

Pakistan ranks among top 10 countries worldwide effected by climate change. Although the main causes of climate change in Pakistan are human activities but there are some natural causes which are geographical location and seasonal variations in Pakistan.

Pakistan is located in South Asia, with the Indian Ocean in its south and the Himalayan mountain range in its north. Its coastal regions are exposed to sea-level rise which causes coastal flooding, erosion and leading to loss of land while, Himalayas range are vulnerable to glacier melting which can cause catastrophic floods, affecting downstream communities and also leads to intense heat waves, which can be deadly. As per seasonal variations are concerned, Pakistan has a cool, dry winter from December to February, a hot dry spring from March to May, intense monsoon season from June - September which brings heavy rainfall and landslides, and retreating monsoon from October to November.

This change in seasonal precipitation patterns have a significant impact on the country's climate.

To start with Human activities taking part in climate change in Pakistan, Deforestation is one of the important

Cause: Trees store carbon dioxide ( $CO_2$ ) from atmosphere through photosynthesis and release oxygen for respiration while deforestation release  $CO_2$  is released back into the atmosphere. that leads to global warming. Pakistan loses around 27,000 hectares of natural forest area every year. Pakistan's forest cover is around 4.7% of its total land area that makes it one of the world's least forested countries while Pakistan possessed 7% of forest areas at the time of independence. Deforestation enhances the hazard of landslides, floods and destruction of soil.

Another main cause of climate change in Pakistan is ozone depletion. The ozone layer is the layer outside atmosphere which protects the surface of earth from harmful ultra-violet and infrared radiations causing dangerous diseases like skin cancer. Ozone layer is depleted by the release of Chlorofluorocarbons (CFCs) used in refrigerators and air conditioners. Due to these gases ozone layer becomes thin which allow ultra-violet radiations to enter the earth making the earth more warm than normal and causing damage to human health and ecosystems. Greenhouse gases are also playing crucial part role in climate change. These are gases in the earth's atmosphere that

absorb and emit radiations contributing to green house effect. Main green house gases are Carbon dioxide ( $CO_2$ ), Methane ( $CH_4$ ) and Nitrous oxide ( $N_2O$ ), released through agriculture, deforestation and burning of fossil fuels. These gases contribute to rising global temperatures, leading to severe heatwaves, droughts, floods and change in seasonal variation patterns.

Industries in Pakistan are also taking part in climate change by releasing green house gases, air pollutants and waste water which contribute to climate change and negative health impacts. One of Pakistan's largest industries, textile industry involves energy-intensive processes leading to green house gas emissions. According to Pakistan Textile Industry Report 2020, The Textile industry alone accounts for 10% of Pakistan's total greenhouse gas emissions, Pakistan's cement industry is the second largest contributor to greenhouse gas emissions. is reported in Pakistan Cement Industry Report 2020. Transportation industry including trucks, buses & and cars contribute to climate change through emissions from fossil fuel combustion. Ministry of Climate Change, Pakistan reported that transportation sector has 14% of country's total green house gas emissions. Industrial activities contribute to increased extreme weather events.

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Further more, Pakistan is an agricultural country and this sector is also contributing to climate change in Pakistan primarily due to emission of green house gases. Ministry of climate change, Pakistan reported Agriculture has 40% of Pakistan's total green house gas emissions. Rice cultivation leads to significant methane emissions and use of synthetic fertilizer for wheat cultivation leads to nitrous oxide emission. Pakistan Agriculture Research Council reported that in Pakistan's agriculture sector Rice and wheat crops are the largest contributors to greenhouse gas emissions.

Thus, this sector is highly participating in climate change issue.

Pakistan's rapidly growing population is also a factor contributing to climate change in Pakistan. Growing population demands for energy, food, water resources, housing, and other resources that leads to climate change. Pakistan's population is growing at rate of 2.1% per annum, which is one of the highest in South Asia. Pakistan has lost 30% of its forests due to urbanization. As overpopulation will use resources more than before and will make environment polluted and As increased population will use greater number of resources that will be the cause of climate change in Pakistan.

Finally, one of the cause for climate change in Pakistan is mismanagement of resources. Pakistan's energy sector heavily relies on fossil fuels which contribute to climate change and this sector has poor infrastructure. Land mismanagement has led to deforestation which again adversely effect climate change. Pakistan has no facility of proper disposal of waste resulted in dumped of waste in landfills and waterways contributing to climate change. The country has limited recycling facilities, resulting in the waste of valuable resources and contributing in climate change.