**Understanding Climate Change**

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June 7, 2024

Climate change has rapidly become one of the most pressing issues of our time. Manifesting through prolonged rains, temperature extremes, unprecedented glacier melt, warming oceans, droughts, storms, and rising sea levels, it has wrought havoc on human life in countless ways. These environmental changes have made countries around the globe, including Pakistan, vulnerable by contributing to global warming and continual flooding. While climate change is a natural long-term shift in temperature and weather patterns, the abnormal variations observed since the 1800s are primarily the result of human activities. The construction of industries, deforestation, and other actions have significantly exacerbated climate vulnerability.

Deforestation is a major driver of climate change, with approximately 10 million hectares of forests being lost each year. This loss is critical because forests play a crucial role in absorbing carbon dioxide through photosynthesis. Plants reduce 13.7 billion tons of CO2 annually, mitigating the greenhouse effect. However, the destruction of forests has led to an increase in atmospheric CO2, contributing to more intense heatwaves and other climate anomalies.

Pakistan, which is linked to more than 40 industrial sectors, faces significant challenges in this regard. These industries, along with power plants that burn fossil fuels to generate electricity, release large quantities of greenhouse gases such as CO2 and nitrous oxide (N2O), which trap heat in the atmosphere and exacerbate global warming.

Climate change is a critical global issue that requires immediate and sustained action.

Power generation and industrial activities are not the only sources of greenhouse gas emissions. In Pakistan, surplus electricity usage in homes and commercial buildings accounts for approximately 35 percent of the total emissions. Transportation, which is the fourth largest source of global warming, contributes roughly 15 percent of greenhouse gases globally. As of 2004, over 8 billion tons of CO2 were being emitted annually, leading to a rise in global temperatures. Today, the world emits about 37 billion tons of CO? from fossil fuels and industrial activities each year, posing a significant threat to environmental stability.

The impacts of climate change are severe and far-reaching. Countries around the world, including Pakistan, experience a range of natural disasters linked to climate change, such as cyclones, tsunamis, and wildfires. For instance, the tsunami of 1945 on the Makran Coast in Balochistan killed about 4,000 people, while the 2004 tsunami devastated Karachi and killed 230,000 people in the region. More recently, a deadly cyclone in Bangladesh caused the loss of 12 lives in May of this year. Additionally, the rapid melting of glaciers due to rising temperatures has resulted in the formation of 33 ice-dammed lakes in Pakistan, putting 7.1 million people at risk of glacial lake outburst floods (GLOFs).

Intense rainfall events, particularly in Balochistan and Khyber Pakhtunkhwa (KP), have also led to significant loss of life and property. The catastrophic flood of 2022 in Pakistan affected 33 million people, resulting in 1,700 deaths and 12,000 injuries. Similarly, the 2004 floods caused 53 fatalities and 50 injuries, along with extensive infrastructural damage. Among the most concerning effects of climate change are extreme heat waves. According to NASA, global temperatures have risen by about 1.520F since the late 19th century, and sea levels have increased by 6-8 inches over the past century. In 2004, temperatures in Pakistan soared to 480C, while Delhi in India reached 52.90C and Iran experienced record-breaking temperatures of 660C. Turbat, a district in Balochistan, became the second-hottest city in Pakistan, where a social media post on May 30, 2024, showed plastics melting in a parked car due to extreme heat.

To address the multifaceted problem of climate change, it is crucial to take proactive measures. One effective strategy is to prioritize environmental cleaning and reduce pollution. This involves promoting the use of renewable energy sources such as solar, wind, and hydroelectric power, which are clean, reliable, and have higher energy densities. Currently, about 29 percent of the world’s electricity comes from renewable sources, and increasing this share can significantly reduce heatwaves and other climate impacts.

Reforestation and afforestation are also vital in mitigating climate change. Planting more trees can help absorb CO2 from the atmosphere, reducing the greenhouse effect. Additionally, technological advancements in renewable energy storage, such as Tesla’s development of batteries to store solar energy, can enhance the efficiency and reliability of renewable power systems.

Public awareness and education about the risks associated with floods, cyclones, and tsunamis are essential for safeguarding communities. Governments and organizations should actively disseminate information and implement early warning systems to prepare and protect citizens from natural disasters. Moreover, sustainable urban planning and construction practices can help minimize the environmental impact of development activities.

Climate change is a critical global issue that requires immediate and sustained action. Human activities have significantly contributed to the current crisis, but through concerted efforts, it is possible to mitigate its impacts. By adopting renewable energy, enhancing green cover, leveraging technology, and raising awareness, we can work towards a more sustainable and resilient future. Both individuals and governments must prioritize these actions to combat climate change and protect the planet for future generations.

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