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Heat Wave and its Disastrous Consequences

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Abstract

Heat wave has become an epic problem and is recurring every year and is lasting for many days. The days are becoming hotter than before and are fatal to individuals. An increased torture to the earth is the reason why the planet warms up extensively. The impact of heat waves directly impacts the economy when productivity decreases due to various reasons. Along with growth, carbon footprints have to be minimized for the climate to stabilize.

Keywords: Climate change, Environment, Well-being, Human Productivity, Ecosystems, and Disaster Studies.

Introduction

It is a serious issue regarding the increase in temperature, and the scorching heat is impacting humans and the ecosystem alike. Heat waves are denoted as the repeated occurrence of hot days (Perkins & Alexander, 2013). Heat waves are estimated by multiplying the number of heatwaves, duration, and conditions (Mazdiyasni, et al. (2017). By the end of this century, the spatial warming will be closer to 5.5^{o}C affecting the Indian states in the north, central and western parts (Kumar et al., 2013). In March 2022, the highest temperature was recorded which was the hottest in one hundred and twenty-two years. The reason is attributed to the increase in greenhouse gases. As per the World Bank records in India, the heat waves occur during the summer months from March to June or extend until July. Usually, around five to six heat waves occur, and each event lasts for many weeks. At the onset of summer, the nation experiences an average maximum temperature of 33^{o}C during the March month, and it rises as the days elapse. The temperature exceeds 40^{o}C in plains and above 30^{o}C in mountainous regions. One of the reasons for the increase in temperature is the shortage of rainfall. The shortage of rainfall is at a higher level, 72 per cent while considering the country as a whole. The shortage is high in the north-western part of India at a rate close to 89 per cent.

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The effect of heatwave has reduced farming produce, increased energy expenditure, rise in drought and depletion in underground water levels. Further, it can change human behaviour, quality of air, delivery system and scarcity of some crucial infrastructure sources like water and energy. Heat conditions can alter human behaviour, the transmission of diseases, health service delivery, air quality, and critical social infrastructures such as energy, transport, and water. The impact of heatwaves affects the labourers working in labour-intensive jobs like construction, delivery service, and other sales-related jobs.

These unpleasant events directly impact the health of human-beings (Mazdiyasni & Agha Kouchak, 2015). There are severe health issues reported related to the respiratory, cardiovascular, diabetes-related and cerebrovascular systems, leading to fatality (Wilker et al., 2012). Due to extreme heat conditions, individuals develop cramps, exhaustion, hyperthermia and heatstroke. The impact on health is due to the dearth of good housing facilities, safe and clean drinking water provision and affordable health care services. All sensitive age groups are susceptible to extreme weather conditions (Bouchama & Knochel, 2002). Though the effect is on all individuals equally, the significant casualty is the underprivileged who carry out labour-intensive occupations—those deprived of suitable rooftops and without medical assistance.

Objective

To understand the impact of heat waves on the key sectors of economy.

Impact of Heat Waves

The consequences of the heat waves have a tremendous impact on a country's economy. Individuals occupied with outdoor jobs are severely affected by heat waves. Delivery boys, construction workers, and security personnel to name a few. Those working indoors get affected due to the lack of a proper cooling system within the building. Factory workers and kitchen staff are examples. When temperature increases, there is a bearing on productivity. The prediction is that the continuing heat waves could reduce 5.8 per cent of the working hours, that is, around thirty-five million jobs. Employees fall sick due to harsh weather and do not report to work resulting in reduced productivity. The reduced working hours due to extreme heat have a cascading impact on the country's economy. A study by (Xia, et al., 2018) estimated a loss of 27.5 billion yuan in 2013 for a metropolitan city, Nanjing, in China, due to the extreme heatwave equal to about 4% of the gross production value of the city. Their study further

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remarked that the loss of productive time in plantation and mining areas has a more significant impact than on the service and manufacturing divisions. These revelations explain the severe consequences of heat waves. The disaster caused by heat waves persists for a relatively more extended period than floods or cyclones. The harm it causes to human health creates a more significant hazard to a country's economy (Xia, et al., 2018). The heat-induced morbidity and mortality rate is another way to calculate its impact on the economy. There are studies conducted in different countries revealing the higher rating of morbidity and mortality rate of heatwave cases and its impact on the economy e.g.:- Japan (Honda et al., 2007), Europe (Baccini et al., 2011) and the US (Anderson & Bell, 2011). Further, Barreca et al. (2016) identified the usage of air conditioners to reduce the mortality rate in the US, which had a positive impact on the economy as the purchase and usage of air conditioners increased from 85 billion dollars to 185 billion dollars.

There are reports in the media regarding the interruption of railway service or suspension of airway services due to the hotter railway tracks and runways. The usage of power is at its peak during extreme heat. Individuals try to maintain the room temperature by using air-conditioners, fans and room coolers. The excess consumption of it results in increased electricity prices. There are cases where power outages happen due to excess utilization of electricity. The power shortage affects the functioning of various industries. Indoor business is affected badly due to increased summer temperature due to this reason. It has a severe impact directly or indirectly on productivity, which will harm the country's economy.

Excess heat devastates the crops that are ready to harvest. The sprinklers can satiate the increasing temperature, but for most farmers, it may be an extra cost. The increasing temperature damages the wheat harvest as the temperature in the central and northern parts of India is touching 120 Fahrenheit. The heatwave affects the wheat-growing regions with temperatures ranging from 109F to 112F and above. Some wheat-growing states severely affected by heat waves are Uttar Pradesh, Punjab, and Madhya Pradesh. The crops are poorly affected due to the sudden increase in temperature from 32^{o}C to 41^{o}C in most of northern India. The current estimation is that 15 per cent of the wheat output would weaken due to the unbearable rise in temperature. Cumin is another crop that is poorly affected due to extreme

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temperatures. There is a reduction in the output in the cumin-producing states like Rajasthan and Gujarat. Apart from the struggle with high heat waves, there is severe difficulty in watering the produce and quenching the thirst of livestock.

Individuals become tired and exhausted due to high temperatures resulting in less production. Vulnerable individuals fall sick easily while working in the scorching sun. Such people develop illnesses in indoor and outdoor working conditions. The mortality rate increases due to heatstroke, heart attack, and other related conditions. The IMD statistics reveal that seventeen thousand Indians died past fifty years due to heat waves. Another report projected that more than six thousand individuals died between 2010 and 2018. Around 2000-3000 deaths occur in some countries like Britain and France due to the severe heat waves. The 2021 summer recorded the highest temperature in the Western countries. Heatwaves caused drought and wildfires in many states in the United States, increasing the mortality rate. Even Russia experienced a severe rise in temperature, which devastated the agriculture sector, causing a massive loss of about $ 1 billion. In 2013, a heatwave in Nanjing reduced the output by three per cent. However, another study revealed that when temperature increases above 38^{o}C, productivity decreases at a rate of 62 per cent. Schlenker and Roberts (2009). A study in the year 2011 found that consumption of household energy increases annually by 0.4 per cent when there is an increase in temperature above 90F (Deschênes & Greenstone, 2011)

The Indian Institute of Tropical Meteorology experts mentioned that the rise in heat waves is due to global warming affecting climatic change. Scholars have predicted that the continued rise in temperature globally causes injury to the global economy (Field et al., 2014). There is literature (Burke et al. 2009, Dell, Jones, and Olken 2012) warning about the negative economic growth of developing economies due to the rising temperature. The agricultural industry reveals a diminishing number in terms of output due to the heat waves. (Burke and Emerick 2016). These numerals are reflected in the GDP finally.

Another research (Krueger and Lindahl (2001) conducted on schoolchildren found that high-temperature impacts test scores. The test scores in mathematics have shown a tremendous decrease due to the increase in temperature beyond 21^{o}C, but this impact is negligible in the case of reading scores. The research concluded that different parts of the brain respond to heat differently. Even the students who retook the PSAT showed reduced scores when conducted

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during extremely high temperatures. Learning is reduced by one per cent when the temperature increases by 1F (Park et al., 2020).

Research stated that the early living environment impacts the individual capital outcome. The study states a negative correlation between an individual's economic outcome and the prenatal exposure to a mean temperature exceeding 32^{o}C (Isen et al., 2017). Those who can afford an air conditioner always have an advantage over others. Hence, the study confirms the relationship between the individual's economic condition and overcoming extreme temperatures. The increased use of air conditioners augments energy consumption. It is estimated that the energy consumption will increase to 83 per cent by 2100. The demand for the source of energy depends on its usage of it. Research confirms that the temperature increase has an impact on the economy of a country (Barreca, Olivier and Melanie (2015)

The Positive Side

Though heatwaves have negative impacts, there are some advantages related to them. Some diseases (which diseases) can be kept at bay due to the intense sunshine; this helps such individuals to remain healthy. There are some products which are consumed in plenty. Ice creams, cold drinks, iced foodstuffs and certain frozen fruits are consumed in high quantities, improving the financial status of such companies. Domestic tourism has a boom during these seasons in some places. Companies manufacturing fans, room coolers, and air conditioners gain during this period as demand is very high.

Conclusion

As global warming intensifies, the coming days and nights will be hotter, and heat waves will become recurrent and severe. Occurrence of illness and death increases. Prolonged heat waves damage crops and kill livestock. Though some industries flourish, the impact is dangerous when viewed from any other angle. The time has come to seriously take action to beat the climatic changes due to our deeds. The solution is to combat the devastating situation with what is required for the rejuvenation of the mind and soul.

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