the global land area and are home to 3 billion people. The multiplicity and complexity of the processes of desertification make its quantification difficult. Desertification hotspots, as identified by a decline in vegetation cover, extended to about 9.2% of drylands in between the 1980s and 2000s, affecting about 500 million people in 2015. The highest number of people affected are in the South and East Asia, the Sahara region including North Africa, and the Middle East.

Desertification, even if viewed as a subset of the general land degradation problem, has undoubtedly proved to be controversial, especially since the 1977. The term has been seen as confusing, as it is grouping together a range of environmental processes and because of the images it presents, an inappropriate images of desert advance through sand dunes encroaching upon productive land.

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

The dry lands are comprised of arid, semiarid and sub-humid areas, the difference being in their degree of aridity. Aridity is the result of the interaction between various climatic factors (rain, temperature, wind) and evapotranspiration. These elements combine together to determine the growth of plants and the capacities of animals or humans to live fittingly in a harsh natural environment.

Almost half of the terrestrial land surface, equal to 6.45 billion hectares, is made up of drylands (47% according to the World Atlas of Desertification, UNEP, 1997). They are distributed among all the great regions of the planet. One billion hectares is hyper-arid; these are real deserts such as the Sahara. Students, take few minutes to look the following video, showing conditions of dry lands and their like with desertification

Generally, 5.45 billion hectares of land are arid, semi-arid and sub-humid areas. Desertification occurs in these parts of the planet. These areas are inhabited by one fifth of the world's population or 1.2 billion inhabitants in the year 2000. It is here where the soils are fragile, vegetation is sparse and the climate is difficult that helps to expand desertification. Land degradation occurs everywhere, but can only be defined as 'desertification' when it occurs in the drylands. Some 70% of the 5.2 billion hectares of drylands used for agriculture around the world are already degraded. Thus, desertification now damages practically one quarter of the total land surface area of the world and it also affects about two-thirds of the countries of the world. [Students refer to figure 7.3 & figure 7.4 and infer the severity of the desertification process and its effects critically.]

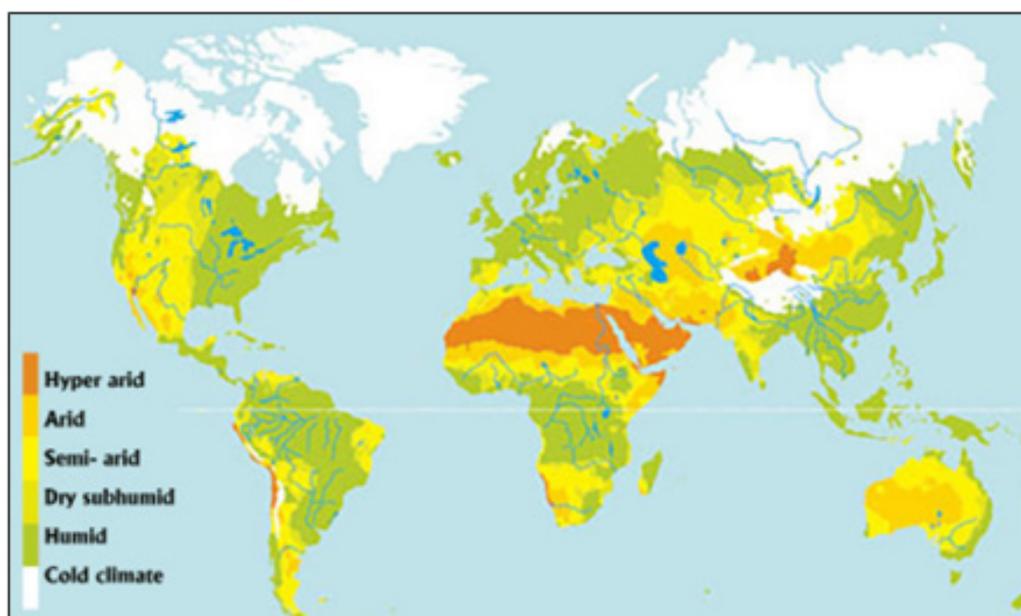


Figure 7.1. World Map of Aridity Zones

The world's drylands are particularly affected by desertification as they have the following fundamental features:

- 🌍 Low precipitation that is infrequent, irregular and unpredictable;
- 🌍 Large variations between day and night temperatures;
- 🌍 Soil that is poor in organic matter;
- 🌍 Lack of water for consumption; and
- 🌍 Plants and animals adapted to climatic variables (heat resistance, lack of water).

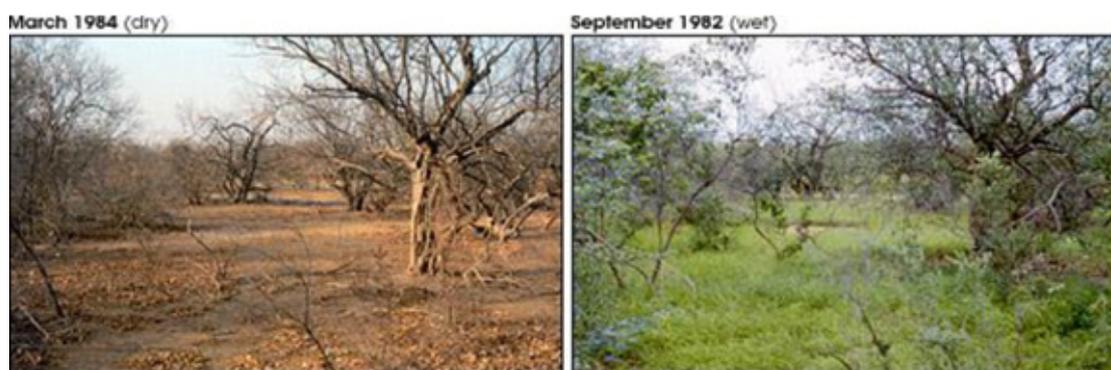


Figure 7.2 The process of desertification

7.2.3. Causes of Desertification



Students, how does desertification occurs?
Dear students try to relate your idea with the characteristics of dry lands.

An obvious starting point when considering the causes of desertification is the increase in the human population from about 1 million in the Stone Age to 1 billion in 1850 and 6 billion in the 1990s.

Desertification and land degradation have emerged as a significant and seemingly permanent issue as a result of the combined effects of technology, human population expansion, and cultural shifts. Therefore, man is one of may be the 3 million species but today consumes far more food than all of the other land animals put together. Ever since people started to use fire to improve grazing and domesticate crops and cattle, land degradation and desertification occurred, and this happened everywhere. Some of the factors that contribute to desertification are discussed in a greater depth in the following sections:

a. Population growth

Since the middle of the 20th century many countries have experienced significant population growth (a greater number of children are born while infant mortality decreases slightly, but also people tend to live longer). As a result, the rate of population growth is often high when it is between 2% and 3% per year. That means in certain countries, the population will double within the next 20 to 30 years. As a result, such fast population increase makes it impossible to feed them using traditional methods of production. Increase in agricultural pressure on land, with the added effect that the soil in the drylands is not given sufficient time to recover, leads to an eventual drop in productivity. Basically human action, ironically, is necessary to restore damaged areas. That means, people have the potential to devastate the environment as well as the ability to heal and rehabilitate it.

b. Over-exploitation of natural resources

Due to the lack of alternative survival strategies, farmers tend to relentlessly exploit natural resources (food crops, water for drinking and washing, firewood) to the point that they are often over-exploited and cannot regenerate naturally. Soil nutrients and organic matter begin to diminish as intensive agriculture removes quantities of nutrients greater than the soil's natural regeneration capacities. As a result, the soil does not recover as quickly as it does during fallow periods. This traps it in a vicious cycle of environmental deterioration and poverty, both of which are major contributors to desertification.

Over-cultivation exhausts the soil, overgrazing removes the vegetation cover that protects it from erosion. The causes are multiple and interact in a complex manner. The principal causes exacerbating 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,
- ◆ Intense breeding and overgrazing with pressure on vegetation and soil trampling by livestock;
- ◆ Separation of cattle rearing and agriculture, eliminating a source of natural fertilizer or organic matter (cattle dung) used to regenerate the soil;
- ◆ Deforestation;
- ◆ Bush and forest fires;
- ◆ In mountainous regions, crops are cultivated along the downward sloping face rather than following the natural contour lines of the mountain.
- ◆ Deterioration of terraces and other soil and water conservation techniques



Figure 7.3. Example of overexploitation Tokyo tuna market

c. Deforestation and energy

The use of firewood is one of the principal causes of desertification. In tropical arid areas, wood is the principal source of domestic energy for cooking and lighting both in rural and urban areas, and it is also used for construction. In this way, large tracts of forest are destroyed. Due to the lack of water in the drylands, forest regeneration is very slow, reducing the dynamic growth of vegetation.

However, allowing for rest periods from grazing and increasing fallow periods, generally have spectacular regenerating effects on the forest. In the drylands, this regeneration is very slow because of water scarcity. Thus, deforestation is a major cause of desertification. To limit the need for deforestation, only renewable sources of energy (hydraulic, wind, solar) and gas and petrol should be encouraged as it can replace wood consumption.



Figure 7.4. Example of Deforestation in Liberia

d. Do climate change and deforestation cause desertification?

The climate of the planet has changed over the course of history (see Chapter Two). Variations in arid and humid climates have been observed in most regions of the world. Thus, a desert to-day could have been a humid and fertile zone in the past, and is still in the process of evolving. Moreover, today's forests originally developed from low-lying vegetation made up of grasses and shrubs. However, if humans continue to over-exploit forest resources and influence the climate by gas emissions, who knows what will remain of the forests in the next few decades. Global and regional variations in temperature at the ocean surface are directly linked to rain cycles. This is the case of the phenomenon known as 'El Nino' whose persistent and devastating rains affect the eastern coast of the Americas, Asia and even Africa. As a result of this situation, the area may be warm by at least several degrees Celsius. Deforestation, Overgrazing and over cultivation on grass lands in semi-arid areas cause similar changes in albedo, leading to an increase in desert conditions, a process known as desertification. Student, revise the key points of what you have covered and reflect on the factors aggravating desertification at global level.

7.2.4. The Consequences of Desertification

Billions of acres of the world's range and cropland, along with the welfare of millions of people, have been affected by desertification in recent decades.

One of the main causes is believed to be overgrazing, although over cultivation, poor irrigation practices, and deforestation also play a significant role. Some of the major effects of desertification is given below. Desertification decreases the resilience of the land to natural climatic change. Thus, soil, vegetation, freshwater supplies, and other resources' efficiency and viability are all affected. Soil becomes less productive as a result of topsoil erosion, which can be blown away by wind or washed away by rainstorms. When pastures are overgrazed, edible plant species may go extinct, and non-edible plant species may invade the area. Some of the consequences are caused by people who live outside of the impacted areas. Downstream flooding has resulted in decreased water quality due to sedimentation in rivers and lakes, silt sediment in reservoirs and navigation channels, dust storms, and sand drifting, are a few instances. Food production will suffer greatly if desertification is not prevented and the area's food yields are not restored. Many of the nations impacted by desertification, malnutrition, hunger, and disaster are all conceivable results. Desertification often adds to famine in regions where there is also poverty, civil disturbance or conflict. Drought and land degradation often help to trigger a crisis, which is then made worse by poor food distribution and the inability to buy what is available. Desertification has huge societal consequences, including land degradation, drought, population migration, wars, and conflict over freshwater.

Desertification has a significant economic impact; it is estimated that the annual income lost in desertification-affected regions is over 42 billion USD. However, some of the most significant consequences of desertification are listed below.

- ◆ Farming becomes next to impossible;
- ◆ Decrease in crop yields;
- ◆ Hunger;
- ◆ Flooding;
- ◆ Poor water quality;
- ◆ Poverty;
- ◆ Biodiversity loss;
- ◆ Endangerment and extinction of species;
- ◆ Destruction of habitats; and
- ◆ Migration.

7.2.5. Desertification in Eastern Africa

Essentially, two-thirds of Africa is classified as dryland, with 319 million hectares of land considered to be vulnerable to desertification. These areas are concentrated in Sahelian region, Horn of Africa and Kalahari in the south. Increasing concentration of poverty in the drylands of sub-Saharan Africa has been documented, where 41% of the total population lives in extreme cases.

This is mainly because of desertification. Thus, desertification is one of the most severe concerns and risks to Africa's long-term development.

The sub-region of East Africa lies between 21°0 north latitude and 11°0 south latitude in the Tropics. It includes nine countries Djibouti, Eritrea, Ethiopia, Kenya, Somalia, Sudan, South Sudan, Uganda and the United Republic of Tanzania. The Sahara Desert has a significant influence on this region, making it relatively dry. Desert covers more than 1 million square kilometers, including all of the northern Sudan. The climate is characterized by high temperatures and low precipitation (less than 200 mm). Very arid and semi-arid climates are also found in Somalia, Djibouti and along the coast of Eritrea, with annual rainfall ranging between 400 and 750 mm. Most of Ethiopia and the mountains of Kenya have mountain climates with higher rainfall and lower temperatures. Uganda and the coast of the United Republic of Tanzania are mostly characterized by a very humid climate with high temperatures and a very short dry season. The rest of Tanzania, Kenya and Uganda have typical tropical climate with a long dry season. Dear students explain the level and characteristics of desertification in Eastern Africa and use figure 7.5 for further comprehension.

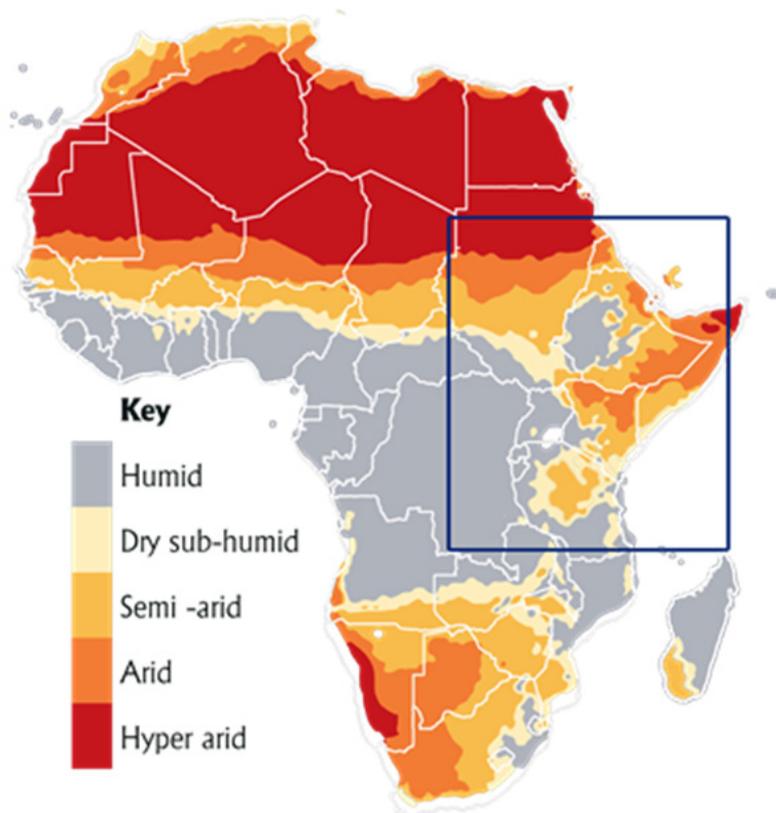


Figure 7.5. The extent of desertification particularly in Eastern Africa

Rapid population increase, widespread deforestation, and the building of large-scale projects that damage the environment are all contributing to desertification in semiarid East Africa. Desertification has already proven to be one of the key challenges affecting the livelihoods of the poor people of the region. Most of the people in this region are living predominantly in rural areas where their lifestyles are traditional peasants relying heavily on land for livelihood. The governments have to try and export little to earn foreign exchange which is used to import much needed machinery,

Mineral fuels, manufactured goods, chemicals, etc. A little revenue is therefore left to be used in developing and providing the needs of the growing population. It is in the above context that the population of East Africa is seen as growing faster than their economies can provide for.

Attempts to combat desertification in Eastern Africa

National efforts to combat desertification: They include the recent creation of Presidential Commission on Soil Erosion and Afforestation in Kenya. The starting of a tree nursery in each district of the countries, particularly Kenya and Ethiopia and the designation of a national tree planting day. Thirdly, the local agricultural extension officers are to be more active in encouraging Proper agricultural practices. Ethiopian 'green legacy' is a typical example in this respect.

International projects: Though it is no longer active, UNESCO's Integrated Project on Arid Lands began in 1976 in Kenya as a pilot project of research, training, and demonstration. Its primary task was to find direct solutions to the more urgent environmental problems associated with desert encroachment and ecological degradation of arid lands. It was then to develop new strategies for pastoral land management and regional development. This program's task is to find scientific management principles to the environment and to use these findings to improve living conditions of the people. The principal objective of it is to enhance production in the agricultural and forestry industries, followed by increased productivity and stress tolerance. []

Resources

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- Geist, H. (2017). *The causes and progression of desertification*. Routledge.
- The Drylands, Deserts and Desertification Conference 2014. (2014, December 14). YouTube. <https://www.youtube.com/watch?v=8NIJKSjjXD8>



Activity 7.2

1. Describe about the causes and effects of desertification with concrete example around your environment.
2. Explain the nature of desertification in the east African context.

Deserts are defined as areas of the Earth that get a little or no rain, often 250mm or less per year which is different from the idea of desertification.

Almost half of the terrestrial land surface, equal to 6.45 billion hectares, is made up of drylands. They are distributed among all the great regions of the planet. One billion hectares is hyper-arid; these are real deserts such as the Sahara.

Some of the major factors contributing for the expansion of desertification are; Population growth, Over-exploitation of natural resources, Deforestation and energy, climate change.

Billions of acres of the world's range and cropland, along with the welfare of millions of people, have been affected by desertification in recent decades. There are also several consequences such as; Decrease in crop yields; Hunger, Flooding, Poverty, Biodiversity loss, and Migration.

Rapid population increase, widespread deforestation, and the building of large-scale projects that damage the environment are all contributing to desertification in semiarid East Africa.



Self-test Exercise 7.2

Multiple choice

Part I: Multiple choice: Choose the best answer from the given alternatives

- The _____ desert is the largest desert in the world.
 - Thar desert
 - Gobi Desert
 - Sahara Desert
 - Great Sandy desert
- The CAUSES of desertification are:
 - drought
 - overgrazing
 - human environment interaction
 - all of the above
- Which of the following is an effect of desertification?
 - food shortages
 - strong economies
 - growth of new plant life
 - all of the above
- In East Africa the process of desertification causes greater hardship for women than for men mostly because
 - women consume more water than do men
 - women are primarily responsible for collecting the fuelwood and water for their families
 - in times of drought family size usually increases
 - there are proportionately more women than men in this area
- Which one of the following is the characteristics of the Sahel Region?
 - located south of the Sonoran Desert in North America.
 - located south of the Saharan Desert in Africa.
 - a region located within the Gobi Desert.
 - the only known desert located in Eastern Europe

Part II: Short note writing: Give short answer to the following question (6).

- What is the connection between desertification and drylands?



Checklist

Dear learner! Now it is time to check your understanding of the meaning, scope, and branches of geography. Read each of the following questions and answer them by putting a tick (✓) mark in one of the boxes under alternatives 'Yes' or 'No'.

No	Items	Yes	No
1	Can you describe the meaning of desertification?		
2	Can you explain the relationship between dryland and desertification?		
3	Are you able to identify the main factors contributing for the expansion of desertification?		
4	Can you describe the major consequences of desertification?		
5	Can you explain the effect of desertification in semiarid East Africa?		

SECTION THREE

Drought and Famine



Section Overview

Dear learner in this section you will learn about drought and famine. Their concepts cause and effects will be the focus of the section.] In this century, drought has directly touched 1.5 billion people in this century, which is more than any other slow-onset calamity. Climate change, environmental deterioration, and demographic shifts will lead this figure to rise abruptly. According to a recent research, immediate action is required to improve drought management and prevention. Drought is arguably the biggest single threat from climate change. Its impacts are global. Some say drought triggered the crisis in Syria that sent tens of thousands of refugees heading for Europe. Relief failures and poor drought forecasting caused innumerable deaths in the Horn of Africa during 2011 and 2012. Yet calls to prevent future disasters by establishing a UN body to provide a global drought early warning system, first made almost a decade ago, remain unfulfilled. Climate change is raising temperatures and varying rainfall patterns, increasing the frequency, intensity, and length of droughts in many parts of the world.

This sub section intends to enable you understand and experience about the essence and types of drought, its causes and impacts. Famine killed roughly 75 million people in the 20th century, though it had all but gone in recent decades, until it resurfaced all of a sudden, with South Sudan declaring famine in late February of 2021, and Somalia, Nigeria, and Yemen issuing hunger alerts. The following questions, thus, remain on the desks of the GOs and NGOs: What accounts for the sudden increase in the number of persons in need of emergency food assistance? And why, at a time when global poverty and hunger are falling, are we now confronted with four possible famines in unrelated countries?

Situation update for 2021: A fatal combination of violence, COVID-19, and the climate catastrophe have driven more than 7 million people in six East African nations to the brink of famine. In addition, 34 million people are suffering from food insecurity at crisis levels. A humanitarian crisis is emerging, food security is deteriorating, and unless international intervention is immediately scaled up, the East African famine is going to spread and endanger millions of lives.

Section Learning Outcomes

At the end of this section, you will be able to:

-  define the essence of drought;
-  distinguish different types of droughts and their causes;
-  explain the major causes and effects of drought taking some countries as examples.
-  identify the major causes and effects of famine; and
-  analyze the mechanisms to cope up the effects of famine.

KEY TERMS

- Drought-Prone Regions,
- Dryness Ratio,
- Meteorological Drought,
- Hydrological Drought,
- Agricultural Drought



What do you mean by drought?
What are the most essential factors considered in deterring a drought?

7.3.1. Definition of Drought

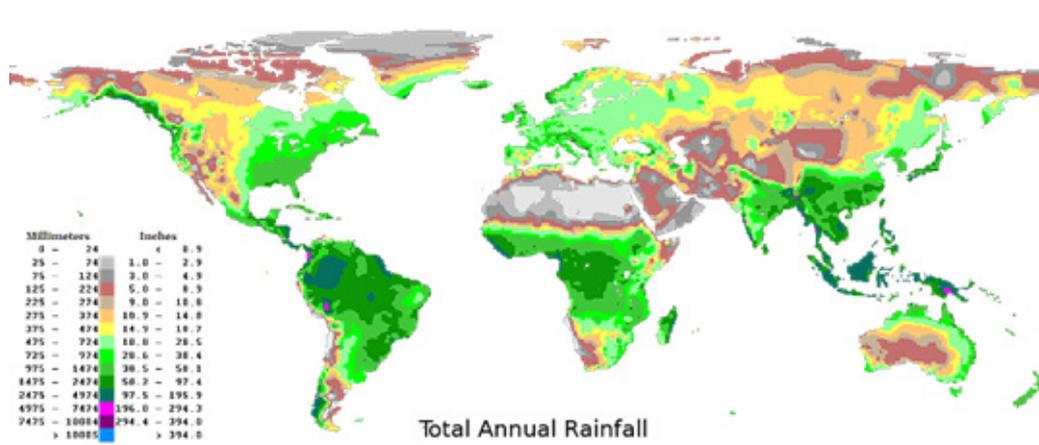
[Student, the points you made related to the meaning and causes of should have to stimulated your curiosity to read the following lesson note. Desertification, drought, and famine are all linked, as stated in the preceding section. When evaluating the concept of drought, the first thing we will ask is where the deserts and their borders are; where the drought-prone zones are, and the places where there is a lack of rain. Quantitatively, the dryness ratio or indices can be used to calculate a rainfall deficit in places that are dry on a regular or seasonal basis. Drought and aridity are clearly related phenomena. A permanent rainfall deficiency causes aridity. Drought is the absence of regular rainfall over an extended period of time. The Sahelian and Sudanese ecosystems in Africa are the most often drought-affected areas.

A generally accepted definition of drought is a 'temporary reduction in water or moisture availability significantly below the normal or expected amount for a specified period.' The key assumptions of such a definition are:

1. The reduction is temporary (if the reduction were permanent then terms such as "dry" and "arid" would be more appropriate).
2. The reduction is significant.
3. The reductions are defined in relation to a "norm" i.e. normal expectation.
4. The period taken as the basis for the norm is specified.

It is crucial to understand how the "norm" is defined. To provide more explanation for assumptions 3 and 4. The "norm" may be defined either:

Technically: a reduction of water availability might qualify as a "drought" when it falls below about 80% of the average availability over the preceding 20 years, or Culturally: in terms of the level of water availability the society has come to expect. Thus, after a run of ten years with above average rainfall a society may have become used to the wetter state and perceive the first year of average rainfall as a drought.



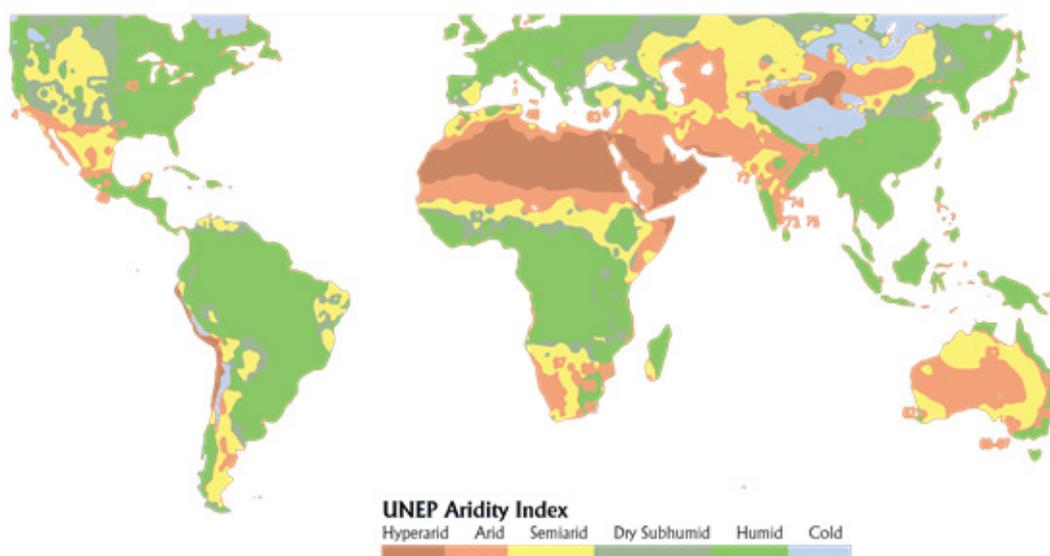


Figure 7.6: Distribution of Aridity in the world

7.3.3. Types of Drought

student, take minutes and examine the definition of “drought”; now you will see the different types of drought. Can state some of the method that helps to classify drought? It is a common practice to distinguish between three forms of drought; meteorological, hydrological, and agricultural droughts. These categories are usually, but incorrectly, viewed as synonymous.

a. Meteorological Drought

It describes a situation where there is a reduction in rainfall for a specified period (day, month, season, or year) below a specified amount – usually defined as some proportion of the long term average for the specified period of time. Its definition involves only precipitation statistics. Care needs to be taken in utilizing and aggregating rainfall data.

The word “drought” is most commonly used to refer to meteorological drought. Efforts have been made to design a universal definition of meteorological drought that would fit all localities and situations. These definitions reflect climatic abnormalities, and are based on a deficit of rainfall from a conversion long-term average. That means Meteorological drought occurs when precipitation is significantly below expectations. Its definition involves only precipitation statistics and depends on the time of year and on location.

b. Hydrological Drought

It involves a reduction in water resources (stream flows, lake levels, groundwater, and under- ground aquifers) below a specified level for a given period of time. Its definition involves data on availability and offtake rates in relation to the normal requirements of the system (domestic, industrial, irrigated agricultural) being supplied.

The distinction between the two types can often be blurred as hydrological droughts may be caused by reductions in precipitation anywhere within the catchment area of the river or aquifer system. Thus, irrigated agricultural areas alongside the River Nile in Egypt may experience a hydrological drought as a result of a meteorological drought in the Ethiopian Highlands regardless of the levels of rainfall within Egypt itself. In the case of rivers fed by snowmelt, irrigated areas downstream may experience reduced water availability as a result of reduced snowmelt caused by below normal temperatures during the summer months. Areas drawing water from underground aquifers through wells and boreholes may experience hydrological drought as a result of geological changes which cut off parts of the aquifer. Over- utilization of the aquifer may also result in its exhaustion.

c. Agricultural Drought

Agricultural drought occurs when the water supply necessary for agriculture becomes scarce. An agricultural drought depends on the amount of rainfall expected and the use to which water is put, hence a shortage of water is felt because of human activity, whereas a meteorological drought creates stress on plant life unconnected with people and their needs. Sometimes agricultural drought defined in terms of soil moisture deficit and state that it occurs when there is a consistently high soil moisture deficit over the growing season.

In human terms, agricultural drought is a moisture deficit on a sufficient scale to cause disruption of the rural economy. In an extreme agricultural drought, crops fail, and animals and perhaps people die. A shifting drought threshold shows how changes in population pressure and crop rotation may affect the drought threshold. Thus, agricultural drought is analyzed as a substitution of maize, a more water demanding cash crop than millet, a traditional dry area crop that affect the Kenyan landscape.

7.3.4. Ratio and Indices Drought

A number of different indices have been developed to quantify a drought, each with its own strengths and weaknesses. Most commonly used indices are:

- Palmer Drought Severity Index (PDSI)
- Crop Moisture Index (CMI)
- Satellite Vegetative Health Index (VHI)
- Percentile of Normal precipitation
- Standardized Precipitation Index (SPI)

Palmer Drought Severity Index: The PDSI was the first index developed in the United States. (1965).

It is a soil moisture algorithm based on precipitation and temperature data, as well as the local available water content of the soil. From the inputs, all the basic terms of the water balance equation can be determined. Negative values depict drought (range -6 to 6).

- **Strengths:** it is very comprehensive, it places current conditions in an historical perspective, and it is best for long-term drought and homogeneous area.
- **Limitations:** it can be slow to respond, it does not consider snowpack, and there is a need to know the state of the climate.

Crop Moisture Index: The Crop Moisture Index was also developed by Palmer (1968), and is a simple water balance index. The CMI responds more rapidly than the Palmer Index and can change considerably from week to week, so it is more effective in calculating short-term abnormal dryness or wetness affecting agriculture.

- **Strengths:** it reflects quickly changing the soil conditions for agricultural applications.
- **Limitations:** it is useful only during the growing season, and is not a useful tool for a long-term drought monitoring.

Satellite Vegetative Health Index: The Satellite VHI is a combination of the chlorophyll and moisture content in vegetation combined with surface thermal changes. A Vegetation and Temperature Condition Index (VT) is produced, with values from 0 to 100 characterizing change in vegetation conditions from extremely poor (0) to excellent (100).

- **Strengths:** it provides good spatial coverage of vegetative health for agricultural applications; it is useful for early drought detection; it is not adversely affected by bad surface observations.
- **Limitations:** It is useful only during the growing season.

Percent of Normal Precipitation: it is calculated as;

$$PNP = (\text{Actual precipitation}) / (\text{Normal precipitation}) \times 100$$

- **Strengths:** it is very easy to calculate, regularly generated by various climate soft- ware packages, and is generally useful and easy to be understood by media and public.
- **Limitations:** it is often misunderstood as precipitation has a non-normal distribution, which is not taken into account. A station or climate division must have a long record of observations from which a normal can be computed.

Standardized Precipitation Index: The SPI calculation for any location is based on the long- term precipitation record for a desired period.

This long-term record is fitted to a probability distribution, which is then transformed into a normal distribution so that the mean SPI for the location and desired period is zero (half of the precipitation amounts are below the median, and half above) (Edwards and McKee, 1997).

The SPI is negative for drought (index ranges from -2 to 2).

- **Strengths:** It is not as complex as the PDSI; it can provide early warning of both the onset and end of drought; and it captures the various time scales of drought.
- **Limitations:** Precipitation is the only input - temperature and soil moisture are not included, and it is based on preliminary data.

Based on this index for 12-month we can get the following level of drought

Level	Measurement
Extremely wet	2.0+
Very wet	1.5 to 1.99
Moderately wet	1.0 to 1.49
Near normal	0.99 to 0.99
Moderately dry	-1.0 to -1.49
Severely dry	-1.5 to -1.99
Extremely dry	-2 and less

7.3.5. Causes of Drought

Droughts are primarily caused by changing weather patterns, which manifest as an excessive accumulation of heat on the earth's surface, as well as meteorological changes that result in less rainfall and lower cloud cover, all of which result in higher evaporation rates. Basically, droughts in Africa are caused by a combination of natural and human factors.

The most important natural factor responsible for the prevalence of drought is El Nino and La Nina effect. In Africa it occurs most frequently during the warm El Nino period. In fact, this does not happen always as there are many other local and global factors influencing the drought phenomenon. In Southern and Eastern Africa regions, droughts have occurred during cold La Nina time. In some cases, a powerful La Nina event was the primary cause of the drought in the Horn of Africa in 2010–2011.

The recent severe droughts in Sahel region were caused by the ocean warming (southward warming gradient of the Atlantic Ocean and steady warming of the Indian Ocean), southward shift of Inter Tropical Convergence Zone (ITCZ).

Regarding the anthropogenic factors, the land - atmosphere feedbacks through natural vegetation and land cover change are also important factors. Anthropogenic contribution in land use change altering the land surface feedback mechanisms is also seen as a factor. Further- more, human induced greenhouse gas emission is also considered as a contributory factor to oceans warming. Although it is generally true that lower rainfall results in lower crop yields, the following factors have an impact on the strength of the connection and on the severity of drought in many African nations:

- The proportion of production which is irrigated;
- The moisture retention capacity of the soil;
- Timeliness of the rainfall (the normal growing season rainfall occurring during the cycle);
- The adaptive behavior of farmers; and
- a standard operational definition of drought.

7.3.6. The Impact of Droughts

Of all the natural hazards, droughts are potentially those having the greatest economic impact and affecting the greatest number of people. Earthquakes and cyclones may be of enormous physical intensity but are invariably of short duration, and are geographically limited. By contrast droughts affect large geographical areas, often covering whole countries or parts of continents and may last for several months and, in some cases, several years. Of the main natural disasters, droughts are unique in terms of the length of time between the first indications from, for example, rainfall monitoring, that a drought is developing and the point at which it begins to impact significantly upon the population of the affected area. Droughts, almost or virtually always, have a direct and significant impact on food production and the overall economy. The impact on a particular population is related to the severity and nature of the drought, but equally, and occasionally more importantly, to the nature of the economy and society in the affected area.

First, consider an extreme example. Two semi-arid countries experience a 50% reduction in annual rainfall. Country X is a high income economy where agriculture contributes only 10% of the total Gross Domestic Product (GDP) and water for industry, agriculture and domestic use is drawn from reliable underground aquifers. Country Y is a low income economy where agriculture is primarily rain-fed and contributes 50% of total GDP.

Clearly the drought impacts on Country X are likely to be negligible whereas for Country Y they are likely to be severe. The scenario becomes more interesting if the assumption about the reliability of the underground aquifers in Country X is altered so that water is drawn from rivers and reservoirs whose catchment area is affected by the reduction in rainfall a hydrological drought. Likely impacts include reduced agricultural and industrial production, increased unemployment, domestic water rationing, increased cost of living, and increased investment in the exploitation of alternative water resources, and so on. Bearing in mind the variations between economies and societies noted above, the following list of potential economic and social impacts of an agricultural drought may be helpful. The list is neither exhaustive nor comprehensive but is intended to illustrate some of the possible outcomes of drought.

Potential information sources on the impacts are noted in brackets.

- ◆ Reduced income for farmers and agricultural laborers (household income and expenditure surveys undertaken by statistics departments, ministries of agriculture, university researchers, employment offices).
- ◆ Reduced spending locally on agricultural inputs and equipment and non-agricultural items and services like travel and non-subsistence foods.
- ◆ Decrease in price of livestock as farmers are forced to sell because of increases in the cost of pasture and purchased feeds.
- ◆ Increased price of staple foods.

- ◆ Inability of certain groups within the population to afford increased food prices results in their:
 - ◆ Switch to cheaper and sometimes less preferred foods;
 - ◆ Reduction in overall food intake;
 - ◆ Borrowing to maintain food intake;
 - ◆ Selling assets to raise funds;
 - ◆ Engaging in alternative income earning activities locally;
 - ◆ Migrating in search of employment opportunities; and
 - ◆ Migration to where relief food is being distributed.
- ◆ Reduced food intake leads to deterioration of nutritional status and reduction in ability to resist infection.
- ◆ Difficult and scarce availability of water results in a general increase in diarrheas and other water/hygiene-related illnesses.
- ◆ Increased stress and morbidity (disease and illness) results from migration journey.
- ◆ Drying-up of water sources leads to reduction in water quality, the need to travel further to collect water and possibly migration to better water.
- ◆ Increased competition for access to remaining water sources may lead to increased incidence of local disputes/conflict.
- ◆ Loss of education due to reduction in school attendance by children lacking energy and/or money for fees, plus the need for them to assist other family members in water collection and income generating activities.
- ◆ Social costs of migration, e.g. break-up of communities and families.

Dear student, as we repeatedly reminded you at intervals take time and reflection on your level of understanding comparing the learning outcomes set. Then, build the next learning, on the experience obtained and meaning you constructed ...

7.3.7 Famine



What distinguishes famine described in news reports from the actual circumstances that exist in the society?

Dear student, compare what you have said about the question posed to the explanation made in the next paragraph.

Definition

For many, the word famine is defined by images of mass starvation, where whole communities are literally starving to death. Indeed, this is the power of the modern media that some tend to define famine in terms of the horrific and widely screened film of the feeding camps in Ethiopia and southern Sudan specific cases.

However, to accept that famine is a process rather than a single clearly identifiable event that creates problems for those trying to differentiate famine from other more prevalent conditions such as chronic hunger. It affects as many as a one-third of the world's population and causes the premature death of many among the world's poor. The following is the safest method of defining famine. Famine results from a sequence of processes and events that reduce food availability or food entitlements causing widespread and substantially increased morbidity and mortality.

Over the last two decades, the concept of food security has emerged as a definitional scheme that considers the relationships between food production, distribution and consumption. It is now widely used by governments and donor agencies, and it is helpful to locate famine within this framework. The most widely used definition of food security is that outlined by the World Bank (1986):

Food security is access by all people at all times to enough food for an active, healthy life. Its essential elements are the availability of food and the ability to acquire it. Food insecurity, in turn, is the lack of access to enough food. There are two kinds of food insecurity: chronic and transitory.

Chronic food insecurity is a continuously inadequate diet caused by a household's persistent lack of ability to buy or to produce enough food.

Transitory food insecurity is a temporary decline in a household's access to enough food. It often results from instability in food prices, declining food production or household incomes and in its worst form produces famine.

Incidence of Famine

Famines have occurred periodically in most, if not all, societies throughout history. Chronicles of ancient civilizations in India, Egypt, Western Asia, China, Greece and Rome record famines in these and other parts of the world. In the Middle Ages, famine was a frequent occurrence in Europe. For example, historians estimate that during the 900-year period from the 10th C to the 18th, there were 89 "general" famines in France and hundreds more "local" famines. Since then famines in Western Europe have become markedly less frequent as a result of agricultural innovation and the Industrial Revolution, though the 1846-51 "Great Famine" that occurred in Ireland was possibly one of the most catastrophic.

The most recent "famine" to occur in Western Europe developed in the Netherlands during the winter of 1944 when a military stalemate between the advancing Allied Forces and the retreating German Army created severe food shortages in the main urban areas and significantly increased mortality.

Estimate of the total deaths directly attributable to a particular famine are notoriously poor, often prone to exaggeration, and frequently a matter of dispute. In modern history, Ethiopian Famine of 1984-1985 is the most disastrous one.

Causes of Famine

Famines are caused by either or both of the following factors:

- A decline in food availability; and
- A reduction in people's access to, or their ability to acquire, food.

Declines in food availability may be caused by a range of "natural" and human-induced factors. These are the factors that may precipitate a food crisis and indicates early symptoms.

Among the "natural" factors are:

- Agricultural drought;
- Floods;
- High winds;
- Unseasonable cold spells /frosts;
- Crop disease; and
- Pest invasion (e.g. locusts, army worms and quelleda birds).

Among the human-induced factors are:

- ◇ Conflict preventing farmers from planting, weeding, harvesting, and selling or possibly, involving the physical destruction of standing crops.
- ◇ External economic shocks, e.g. sudden increases in the price of imported oil or fertilizers or a sudden decline in the value of a country's exports thereby limiting its capacity to import items normally necessary for agricultural production. Internal macro-economic mismanagement, e.g. poor agricultural pricing policies discouraging farmers from growing surpluses, the overtaxing of export commodities so that the country's foreign exchange earnings fall, and it becomes less able to import vital commodities such as oil and fertilizer.
- ◇ Forced procurement of farm produce by state organizations over-export of foods which reduces the amount available nationally to below required levels.
- ◇ A reduction of people's ability to acquire food may also be caused by a range of "natural" and human-induced factors which affect supply and ability to purchase.

Measures to Maintain Food Security

The overall objective of short term relief measures should be to protect people's access to food through:

1. Ensuring the availability of food in the affected area, and
2. Protecting the entitlements of all groups within the affected population.

Some of the principal measures for maintaining food security include:

- ◇ Price stabilization;
- ◇ Food subsidies;
- ◇ Employment creation programs;
- ◇ General food distributions;
- ◇ Supplementary feeding programs;

- ◆ Special programs for livestock and pastoralist populations;
- ◆ Complementary water programs; and
- ◆ Complementary health programs.

Resources

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Activity 7.3

1. Why defining drought is a difficult task?
2. Write an essay about Ethiopian famines which occurred at different times by asking elderly people in your community.

Self-test exercise

Answer questions 9-12 by writing 'True' for the correct statements or 'False' for the wrong statements.

1. A drought is a situation in which there is a severe (extreme) lack of water, food, cattle fodder, and employment for people as a result of insufficient rainfall.
2. A drought occurs when there is rain for an extended length of time.
3. A famine could result from poor drought management because families with lower purchasing power,
4. Drought conditions do not affect all life forms.
5. Households with children experience food insecurity at almost double the rate of households without children
6. In school, children from food insecure households perform just as same as children who have enough nutrition daily.

Give short answer to questions 1-5.

1. Describe the major causes and consequences of drought by taking some concrete example from your locality.
2. Why the three types of drought are understood as synonymous?
3. How are desertification, drought and famine related?
4. What are the major historical famine areas of the world?
5. Describe the relationship between famine and conflict.


Checklist

Dear learner! Now it is time to check your understanding of the meaning, scope, and branches of geography. Read each of the following questions and answer them by putting a tick (✓) mark in one of the boxes under alternatives 'Yes' or 'No'.

No	Items	Yes	No
1	Can you define the concept of drought and famine?		
2	Can you explain the relationship between famine and conflict?		
3	can you describe the cause and impacts of drought?		
4	are you be able to identify drought prone regions on the map?		
5	Can you describe the different type of drought?		
6	are you be able to explain the different measurement techniques of drought?		
7	can you explain the various idiocies of measuring famine?		
8	can you describe the cause and impacts of famine?		

Unit Summary

Climate change, desertification, drought, and famine are some of the major global issues that are causes of concern among many people.

Deforestation is a type of land degradation that happens in arid, semiarid, and dry sub-humid environments (drylands) as a result of varieties of reasons, including human activities and climate change. Desertification received a lot of attention in the 1970s as a result of the consequences of a long term drought in Western African Sahel. As a result of the United Nations Conference on Deforestation, the United Nations Convention to Combat Desertification was formed. As to eastern African desertification condition, the dryland of the region is representing about 65% of the total area of the region that is highly vulnerable to desertification. Rapid population growth, widespread deforestation and the construction of large-scale projects cause land degradation in this arid and semiarid area of eastern Africa. Various attempts were made to combat desertification by promoting afforestation programs.

Drought is the absence of regular rainfall over an extended period of time. There are five dry lands identified in the world. These include Sonoran Desert, Atacama, the vast diagonal area extending from Atlantic to China, Namib-Kalahari, and most Australian area. Three different types of drought are identified: these are meteorological, hydrological and agricultural. These categories are usually but incorrectly viewed as synonymous terms though they are essentially different. There are different types of ratio or indices of droughtiness. The most commonly used are: Palmer drought severity index, crop moisture index, satellite vegetative health index and standard precipitation index. The major causes of drought are categorized as natural and manmade. El Nino, La Nina and warming ocean that affects the shift of Inter-Tropical Convergence Zone (ITCZ) are taken as natural. Also, land cover change, greenhouse gas emission is some of the manmade factors. Drought affects large geographic area. It always has a direct and significant impact on food production and the overall economy.

Famine is not a single easily identifiable phenomenon; it is rather a process that is difficult to differentiate from critical hunger. A more precise definition of famine is that it is the result of a process reducing food availability or food entitlements, and causes widespread and substantially increased morbidity and mortality. Famine is mainly caused by either or both of a decline in food availability and a reduction in people's access to or their ability to acquire food. To maintain food security, it is necessary to take measures in protecting people's access to food through ensuring the availability of food in the affected areas, and protecting the entitlements of groups with the affected population.

Unit Review Exercise

Multiple Choice: Choose the best answer from the given alternatives for the following statements and questions.

1. what is the main reasons that makes climate change is contemporary geographical issues and concerns of the world?
 - A. It threatens the lives and livelihoods of billions of people
 - B. it requires comprehensive, integrated strategies
 - C. the severity has increased more recently than before.
 - D. all of the above
2. Which of the following is a cause of desertification?
 - A. Deforestation
 - B. drought
 - C. Overgrazing
 - D. all of the above
3. An effect of desertification is:
 - A. Food shortages
 - B. strong economies
 - C. Growth of new plant life
 - D. all of the above
4. Which factor is not responsible for the spread of desertification?
 - A. Soil erosion
 - B. deforestation
 - C. Climate change
 - D. Conservation of water
5. Which of the following is describing the meaning of overgrazing?
 - A. Allowing herds to drink water in the grasslands
 - B. traveling from place to place
 - C. Excessive grazing which causes damage to grasslands
 - D. Leaving herds unattended
6. Which one of the following expressions best describes the essence of droughts?
 - A. prolonged period of normally low rainfall, leading to a shortage of water
 - B. prolonged period of abnormally low rainfall, leading to a shortage of water
 - C. prolonged period of abnormally low rainfall, leading to abundance of water
 - D. all of the above
7. Which types of drought is expressed in terms of soil moisture deficit?
 - A. Agricultural,
 - B. hydrological,
 - C. Meteorological
 - D. All of the above
8. Which one is a human component that causes drought in the Sahel region?
 - A. Rain failure
 - B. La Nina
 - C. Over cultivation
 - D. Lengthy wet and dry season
9. One of the following term is referring the idea of food security. Which one?
 - A. Related to efforts to prevent terrorists from poisoning food supplies
 - B. ensuring everyone's access to food
 - C. Food surpluses with distribution
 - D. Shortage of water for agriculture
10. A famine is something that happens when a large group of people don't have
 - A. Enough to eat
 - B. shelter from the cold
 - C. Enough fresh water to drink
 - D. enough money

11. Which one is denoting entitlements to food?
- A. The term refers to social welfare programs, e.g. the Fair Price food shops.
 - B. It means the pathways through which people access food, whether by production, purchase, social protection programs or other means.
 - C. When countries enact right-to-food legislation, then people are entitled to food.
 - D. The term is a reference to agrarian reform programs that provide farmers with land titles.

Answer Key for Self-test exercises

Section 1

1D 2C 3B 4C 5D

Section 2

1C 2D 3D 4B 5A

Section 3

1. True 2. False 3. True 4. False 5. True 6. False

Answer Key for Unit Review Exercises

1D 2D 3A 4D 5C 6B
7A 8C 9B 10A 11B

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UNIT EIGHT

GEOGRAPHICAL ENQUIRY AND MAP MAKING

Unit Introduction

Dear student, this is the last unit of grade 12 geography lessons, and it contemplates various issues you learned in the previous units. It concentrated more on assessing the tools and methodologies making a research and elucidating various geographical thoughts and enquiries.

Geographical enquiry as a method of scientific study involves the learners' active participation. Geographical enquiries at the 21stC should encompass all the essential skills related to the subject matter of Geography. Besides, new thinking, skills and strategies are essential to solve local and global environmental and socioeconomic challenges. Among these are Geographic Information System (GIS), Remote Sensing, sophisticated statistical approaches, and an aspect of ICT related to study of Geography. Current understanding of the process of scientific and mathematical investigations make the study of first-hand data through fieldwork or the investigation of second hand data or both manageable and workable.

Unit Contents

- 8.1 Fundamentals of research in Geography
- 8.2. GIS Data and Map Making Using GIS

Unit Summary

Unit Review Exercise

Unit learning outcome

At the end of this unit, you will be able to:

-  acquire the basics of research knowledge and skills to undertake geographic research;
-  select and use different approaches in geography research; and
-  make different types of maps and interpret them.

The Required Study Time: 28 hours

Learning Strategies

In the unit, the suggested learning strategies are:

- ◇ written brainstorming questions;
- ◇ Problem-solving method;
- ◇ individual project;
- ◇ observation and report writing;
- ◇ written and practical activities;
- ◇ self-test assessments

SECTION ONE

Fundamentals of Research in Geography



Section Overview

Dear learner! In this unit, you will learn about a research in geography. Research is the process of using a collection of skills and knowledge that you have acquired to take the most in-depth investigation of a problem you are confronted with. But does research have a universal meaning? The answer to this question seems “no”. Different writers particularly in the field of geography define research differently while the following main elements are the most common components used to define the concept research:

- ◆ an inquiry to obtain dependable and useful information,
- ◆ a scientific approach to study a problem, and
- ◆ a systematic and objective search for reliable knowledge.

Therefore, one could define research as a scientific method of seeking a solution for the problems identified. It is basically a systematic inquiry into causes or the discovery of new facts through planned and organized effort that requires time, money and skill. Generally, research is the search for knowledge through objective and systematic methods of finding solutions to problems.

Section Learning Outcomes

At the end of this section, you will be able to:

-  explain the notion of research; and
-  identify the main components that help to understand the concept of research in Geography.

8.1 The Purpose of Undertaking Research and Features of a Geographic Research

The Purpose of Undertaking Research



Why do we conduct research?

Student, critically relate your thoughts to the descriptions made next. Governments and private companies have been investing huge amount of money for conducting research to meet their own purpose. As developed countries have been investing vast resources for research, they are proving to be sources of new knowledge and innovation. Research capability and the extent to which this capability is directed into action are two significant variables that influence a country's development. As sometimes good researches don't always reach their intended audience, it's critical to make researches accessible to the appropriate institutions, among other things, so that they may be used to take action.

In general, most professional researchers base their research on the following five main motivations:

Exploration: includes investigating little understood phenomena, identify/ discover important variables, generate questions for further research, etc.

Explanation: includes explaining why forces created the phenomenon in question, identifying why the phenomenon is shaped as it is.

Description: includes documenting and characterizing the phenomenon of interest.

Understanding: includes comprehending processes and interaction of phenomenon and people.

Prediction: includes predicting future outcomes for the phenomenon and forecast the events and behaviors resulting from the phenomenon.

Features of a Geographic Research

Geography as a subject provides a conceptual and practical overview of the diverse research methods for learners. The techniques that geographers use in their work are not developed in a vacuum. They are developed to address specific problems and, thus, reflect the focus of the discipline at particular times. These techniques reflect the conscious decisions of geographers about the kinds of information that are important to collect; the spatial scales at which information should be collected, compiled, analyzed, and displayed; data sampling strategies and experimental designs; data representation; and methods for data analysis. The methodologies for empirical research vary as theoretical perspectives shift. Thus, advancement of the discipline goes hand in hand with the development of new and improved techniques for collecting, analyzing, and interpreting information.

Geographers undertake research for all the reasons/ motivations mentioned above often in combination with each other. For instance, in your study, you may start with some exploratory investigations to determine which variables or factors are important. Next, you might try to describe the phenomena and how they are related. You may follow this by seeking to explain what caused the phenomena, and to make a prediction about future outcomes.

Example, if we were interested to investigate why people migrate to a new and relatively unknown area, the four approaches could be linked in the following way:

- ◆ Explore why people might want to relocate from their current location to a new one,
- ◆ Describe the patterns of migration based on the factors found during exploration,
- ◆ Explain the patterns of migration identified when describing the exploratory factors,

Any research project has the following three components:

- A subject matter (what is being studied?),
- Methodology or Approach (how it is being studied), and
- Philosophical bases (ontology, epistemology, and etc..).

The whole procedure of your research job is determined by your geographic knowledge. Geography is one of the few subjects that may easily link the social sciences, biophysical sciences, and humanities. Though various definitions exist, Geography can be regarded as a science concerned with the rational development, and testing of theories that attempt to explain and predict the spatial distribution and location of various characteristics on the surface of the earth. For geographers, research is the process of trying to gain a better understanding of the relationships between humans, space, place and environment which leads them use scientific methods.

Geography has a long history of research that spans to 2000 years ago. It has always welcomed new technology, research methodologies, teaching methods, skills, and material as a scientific subject. The scope and technique of geography have developed over time as a result of technological advancements and the accumulation of knowledge. Traditionally, geographical research is related to the locations of places and people. In the eighteenth century, geography's focus shifted to the physical and human characteristics of places in our world. In the mid-twentieth century, geographical research focused mainly on:

- ◆ The spatial distributions of phenomena and things,
- ◆ The resulting patterns and interactions, and
- ◆ The forces responsible for the formation of the patterns.

Dear student, what specific feature did you note regarding research role in Geography context? Reflect on this and read further to broaden your understanding.

Teaching geography is all about getting students to grasp today's concerns, such as population, land use, urban, economic, and health problems, as well as natural hazards. The 21stC teaching geography requires scoping, systems thinking (such as climate, watersheds, and energy systems), and critical thinking. Geographical studies, thus, have recently begun to address environmental concerns such as hunger, global warming, poverty, and the long-term evolution of our ecosystem. Changes in the discipline's tools and techniques have firmly positioned geography in the space era on a worldwide scale. At the personal level, the smartphone and global positioning system (GPS) have proven to be significant academic drivers and active players in the digital revolution. Geographers continue to adjust their perspectives on the world by employing both conventional and newly emerging technologies, such as mapping and GIS, respectively.



Activity 8.1

1. Discuss the main elements that make a research report different from other news and fiction written in books and journals.
2. Can you elaborate the contribution of a certain research for science and applied actions? Please use some reference books or the internet to get the material (dear student refer the above sources).

8.1.2 Research Approach and Methodology



Student check to what extent your reflective points to the preceding question approximate with the following descriptions?

What is the difference between research approach, methodology and method?

a. Research approaches

The general way of treating a certain research problem is referred to as a research approach. Basically, research approaches are classified as quantitative and qualitative. Some literature may add a third alternative called mixed research approach. The following subsections discuss these three different approaches.

Quantitative approach

As you might have introduced, the meaning and classifications of research approaches and in this subsection you will deal on quantitative approach first. Quantitative research includes designs, techniques and measures that produce discrete numerical or quantifiable data, and data analysis is mainly statistical (deductive process). That means, we use the quantitative approach when trying to verify a given geographical theory. We translate the concepts of the theory into variables that can be measured with statistical techniques. The benefit of this method is that the quantitative technique used by one researcher may be utilized by another researcher for other purposes or to expand on the same data.

Examples of issues that show the application of this approach have been given as follows: Temperature decreases as one travels from lowland to highland areas;

Land value increases as someone moves from city periphery to the city center.

These examples basically discover the difference in variables that occur as a function of altitude and distance measured from a designated place, for example, from lowland to highland and from periphery to the city core.

Thus, elevation and distance are the variables that determine the changing spatial patterns of temperature and land value, respectively.

The major subdivisions of quantitative research approach have been presented below.

- ◆ Statistical/Correlational Analysis,
- ◆ Experimental, and
- ◆ Quasi-Experimental.

Qualitative Approach

A qualitative research is concerned with methods, procedures, and measurements that do not yield discrete numerical data. It involves extensive descriptive data in order to gain insights into phenomena. Data analysis includes the coding of the data and production of verbal synthesis (inductive process). This method does not examine any already held theories or hypotheses. There are no quantitative approaches used. As a result, other researchers will be unable to replicate the findings. Data are utilized to explain a new hypothesis in the qualitative method. Some of the major types of qualitative research approaches include the following:

- ◆ Historical/Narrative research,
- ◆ Ethnographic research,
- ◆ Case study,
- ◆ Action research.

Mixed Methods Research

In the actual world, the data types that our study deals with are interlinked and difficult to separate. There are also a number of social and environmental issues, all of which are complexly interrelated. Therefore, the third research strategy is being developed in modern research activities. That is a mixed research approach. Mixed methods research is research in which quantitative and qualitative techniques are mixed in a single study. It is the third major research paradigm/perspective, adding an alternative (when it is appropriate) to quantitative and qualitative research approaches. According to proponents of the method, the following two elements should be considered while using the mixed research approach.

- ◆ The issue of harmony and the idea of how quantitative and qualitative methods are interrelated to use both in a single research.
- ◆ Flexible outlook that researchers should use the approach or mixture of approaches that works the best in a real world situation.

b. Research method and methodology

dear learner! You are here expected to distinguish the meaning of research methods and methodology, which seems identical in essence. The terms research method and research methodology are interchangeable, although they have difference in terms of scope. A research work is mostly an investigation of a problem. The researcher's motivation might stem from his or her curiosity as well as a clear objective to solve the challenge.

However, the use of research results as a guide is required in many business, social, intellectual, and other issues.

Research methods fundamentally include all those techniques/methods that are adopted for conducting research. Some of the main methods incorporated in the research works are:

- The collection and organization of data necessary or related to the problem,
- The use of statistical parameters to treat and interpret the organized data, and
- The evaluation of the accuracy of the result obtained.

Research methodology, on the other hand, refers to a way of systematically solving the re- search problem. It is a science of studying how research is conducted scientifically. Thus, the concept of research methodology is much broader than the method and it considers:

- Why the study is undertaken (its significance at various levels);
- How the research problem is identified;
- What assumptions or hypotheses are formulated;
- What type of data are collected; and
- Why a particular method or technique of analyzing the data is chosen.

In short, research methodology has wider dimensions than research method or technique. It is the philosophy or logic behind the research.

Study of basic geographic research methodology is therefore expected to give you knowledge and skills in areas indicated below:

- Gathering materials and data, and arranging them,
- Participating in field work,
- Preparing questionnaires, interviews etc.,
- Using statistical techniques, and
- Interpreting and reporting results of the study that you have designed or proposed.

Student, take time and ask your self the extent you have understood the substances of the content you covered up to now, then continue to the next topic with similar focus.

C. Research Design

Dear learner, now you will focus on the idea of research design. The development of a research project design, also known as “Research Design,” is a difficult undertaking that follows the job of defining the research problem. Decisions regarding what, where, when, how much, by what means concerning an inquiry or a research study constitute a research design.

A research design is an arrangement of circumstances for data collection and analysis that combines the relevance, study goal and procedural efficiency. In reality, the research design is the conceptual framework for doing research, and it serves as the blueprint for data collection, measurement, and analysis. That is, the study design reflects a flowchart of what the researcher would do, from hypothesis development through operational implications and data analysis.

A research design must, at least, contain:

- A clear statement of the research problem;
- Procedures and techniques to be used for gathering information;
- The population to be studied; and
- Methods to be used in processing and analyzing data. Section 3

8.1.3 Basic Elements of a Research



what are the main components of a research paper?

Dear student! I hope that you have read different research works done by other people. Do you remember the main important contents you read from those research papers?

The research process consists of a number of closely related activities necessary to effectively carry out a research. The diagram below depicts the major components of a research project, the information that they manage and the process. Dear learner! Figure 8.4 gives you a brief representation of the important component which may redundantly appears in researches papers of different fields of studies.

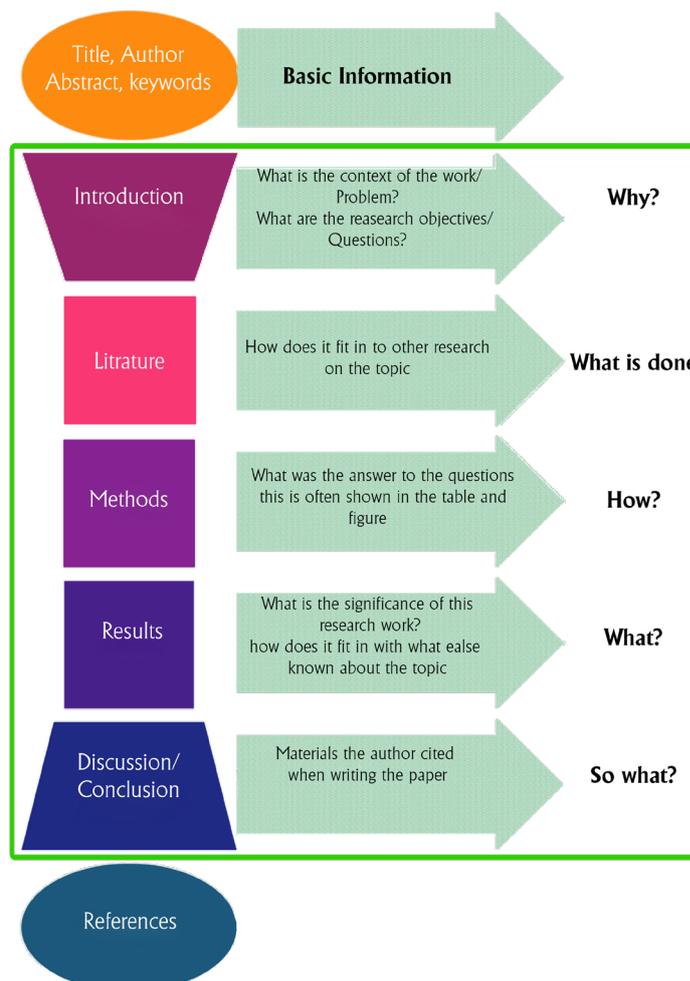


Figure 8.1. Components of Research Project

Research Problem: Identification and Formulation

Dear learner, you are advised to identify thoughtfully the concepts, principles and procedures of research in general and action research in particular in your readings of the lesson notes and analysis of visual figures. Thus, the research problem formulation involves the identification of a general topic and formulating it into a specific research problem. It requires a thorough understanding of the problem and rephrasing it in meaningful terms from analytical point of view. The understanding of the problem needs:

- ◆ Discussions with colleagues or experts in the field (Brainstorming); and
- ◆ Examining conceptual and empirical literature on the topic.

Problem Statement: The problem statement describes the context for the study, and it also identifies the general analysis approach. Some of the important sources of research problem are:

- ◆ Professional experience- the researcher's own experiences in the field;
- ◆ Inference from theory;
- ◆ Professional literature- reports, bibliographies of books, and articles, periodicals, abstracts, etc.;
- ◆ Technical and social changes - new developments may bring forth new problems for research.

Dear student, when you are doing a research you need to have concrete evidence for your problem. Therefore, after identifying the problem you research, you have to review the literature that supports your problem. The next reading gives you some highlight about literature review.

Literature Review

The purpose of the literature review is to situate your research in the context of what is already known about a topic. It need not be exhaustive; it needs to show how your work will benefit the whole. It should provide the theoretical basis for your work, show what has been done in the area by others, and set the stage for your work. It should probably move from the more general to the more focused studies; it need not be exhaustive, but has to be relevant. Sometimes the literature review is incorporated into the introduction section. However, most scholars prefer a separate section, which allows a more thorough review of the literature. Student, note the following main points and reflect on the why of related literature review in your subject context before moving to the components of research.

- ◆ The literature review serves several important functions, for instance, it: Ensures that you are not "reinventing the wheel".
- ◆ Gives credits to those who have laid the groundwork for your research.
- ◆ Demonstrates your knowledge of the research problem.
- ◆ Demonstrates your understanding of the theoretical and research issues related to your research question.

- ◆ Shows your ability to critically evaluate relevant literature information.
- ◆ Indicates your ability to integrate and synthesize the existing literature.
- ◆ Provides new theoretical insights or develops a new model as the conceptual framework for your research.

Objectives

The objectives of a research project summarize what is to be achieved by the study. Objectives should be closely related to the statement of the problem. The general objective of a study states what researchers expect to achieve by the study in general terms. It is possible (and advisable) to break down a general objective into smaller, logically connected parts. These are normally referred to as specific objectives. Specific objectives should systematically address the various aspects of the problem as defined under 'Statement of the Problem' and the key factors that are assumed to influence or cause the problem. They should specify what you will do in your study, where and for what purpose.

The formulation of objectives will help to:

- Focus the study (narrowing it down to essentials);
- Avoid the collection of data which are not strictly necessary for understanding and solving the problem you have identified; and
- Organize the study in clearly defined parts or phases.

Properly formulated, specific objectives will facilitate the development of your research methodology, and will help to orient the collection, analysis, interpretation and utilization of data.

Research Questions

Research question may be drawn from the statement of the problem. The purpose of the re- search question is to make the research focused. Thus, it sails a research study in a particular direction. A good question should have the following attributes.

- ◆ It is stated as a question,
- ◆ It is specific,
- ◆ It includes key terms and / or variables to be investigated,
- ◆ It can be operationalized, and
- ◆ It is written in a simple and precise form.

Preparing the Research Design

After formulating the research problem, you prepare a research design. The research design is the conceptual framework within which the research could be conducted. It helps you collect related evidence. It also helps you to limit required time, effort and expense. The what, where, when, how much, and by what means of your research project and its subject are answered by a research design.

Determining the sample

Conducting a study on the entire population is tough, and our project may be too vast to be feasible. The population refers to the total group of people with whom the study will be conducted. Sometimes, the entire population will be sufficiently small, and the researcher can include the entire population in the study. This type of research is called a census study. Usually, the population is too large for the researchers to attempt to survey all of its members. A small, but carefully chosen sample can be used to represent the population. The sample reflects the characteristics of the population from which it is drawn. Sampling methods are classified as either probability or non-probability characteristics of the population from which it is drawn. Sampling methods are classified as either probability or non-probability.

Probability Sampling: Probability sampling is also known as 'random sampling' or 'chance sampling' in which each member of the population has a known probability of being selected. Probability methods include random sampling, systematic sampling, stratified sampling and clustered sampling.

Non probability sampling: Here members are selected from the population in some non-probability manner. These include convenience sampling, judgment sampling, quota sampling and snow ball sampling.

Data Collection

Data collection is a time-consuming and costly part of the research process. There are two basic sources of data; these are primary and secondary source.

Primary Data source: A primary data source is an original data source, that is, one in which the data are collected firsthand by the researcher for a specific research purpose or project. This type of data collection is original in character. The research produces the data, rather than relying on existing data. There are several ways of collecting primary data.

- Experimental data,
- Survey questionnaires,
- Interview,
- Personal observations,
- Focus group discussions,
- Satellite imageries, metrological data.

Secondary data source: Secondary data is data which has been collected by individuals or agencies for purposes other than those of our particular research study. For example, if a government department has conducted a survey of, say, family food expenditures, and then a food manufacturer might use this data in the organization's evaluations of the total potential market for a new product. Similarly, statistics prepared by a ministry on agricultural production will prove useful to a whole host of people and organizations, including those marketing agricultural supplies. Some of the secondary data could be grouped as published and unpublished:

a. The Published data source include:

- ◆ Publications by governments and NGOs
- ◆ Journals
- ◆ Magazines and newspapers
- ◆ Reports by universities, scholars, etc.
- ◆ Historical records, etc.

b. Unpublished data include:

- ◆ Diaries
- ◆ Letters
- ◆ Unpublished biographies, etc.

Data analysis and interpretation

The methods used to analyze data will depend on the type of research, qualitative or quantitative research, which is again influenced by personal and methodological preference and educational background. For quantitative data analysis, issues of validity and reliability are important. Thus, the researcher must make sure that their measurements are stable and consistent and that there are no errors or bias present. For quantitative data, the analysis can be left until the end of the data collection process.

For qualitative data, the researcher might analyze as the research progresses, continually re- refining and reorganizing in light of the emerging results. It is useful to produce an interview summary form or a focus group summary form which you complete as soon as possible after each interview or focus group has taken place. This includes practical details about the time and place, the participants, the duration of the interview or focus group, and details about the content and emerging themes. The method you use will depend on:

- Your research topic,
- Your personal preferences, and
- The availability of time, equipment and finances.

Results

The results are actual statements of observations, including statistics, tables and graphs. The following are some of the guidelines useful for presenting the results of a study:

- Mention negative as well as positive results.
- Do not interpret results - save that for the discussion.
- Present sufficient details so that others can draw their own inferences and construct their own explanations.

Break up your results into logical segments by using subheads.

Discussion

The discussion section should be a brief essay in itself, answering the following questions and caveats:

What are the major patterns in the observations? (Refer to spatial and temporal variations.)

- What are the relationships, trends and generalizations among the results?
- What are the exceptions to these patterns or generalizations?
- What are the likely causes (mechanisms) underlying these patterns resulting pre- dictions?
- Is there agreement or disagreement with previous works or studies?
- Interpret results in terms of background laid out in the introduction:
- What is the relationship of the present results to the original question?
- What are the things we now know or understand that we didn't know or understand before the present work?
- Include the evidence or line of reasoning supporting each interpretation.
- What is the significance of the present results: why should we care?

Conclusions

What is the strongest and most important statement that you can make from your observations? If you met the reader at a meeting six months from now, what do you want them to remember about your findings? The following are a few guides for writing this part:

- ◆ Refer back to problem posed, and describe the conclusions that you reached from carrying out this investigation;
- ◆ Summarize new observations, new interpretations, and new insights that have resulted from the present work; and
- ◆ Include the broader implications of your results.

Recommendations

This section may include remedial action to solve the problem; further research to fill in gaps in our understanding; and directions for future investigations on this or related topics. That means, the recommendations you make in your research paper are critical to the strategies you have in place to further your field of study.

Resources

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Zina, O. (2021). *The essential guide to doing your research project*. Sage.



Activity 8.2

Student, now try to think about your reading and attempt to remember the main points, and answer the following activity

1. State the important elements of research paper



Self-test Exercise 8.1

For the following questions choose the best answer among the given alternatives

1. What is the purpose of doing research?
 - A. To identify the problem
 - B. To find the solution
 - C. A and B
 - D. None of the above
2. Research that uses qualitative methods for one phase and quantitative methods for the next phase is known as:
 - A. Action research
 - B. Mixed research method
 - C. Quantitative research
 - D. Positivists research
3. All are the main components of Any research project except_____
 - A. A place where the researcher living
 - B. A subject matter (what is being studied)
 - C. Methodology or Approach (how it is being studied)
 - D. Philosophical bases (ontology, epistemology)
4. Which one of the following is not refers to research method?
 - A. include all those techniques/methods that are adopted for conducting research
 - B. an arrangement of circumstances for data collection and analysis that combines the relevance
 - C. produces discrete numerical or quantifiable data and it is mainly statistical / deductive process
 - D. none of the above
5. Which one of the following is the main focus area of the mid-twentieth century, geographical research?
 - A. The spatial distributions of phenomena and things,
 - B. The resulting patterns and interactions
 - C. The forces responsible for the formation of the patterns.
 - D. All of the above



Checklist 1.1

Dear learner! Now it is time to check your understanding of the meaning, scope, and branches of geography. Read each of the following questions and answer them by putting a tick (✓) mark in one of the boxes under alternatives 'Yes' or 'No'.

No	Items	Yes	No
1	Can you list down the main elements of a research paper?		
2	Can you identify the main sources of research problem?		
3	Can you mention the main functions of literature review?		
4	Can you explain how research objective help us to manage the course of our research project?		
5	Can you explain why we take a sample in doing a research project?		
6	Can you differentiate the two types of data?		
7	Can you identify the difference and similarity of the result and discussion in the research paper?		
8	Can you identify the significance of research in addressing the environmental and socio- economic issues?		
9	can you elaborate the typical nature of geographic research?		
10	Can you compare the characteristics of geographic research with other subjects?		
11	Can you explain the current advancement that makes geographic researches different from the previous?		

Scholars have been conducting studies to explore, explain, analyze, understand, and predict social and economic problems.

The same objectives are combined when geographers conduct research. Initial exploratory research may be conducted in geography to identify the variables or factors that are significant. It then makes an attempt to explain the phenomena and their connections. Next, try to determine what produced the phenomenon and try to anticipate what will happen in the future.

The general way of treating a certain research problem is referred to as a research approach.

Quantitative research produces discrete numerical or quantifiable data and it is mainly statistical /deductive process that can be used to verify a given geographical theory.

A qualitative research involves extensive descriptive data in order to gain insights into phenomena and the coding of the data and production of verbal synthesis (inductive process).

Mixed research is a research in which quantitative and qualitative techniques are mixed in a single study and add an alternative (when it is appropriate).

Research methods fundamentally include all those techniques/ methods that are adopted for conducting research, however, a research methodology refers to a way of systematically solving the research problem.

A research design is an arrangement of circumstances for data collection and analysis that combines the relevance, study goal and procedural efficiency.

SECTION TWO

GIS Data and Map Making using GIS



Section Overview

Dear student, in grades 10 and 11 you have learned about the basics of Geographic Information System (GIS). GIS is a tool for capturing, storing, manipulating, analyzing, managing, and presenting various forms of geographic data. This technology's essential term is geography, which indicates that the main part of the data is spatial. That is to say, the information used in it is linked to a specific location.

Just as we use a word processor to write documents and deal with words on a computer, we can use a GIS application to deal with spatial information on a computer. As indicated above the acronym GIS stands for 'Geographical Information System'. It consists of the following basic elements:

- Digital Data – the geographical information that you will view and analyze using computer hardware and software.
- Computer Hardware – computers used for storing data, displaying graphics and processing data.
- Computer Software – computer programs that run on the computer hardware and allow you to work with digital data. A software program that forms part of the GIS is called a GIS Application.

With a GIS application you can open digital maps on your computer, create new spatial information to add to a map, create printed maps customized to your needs and perform spatial analysis.

As case study Let's look at a simple example as to how GIS can be useful. Imagine you are a health worker and you make a note of the date and place of residence of every patient you treat. You may use GPS measurements to help your reporting and make your patient's location more specific for your supervisor or substitute worker

As the continuation of your previous grade lessons, the following sections discuss the GIS data type and use, and the method of data analysis.

Section Learning Outcomes

At the end of this section, you will be able to:

-  construct statistical diagrams using generated data from various sources;
-  make administrative, topographic, and watershed maps; and
-  interpret different type of maps.

8.2.1. Gathering Data for GIS



Student, in your previous lessons you have seen various maps presenting different information. Do you recall how to gather the data represented by those maps? Do you have any idea as to how to create or obtain data for your GIS work?

GIS is made up of five fundamental components. These are Data, Software, Hardware, People, and Methods. Data is one of the most essential aspects of it. GIS data is basically a spatial data that can be mapped. Spatial data can be obtained from various sources. It might be data obtained directly from the ground or data gathered by others for their own purposes. The first segment may include field survey data and remote sensing photos. The second part includes paper maps and current digital data sets. Therefore, GIS data may be categorized into primary and secondary type, as we saw in the research method section.

a. Data generalization

To represent, symbolize and represent, the GIS data has to pass through the process of abstraction or generalization. Two key factors must be addressed while collecting, representing, and symbolizing GIS data. These are selecting the level of measurement (nominal, ordinal, interval, and ratio) and choosing the dimensionalities of the features (point, line, area, volume).

Level of measurement

In nominal measurement, the numerical values just “name” the attribute uniquely with no ordering of the cases implied. For example, jersey numbers in basketball are measures at the nominal level. A player with number 30 is not more of anything than a player with number 15, and is certainly not twice whatever number 15 is a half. In ordinal measurement the attributes can be rank-ordered. Here, distances between attributes do not have any meaning.

For example, on a survey you might code Educational Attainment as 0 = less than high school; 1 = some high school; 2 = high school degree; 3 = some college; 4 = college degree; 5 = post college. In this measure, higher numbers mean more education. But is the distance from 0 to 1 the same as 3 to 4? Of course not. The interval between values is not interpretable in an ordinal measure.

In interval measurement, the distance between attributes does have meaning. For example, when we measure temperature (in Fahrenheit), the distance from 30 -40 is the same as the distance from 70-80. The interval between the values is interpretable. Because of this, it makes sense to compute an average of an interval variable, whereas it does not make any sense to do so for ordinal scales.

But note that in interval measurement ratios do not make any sense; 80 0c is not twice as hot as 400c (although the attribute value is twice larger).

Finally, in ratio measurement there is always an absolute zero that is meaningful. This means that you can construct a meaningful fraction (or ratio) with a ratio variable.

Weight is a ratio variable. In applied social research most “count” variables are ratio, for example, the number of clients in the past six months. Why? Because you can have zero clients and because it is meaningful to say that “...we had twice as many clients in the past six months as we did in the previous six months.”

Features dimensionality

Mapping Features Conceived as a Point: Many mapped phenomena exist at points, are referenced to as points in reality, or conceived as points for mapping purposes. Such a feature has a locational attribute (X, Y coordinate) that specifies its position on the earth. It might be measured in both quantitative and qualitative ways.

Mapping Feature Conceived as Line: Symbols portraying attributes of features conceived as lines are easy to find on the maps. Examples of these symbols include coast line, rivers, administrative boundaries, roads, rail ways and flow and movements between locations. Line features also represent qualitative and quantitative information/data.

Nominal Data

Point	airport 	town 	mine 	capital 
Line	river 	road 	boundary 	pipeline 
Area	orchard 	desert 	forest 	water 

Figure 8.2: Mapping feature conceived as point, line and area at the nominal scale

Mapping features conceived as area: climate and soil are examples of attribute values collected at a point but conceived as areas and mapped by area symbols. To represent area symbol, we use visual variables associated with patterns (texture, arrangement, and orientation) for mapping features conceived as areas.

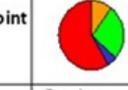
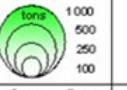
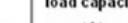
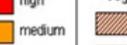
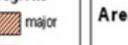
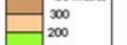
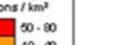
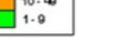
Point	Airports  international  national  regional	Oil well production  high  medium  low	Populated places  large  medium  small	Point	Election results % of votes 	Mineral production  1000 500 250 100	Populated places  50 - 80  10 - 49  1 - 9
Line	Roads  expressway  major  local	Drainage  river  stream  creek	Boundaries  international  provincial  county	Line	Roads: load capacity  over 10 tons  5 - 10 tons	Stream flow  1500 1000 500 0	Elevation  80 40 20
Area	Soil quality  good  fair  poor	Cost of living  high  medium  low	Industrial regions  major  minor	Area	Precipitation  25  20  15  10  0 cm.	Elevation  400 metres  300  200  100  0 sea level	Population density  50 - 80  10 - 49  1 - 9

Figure 8.3: Mapping features conceived as point, line and area at the ordinal and ratio scale

Symbolizing features Attribute as Volume: The statistical surface is one of the most important cartography related to volume. It exists for any distribution that is mathematically continuous over an area, and is measured on an ordinal, interval or ratio scale measurement. Dot Maps, Choropleth Maps and Isarithm map are the main examples for portraying features attribute value as volume.

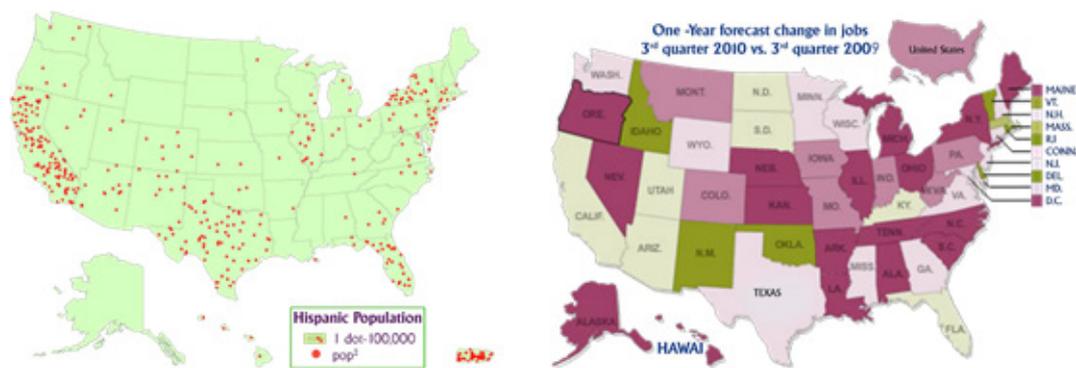


Figure 8.4: Features representation as volume with dot mapping and Choropleth

After viewing the above two considerations of the mapping feature and its attribute data, it is possible to make good data generalization. Why do we need to generalize data? It is helpful to distinguish between important and unimportant phenomena or events, and enhance map communication. Thus, each selected feature and its attributes should contribute to the effective communication of information. Some the major elements of data generalization in map making are stated below:

- ❖ Classification – ordering, scaling and grouping features by their attributes and attribute values.
- ❖ Simplification- determining important characteristics of the feature attributes, and eliminates unwanted details.
- ❖ Exaggeration – enhancing or emphasizing important characteristics of the attributes.
- ❖ Symbolization- the graphic coding of information and thereby placing it into a map context

b. Data representation

Proper representation of data is an important requirement in GIS work. In a GIS environment, there are four basic ways of representation of data in a choropleth maps that all look different. Map readers may likely draw different conclusions from those maps. In those maps data values, which are given below, are grouped into five classes using different data classification methods. You can compare data classification methods.

The natural break / Jenk's method divides data into the most homogeneous five classes. Notice that the fifth class (53950–105350) in the natural break map, is internally homogeneous, and is distinct from the other classes.

Breaking points are determined through a clustering algorithm that maximizes similarity with class and difference between classes. The default option for data classification in many GIS software is natural break because natural break organizes data in itself, and works in most (if not all) cases.

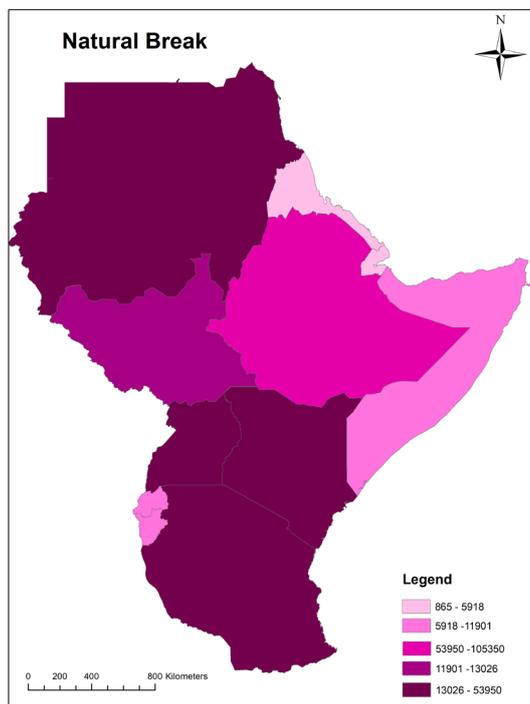


Figure 8.5: Natural break Jenk's representation of Eastern African countries population, 2017

In an equal interval map, the data values are divided into five classes with equal intervals. To determine the intervals, you divide the range (maximum value minus minimum value) by the number of classes. Classes are equally divided at the interval. $105350 - 865 = 104485$; thus, when we divide $104485 / 5 = 20897$. The fifth class has the range $84453 - 105350$ in an equal interval map. While the equal interval method is easy to understand, it does not fairly represent data when the data is highly skewed. For example, in the equal area map in Figure 8.8, the fourth and fifth classes are overrepresented despite the low frequency of the data.

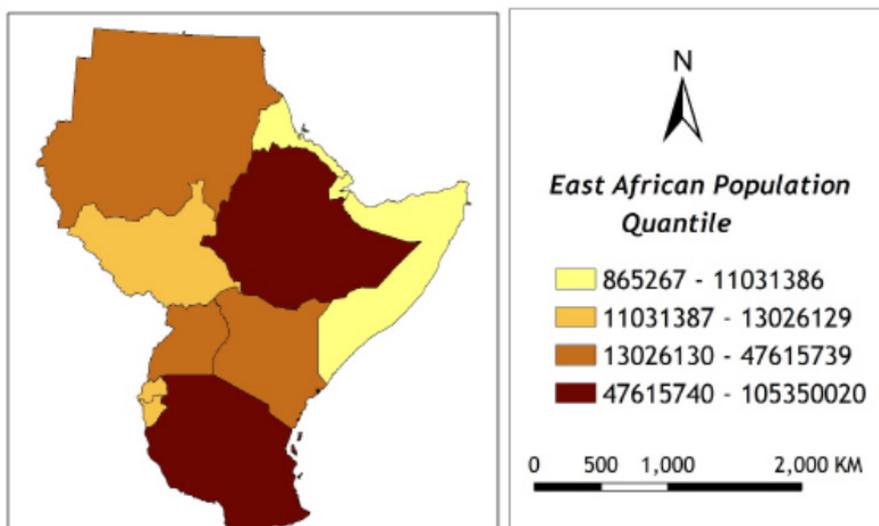


Figure 8.7. Quantile method representation of Eastern African countries population, 2017

Standard deviation calculates the mean and standard deviation from data, and determines breaking points by subtracting multiples of standard deviation from the mean. The standard deviation method is useful when it is important to convey how much data deviates from the average for each areal unit. In contrast to the equal interval and quantile method and natural break, standard deviation takes into account the frequency distribution of data.

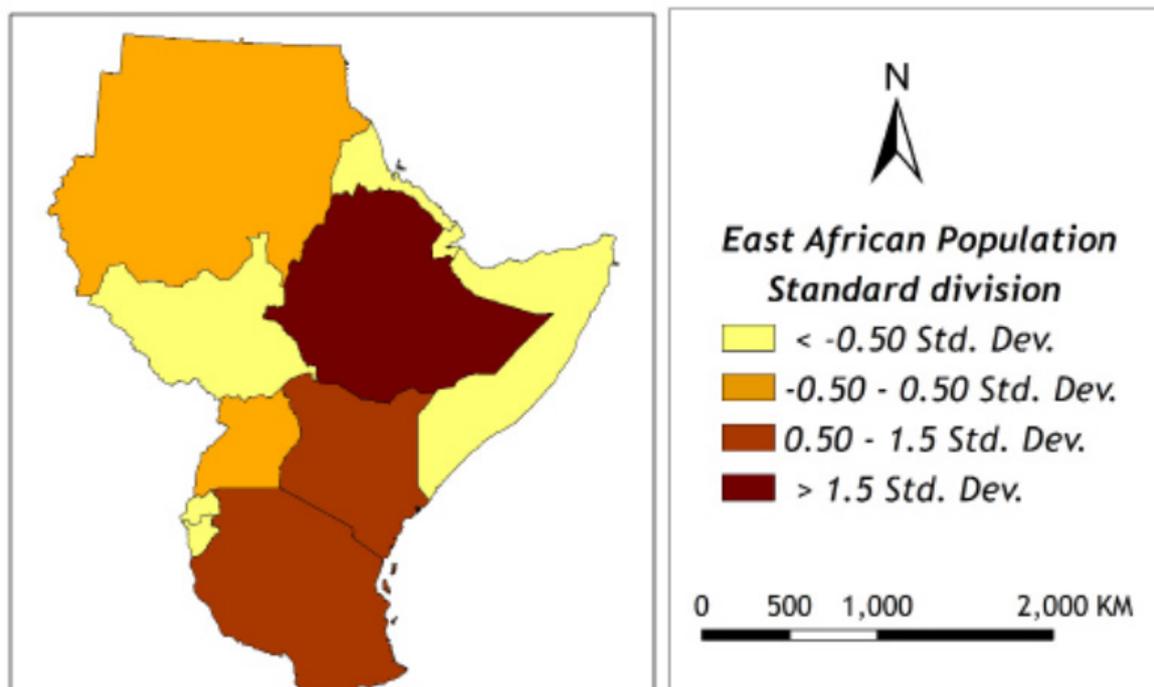


Figure 8.8. Standard deviation method representation of Eastern African countries population, 2017

Using GIS software, you can also set your own breaking points to meet map requirements. For example, it would make sense to group data into classes manually when you need to visualize income data by population size and countries.

Data should be normalized as needed before mapping. Data normalization is intended to facilitate comparison of data values that are often measured in different units. For example, if you are studying how prevalent obesity is in a community, it would be more useful to look at obesity rates than the number of obese persons because variations in base populations across communities make it hard to compare obesity prevalence equally. Examples of normalized data include mortality rate, rate of population change, and median household income.



Activity 8.3

1. Describe the major properties of GIS data are, how we represent them on a map, and what key conditions must be addressed in representation. Please take the population of a district or 'woreda' in a region where you reside, and attempt to classify it by using natural break/Jenk's method, equal interval, quantiles and standard deviation methods.

8.2.2. GIS Data Analysis



Can you state some of the problems in your locality that could be addressed by applying GIS techniques?

Dear student, you discussed some of the basic sources and methods of data collection and generalization in the previous section. As shown in Figure 8.12, the GIS work process includes six key phases or steps. However, this part mainly focuses on the fundamentals of data processing and analysis.

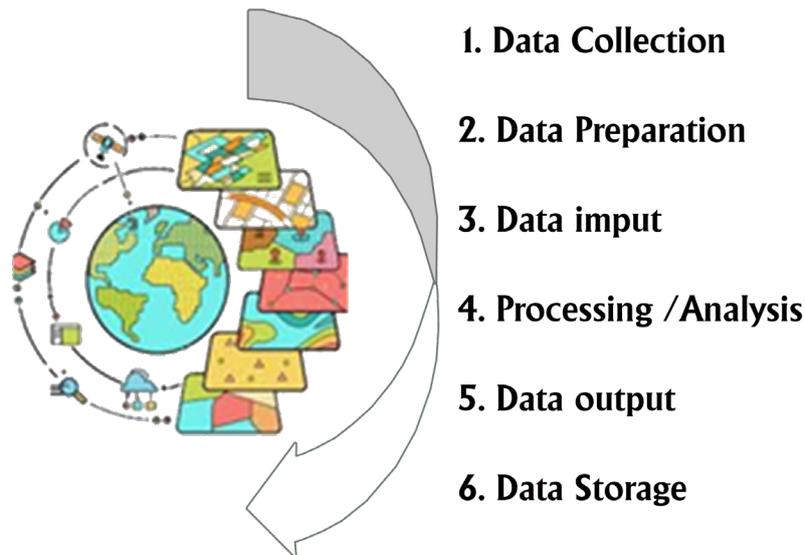


Figure 8.9. The major steps the GIS project follows

A GIS enhances the data analysis process by providing tools. This can help to create meaningful sequence and show new relationships within or between data sets. Thus, it increases understanding of real world. This is done by integrating data from many sources and analyzing multi-parameter data to offer answers and solutions to a given problem. Spatial analysis is the vital part of GIS. Its operation can be grouped into two, the first deals with no new data generation that includes Attribute Query and Spatial Query or generally called querying. The second one is concerned with generating a new data including proximity or buffering, overlay and network analysis.

a. Querying

Attribute Query: It's a process of selecting information by asking logical questions. Example: From a database of a city parcel map where every parcel is listed with a land use code, a simple attribute query may require the identification of all parcels for a specific land use type. Such a query can be handled through the table without referencing the parcel map. Because no spatial information is required to answer this question, the query is considered an attribute query.

In this example, the entries in the attribute table that have land use codes identical to the specified type are identified.

Spatial Query: Involves selecting features based on the location or spatial relationships, which requires processing of spatial information. For instance, a question may be raised about parcels within one mile of the freeway and each parcel. In this case, the answer can be obtained either from a hardcopy map or by using a GIS with the required geographic information.

b. Analysis to generate new data

Student, let us take this spatial analysis concept a step further.

- ◆ Have you ever tried to figure out how to go from your house to your school in the least amount of time?
- ◆ Have you ever had trouble getting to the nearest health facility from your home?
- ◆ Assume your family has an ice cream parlor, a fruit market, a bakery, and so on.

Has your family had difficulties in obtaining a new branch business center?

GIS has a method to tackle these problems.

Proximity analysis

Proximity analysis is an important function in GIS as it covers a wide range of topics that help in answering many spatial issues. One of the most basic questions asked of a GIS is “what is near to what?” Proximity tools can be divided into two categories depending on the type of input the tool accepts, namely, features or raster. Therefore, there are two forms of proximity analysis: feature/ vector based proximity analysis and raster based proximity analysis.

Feature (vector) based proximity analysis: For feature data, the tools found in the Proximity toolset can be used to discover proximity relationships. Buffers are usually used to delineate protected zones around features or to show areas of influence. For example, you might buffer a school by one Kilometer and use the buffer to select all the students that live more than one Kilometer from the school to plan for their transportation to and from the school. You could use the multi-ring buffer tool to classify the areas around a feature into near, moderate distance, and long distance classes for an analysis. Buffers are sometimes used to extract data to a given study area or to exclude features within a critical distance of something from further consideration in an analysis. You might use Near tool to find the closest stream for a set of wildlife observations or the closest bus stops to a set of tourist destinations. The tool will also add the Feature Identifier and, optionally, coordinates and the angle toward the nearest feature.

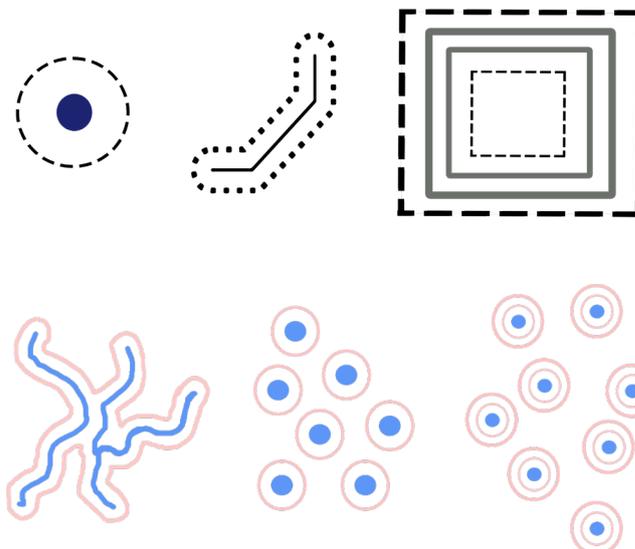


Figure 8.10. Buffered lines, points and multiple ring buffers

Raster-based distance tools: The ArcGIS Spatial Analyst Extension Distance toolset contains tools that create raster showing the distance of each cell from a set of features or that allocate each cell to the closest feature. Distance tools can also calculate the shortest path across a surface or the corridor between two locations that minimizes two sets of costs. Distance surfaces are often used as inputs for overlay analyses. For example, in a model of habitat suitability, distance from streams could be an important factor for water-loving animals. You might use Euclidean Distance as part of a forest fire model, where the probability of a given cell igniting is a function of distance from a currently burning cell.

Euclidean distance is straight-line distance for a given set of input features; the minimum distance to a feature is calculated for every cell. The figure shown below is an example of the output of the Euclidean Distance tool, where each cell of the output raster has the distance to the nearest feature.

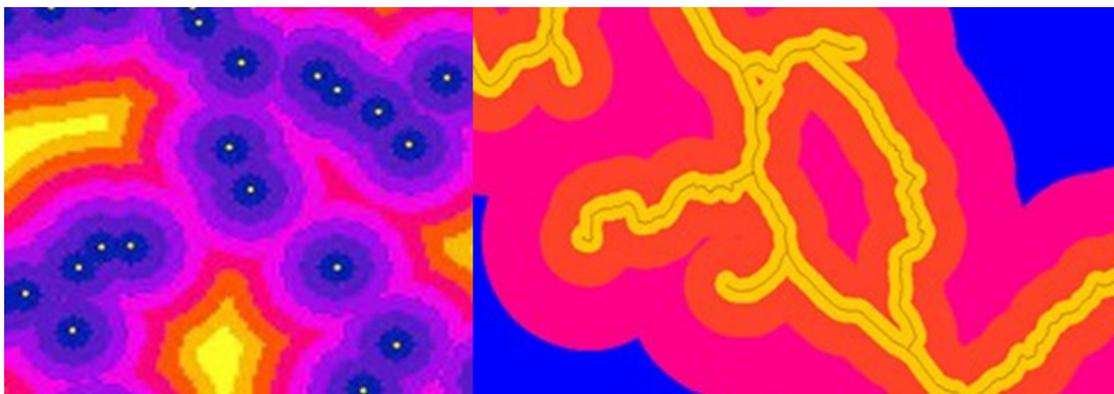


Figure 8.11. Euclidian distance raster representation

Overlay analysis

Overlay analysis is an age-old technique of deriving new information from two or more layers of data covering the same area. It is arguably the most powerful function of a GIS. Any mapped area of the earth's surface can be subdivided (classified) into any number of different thematic "layers". Thus, a typical map will conventionally show rail lines, the road network, forested areas, urban areas, the river network, the coastline, etc., and each of these themes can be mapped separately. Based on the input data used in the process, there are two kinds of overlay analysis. These are raster and vector overlay.

Vector Overlays: The first type of overlay operations we are going to discuss in this subsection is vector overlay. A vector overlay involves combining point, line, or polygon geometry and their associated attributes. All overlay operations create new geometry and a new output geospatial data set. You should be cautioned that with certain overlay operations, very large attribute tables may result if the overlay operations combine many layers, and each layer has a very large attribute table. Additionally, it might be possible that the combined attribute tables would cause duplicate attribute fields to exist. In these cases, you should consider reducing the number of transferred attributes to the minimum required, and renaming duplicate fields so that there is no ambiguity. The vector overlay has also three functions. These are clip, intersections, union.

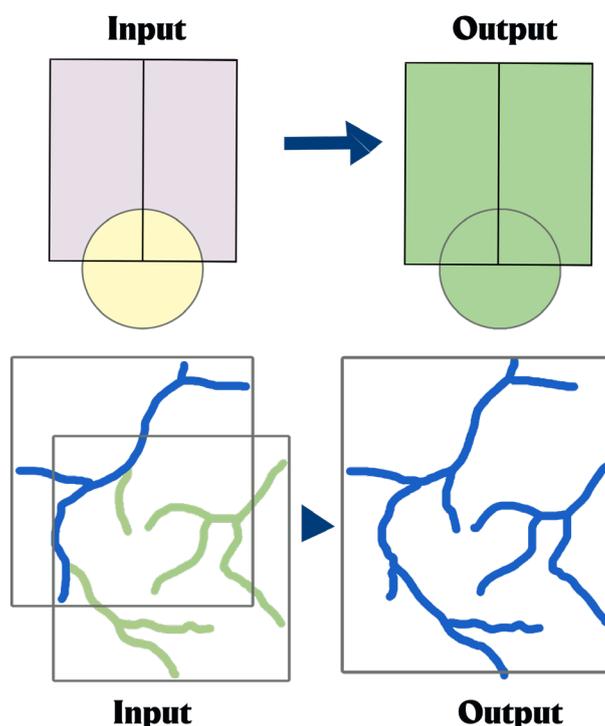


Figure 8.12. Union vector overlay function and output

Raster overlay: in this part we will discuss the raster overlay. Just like with vectors, we can perform overlay analysis with raster sets using a different series of tools. As vector tools only work with vector layers, raster tools only work with raster layers, and with the exception of a vector layer designating an extent in some raster tools, there are no tools which combine vector and raster data sets for geoprocessing. By "overlaying" one raster over another, we can examine the cell values from one raster to another and find relationships.

A faster way of performing an overlay is to use raster data. If both raster layers are of the same resolution and their pixels are aligned, then an overlay operation is merely matching corresponding pixels from both layers and combining their attributes to form a new pixel in the composite layer.

This involves no geometrical calculations and no creation of new polygons. Unless the layers are extremely large, overlay analysis involving raster layers can be done interactively. To process the raster overlay analysis, we may utilize a variety of functions. In general, we utilize spatial analysis, overlay tools for one thing, and map algebra for the other.

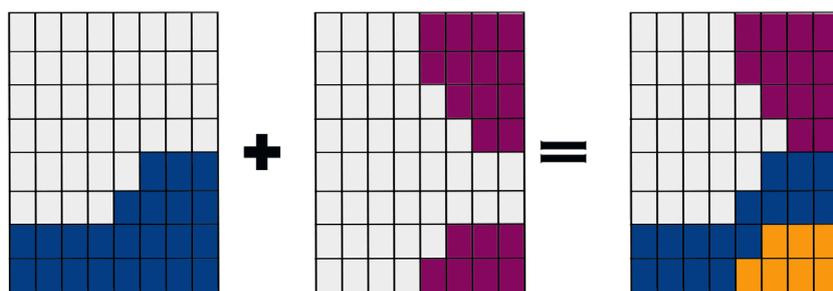


Figure 8.13. Simple map algebra function for raster overlay analysis

Network analysis

[In the context of GIS, a network is defined as a set of interconnected linear features through which resources can flow. Common examples of networks include highways, railways, city streets, canals, rivers, transportation routes etc. through which different vehicles and water can flow. There are many spatial problems that require the use of network analysis for their solution. These include:

- ◆ to find the shortest path (in terms of physical distance or least cost) that can be followed to visit a series of features in a network, known as pathfinding;
- ◆ to assign one or more portions of a network to be served by a facility or business location, called allocation;
- ◆ to find all portions of the network that are connected with the movement of a particular feature (e.g., city transport), known as tracing;
- ◆ to depict the accessibility of a location and the interactions that occurs between different locations (based on a technique known as gravity modeling). This is widely used in economics, geography, engineering, and urban planning, known as spatial interaction;
- ◆ to generate a distance matrix between different pairs of locations in the network, known as distance matrix calculation; and
- ◆ to determine simultaneously the locations of existing and planned facilities, as well as the allocation of demand to these facilities, known as location-allocation modeling.

Resources

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Activity 8.4

1. describe how you might utilize the GIS function to tackle a current problem in your surroundings.
2. Use the Google Maps application on smart phone, tablet, or other device to plan your journey to a cafeteria, market place, shop, or any other place from your house.

GIS is made up of five fundamental components. These are Data, Software, Hardware, People, and Methods.

To represent, symbolize and represent, the GIS data has to pass through the process of abstraction or generalization.

major elements of data generalization in map making are; Classification, Simplification, Exaggeration, Symbolization

Two key factors must be addressed while collecting, representing, and symbolizing GIS data. These are selecting the level of measurement (nominal, ordinal, interval, and ratio) and choosing the dimensionalities of the features (point, line, area, volume).

There are number of GIS data classification methods used in the system that Map readers may likely draw different conclusions from the maps. Some of these methods are natural break, equal interval, quantile, Standard deviation

area of the earth's surface can be subdivided (classified) into any number of different thematic "layers". Thus, a typical map will conventionally show different subject and each of these themes can be mapped separately, the integration of these different layered data produces a new output layer through the process of overlay analysis.

There are two types of overlay analysis these are vector based overlay and raster based overlay.

Network analysis, in the GIS system, defined as a set of interconnected linear features through which resources can flow.



Self-test Exercise 8.2

For each of the following questions, choose the best answer among the given alternatives

1. One column in a data table is the gender of the employee (e.g. Male, and Female,). What level of measurement is used here?
 - A. Interval
 - B. Ratio
 - C. Ordinal
 - D. Nominal
2. A teacher notes down the weight of each student in the class. What level of measurement is being used in this case?
 - A. Nominal
 - B. Ordinal
 - C. Interval
 - D. Ratio
3. Which of the following is the digital data creation methods used for GIS data creation?
 - A. Digitization
 - B. Ortho rectified imagery
 - C. Demodulation
 - D. Both a and b
4. Generalization is the process by which: (check those that apply)
 - A. the cartographer communicates the spatial pattern and organization of real-world objects on a map.
 - B. real-world features are simplified to allow them to be drawn on a map at reduced scale.
 - C. misleading or erroneous information is added to a map.
 - D. real-world features are selected or not selected for inclusion on a map.
5. Which of the following is not an element of GIS data generalization?
 - A. Digitization
 - B. Classification
 - C. Simplification
 - D. Symbolization
6. Which of the following statements is true about the capabilities of GIS
 - A. Data capture and preparation
 - B. Data management, including storage and maintenance
 - C. Data manipulation and analysis
 - D. All of the above
7. A buffer zone around a point feature will be _____.
 - A. a line
 - B. a circle
 - C. a polygon
 - D. a point

8. Which of the following could you use a buffer operation for?
- A. Calculating the area of overlap between two polygon data layers.
 - B. Determining the area within a set distance from a point, line or area feature.
 - C. Calculating the number of observations within a set distance of a point, line or area feature.
 - D. Calculating the distance from one point to another.
9. What is point-in-polygon overlay?
- A. An overlay method used to reclassify polygon data.
 - B. An overlay method used to determine which points lie within the boundary of a polygon.
 - C. A method interpolating point data.
 - D. An overlay method used to determine the distance between a point and its nearest neighboring polygon.
10. Which of the following GIS data analysis techniques is used to route vehicles on busy city streets?
- A. Spatial query
 - B. Proximity analysis
 - C. Overlay analysis
 - D. Network analysis



Checklist

Dear learner! Now it is time to check your understanding of the meaning, scope, and branches of geography. Read each of the following questions and answer them by putting a tick (✓) mark in one of the boxes under alternatives 'Yes' or 'No'.

No	Items	Yes	No
1	Do you able to list the five fundamental components of GIS?		
2	Can you describe the importance of abstraction or generalization to represent and symbolize GIS data?		
3	Do you able to identify the major elements of data generalization in map making?		
4	Can you explain the two key factors that must be addressed while collecting, representing, and symbolizing GIS data?		
5	Can you identify and apply the use of the different methods of GIS data classification used in the system that may likely give us different interpretation about the map data?		
6	Can you describe the two groups of spatial data analysis?		
7	Are you able to define attribute Query?		
8	Can you define spatial Query?		
9	Can you give examples of situations where a GIS proximity analysis could be required?		
10	Can you define a GIS overlay analysis?		
11	Can you list the two categories of overlay analysis?		
12	Are you be able to explain What is GIS-based network analysis mean?		

Unit Summary

Research is a scientific method of investigating answers for the problems identified. Development in any country depends, among other things, upon its research capability. There are two basic approaches often used in geographical research works. They are quantitative and qualitative approaches. Current researchers developed a new approach what they call it mixed approach that incorporate both the quantitative and qualitative approaches. Their difference lies mainly in the attributes considered to be measured and the techniques chosen to be used.

Geographical research works are different from the research work of other disciplines/sciences. They are very much concerned with spatial distributions and organizations of things and phenomena in time bound. They also consider the forces that results in determine the distributions.

In the study and analysis of spatial aspects, geographical research procedures and techniques share with other sciences. For example, identifying the research problem, defining the objective and significance of the research, reviewing literature related to the study, formulating a working hypothesis, etc.

Several GIS data sources are available, including various geoportals that provide information sets utilized in GIS and spatial databases for geospatial analysis and mapping. To make map interpretation and visualization easier, the data must be simplified, classified and symbolized in various ways as necessary.

It is difficult to perform geographical quality research today without the use of geospatial technologies. But the use of the most modern GIS techniques is only meaningful when a specific geographical problem is posed with its basic attributes such as location, distribution, regionalization, systemic interaction between physical environment and human action, and its impact on the landscape and land uses, ecological footprint, sustainability, etc. In most cases, the advanced geospatial analysis and representation techniques correspond to complex models of geographic information processing, because they investigate complex models of spatial organization.

Unit review Exercise

Multiple Choices: Choose the best answer from the given alternatives for the following statements and questions.

1. A research paper is a brief report of research work based on
 - A. Primary Data only
 - B. Secondary Data only
 - C. Both Primary and Secondary Data
 - D. None
2. Which of the following is not the major component of a research paper?
 - A. Problem statement
 - B. Publisher
 - C. Research question
 - D. Discussions
3. Which of the following options are the main tasks of research in modern society?
 - A. To learn new things
 - B. To keep pace with the advancement in knowledge
 - C. To systematically examine and critically analyze the investigations/sources with the objective
 - D. All of the above
4. Which of the following is a measured quantitative variable?
 - A. Weight in kg
 - B. Height in cm
 - C. Domestic violence
 - D. Income in Birr
5. Which of the following refers to an action research?
 - A. A longitudinal research
 - B. An analytic research
 - C. A research initiated to solve an immediate problem
 - D. A research conducted with socioeconomic objectives
6. Which of the following statements is not true about the capabilities of GIS?
 - A. Data capture and preparation
 - B. A system of data vending
 - C. Data manipulation and analysis
 - D. Data presentation
7. By 'spatial data' we mean data that has _____.
 - A. Complex values
 - B. Graphic values
 - C. Positional values
 - D. Decimal values
8. All are referring to features dimensionality EXCEPT: -
 - A. Polygon
 - B. Volume
 - C. Line
 - D. Interval
9. Which of the following is not an element of map data generalization?
 - A. Description
 - B. Classification
 - C. Exaggeration
 - D. Symbolization
10. A process of selecting information by asking logical questions from a given data table is known as _____.
 - A. Attribute Query
 - B. Spatial Query
 - C. Fuzzy analysis
 - D. Statistical analysis
11. GIS Methodology that can solve the problem of effective school bus routing monitoring and management support scheme is _____.
 - A. Proximity analysis
 - B. Network analysis
 - C. Overlay analysis
 - D. Structured query

Answer Key for Self-test Exercises

Section 1

1C 2B 3A 4D 5D

Section 2

1D 2D 3D 4C 5A
6D 7B 8B 9B 10D

Answer Key for Unit Review Exercise

1C 2B 3D 4C 5C
6B 7C 8D 9A 10A
11B

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GLOSSARY

Absolute poverty: A type of poverty that is the same regardless of location and that occurs when the resources required for minimum physical health are lacking, typically defined by limited access to food, clothing, and shelter.

Agricultural Drought: links various characteristics of meteorological drought to agricultural impacts, focusing on precipitation shortages, differences between actual and potential evapotranspiration, soil water deficits, reduced groundwater or reservoir levels, and so on. Plant water demand depends on prevailing weather conditions, biological characteristics of the specific plant, its stage of growth, and the physical and biological properties of the soil.

Biodiversity Loss: Biodiversity loss, also called loss of biodiversity, a decrease in biodiversity within a species, an ecosystem, a given geographic area, or Earth as a whole. Biodiversity, or biological diversity, is a term that refers to the number of genes, species, individual organisms within a given species, and biological communities within a defined geographic area, ranging from the smallest ecosystem to the global biosphere.

Bribery corruption: an attempt to make someone do something for you by giving the person money, presents, or something else that they want.

Bright Greens Environmentalism: emerged as a group of environmentalists who believe that radical changes are needed in the economic and political operation of society in order to make it sustainable, but that better designs, new technologies and more widely distributed social innovations are the means to make those changes and that society can neither stop nor protest its way to sustainability.

Corruption Perceptions Index: refers to an index that scores countries on the perceived levels of government corruption by country. Scores range from zero to 100, with zero indicating high levels of corruption and 100 indicating low levels. The CPI is published annually by Transparency International, an organization that seeks to stop bribery, fraud, and other forms of public sector corruption.

Covid-19: a potentially severe, primarily respiratory illness caused by a coronavirus and characterized by fever, coughing, and shortness of breath. In some people, the disease also damages major organs, as the heart or kidneys.

Dark Greens Environmentalism: believe that environmental problems are an inherent part of industrialized, capitalist civilization, and seek radical political change. Dark greens believe that currently and historically dominant modes of societal organization inevitably lead to consumerism, overconsumption, waste, alienation from nature and resource depletion.

Desertification: the process by which fertile land becomes desert, typically as a result of drought, deforestation, or inappropriate agriculture.

Drought-Prone Region: is defined as one in which the probability of a drought year is greater than 20%. A chronic drought prone area is one in which the probability of a drought year is greater than 40%.

Dry land landscape: are arid, semi-arid, and dry, sub-humid areas³ that receive less precipitation than the evaporative demand, and plant production is thus water limited for at least a substantial part of the year. Water scarcity has shaped dryland ecosystems, their biodiversity, and human cultures.

Ebola: Also called Ebola fever, Ebola hemorrhagic fever, Ebola virus disease, a usually fatal disease, a type of hemorrhagic fever, caused by the Ebola virus and marked by high fever, severe gastrointestinal distress, and bleeding.

Empowerment: the process of gaining freedom and power to do what you want or to control what happens to you, example female/youth empowerment.

Environmental activism: refers to the coming together of various groups of individuals and organizations that work in collaboration in social, scientific, political, and conservational fields with the main purpose of addressing environmental concerns.

Environmental footprints: the effect that a person, company, activity, etc. has on the environment, for example the amount of natural resources that they use and the amount of harmful gases that they produce.

Folk medicinal knowledge: consists of the healing practices and ideas of body physiology and health preservation known to some in a culture, transmitted informally as general knowledge, and practiced or applied by anyone in the culture having prior experience.

Food security: is the measure of the availability of food and individuals' ability to access it. According to the United Nations' Committee on World Food Security, food security is defined as meaning that all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life.

Formal education: usually takes place in the premises of the school, where a person may learn basic, academic, or trade skills. Small children often attend a nursery or kindergarten but often formal education begins in elementary school and continues with secondary school.

Free market environmentalism: is an approach to environmental problems that focuses on improving environmental quality using property rights and markets.

Gini Coefficient: The Gini index, or Gini coefficient, is a measure of the distribution of income across a population developed by the Italian statistician Corrado Gini in 1912. It is often used as a gauge of economic inequality, measuring income distribution or, less commonly, wealth distribution among a population. The coefficient ranges from 0 (or 0%) in urbanized or the process of becoming urbanized

Dryness Ratio: is defined as the ratio of the mass of actual dry steam to the mass of steam containing it 246 to 1 (or 100%), with 0 representing perfect equality and 1 representing perfect inequality. Values over 1 are theoretically possible due to negative income or wealth.

Global north: Global North refers to those technically and socially well-developed countries, basically located in North America and Europe

Global south: a term often used to identify lower-income countries on one side of the so-called global North–South divide it refers consists of the poorest and least industrialized countries, which are mainly in the southern part of the world.

Grand corruption: is the abuse of high-level power that benefits the few at the expense of the many, and causes serious and widespread harm to individuals and society. It often goes unpunished.

Green buildings: is a building that, in its design, construction or operation, reduces or eliminates negative impacts, and can create positive impacts, on our climate and natural environment.

HIV/ AIDS: human immunodeficiency virus, retroviruses that infect and destroy helper T cells of the immune system causing the marked reduction in their numbers that is diagnostic of AIDS. AIDS acquired immune deficiency syndrome a diseases caused by HIV

Human induced: are caused entirely or predominantly by human activities and choices.

Hydrological drought: refers to a persistently low discharge and/or volume of water in streams and reservoirs, lasting months or years. Hydrological drought is a natural phenomenon, but it may be exacerbated by human activities. Hydrological droughts are usually related to meteorological droughts, and their recurrence interval varies accordingly.

Income security: is about the level of income (absolute and relative to needs), assurance of receipt, expectation of income adequacy now and improvement or deterioration in the future, both during a person's working life and in old age or disability retirement. Income security is about actual, perceived and expected income.

Indigenous knowledge: refers to the understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings. For rural and indigenous peoples, local knowledge informs decision-making about fundamental aspects of day-to-day life.

Informal education: may be a parent teaching a child how to prepare a meal or ride a bicycle. People can also get an informal education by reading many books from a library or educational websites.

Interdisciplinary: involves the combination of two or more academic disciplines into one activity (e.g., a research project)

Land degradation: is a process in which the value of the biophysical environment is affected by a combination of human-induced processes acting upon the land. It is viewed as any change or disturbance to the land perceived to be deleterious or undesirable.

Lifelong learning: is a form of self-initiated education that is focused on personal development. While there is no standardized definition of lifelong learning, it has generally been taken to refer to the learning that occurs outside of a formal educational institute, such as a school, university or corporate training.

Light greens environmentalism: see protecting the environment first and foremost as a personal responsibility. They fall in on the transformational activist end of the spectrum, but light greens do not emphasize environmentalism as a distinct political ideology, or even seek fundamental political reform. Instead they often focus on environmentalism as a lifestyle choice.

Lorenz curve: Lorenz curve is a graphical representation of the distribution of income or wealth within a population. Lorenz curves graph percentiles of the population against cumulative income or wealth of people at or below that percentile. Lorenz curves, along with their derivative statistics, are widely used to measure inequality across a population. Because Lorenz curves are mathematical estimates based on fitting a continuous curve to incomplete and discontinuous data, they may be imperfect measures of true inequality.

Malaria: Pathology. any of a group of diseases, usually intermittent or remittent, characterized by attacks of chills, fever, and sweating: formerly supposed to be due to swamp exhalations but now known to be caused by a parasitic protozoan, which is transferred to the human bloodstream by a mosquito of the genus *Anopheles* and which occupies and destroys red blood cells.

Mass media: the means of communication that reach large numbers of people in a short time, such as television, newspapers, magazines, and radio.

Meteorological drought: is defined on the basis of the degree of dryness, in comparison to a normal or average amount, and the duration of the dry period. Definitions of meteorological drought must be region-specific, since the atmospheric conditions that result in deficiencies of precipitation are highly region-specific.

Multinational corporation: has facilities and other assets in at least one country other than its home country. A multinational company generally has offices and/or factories in different countries and a centralized head office where they coordinate global management. Some of these companies, also known as international, stateless, or transnational corporate organizations, may have budgets that exceed those of some small countries.

Ozone depletion: The ongoing reduction of ozone in the stratosphere. Ozone (O₃) is present in 1 ppm in the upper stratosphere, and it absorbs virtually all of the UV radiation from the sun. Patronage corruption: type of corruption or favoritism in which a party in power rewards groups, families, or ethnicities for their electoral support using illegal gifts or fraudulently awarded appointments or government contracts

Petty corruption: is the lowest form of corruption, typically involving low-level public servants, or managers who abuse the limited authority of their positions for personal gain. 248 Petty corruption frequently involves the abuse of entrusted power in exchange favors or small sums of money.

Pollution: the action or process of making land, water, air, etc., contaminate, dirty and not safe or suitable to use industrial practices that have caused pollution of the air and water.

Relative poverty: is when households receive 50% less than average household incomes, they do have some money but still not enough money to afford anything above the basics. This type of poverty is, on the other hand, changeable depending on the economic growth of the country.

Solar chimney: A natural draft drive device that uses solar radiation to provide upward momentum to a mass of air, thereby converting the thermal energy to kinetic energy, which can be extracted from the air with suitable wind machines.

Tacit knowledge: Knowledge gained from personal experience. The knowledge possessed by your team members is one of your organization's most valuable assets.

Trade balance: the difference in value over a period of time between a country's imports and exports.

Urbanization: the quality or state of being urbanized or the process of becoming urbanized

Sample Assignment Two

Dear learner; I hope you enjoyed reading the module and doing the self-test questions. Now you are at the stage of completion of Module One. But, before moving to the next module you are required to do 'Assignment One'. The assignment will carry 10% of your results. Hence, please try to do it carefully and properly. Note that the assignment has to be completed and submitted to the course tutor within 30 days.

Give short answer for the following questions.

1. Write the main causes of poverty.
2. Explain the trend of global economic imbalance.
3. Discuss the distribution of corruption throughout the world.
4. Describe the major environmental sustainability solutions.
5. What are the main type environmental movement? explain them.
6. What made the definition of desertification controversial after 1970s?
7. Compare and contrast the types of drought.
8. Describe the main element of the research paper.
9. What are the major functions of GIS?
10. Mention the main processes that can be applied on vector data.



GEOGRAPHY

DISTANCE LEARNING MATERIAL
GRADE 12

MODULE TWO



FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
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