

ENVIRONMENTAL SCIENCE

SUBJECTIVE PART - PART II

Question no. 2

Part a

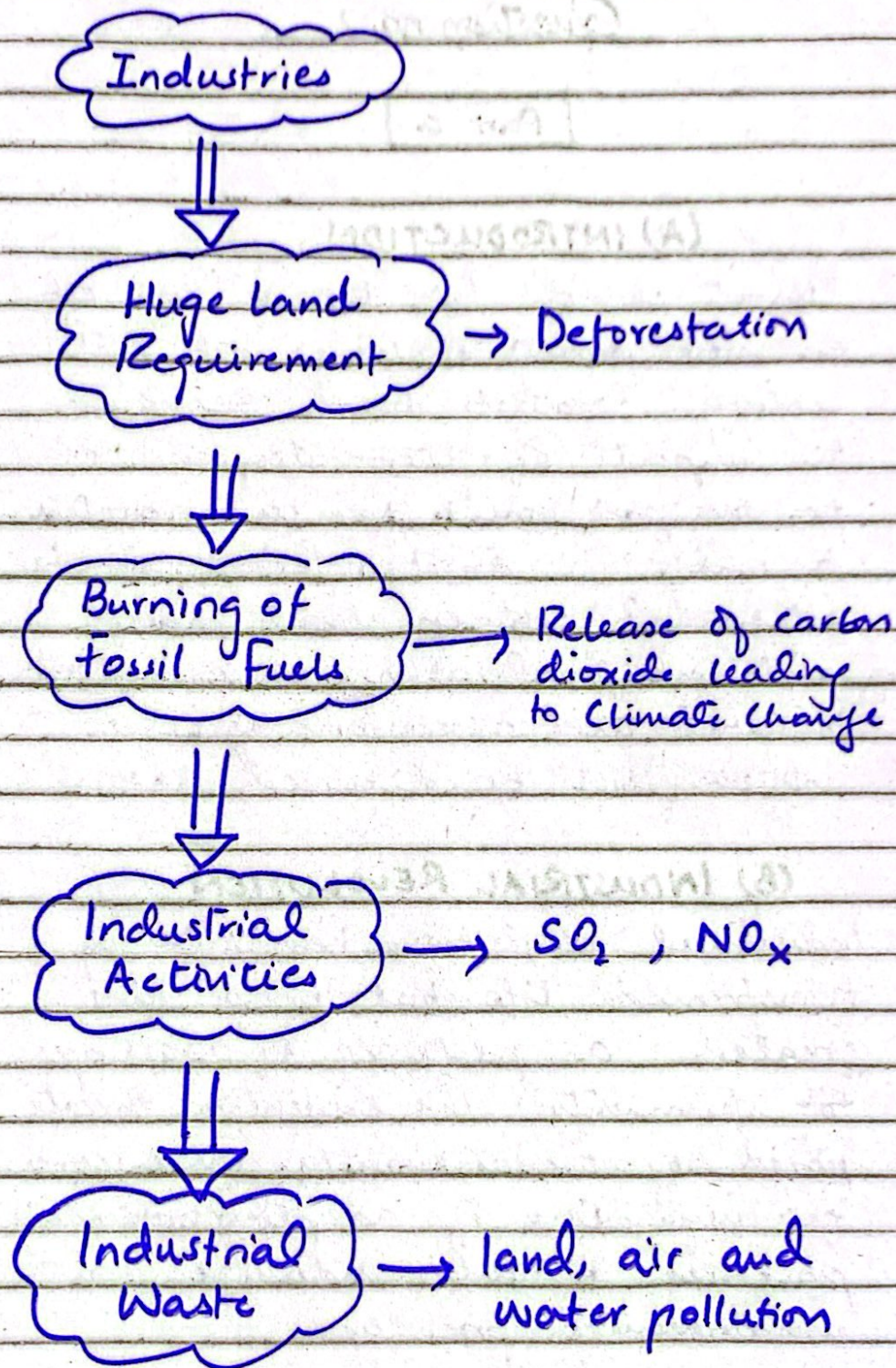
(A) INTRODUCTION

Climate change has become one of the most pressing challenges of 21st century. Scientists have observed the impacts of deteriorating environment for the past one to two centuries. Due to which, a direct relation can be established between climate change and industrialization era. It has also resulted into a cascade of issue which will be discussed below.

(B) INDUSTRIAL REVOLUTION

Industrial revolution has certainly transformed life but it has also created a plethora of challenges for humanity. The existential threats posed by the industries underscore the imperative of adopting sustainable practices to make industries environmental-friendly.

(C) ENVIRONMENTAL CONSEQUENCES OF Industrial Revolution



(1) Huge Land Requirement

Industries require huge portions of land, due to which, forests are cut down. Forests are known as carbon sinks. Therefore, deforestation leads to climate change.

(2) Burning of fossil fuels

Major energy source of industries comes from burning of fossil fuels which releases massive amounts of carbon dioxide, further contributing toward climate change.

(3) Industrial Activities

Industrial activities produce harmful chemicals such as sulphur dioxide (SO_2) and nitrogen oxides (NO_x), resulting into acid rain and contributing towards soil degradation.

(4) Industrial Waste

Industrial waste consists of toxic chemicals resulting into land, air and water pollution. The environmental pollution further contribute towards global warming and climate change.

(D) Effects of climate change

Climatic change

Frequent and
Intense Natural
Disasters

Rising sea levels
threatening island
and coastal regions

Disease Outbreaks

Food scarcity

Deportation

Eutrophication

Infrastructure
Damage

Economic Loss

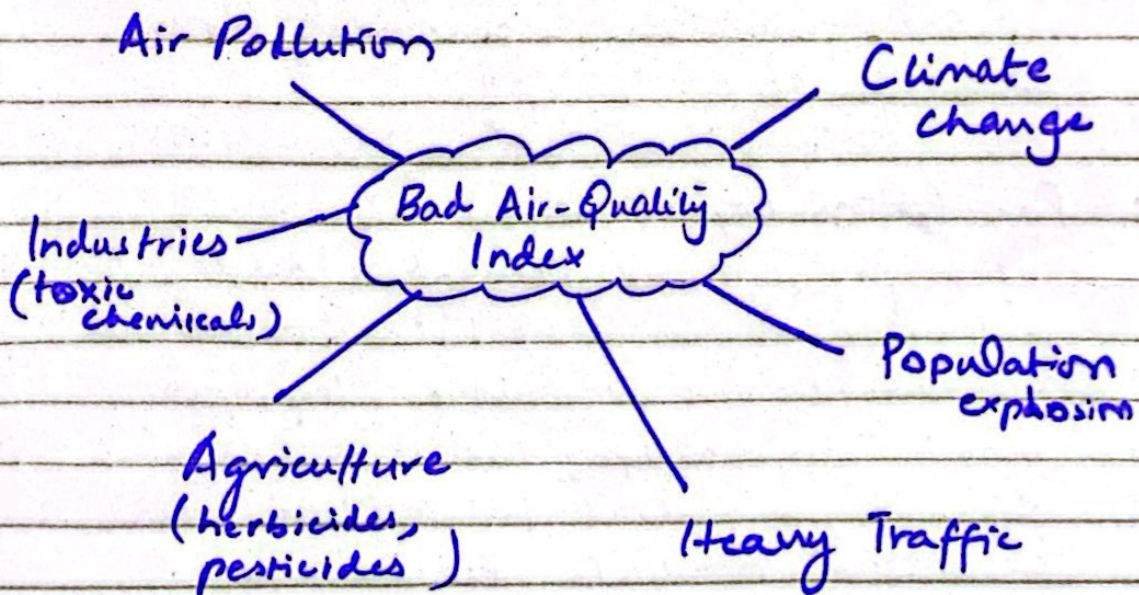
Biodiversity loss

(E) CONCLUSION

There is no doubt that industrial revolution has paved the way towards socio-economic progress. But at the same time, it has caused grave challenges for humanity which cannot be overlooked. The threats posed by industrializations underscore the importance of adopting sustainable practices to make industries environmentally friendly, as they are crucial for human growth and development.

Part 6

(A) Underlying factors of Bad Air-Quality Index



(1) Climate Change

Unsustainable practices of humanity has led to climate change causing plethora of challenges for generations to come.

(2) Air Pollution

Rapid increase in air pollution has resulted into bad air quality index in major cities of Pakistan.

(3) Industries

Toxic chemical and untreated waste from industries is further deteriorating air quality in Pakistan.

(4) Agriculture

Excessive use of fertilizers, herbicides and pesticide is also playing a major role in aggravating the air quality.

(5) Population Explosion

The rapidly growing population and urbanization is contributing to ~~increase~~ increasing domestic waste. Improper waste disposal practices such as open-dumping prevalent in Pakistan, release harmful chemicals resulting into air pollution.

(6) Heavy Traffic

Due to low quality public transport system, people in Pakistan prefer personal vehicles, leading to heavy traffic. Fuel vehicles release carbon resulting into air pollution.

(B) WAYOUT

(1) Renewable Energy

Pakistan should shift toward renewable energy resources such as solar, wind, biomass and hydropower instead of relying on fossil fuels.

(2) Sustainable Industrial Practices

Sustainable practices such as Direct Air Capture (DAC) and Carbon Mineralization should be adopted in industries to reduce pollution.

(3) Sustainable Practices in Agriculture

Sustainable practices such as verticle farming and precision farming should be adopted to ensure optimal use of land and resources.

(4) Electric Vehicles

Electric vehicles should be promoted to reduce pollution and to ensure clean environment.

(5) Public Transport

Public transport should be improved so that people reduce the use of personal vehicles.

(6) Green Infrastructure

Green Infrastructure should be adopted in cities to make them more environmental-friendly.

(7) Reforestation and Afforestation

Plantation campaigns should be carried out. Reforestation and afforestation should be ensured to reduce air pollution.

Question no. 4

Part a

RECENT POLICING RELATED TO CLIMATE CHANGE

(1) Plantation Drives

As forests are known as carbon sinks and act as a great way to combat climate change, multiple plantation drives have been planned throughout the country.

(2) Promotion of Electric Vehicles

The government has stressed great importance on shifting towards electric vehicles. For this purpose, multiple steps have been taken to promote electric vehicles in the country.

(3) Smog Towers

The government of Pakistan plans on installing smog towers in major cities to control smog and air pollution. One has already been installed in Lahore.

(4) Improving Public Transport

The government is working on improving public transport so that people would reduce use of personal vehicles.

(5) Waste Disposal Management

The government of Pakistan is taking special measures to ensure proper disposal of waste to control pollution in the country.

(6) Promotion of Renewable Energy

The government has imposed subsidies on renewable energy sources to encourage their sales.

(7) Agriculture sector

More efficient fertilizers have been introduced in the market. The government is taking steps to encourage and help farmers adopt sustainable practices in agricultural sector.

(8) Industrial sector

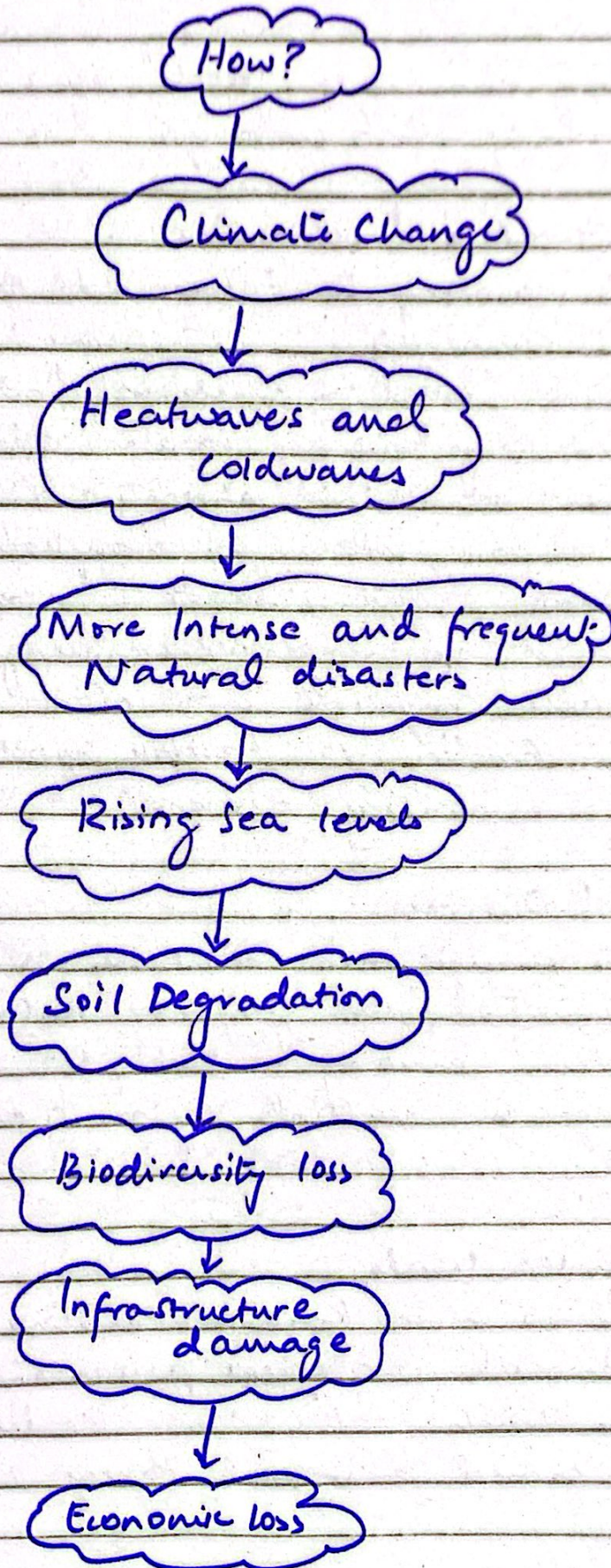
The government is taking steps to encourage sustainable industrial practices. The industries are being advised to adopt pollution control measures.

Part 6

(A) INTRODUCTION

For a long time, humans continued their activities on Earth without considering their consequences. As a result of those activities - burning of fossil fuels, deforestation and urbanization - nature has now become revengeful and is now reacting with an even greater force. It has caused existential threat to humanity in the form of climate change. Climate change has led to a cascade of threats including food insecurity, disease breakout and biodiversity loss.

(B) Nature has become REVENGEFUL



(1) Climate Change

Climate change is one of the most pressing challenges faced by humans in twenty-first century.

(2) Heatwaves and coldwaves

Global warming has increased the global temperature, intensifying heatwaves. Heatwaves lead to increased rate of heatstrokes among masses. It also results into rapid absorption of water from soil, intensifying drought conditions. While climate is normally associated with global warming, it has also resulted into intense cold waves leading to frostbite, hypothermia and respiratory diseases.

(3) Natural Disasters

Climate change has resulted into more intense and frequent natural disasters, causing catastrophic damage in multiple regions of the world.

(4) Rising sea levels

Global warming leads to melting of ice caps and glaciers, increasing the sea levels. The rising sea levels have caused existential threat to

island and coastal countries. For example, Bangladesh with an average elevation of 1.5 meters above sea level experiences frequent flooding. According to IPCC, around 20 million people in Bangladesh would be displaced by mid-century due to floods.

(5) Soil Degradation and Food Insecurity

Rising temperatures and frequent natural disasters lead to soil degradation, resulting into food insecurity. For example, floods in 2022 in Pakistan destroyed crops and livestock, causing massive food shortage in the country.

(6) Bio-diversity loss

According to UNO, around 1 million species are at risk of extinction due to climate change. Climate change destroys ecosystems leading to bio-diversity loss.

(7) Infrastructure damage

Rising temperatures destroy the infrastructure material, increasing the maintenance cost. Natural disasters - intensified by global warming - lead to the destruction of road, bridges and power lines.

8) Economic Loss

The massive destruction caused by climate change negatively impact the economy. For example, according to World Bank, the floods in 2022 caused an economic loss of \$30 billion to Pakistan.

(C) CONCLUSION

Nature has certainly become revengeful and is threatening the very survival of humanity. It is high-time that humans learn a lesson from their past mistakes and adopt environmental-friendly and sustainable practices to ensure clean and safe future.

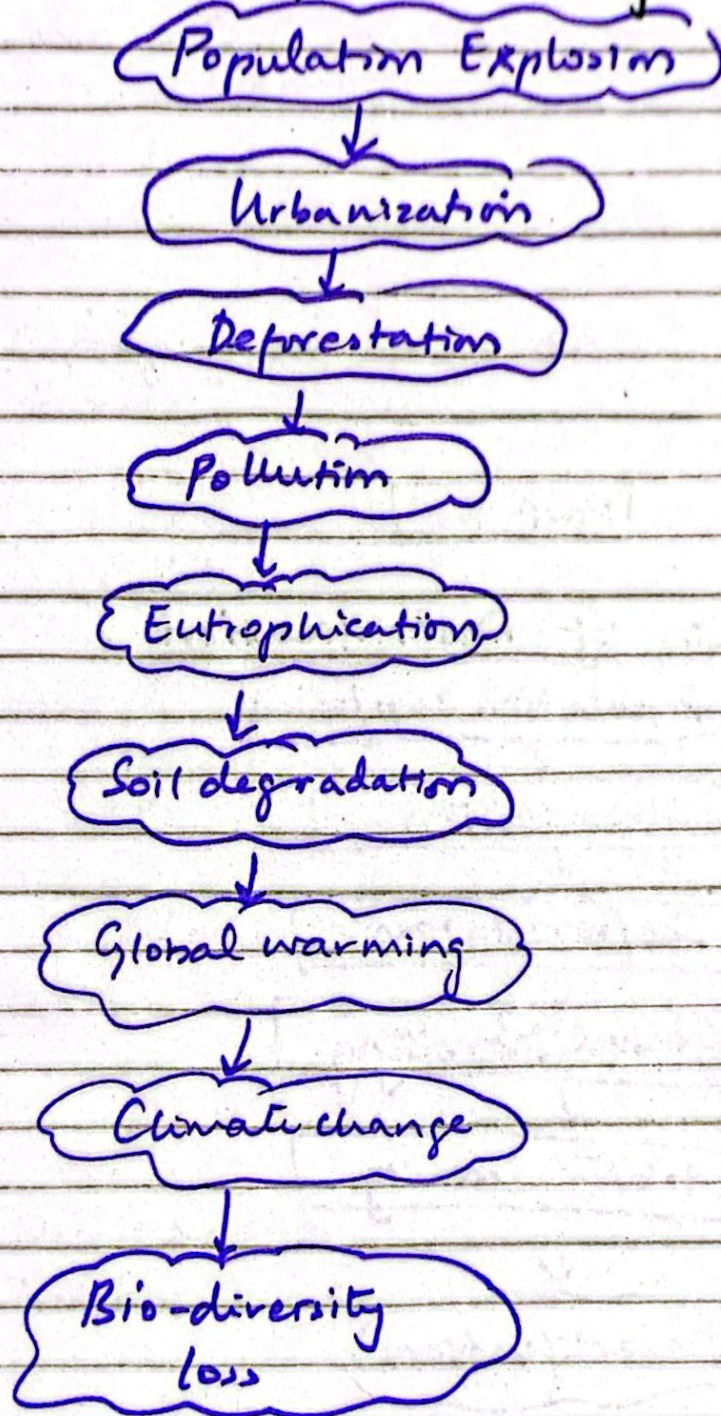
Question no. 6

Part a

(A) Bio-diversity loss

Bio-diversity refers to the variety of species that exist in air, water and land on Earth. Bio-diversity loss refers to the threat of extinction of these species.

(B) Causes of Bio-diversity loss



(C) Convention on Bio-Diversity

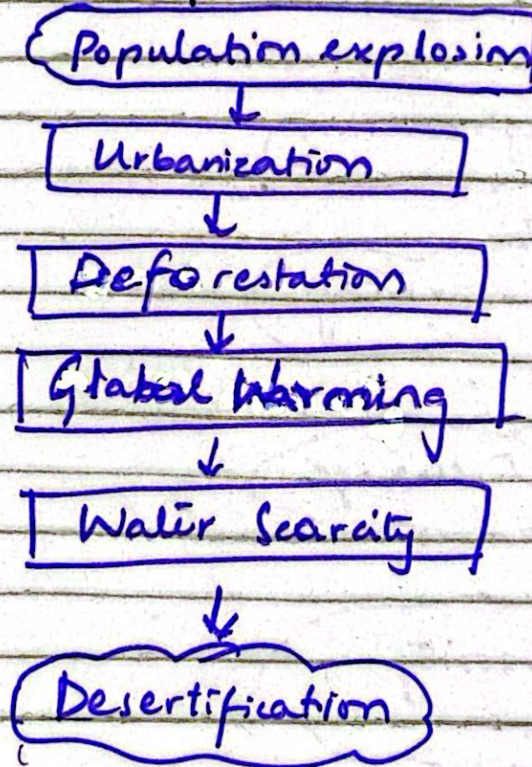
Convention on Bio-diversity was adopted during Earth Summit in 1992.

Objectives

- 1) Conserve eco-system
- 2) Prevent bio-diversity loss
- 3) Mitigate effects of climate change.

Part b

(A) Causes of Desertification



(1) Population Explosion

Population of Africa, like the whole world, has increased rapidly which has caused grave environmental challenges including desertification.

(4) Urbanization

The rapid growth in population has led to urbanization. The concrete structures in urban centres decrease water table.

(3) Deforestation

Forests maintain water table. To cater the growing population and urbanization, massive forests were cut down.

(4) Global warming

As forests are carbon sinks, deforestation led to global warming.

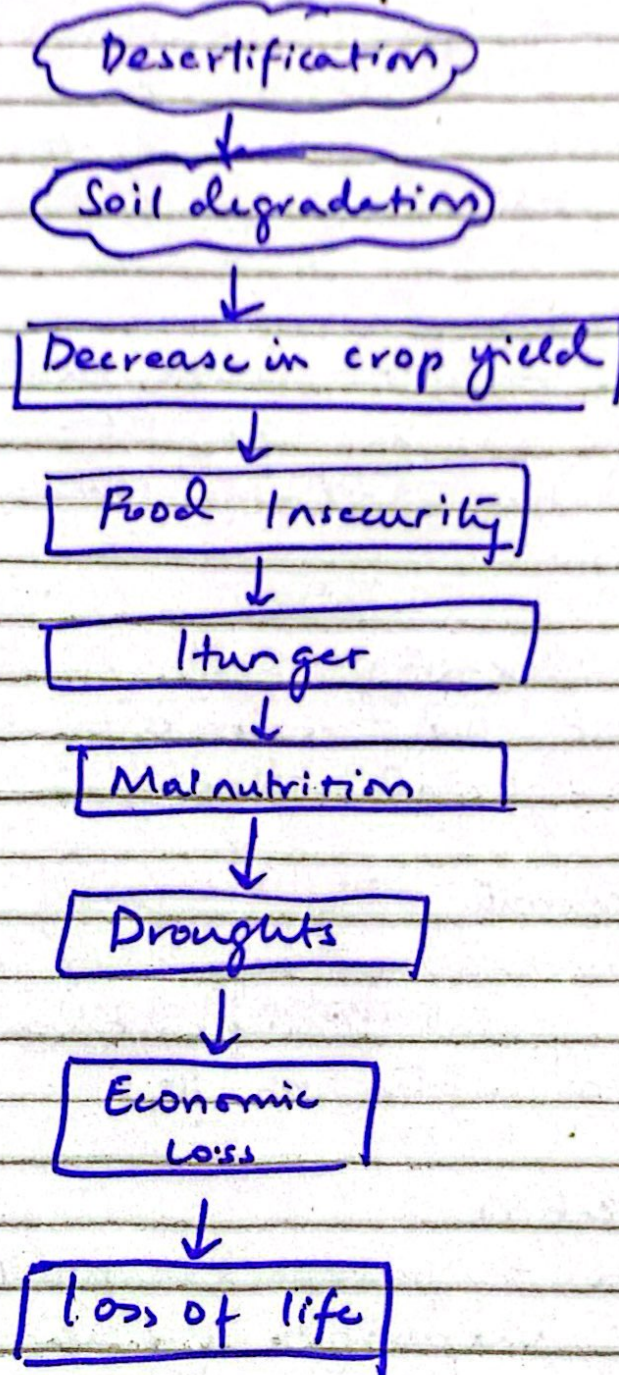
(5) Water scarcity

Global warming refers to increase in the global temperatures which led to water scarcity.

(6) Desertification

Increased temperatures expedite the process of evaporation of water from soil. Increased temperatures and water scarcity led to desertification in Africa.

(B) Effects of Desertification



(C) UN Convention on Desertification

UN convention on desertification was established to take steps to eradicate desertification.

Objectives:

- 1) Eradicate desertification
- 2) Food security
- 3) Plantation drives

Question no. 7

Part a

(A) NEP

National Environmental Protection Act was passed by the government of Pakistan in 2012.

(B) FEATURES OF NEP

Following were the features of NEP:

- 1) Protection of environmental species
- 2) Plantation
- 3) Protecting water bodies
- 4) Ensuring clean environment
- 5) Controlling air, water and land pollution
- 6) Preventing wastage of natural resources

Part b

(A) UNFCCC

United Nations Framework Convention on Climate Change (UNFCCC) was adopted in the Earth Summit 1992.

(B) UNFCCC paving way toward ENVIRONMENTAL PROTECTION

(1) First treaty to recognize Climate Change
UNFCCC was the first treaty that officially recognized climate change as global threat.

(2) Adoption by the world
UNFCCC was signed by majority countries of the world.

(3) Promoted further Climate treaties
UNFCCC laid foundation for further climate treaties. For example, after about two years, Kyoto Protocol was signed.

(4) Shifted world focus
UNFCCC successfully shifted the focus of the world to a grave existential threat: climate change.

(5) Sustainable Practices
UNFCCC gave lead to adoption of sustainable practices across the globe. This resulted into mitigation of effects of climate change.