**[The perils of heatwaves](https://www.dawn.com/news/1809041/the-perils-of-heatwaves)**

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HEATWAVES are born from an intricate atmospheric interaction in which warm air is pushed towards the ground by the high pressure in the atmosphere. Heatwaves are exacerbated by climate change. They are also influenced by natural climatic patterns like El Niño and La Niña. Heatwaves pose a grave challenge to our environment, economy, and community — from devastated ecosystems, stressed energy systems and agriculture to increased health hazards and social inequities.

The catastrophic potential of heatwaves in Pakistan is illustrated by historical and current incidents. A severe heatwave with temperatures reaching 45 degrees Celsius struck Sindh in June 2015, claiming the lives of over 700 individuals. Karachi experienced most of the reported deaths, in the span of three days, caused by acute dehydration and heatstroke. Parts of Pakistan witnessed some of the highest temperatures of over 50°C from March to May 2022. The authorities reported 65 fatalities, though the toll may be higher. The heatwaves were followed by destructive monsoon rains, glacial lake outburst and flash floods that affected 33 million people, claimed over 1,700 lives, and damaged or destroyed more than 2.2m homes.

Considering these challenges, efficient heatwave mitigation, adaptation, and solution options are critical. Some mitigation strategies are:

First, the reduction of greenhouse gas emissions — the predominant cause of climate change. Key measures for lowering GHG emissions include switching to renewable energy sources, improving energy efficiency, promoting sustainable transportation, and adopting cleaner industrial practices.

Mitigation and adaptation are critical.

Second, energy efficiency and conservation through initiatives such as building insulation, energy-efficient appliances, and smart grids.

Third, mitigating urban heat islands through green spaces, such as parks, green roofs, and vertical gardens. Reflective pavements and roofs with specific coatings can be utilised to minimise surface temperatures and reflect sunlight.

Additionally, policy and planning measures can utilise heat stress indices and meteorological data to develop efficient heatwave early warning systems that offer rapid response and public alerts. Sustainable urban planning techniques, including mixed land use, appropriate zoning, and the incorporation of green infrastructure, might prove helpful.

Finally, enhancing public awareness and education about heatwaves to enable people to take preventive action and defend vulnerable groups. Media campaigns, community workshops, and educational programmes are essential to educate people about heatwave hazards, early warning systems, and emergency response procedures.

Some adaptation strategies are:

Climate-resilient agriculture: This would entail employing climate-resilient farming methods to help ensure food security during heatwaves. This is accomplished by promoting the production of drought-tolerant plants, improving irrigation techniques, and arming farmers with adaptive technologies.

Heatwave emergency response: This could be improved bydrafting and implementing heatwave emergency response plans that specify what should be done during heatwaves, building cooling centres, improving accessibility to clean drinking water, and developing communication channels for public preparedness.

Research and monitoring: Investing in this area can identify at-risk locations and populations, and help create adaptation plans to comprehend the effects of heatwaves.

Health protection measures: Suppor­t­ing these can help public health syst­ems become more re­­silient to heatwaves by establishing gui­delines for medical professionals on heat-related disorders, launching awareness-raising public health initiatives, and ensuring there are enough medical resources and facilities to address heat-related conditions to aid in protecting vulnerable populations.

The frequency and intensity of heatwaves are predicted to rise globally. Urban locations with high-population densities, low-income populations, outdoor labourers, and those with pre-existing medical issues are at greater risk. To safeguard vulnerable people and guarantee resilience in the face of future climatic scenarios is important.

To create and implement efficient adaptation solutions, we must encourage cooperation among individuals, communities, and policymakers. Building a resilient future, lowering GHG emissions, and lessening the effects of heatwaves all depend on putting emphasis on sustainable practices and mitigating climate change. Collectively, we can safeguard vulnerable groups, improve readiness and build a more secure and sustainable world for future generations.

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