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DEVASTATING RAMIFICATIONS OF HEATWAVE ACROSS THE DEVELOPMENT SPECTRUM: LES MISERABLES

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The sky blazes like an “atomic bomb”, the heat from it is a “slap in the face”, the eyes sting and “everything was tan and beige and a brilliant, unbearable white”. Water doesn’t help because it is “hot as a bath... worse than the air”. People die “faster than ever”.

Kim Stanley Robinson, *The Ministry for the Future* (2020)

With Mungeshpur, north New Delhi, recording an unprecedented temperature of 52.9°C on May 30, 2024, there have been heightened concerns of urbanisation and humidity. This uneasy sense, queasy feeling and dystopian heating saga is ubiquitous, e.g., temperature breached 40 °C in July 2022 in the United Kingdom, China’s northwest town recorded 52 °C in 2023, Sicily in Italy recorded 48.8 °C in 2021, over a dozen pilgrims died of heatstroke in Saudi Arabia, which was incinerated by sizzling heat waves.



Such examples of the summer of widespread discontent can easily be increased since 2024 May marked the 12th consecutive month of average global temperatures breaching all observations since 1850. These examples clearly bring to the fore the gross inadequacy of a business as usual or a more of the same stoic approach and necessitate placing these interrelated summer woes in the contextually wider issue of climate change. Consequently, there has also to be an accent on investing in, building, and operating reliable, resilient, and innovative energy infrastructure, using alternative transportation modes, and aggressively transitioning from fossil fuels to a net-zero economy by 2050.

Conceptual and Methodological Framework

The heat wave in India, as in other parts of the world, means different things to different people much like the blind men and the elephant. Semantically a heat wave is defined differently across geographies. According to the India Meteorological Department (IMD), in the plains, a heat wave is characterised by maximum temperatures reaching up to 40°C or more, while in coastal areas, it is when maximum temperatures reach 37°C or higher. In hilly regions, the threshold is 30°C or higher. Heat waves in India typically occur between March and July, with acute heat waves occurring mainly from April to June affecting the northern Indian plains more than coastal areas. This deleteriously impacts income growth, price stability, and investment. Given the overarching grim scenario, measures, such as, cooling and migration have bounded applicability and negative externalities.

Global Perspective

The Intergovernmental Panel on Climate Change's (IPCC's) Working Group I examined huge heat wave and extremely anomalous temperatures in India from March 2022 to April 2022. The Group chillingly found 30 times greater probability of such events occurring than they would have without climate change. While intensified and sustained heat wave devastates the complete development spectrum, it hits the poorly endowed regions and the poor, the deprived and the vulnerable sections of population hard by the damage to lives (e.g., asthma and chronic obstructive pulmonary disease (COPD), cardiovascular diseases like heart failure and coronary artery disease, chronic kidney disease, diabetes, and neurological conditions like multiple sclerosis or Parkinson's disease) and livelihoods.

Charles Kindleberger wrote pithily "*for historians each event is unique*". But whereas "*history is particular; economics is general*"; it involves finding patterns. Today's specter reveals global warming and climate on an intensively terrifying scale and raises increasing fears of "*Armageddon*", fears of the excruciatingly rising global chasm across

development levels manifested in the ostensible effect of climate change “*with the poorest fifth of households disproportionately more likely to have lower resilience scores than those who are better-off*” (Nancy Hey, Director of Evidence and Insight, Lloyd’s Register Foundation). Gender disparities also increasingly get intensified.

According to the Fourth Assessment Report (2007) of the IPCC, the observed effects of greenhouse gases (GHGs) include:

1. The global average surface temperature has increased by approximately 0.65°C over the last 50 years.
2. Eleven of the last 12 years (1995–2006) rank among the 12 warmest years since records began in the 1850s.
3. The rates of warming and of sea level rise have accelerated in recent decades.
4. Many areas, particularly mid- to high-latitude countries, have experienced increases in precipitation and there has been a general increase in the frequency of extreme rainfall.
5. In some regions, such as parts of Asia and Africa, the frequency and intensity of droughts have increased in recent decades.
6. The frequency of the most intense tropical cyclones has increased in some areas, such as the North Atlantic, since the 1970s.

The IPCC has made the following terrifying projections for the next century:

1. Global mean surface temperature will rise by 1.1–6.4° C, depending partly on future trends in energy use. Warming will be greatest over land areas and at high latitudes.
2. Heat waves, heavy precipitation events, and other extreme events will become more frequent and intense.
3. Sea level rise is expected to continue at an accelerating rate.

Indian Scenario

Historically Indian agriculture has always been subject to the vagaries of the monsoon and agriculture in India has often been called “*a gamble in monsoon*”. With improved irrigation (e.g., drip, sprinkler irrigation), high yielding variety (HYV) seeds and fertilisers, the impact of monsoon on agriculture has reduced.

India's labour productivity, particularly for outdoor workers in agriculture, construction, and mining drastically declines because of heat waves. Increased irrigation and air pollution control aggravate heat stress, lowering productivity by 2-4% for every degree rise above 27°C, raising power demand and exacerbating water scarcity.

The Indian economy is debilitated by damaged human and animal health, reduced crop yields, droughts, increased pest and disease pressure and soil degradation. Sweltering heat waves also lower production of animal fodder and reduce animal productivity, raise milk prices and hurt power grids. Similarly, poultry and fishery are also pounded by deteriorating air quality and rising climate change. Such aspects necessitate effective measures to mitigate heat waves and their consequences.

The inequitable and disproportionate impact of heat wave requires a sharper focus on providing succour to the vulnerable population, e.g., mandatory inclusion of wide categories of informal workers in urban areas, inclusion of worker communities and their say in the action plans, reformed labour laws and the Labour Codes from the perspective of informal workers and promoting workers' rights.

RBI' Assessment- Macroeconomic Impact and on different regions

According to the RBI's Report of the Department of Economic and Policy Research (DEPR), climate change stemming from rising temperature and transforming patterns of monsoon rainfall could reduce 2.8 % of India's Gross Domestic Product (GDP) and depress living standards of nearly half of its population by 2050. The Report's scary findings highlighted that India record heat wave greatly affected workers, labour migrants, low-income household. Similarly, a recent report of Climate Transparency chillingly warned that India suffered an income loss of 5.4% of GDP, the highest among the G20 nations in 2021. Hence, a broad-spectrum strategy without being oblivious to ground-level realities needs to be swiftly implemented.

Impact of Heatwave

Heat wave in India stems *inter-alia* from global warming, which leads to long-term increase in Earth's average temperature due to human activities, viz., burning fossil fuels, deforestation, and industrial activities. Heat wave affected vast regions of the country, including Bihar, Jharkhand, Gangetic West Bengal, Odisha, Punjab, Haryana, Chandigarh & Delhi, Rajasthan, Maharashtra, West Madhya Pradesh, and Gujarat. The heat island effect caused by glass facades of buildings and some other design and habit flaws worsens the situation.

India's Heat Action Plans (HAPs) - Pathway to the Future

India's Heat Action Plans (HAPs) with preparatory, adaptive, and responsive elements have not been fully effective because of differential implementation and impact across regions and sectors. This is contextually significant because Dr. Dileep Mavalankar, Director of the Indian Institute of Public Health found most HAPs were not “*built for local context and have an oversimplified view of the hazards*”. “*Nuancing and localising the heat hazard definition by including climate projections*” requires more automated village-level weather stations, properly “*identifying and targeting vulnerable groups*” and a “*granular understanding*” of densely populated neighbourhoods lacking heat combating appliances. Most HAPs were also underfunded, had weak legal foundations with scant accountability, and were largely opaque.

What is prognostically alarming is that Scientists fear at least one year in the next half-decade to overshoot the record annual average temperature observed globally in 2023. The dynamics of Indian heat wave projections across regions reveal real and worrisome fault-lines.

Accordingly, the roadmap ahead must formulate and implement disaster management and risk mitigation strategies and hyper-local sequential heat action plans at the city, district, and state levels in conformity with the guidelines of the National Disaster Management Authority (NDMA), restore and build more blue and green infrastructure – water-bodies and areas with tree cover, provide water, shade, and rest–eat–leisure spaces, promote workers' rights in cities and prepare hospitals for all eventualities.

There must be a closer coordination for access to hydration and cool places, suitable housing, well-conceived heat plans, scientific forecasts, prevention of extensive misery and mid-course correction, wherever needed.

Mitigating strategies based on granular heat-risk data and local adaptive strategies may apparently seem to be a tall order but an objective assessment of the rapidly worsening ground-realities clearly brooks no delay. Going forward, we have to transform or perish. Hence, synchronized measures by all stakeholders including the Ministry of Housing and Urban Affairs (MoHUA) and the Ministry of Labour and Employment (MoLE), non-governmental organizations (NGOs), voluntary agencies (VAs), with a sense of urgency are needed to prevent things from slipping from bad to worse. While all is not lost, at least not yet, the task ahead of adroitly managing a climate-changing world's resilience is difficult but doable. Failure is not an option.