ISSUE BRIEF

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DEADLY HEATWAVES IN PAKISTAN AND THE ROLE OF URBAN PLANNING

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Introduction

Pakistan's increasing vulnerability to heatwaves can be ascribed to its geographical location and the mounting consequences of climate change. The country's expanding urbanization presents issues, but it also provides opportunity to address this phenomenon. Environmentally, heatwaves intensify the Urban Heat Island (UHI) effect, making cities significantly hotter than rural areas due to heat-retaining structures like buildings and roads. This exacerbates water scarcity by increasing evaporation rates in already water-stressed regions. The World Bank Report titled, "Urban Heat in South Asia: Integrating People and Place in Adapting to Rising Temperatures," emphasizes that South Asia, especially Pakistan, is highly vulnerable to excessive temperatures.[1]

Heatwaves in Pakistan have become more common and severe, particularly in metropolitan areas where the UHI effect is evident. However, most Pakistani cities are unprepared to deal with the soaring frequency, intensity, and complexity of heatwaves. Rapid and sometimes unplanned development has resulted in inadequate infrastructure, a lack of green space, and poor living conditions, all of which enhance the impact of heatwaves. Cities such as Karachi, Lahore, and

1 Amin Ahmed, "'Vulnerable' South Asia least prepared to deal with urban heat: World Bank," Dawn, April 30, 2023, https://www.dawn.com/news/1750096/vulnerable-south-asia-least-prepared-to-deal-with-urban-heat-world-bank

Islamabad are particularly vulnerable because of their high population density and poor urban design. Heatwaves in Pakistan, particularly in urban areas, have resulted in thousands of deaths, with vulnerable populations such as the elderly, children, outdoor workers, and those with chronic illnesses being most at risk. The 2015 heatwave in Karachi alone claimed over 1,200 lives.[2]

Climate change has further amplified this vulnerability, with rising temperatures and changing weather patterns leading to more frequent and severe heatwaves across the country. These extreme temperatures cause heatstroke, dehydration, and exacerbate existing health conditions, leading to a significant strain on the healthcare system. Additionally, the economic impact is substantial, as heatwaves reduce productivity in sectors like construction and agriculture, further straining the economy. Heatwaves must be mitigated by developing comprehensive urban planning techniques that improve resilience. The link between urban planning and heatwave prevention is crucial for lowering the serious health risks and socioeconomic disruptions caused by these extreme weather occurrences.[3]

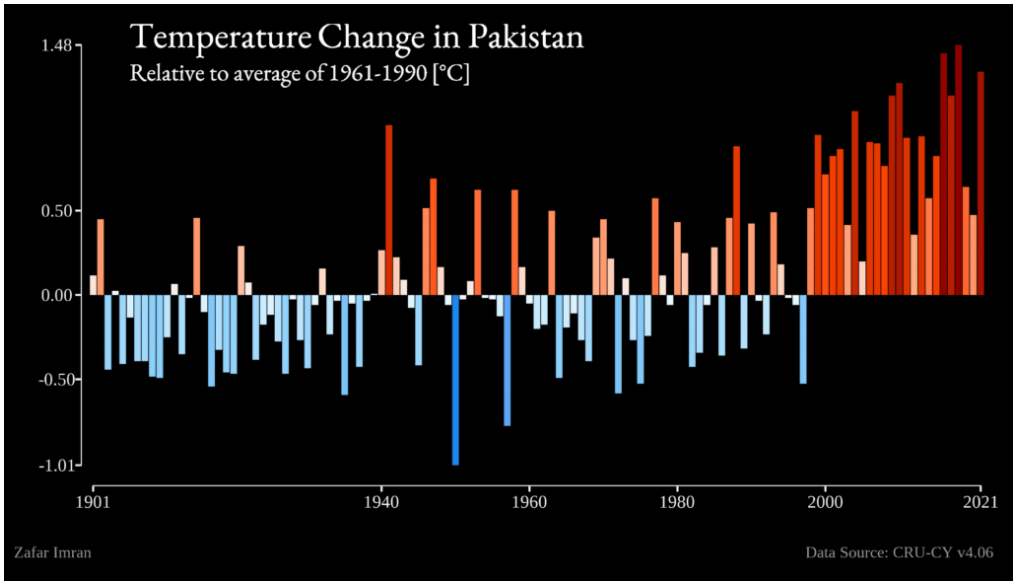

Figure: Temperature Change in Pakistan[4]

Situation in 2024

Pakistan, particularly its largest city Karachi, has recently experienced a severe heat wave, with temperatures soaring above 37°C. The heat, along with power outages and extreme humidity,

2 Editorial, "Heat warnings," Dawn, May 18, 2024, https://www.dawn.com/news/1834195
3 M Waqar Bhatti, "When sea breeze evades the port city," The News, July 7, 2024, https://www.thenews.com.pk/tns/detail/1206985-when-sea-breeze-evades-the-port-city
4 Eric Koons, "Heat Wave in Pakistan 2024: A Scorching Reality," Energy Tracker Asia, June 26, 2024, https://energytracker.asia/heat-wave-in-pakistan/

brought the city's economic engine to a halt, underscoring the deadly effects of climate change. Karachi, a port city on the Arabian Sea, is accustomed to sweltering summers and monsoon floods, but this summer has been especially brutal. Between June 23 and 30, temperatures in Karachi surpassed 40°C, the highest since 2015. The city's most vulnerable people, 60% of whom live in slums, have been impacted the hardest. These individuals live in poorly built homes made of concrete or tarpaulin, with dirt roads, making them particularly vulnerable to adverse weather conditions.[5]

Karachi's condition is far from isolated. Other parts of Pakistan have also been dealing with excessive heat, with temperatures surpassing 50°C. This has resulted in numerous cases of heatstroke, mainly in Lahore, Hyderabad, Larkana, and Jacobabad. Heatstroke, a serious and sometimes fatal disorder, occurs when the body's temperature rapidly rises, resulting in unconsciousness and, in severe cases, incapacity or death. In response, Provincial Disaster Management Authorities (PDMAs) in Punjab and Sindh have directed hospitals to establish heat wave units to treat individuals suffering from heat-related illnesses.[6]

Pakistan's vulnerability to climate change is well-documented. According to a Global Climate Risk Index, Pakistan is the fifth most vulnerable country in the world to climate change, with extreme heat being a significant risk factor. Ms. Rubina Khursheed Alam, the Prime Minister's Coordinator on Climate Change, has pointed out that Pakistan has experienced abnormal rainfall and floods in recent years, further exacerbating the country's vulnerability. The World Weather Attribution group of scientists has confirmed that extreme heat during the pre-monsoon season in South Asia is becoming more frequent and severe due to climate change. Their research indicates that Pakistan's current heatwave is just the latest in a series of climate-related disasters that have plagued the country. The effects of climate change have also led to melting glaciers and increasing monsoon activity, causing catastrophic flooding, such as the 2022 floods that submerged a third of the country.[7]

The impact of these extreme weather events extends beyond health, affecting livelihoods as well. The latest heatwave, the second this month according to the Pakistan Meteorological Department (PMD), follows the wettest April that the country has seen in six decades. The above-average rainfall

5 Zia ur-Rehman, “Pakistan Withers Under Deadly Heat and Fears the Coming Rains,” The New York Times, July 6, 2024, https://www.nytimes.com/2024/07/06/world/asia/pakistan-heat-wave.html

6 AP, “Pakistan heatwave: Hundreds treated for heatstroke as temperatures soar to over 50C,” Euro News, May 28, 2024, https://www.euronews.com/green/2024/05/28/pakistan-heatwave-hundreds-treated-for-heatstroke-as-temperatures-soar-to-over-50c

7 Sarah Zaman, “Pakistan hit by second wave of extreme heat this month,” VOA, May 22, 2024, https://www.voanews.com/a/pakistan-hit-by-second-wave-of-extreme-heat-this-month/7622649.html

resulted in dozens of deaths and devastated large areas of farmland, further straining the country's resources. As always noted, despite contributing very little to global climate change, Pakistan remains one of the most vulnerable countries to its effects. A recent analysis by The Washington Post and Carbon-Plan concluded that by 2030, over 190 million people in Pakistan will be exposed to dangerous levels of extreme heat for at least one month each summer, the second-highest number for any country in the world.[8]

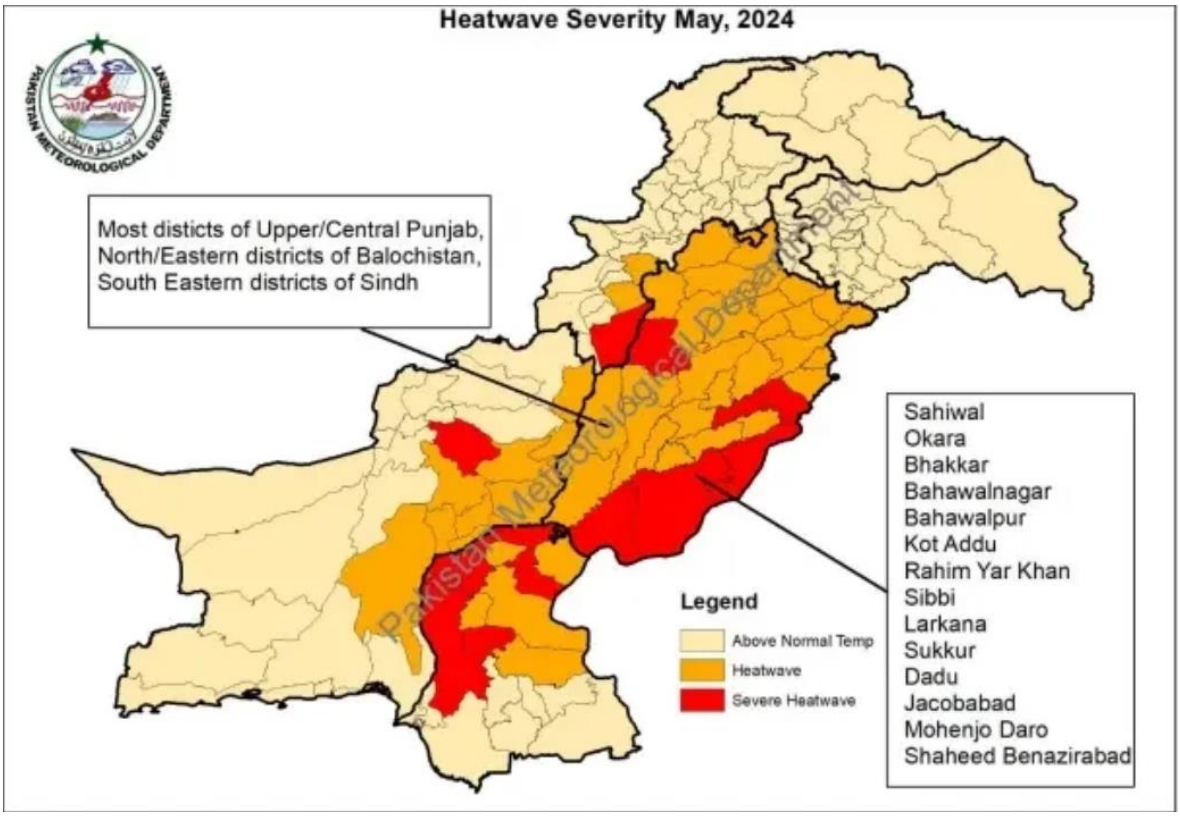

Figure: Heat Severity May 2024[9]

The Role of Urban Planning in Pakistan

Effective urban planning is crucial for mitigating the impact of heatwaves and enhancing city resilience. The challenges of rapid urbanization without corresponding infrastructure development in Pakistan exacerbate these issues. Overloaded power grids and frequent blackouts deprive residents of cooling during extreme heat, while high population density increases the risk of heat-related illnesses among vulnerable groups, including the elderly, children, and those with pre-existing conditions. Many urban dwellers live in poorly constructed housing or informal settlements

8 "Beating the Heat in Pakistan," Earth Observatory, Accessed on August 26, 2024, https://earthobservatory.nasa.gov/images/153065/beating-the-heat-in-pakistan

9 "Extreme heatwave to continue in Pakistan," AAJ News, May 23, 2024, https://english.aaj.tv/news/330361988/extreme-heatwave-to-continue-in-pakistan

lacking proper insulation and ventilation. To address these challenges, urban planning must incorporate green infrastructure and update building codes to include heat-resistant materials and energy-efficient designs. Enhancing power and water infrastructure, developing heatwave early warning systems, and raising public awareness are critical. Implementing heatwave action plans with emergency response measures and cooling centres is essential for protecting vulnerable populations during extreme heat events.[10]

Key strategies include increasing green infrastructure such as parks, green roofs, and urban forests to lower ambient temperatures through shading and evapotranspiration. Strategic tree planting along streets and in public spaces can further reduce the urban heat island effect by providing shade. Additionally, using reflective and heat-resistant materials for roofs and walls can decrease indoor temperatures. Designing buildings with natural ventilation, insulation, and energy-efficient cooling systems can reduce reliance on air conditioning, thus minimizing heat generation. Implementing systems to collect and store rainwater, along with creating wetlands, bioswales, and permeable pavements, can manage stormwater, alleviate water scarcity, and contribute to cooling urban environments. Enforcing zoning regulations to limit high-density construction and promoting compact urban forms with mixed land use can also help reduce heat emissions from vehicles.[11]

Conclusion and Recommendations

Climate change is a major driver of the persistent and increasingly severe heatwaves in Pakistan, with significant impacts on public health, the economy, and the environment. Addressing this challenge requires comprehensive efforts from the government, businesses, and individuals to implement mitigation and adaptation strategies. Effective governance and international support are crucial in building resilience against climate change, safeguarding vulnerable populations, and protecting natural resources. Urban planning plays a vital role in these efforts, offering the potential to create sustainable and resilient cities that are better equipped to handle the challenges posed by rising temperatures.

To mitigate the impacts of heatwaves, urban development policies in Pakistan must prioritize climate resilience. This includes incorporating green infrastructure, sustainable building practices, and energy-efficient materials in urban planning. Strengthening healthcare facilities, upgrading power and water supply systems, and establishing early warning systems are also essential

10 Fayyaz Salih Hussain, “Beating Karachi’s heat,” Pakistan Today, June 26, 2024, https://www.pakistantoday.com.pk/2024/06/26/beating-karachis-heat/

11 Andleeb Khan, “Greening the concrete Jungle: Pakistan’s path to climate resilience,” AP, May 5, 2024, https://www.app.com.pk/national/greening-the-concrete-jungle-pakistans-path-to-climate-resilience/

measures. Local communities should be actively involved in urban planning to ensure their needs are addressed, and research on heatwave patterns and mitigation strategies should be supported to inform policy decisions. Through these concerted efforts, Pakistan can build cities that can withstand the challenges of a changing climate, ensuring the well-being of its citizens and environment.