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ESSAY : CLIMATE CHANGE IN PAKISTAN : CAUSES AND CONSEQUENCES

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THE ESSAY:

Once known for its rich rivers and fertile plains, Pakistan now stands at on the frontline of climate crises that threatens its very survival — from devasting floods to scorching heat waves, the climate change is no longer a distant threat but a harsh reality unfolding in real time. According to Global Climate Index, Pakistan has consistantly been ranked among the top 10 countries most vulnerable to climate disasters. These climatic hazards are not spontaneous but result from activities that cause the ecological imbalance. Some of the main causes of climate change in Pakistan are rapid deforestation, population explosion, heavy reliance on non-renewable energy sources and ineffective waste management. All these factors contribute to the disturbance of ecological balance that poses a serious ~~threat~~ existential threat to both Pakistan and its people. One of the detorimental consequences of climate change in agrarian countries like Pakistan is the loss of fresh water bodies that is a grave threat to country's food and economic security. Other significant

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impacts of climate change in Pakistan are global warming, contamination of fresh water sources, rising sea levels and loss of Biodiversity. Therefore, Climate change is a critical concern for Pakistan which is instigated by the abrupt changes in ecosystem. Its lethal impacts not only constitute the existential threat but also food and economic insecurity. Pakistan requires suitable measures to mitigate the climate hazards and achieve prosperity, food security and economic stability.

To begin with, Rapid deforestation is significantly contributing to climate change in Pakistan. On one hand, urbanization is abruptly increasing for infrastructural and industrial developments as per the need of population growth. This process results in the loss of green cover and as per 2023 consensus data of Pakistan, the urban population is growing around 4.1 annually. Rawalpindi and Quetta have recorded the highest growth rate from 2017 to 2023 which is alarming. Lack of sustainable urban planning also provides a way out to deforestation. Commercialization is done without proper planning and balance in ecosystem is compromised by

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overlooking the significance of green cover. Moreover, in rural areas fuel wood is still in use that is ultimately a loss of valuable species of trees. According to data of United Nations, conifer and reverine forests — including junipers and Himalayan woods — continue being cut heavily for fuel wood, contributing to around 0.5 % of annual deforestation in Pakistan. Pakistan is cutting live trees which actively depletes forests and prevents recovery. On the other hand, there is a lack of awareness among masses. Due to this reason, in urban areas the importance of green cover is marginalized for commercialization. And in rural areas, due to insufficient knowledge people use live trees as a source of fuel. Since, individuals learn from others as well as by their own observation (Differential Association Theory and Social Learning Theory), this practice is learned from generation to generation which contributes to surge in deforestation. Therefore, deforestation plays a vital role in climate change of Pakistan.

The second cause of Pakistan's vulnerability to climate change is population explosion. Pakistan has a huge population of 241.5 million as per 2023 consensus. In-

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-creased population means higher resource demand. This demand increases agricultural activities, industrial productions and energy use, all of which ultimately lead to climate crises and rapid depletion of resources — a threat to country's food, energy, and economic security. Rapid populational growth drives urban sprawl and illegal settlements.. The individuals of such areas may develop strain — a gap between their conventional goals and means to achieve them — that results in their involvement in crimes (Robert Merton's Strain Theory). This results in the surge of crimate rate and societal upheaval. For Instance, they fulfill their ene-rgy needs either through theft or by using conventional energy sources without any climate protectionist measure. Mo-reover, migration culture increases with ra-pid populational surge. People move towards urban areas in search of better facilities which result in the formation of densely po-pulated areas. Such areas lose focus not only on climate but also area management. For Instance, the I-10 sector in Islamabad is a reflection of poor climate and locale management. The road of I-10 Markaz th-at once used to be covered in trees on both sides is now merely a parking spot for residents and an open-air market for vendors.

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Additionally, Pakistan is ranked among the top 5 countries that are home to largest number of world refugees. Granting asylum to refugees means an addition to population bulk as well as environmental and economic stress. For feeding the huge population, lands are overly farmed that cause soil degradation, reduce crop yield and increase the vulnerability to climate change impacts like drought. Hence, population explosion is a serious concern contributing to fatal climate change.

The third reason for climate change in Pakistan is heavy dependency on non-renewable energy sources. The hydrocarbons are not mainly produced in Pakistan, it has to import a major part of the fossil fuel to fulfill the needs, which make the production cost expensive. On one hand, the textile and heavy mechanical industries of Pakistan run mainly on hydrocarbons. For Instance, Faisalabad is largest textile and mechanical hub of Pakistan — both in terms of production volume and number of units. All these industrial units operate on fossil fuels. Oil or diesel is used to run generators. Natural gas is used in textile dyeing, processing boilers and power generation, while coal is used in small scale manufacturing units. This huge reliance on non-renewable energy sources is expensive

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both economically and climatically. The power-sector of Pakistan is no different from the industrial sector- Around 60% of electricity is generated from imported hydrocarbons. This extensive burning of fossil fuel to operate both sectors is drastically impacting the climate sensitivity of Pakistan. On the other hand, the excessive use of vehicles intensifies the problem. Most of the public sector vehicles are of older models which have inefficient engines with high Sulfur contents. Such vehicles release CO_2, black carbon and other short-lived pollutants that absorb sunlight and heat up the atmosphere. Due to insufficient and ineffective public transport, the private sector vehicles dominate consuming around 28% of the energy, almost all from the fossil fuel. The combustion of their fuels release pollutants in the air that intensifies the climate vulnerability — an unprecedented juggernaut of current time. The Intergovernmental Panel on Climate Change identified South Asia specially Pakistan and India — as global 'hotspot' where climate risks interact with social vulnerability, putting millions at risk. Therefore, extensive dependency on non-renewable energy sources poses a serious threat to Pakistan making it more vulnerable to climate crises.

The fourth important cause of climate change in Pakistan is ineffective waste management. On one hand, the

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Open burning of waste is affecting the air quality of major cities of Pakistan like Lahore and Karachi. This open burning process releases black carbon and other pollutants in the air. The pollutants remains in the atmosphere for a short time called smog, as observed in Lahore in the last winters. However, the black carbon settle on the glaciers, halting the ability to reflect light and triggers melting of glaciers which a key indicator of climate change in Pakistan. The Federal Minister for Climate Change and Senator, Musadik Masood Malik recently reported in Senate that rising temperatures have led to formation of over 3000 lakes in Pakistan due to rapid melting of glaciers. Moreover, the production and use of irrecyclable products is still trending in Pakistan. The waste of such products is dumped in the open landfills. This waste produces methane over 5 times more potent than CO_2 in trapping heat. Pakistan's cities like Karachi, Lahore, Faisalabad are producing thousands of tons of waste daily and much of it ends up in open dumps, increasing methane omission and contributing to global warming. On the other hand, the toxic waste from industries is contaminating the water bodies as it is dumped into rivers and canals. When this water

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is used for irrigation, it adversely affects the agriculture, food security and forces the use of chemical fertilizers — the Nitrous oxide (N_2O), another harmful green house gas. Therefore, the ineffective management of waste in Pakistan has triggered climate change.