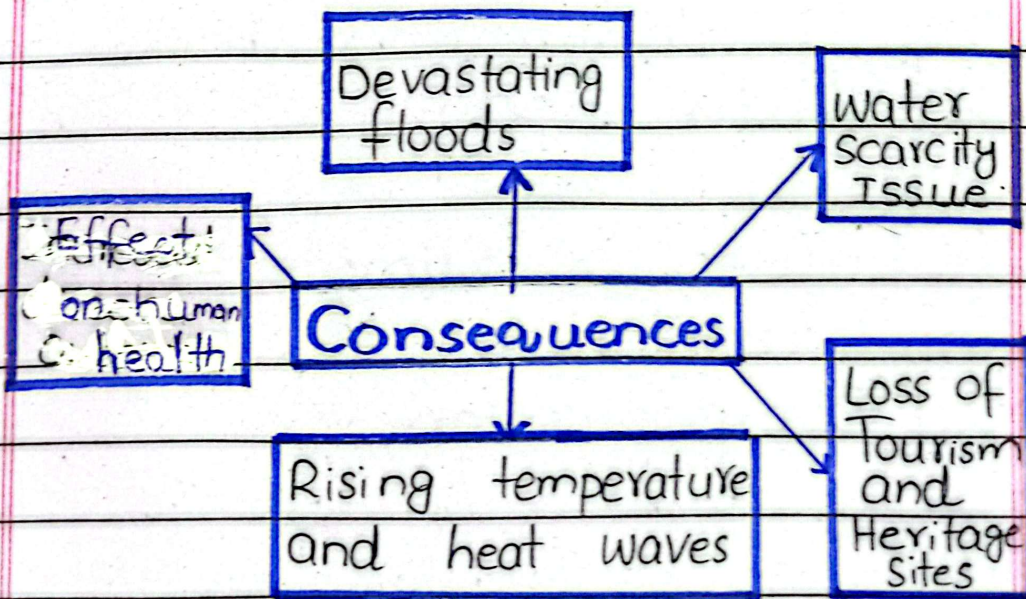
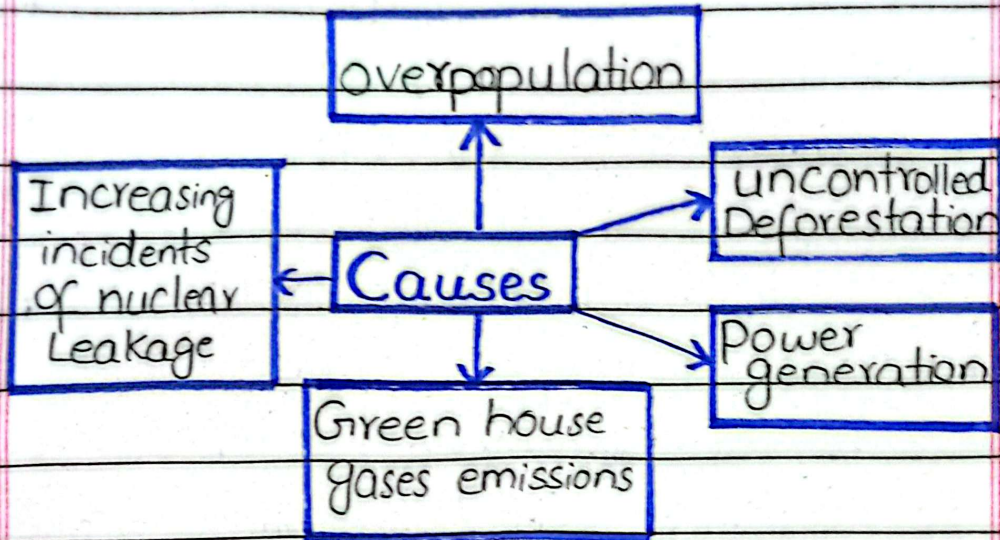


# Climate Change in Pakistan

## Causes and Consequences

### Brainstorm





# Outline

## 1. Introduction

- 1.1. Attention Grabber
- 1.2. Background Information
- 1.3. Thesis Statement

Climate change in Pakistan is driven primarily by overpopulation, greenhouse gases emissions, deforestation, power generation and increasing incidents of nuclear leakage leading to severe consequences such as devastating floods, rising temperature and heatwaves, issue of water scarcity, increased disease outbreak, loss of tourism and heritage sites

## 2 Main Body

### A. Causes of Climate Change in Pakistan

#### 2.1 Overpopulation

2.1.1 Comparison of last two census of Pakistan

2.1.2 Report of Pakistan Bureau of Statistics (PBS)



## 2.2 Increasing incidents of nuclear leakage

2.2.1 Chernobyl disaster of 1986

2.2.2 Fukushima disaster of 2011

2.2.3 Nuclear leakage in Iran

## 2.3 Uncontrolled deforestation

2.3.1 5% area contribute in 0.41% of GDP

2.3.2 46-58 thousand square mile of forest land lost each year

## 2.4 Power generation

2.4.1 Electricity and heat produced by burning of fossil fuels causes a large chunk of global emissions

2.4.2 Overuse of energy

## 2.5 Enhancing quantity of greenhouse gas emissions

2.5.1 Transportation and industrial sectors

## B. Consequences of Climate Change in Pakistan

### 2.1 Devastating floods

2.1.1 Loss of Species

2.1.2 Poverty and displacement



2.1.3 Not enough food

## 2.2 Rising temperature and heatwaves

2.2.1 Human impact

2.2.2 Economic impact

## 2.3 Water Scarcity Issue

2.3.1 Melting glaciers

2.3.2 More Severe Storms

2.3.3 Environmental impact

2.3.4 Economic impact

## 2.4 Effect on human health

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2.4.2 Heatwaves can cause dehydration and electrolyte imbalance

## 2.5 Loss of tourism and heritage site

2.5.1 Rising temperature and extreme weather events are reducing the appeal of tourist destination

2.5.2 Floods and heavy rainfall are damaging cultural heritage sites



# Introduction

On the day of April 7, 2010, an avalanche smashed burying 135 soldiers and civilians under it in the area of Siachen- the world highest battleground. Despite efforts made, many bodies are still missing. This day of misfortune remind the Phenomenon of climate change. It is devastating the world horizons irrespective of ethnicity or race. It is unknown in the last century but is a hot discussion of this century because it is threatening the survival of mankind. Unfortunately, Pakistan is highly vulnerable to climate change in south Asia, despite contributing minimally to global greenhouse gas emissions. It is driven primarily by overpopulation, deforestation, greenhouse gases emission, Power



generation and increasing incidents of nuclear leakage leading to severe consequences such as devastating flood, rising temperature and heatwaves, water scarcity issue, effect on human health, loss of tourism and cultural heritage. However, serious efforts are needed to solve the issue of climate change in Pakistan. Therefore, the main aim of this essay is to discuss the causes behind climate change along with their consequences.

To start with over-population, it has become an issue of life and death for the world that is direct cause of climate change by the gap between the quantities of resources and consumer numbers. Going back into the last century, there was



no problem of climate change because the quantities of resources were quite higher than need. But now the population of world has increased unprecedented. The population of Pakistan is nearly 241 million as per recent census, that was 16 million in the last one. In addition according to report of Pakistan Bureau of Statistics, the population is increasing by 2.4 percent annually. Pakistan's population was estimated to be over 255 million in 2050, making it the 5th most populous country in the world. This increased population needs greater number of resources to live that is the main cause of climate change for this ~~two~~ Pakistan.

Moving forward, forests that are the lungs of the earth are required in large quantity



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to fulfill the needs of the overpopulated world. Their destruction has led to rising temperatures, loss of biodiversity and increased natural disasters. Pakistan is no exception, as uncontrolled deforestation has become a serious environmental and economic concern. The timber mafia, operating with little accountability, cuts trees illegally on a large scale particularly in northern areas. Urbanization and agricultural expansion further deplete forest areas, as land is cleared to accommodate housing scheme and cultivation. As according to a report, 48-58 thousand square mile area is cleared by deforestation. Moreover, 5% area of deforestation contributes 0.5% of Gross domestic product (GDP). This deforestation is further causing damage to climate by causing unexpected rains and floods.



Generating electricity and heat by burning fossil fuels causes a large chunk of global emissions. Most electricity is still generated by burning coal, oil or gas which produces carbon dioxide and nitrous oxide- Powerful greenhouse gases that blanket the Earth and trap the sun's heat. Pakistan's energy sector heavily depends on burning fossil fuels for electricity with increased CO<sub>2</sub> emissions rising from 5.5 million tons in 1990 to 52 million tons by 2023. Coal based power projects under China Pakistan Economic corridor have exacerbated greenhouse gas emissions. Additionally, inefficient infrastructure, including outdated gas pipelines and power plants leads to high levels of unaccounted for gas and methane



leaks further contributing to the problems. Despite having significant potential for renewable energy such as solar and wind Pakistan has been slow to adopt these cleaner alternatives resulting in continued dependence on high-emission energy sources.

Agricultural practices are a significant cause of climate change in Pakistan due to their contribution to greenhouse gas emission and unsustainable land use. One of the main sources is methane emissions from rice paddies and livestock, especially cattle. In Pakistan rice cultivation under flooded conditions creates anaerobic environments that promote methane producing bacteria. Similarly, livestock releases methane during digestion and



management practices further contribute to emission. The extensive use of chemical fertilizers particularly nitrogen based fertilizers leads to the release of nitrous oxide, another powerful green house gas. Over application of these fertilizers is common in Pakistan due to lack of farmer education and weak regulation. Other unsustainable practices include crop residue burning, overgrazing and inefficient irrigation systems all of which degrade soil, reduce productivity and release more emissions. These agricultural activities are key contributors to Pakistan's greenhouse gas footprint, thereby accelerating climate change in the region.

Lastly, manufacturing and industrial activities are significant contributors to climate change



in Pakistan due to their release of greenhouse gases and environmental degradation. The industrial sector which includes textile, cement, steel, fertilizer and chemical manufacturing relies heavily on fossil fuels such as coal, oil and natural gas for energy. The burning of these fuels emits large amounts of  $\text{CO}_2$  and other greenhouse gases into the atmosphere. In particular, cement and steel industries are highly energy intensive and among the top industrial sources of emissions. Many industrial units in Pakistan operate with outdated, inefficient technologies that consume more energy and produce more emissions than modern alternatives. Many factories discharge untreated emissions and waste contributing to



both air pollution and climate change. Industrial processes also emit other harmful gases such as methane, sulfur dioxide and nitrous oxide further intensifying the greenhouse effect. Altogether, industrial sector plays a growing role in the Pakistan's overall emissions, making it a critical area for climate action and sustainable development.

The human driven causes of climate change set the stage for severe consequences that disrupt ecosystems, economies and human life.

First consequence of climate is devastating floods. Increased rainfall over extended periods lead to flooding. Intense cloudbursts causes pluvial floods, where extreme rainfall causes flooding without any body of water



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overflowing. In Pakistan, 2022 monsoon submerged one third of Pakistan destroying 2 million homes and 4.4 million acres of crops. Since June 2025, Pakistan has faced devastating floods triggered by heavy pre-monsoon rains and continuing through the monsoon season into September. The Swat valley and large parts of Punjab were among the worst hit areas. It is claimed that nearly 1000 people has lost lives, displaced over a million people and destroyed thousands of homes and vital infrastructure. Buner was the worst affected district. In mid-august 2025 a sudden cloud burst hit Buner causing a devastating flash flood and landslides. Heavy rain poured within minutes, given people no time to

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react. Entire homes were washed away, lives were lost and many went missing. People ran, cried and searched for loved ones but the flood came so quickly that families could not even escape. It was a tragic disaster that highlighted the lack of early warning system.

with less water available, both for drinking and irrigation, water scarcity is becoming a harsh reality for Pakistan. Pakistan has over 7000 glaciers, the most outside the polar region. Due to global warming, <sup>these</sup> glaciers are melting rapidly increasing flood risk in short term and water scarcity in long term. Limited dam storage and poor urban watershed management result in the



loss of floodwater as runoff rather than their storage for dry spells. Extreme temperatures have caused water reservoirs and dams to lose up to 20 percent of their capacity through evaporation. Currently, Pakistan stands as the 15th most water-stressed nation in the world. Pakistan faces not only water shortages but also dangerously unpredictable behavior. In Swat the riverbed had become dry enough that people used it as a picnic spot. In June 2025, two families went for a picnic by the Swat river. They were having breakfast by the river bank. Some children went to take selfies on what seemed like a dry riverbed unaware of <sup>danger</sup> silently approaching. Suddenly, a heavy water came rushing down the river. 17 people Parents tried to grab



their children but it was too fast. Locals rushed to help but the river showed no mercy. Seventeen family members were pulled into the water. By official report, 12 bodies were recovered. 4 people rescued alive and 1 person remained missing. It was unable to believe that their joyful day had ended in such heartbreak.

Rising temperature and heat waves are clear consequences of human-caused climate change. The primary driver of rising temperature is the increasing concentration of greenhouse gases in the atmosphere largely from human activities like the burning of fossil fuels. Heat waves are becoming more frequent and intense with regions like Sindh and Southern Punjab.



Cities like Karachi have recorded extreme temperature with the June 2025 heatwave reaching  $49^{\circ}\text{C}$  and leading to a significant death toll and emergency medical responses.

The 2022 heatwaves in Pakistan were made 100 times more likely by climate change, with similar events that once occurred every 312 years now expected every three years. Average temperature across the country has risen steadily, over the past few decades. Agriculture, which is the backbone of Pakistan's economy is highly affected with heat stress damaging crops like wheat, cotton and mangoes, threatening food scarcity. Moreover, the growing energy demand for cooling during heat waves puts pressure on Pakistan's already struggling power infrastructure. These



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conditions highlights the vulnerable effect of climate change.

Climate Change in Pakistan severely impact human health by increasing infectious diseases like dengue and Cholera, exacerbating respiratory and cardiovascular issues from air pollution and heatwaves. Vulnerable groups, including the poor, women, children and the elderly are particularly affected by climate related health risk and barriers to accessing health-care. The recent finding on the impact of Climate Change on health in Pakistan are very alarming. A United Nation's Report Claims that 44% of children suffer from stunted growth primarily because of malnutrition.



There is a serious consequence of Pakistan's food insecurity and poverty which is linked to climate change. Unseasonal rains and smog are contributing to viral, waterborne and vector-borne illnesses like Zika virus, dengue, Malaria and Typhoid. Mental health disorders are increasingly reported among communities displaced by climate related disasters such as floods and droughts.

Climate change also poses a significant threat to Pakistan's tourism industry impacting its natural attractions, wildlife, culture heritage and local communities. The country rich in natural beauty and historical landmarks from the snow capped peaks of Gilgit Baltistan to the ancient ruins of Mohenjo-Daro —



is increasing vulnerable to climate induced disasters. Flash floods, like those witnessed in 2022 and 2025, destroyed infrastructure in northern areas rendering roads inaccessible and reducing tourism flow. Moreover, historical sites such as Mohenjodaro face erosion, water logging and degradation due to increased humidity, rainfall and poor conservation funding worsened by climate stress. This dual loss of natural and cultural attractions diminishes Pakistan's global image. Climate Change, therefore, is not just an environmental issue but a cultural and economic one. If left unaddressed, it may lead to irreversible damage to Pakistan's rich heritage and tourism potential.



Addressing climate change in Pakistan requires a comprehensive, multi-sectoral approach that combines policy, public awareness and sustainable development. Government must prioritize renewable energy sources such as solar, wind and hydropower to reduce reliance on fossil fuels. Reforestation initiative like the "10 Billion Tree Tsunami" should be expanded to restore ecosystems and improve carbon sequestration. At the policy level, strict implementation of environmental regulations, climate adaptation strategies and investment in research and innovation are necessary. Public awareness campaigns and education also play a key role in promoting eco-friendly practices at the individual and community



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levels. Ultimately, long term political commitment and community engagement are essential to combat the growing threat of climate change effectively.

In a nutshell, climate change poses one of the most urgent and complex challenges facing Pakistan today, with far reaching causes and consequences. Although the country contributes less than 1% to global greenhouse gases emissions, it ranks among the top nations most vulnerable to climate change. Key contributing factors include deforestation, overpopulation, greenhouse gas emissions and nuclear plants. These factors compounded by global climate shifts have led to severe consequences such as



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such as devastating floods, rising temperature and heatwaves, water security issues, diseases, loss of tourism and cultural heritage. Therefore, Pakistan must adopt a climate-resilient development model focusing on mitigation, adaptation, and strong institutional governance. The climate crisis is no longer a distant threat; it is a present reality that demands urgent, sustained and united actions.