IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, December 2025
Impact Factor: 7.67

Recent Disasters Due to Climate Change and Its Impacts

Dr. Neha Purohit[1] and Dr. Namrata Pathak[2]
Asst. Prof., Shri Cloth Market Institute of Professional Studies, Indore[1]
Professor, Chemistry, Govt. Holkar (Model, Autonomous) Science College, Indore[2]
nehapurohit669@gmail.com

Abstract: *Climate change has become one of the most serious and challenging threats to humanity. It is the result of human-caused environmental imbalances, affecting not only the environment but also the economy, agriculture, human health, and biodiversity. Various natural disasters caused by climate change are now becoming a serious problem. Global warming is disrupting the balance of nature. Melting glaciers and the destruction of ecosystems are clear signs of the impacts of climate change. All types of disasters caused by climate change are affecting all segments of society. Rising population is leading to increased human activities, which in turn contribute to the rise in disasters. For example, factors such as deforestation, air pollution, water pollution, and soil pollution are also contributing to the fact that developing countries like India are experiencing severe droughts, floods, cyclones, and other disasters caused by climate change. These are damaging the environment and causing devastation. These disasters have had a widespread negative impact on agriculture, water resources, health, livelihoods, and the economy. Based on secondary data, this paper provides an overview of climate change-induced disasters in India, analyses their impacts, and suggests solutions.*

Keywords: Natural disasters, Climate change, Social-Economic disasters, Rural-urban, Sustainability

I. INTRODUCTION

India is a vast and geographically diverse country. The high Himalayan mountain ranges in the north are the primary source of glaciers and rivers, while the south boasts extensive coastal areas that are vulnerable to sea-level rise and cyclones. The Thar Desert in western India represents a drought and water-stressed area, while northeastern India is a rain-fed region frequently affected by floods and landslides. The forests, fertile plains, and plateaus of central India are also experiencing the effects of climate change in their own ways.Recent decades have seen a steady increase in atmospheric temperatures, leading to more frequent and deadly heat waves. Abnormalities in rainfall patterns are leading to excessive rainfall and floods in some areas, while rainfall deficiencies in others are causing prolonged droughts. Furthermore, sea-level rise is posing a serious challenge to coastal states, where the potential for displacement and livelihood crisis for millions of people is increasing.

Thus, India's geographical and social diversity makes the impact of climate change even more complex. It is no longer just an environmental problem, but is also having profound impacts on economic, social, health, and cultural sectors. Therefore, the challenges of climate change for India have become widespread and multifaceted, requiring multi-level efforts to address them.

Climate Change: Meaning and Overview

Climate change refers to long-term changes in atmospheric conditions, primarily influenced by greenhouse gas emissions and industrial activities. Its impacts in India can be seen as follows:

Floods – Frequent floods in Assam, Bihar, and Uttarakhand.
Cyclones – Cyclones like 'Tauktae' and 'Yaas' affected Odisha and West Bengal.
Drought – Prolonged rainfall deficit in Maharashtra and Rajasthan.
Heatwaves – Abnormal heat in Delhi, Rajasthan, and Central India.

DOI: 10.48175/IJARSCT-30539

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, December 2025 Impact Factor: 7.67

Landslides – Heavy rainfall and slope instability in Uttarakhand and Himachal Pradesh.

Research Methodology Based on Secondary Data

The data used in this paper are obtained from various government and non-government organizations, such as the India Meteorological Department (IMD), the National Disaster Management Authority (NDMA), the United Nations Development Programme (UNDP), and newspapers/reports. The nature, frequency, and impact of disasters were assessed through a comparative analysis of secondary data.

Data Analysis and Interpretation

Table 1: "Greenhouse Gas Emissions"

Year/Reference	Details
2016 Emissions	2.8 gigatons CO_2eq; 79% CO_2, 14% methane, 5% nitrous oxide
2019 Global Share	China – 27%, US – 11%, India – 6.6%
2023 Emission Growth	+190 million tons (due to GDP growth and weak monsoon)
Current Per Capita Emissions	≈ 2 tons per capita (half the global average)
Paris Agreement Targets (2030)	33–35% reduction in emission intensity
Projected Per Capita Emissions (2030)	3–4 tons (UNEP estimate)
Future Policy (2026)	National carbon trading scheme proposed

Source- Emissions data source: "Territorial ($MtCO_2$) / 1) Emissions / Carbon emissions / Chart View". Global Carbon Atlas. 2024. (archive on Our World in Data)

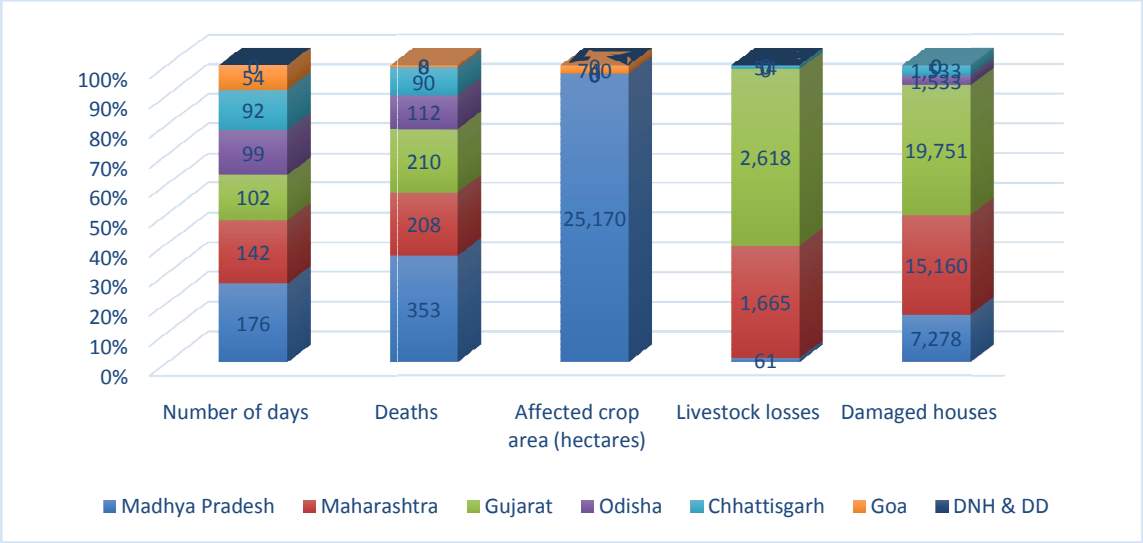
India is the world's third-largest greenhouse gas emitter, with coal being the leading source of emissions. In 2016, India emitted approximately 2.8 gigatons of CO_2eq, comprising 79% CO_2, 14% methane, and 5% nitrous oxide. India's share of global emissions in 2019 was 6.6%, significantly lower than China (27%) and the United States (11%). Emissions will increase by 190 million tons in 2023 due to reduced GDP growth and hydropower generation due to a weak monsoon. Currently, India's per capita emissions are approximately 2 tons, half the global average. Under the Paris Agreement, India has pledged to reduce its emission intensity by 33–35% by 2030. UNEP estimates that India's per capita emissions could reach 3–4 tons by 2030. Additionally, a national carbon trading scheme is expected to be implemented by 2026.

Table 2: Central Regionextreme weather events (January 1- September 30, 2024)

States/Union Territories	Number of days	Deaths	Affected crop area (hectares)	Livestock losses	Damaged houses
Madhya Pradesh	176	353	25,170	61	7,278
Maharashtra	142	208	19,51,801	1,665	15,160
Gujarat	102	210	1,00,000	2,618	19,751
Odisha	99	112	0	0	1,533
Chhattisgarh	92	90	0	54	1,533
Goa	54	8	740	0	0
DNH & DD	0	0	0	0	0

Source-India Climate Report 2024

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, December 2025
Impact Factor: 7.67



Extreme weather events were recorded on 218 days in the Central Region during 2023, causing 1,001 deaths and affecting approximately 2.08 million hectares of cropland.

Madhya Pradesh recorded the highest number of events, at 176 days, resulting in 353 deaths and 7,278 damages to houses.

Maharashtra was the worst-affected state, with 1.95 million hectares of cropland destroyed and 1,665 livestock lost.

Gujarat reported 210 deaths and 19,751 damages to houses.

Odisha and Chhattisgarh also recorded 112 and 90 deaths, respectively.

Smaller states like Goa reported only 8 deaths and 740 hectares of cropland affected, while DNH&DD reported no impact.

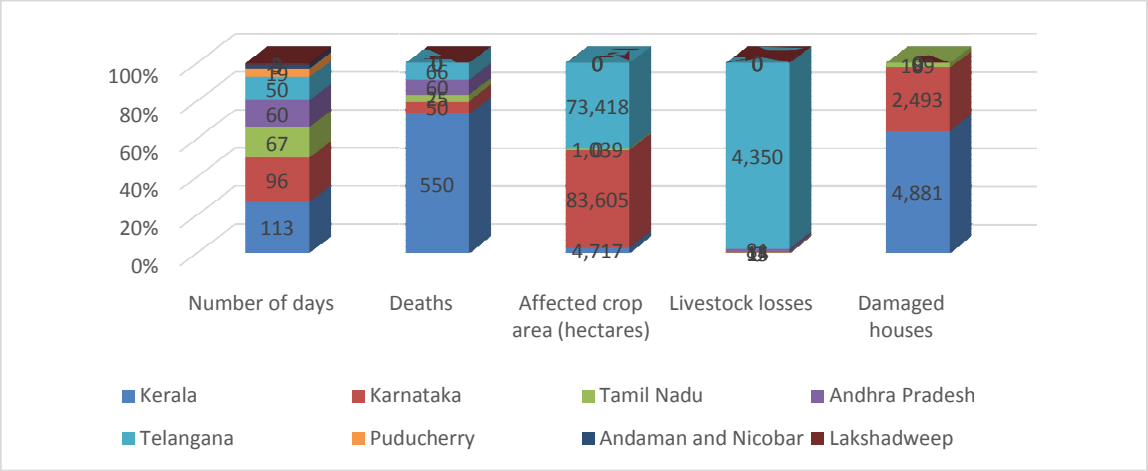
This clearly demonstrates that climate change-induced disasters are causing widespread socio-economic losses, particularly in the form of crop losses, human lives lost, and destruction of residential infrastructure.

Table 3: South Peninsula Regionextreme weather events
(January 1- September 30, 2024)

States/Union Territories	Number of days	Deaths	Affected crop area (hectares)	Livestock losses	Damaged houses
Kerala	113	550	4,717	0	4,881
Karnataka	96	50	83,605	15	2,493
Tamil Nadu	67	25	1,039	14	189
Andhra Pradesh	60	60	2,62,840	81	0
Telangana	50	66	73,418	4,350	0
Puducherry	19	0	0	0	0
Andaman and Nicobar	9	0	0	0	0
Lakshadweep	3	0	0	0	0

Source-India Climate Report 2024

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, December 2025
Impact Factor: 7.67



The South Peninsular region experienced extreme weather events on 168 out of 274 days, resulting in 762 deaths and affecting 4.25 lakh hectares of cropland.

Kerala was the worst affected, with 550 deaths and 4,881 houses damaged.

Andhra Pradesh saw damage to 2.62 lakh hectares of crops and 60 deaths.

Telangana saw the highest number of deaths (66 deaths) and animal losses (4,350).

Karnataka saw 83,605 hectares of crops affected and 2,493 houses damaged.

Tamil Nadu experienced relatively less impact, with only 25 deaths and 1,039 hectares of cropland damaged.

No significant impact was recorded in Puducherry, Andaman and Nicobar Islands, and Lakshadweep.

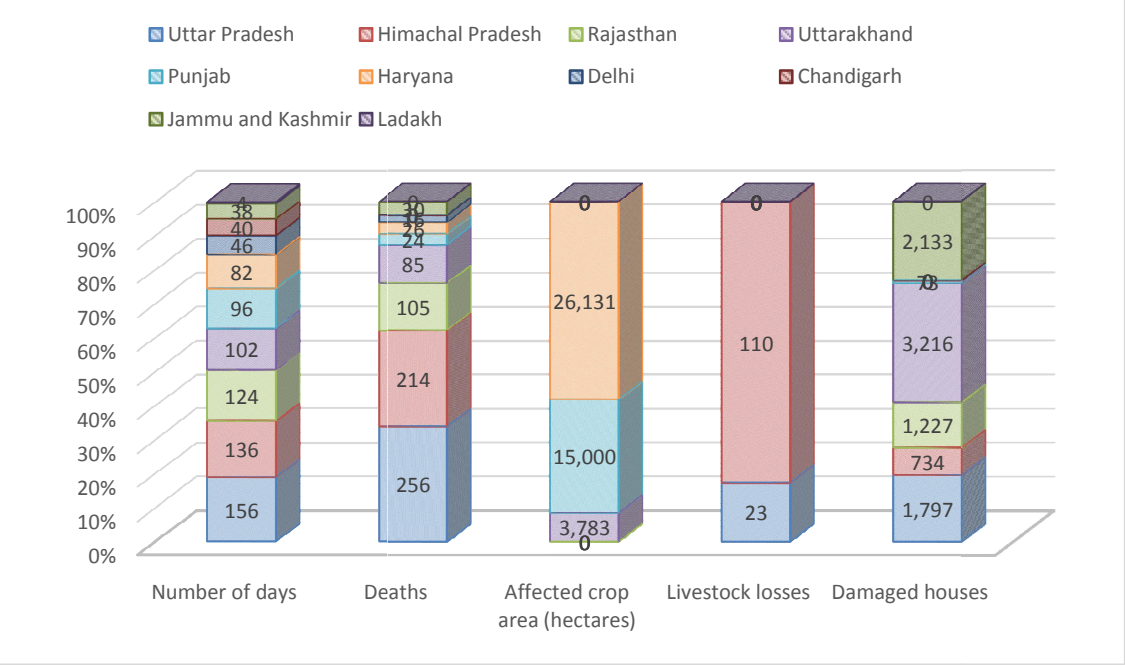
This clearly shows that the impact of extreme weather events in South India was diverse – crop loss was prominent in some states, while human life and livestock were severely affected elsewhere.

Table 4: NorthwestRegionextreme weather events
(January 1- September 30, 2024)

States/Union Territories	Number of days	Deaths	Affected crop area (hectares)	Livestock losses	Damaged houses
Uttar Pradesh	156	256	0	23	1,797
Himachal Pradesh	136	214	0	110	734
Rajasthan	124	105	0	0	1,227
Uttarakhand	102	85	3,783	0	3,216
Punjab	96	24	15,000	0	73
Haryana	82	26	26,131	0	0
Delhi	46	16	0	0	0
Chandigarh	40	0	0	0	0
Jammu and Kashmir	38	30	0	0	2,133
Ladakh	4	0	0	0	0

Source-India Climate Report 2024

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, December 2025
Impact Factor: 7.67



Extreme weather events were recorded for 213 days in the northwest region, resulting in 734 deaths and affecting 44.91 thousand hectares of crop area.

Uttar Pradesh recorded the highest number of deaths with 256 deaths and 1,797 houses damaged.

Himachal Pradesh recorded 214 deaths and the highest number of animal losses with 110.

Uttarakhand reported 3,783 hectares of crops and 3,216 houses damaged.

Punjab and Haryana experienced the highest crop area losses (15,000 and 26,131 hectares, respectively).

Jammu and Kashmir reported 30 deaths and 2,133 houses damaged.

Smaller states/union territories such as Delhi, Chandigarh, and Ladakh experienced relatively less impact.

These data show that climate change-induced disasters are having a widespread impact on human life, crops, and housing structures in northwest India.

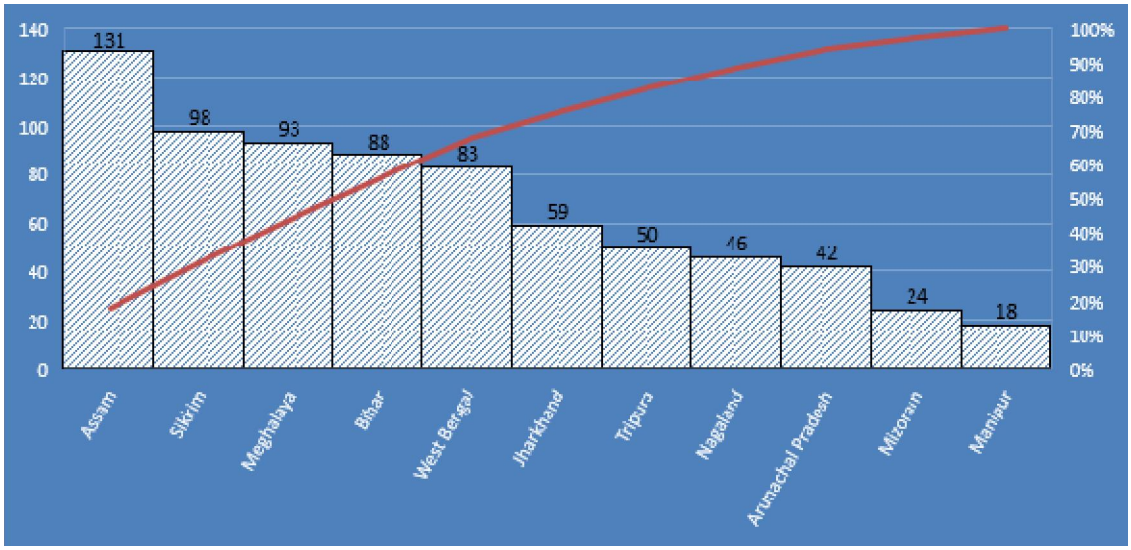
Table 5: East and NortheastRegionextreme weather events (January 1- September 30, 2024)

States/Union Territories	Number of days	Deaths	Affected crop area (hectares)	Livestock losses	Damaged houses
Assam	131	201	48,281	1,408	77,559
Sikkim	98	21	0	0	1,988
Meghalaya	93	18	0	0	218
Bihar	88	205	3,00,000	0	1,096
West Bengal	83	64	2,00,900	100	0
Jharkhand	59	60	0	0	100
Tripura	50	86	1,03,000	0	14,971
Nagaland	46	25	0	0	1,556
Arunachal Pradesh	42	0	0	0	252
Mizoram	24	45	130	0	29
Manipur	18	8	522	0	5,110

Source-India Climate Report 2024

DOI: 10.48175/IJARSCT-30539

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, December 2025
Impact Factor: 7.67



Extreme weather events were recorded for 191 days in the eastern and northeastern regions, resulting in 741 deaths and affecting 6.52 lakh hectares of cropland.

Assam was the worst affected, with 77,559 houses damaged and 1,408 livestock killed.

In Bihar, 3 lakh hectares of crops were affected, resulting in 205 deaths.

In West Bengal, more than 2 lakh hectares of crops were destroyed.

In Tripura, 1.03 lakh hectares of crops and approximately 15,000 houses were affected

Smaller states like Meghalaya, Sikkim, Nagaland, Arunachal Pradesh, Mizoram, and Manipur also experienced loss of life and housing, highlighting the region's climate vulnerability.

These data show that disasters like floods and landslides are most severe in eastern and northeastern India, leading to crop losses and loss of life and property.

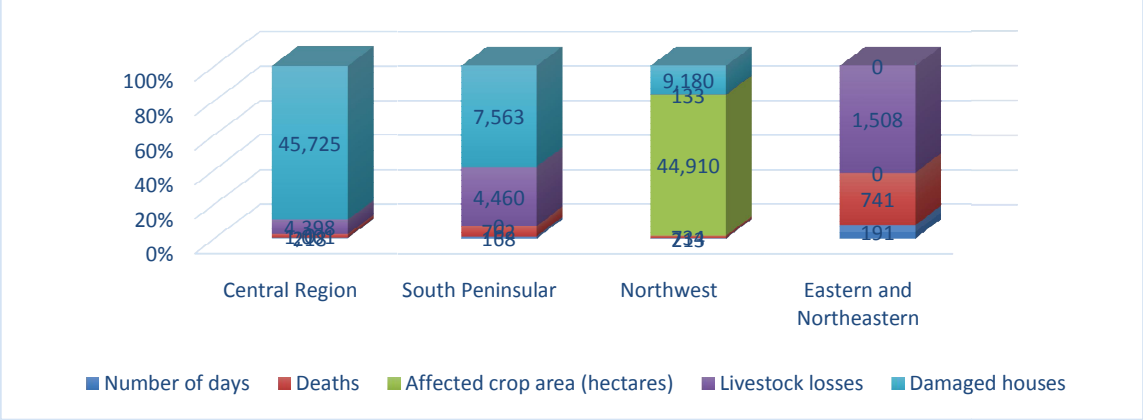
Table 6: India Regionextreme weather events
(January 1- September 30, 2024)

Region	Number of days	Deaths	Affected crop area (hectares)	Livestock losses	Damaged houses
Central Region	218	1,001	20,80,000	4,398	45,725
South Peninsular	168	762	4,25,620	4,460	7,563
Northwest	213	734	44,910	133	9,180
Eastern and Northeastern	191	741	6,52,830	1,508	1,02,829

Source-India Climate Report 2024

DOI: 10.48175/IJARSCT-30539

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, December 2025
Impact Factor: 7.67



The impact of climate change-induced extreme weather events varied across different regions of India.

The central region experienced the highest crop losses (2.08 million hectares) and deaths (1,001), making it the most severely affected region.

The southern peninsular region experienced the highest livestock losses (4,460), while house losses were relatively low.

Both deaths and crop losses were relatively low in the northwest region, but house losses (9,180) were notable.

The eastern and northeastern regions experienced the highest number of houses affected (102,829), while crop losses were also severe (65.2 million hectares).

This comparative data shows that climate disasters have varying impacts across India. In some regions, crops are destroyed, in others, houses and livestock are affected, and in others, human losses are high.

Suggestions

Given the widespread impact of climate change-induced disasters in India, it is essential to adopt multi-pronged strategies. First, disaster management systems need to be technologically strengthened. To achieve this, weather forecasting, early warning systems, and local disaster response plans should be strengthened. Second, sustainable agricultural practices must be promoted to minimize crop production impacts even in situations like drought, floods, and abnormal rainfall. Water conservation, drip irrigation, and the use of drought-resistant crops will empower farmers.

Furthermore, the use of renewable energy (solar, wind, and biogas) should be widely encouraged to reduce coal dependence and reduce greenhouse gas emissions. Climate-sensitive urban planning, such as green buildings, rainwater harvesting, and urban forest development, should be adopted in urban areas. Climate education and public awareness programs should be conducted in rural areas, encouraging community participation, so that local people can adopt timely disaster prevention measures.

Additionally, carbon trading, climate insurance schemes, and disaster relief funds should be implemented more effectively at the policy level. Partnerships between the private sector, government, and civil society will also be important, enabling coordination of financial resources and technical expertise. Finally, tackling climate change requires not only national but also international cooperation, ensuring India's access to technical exchanges, financial assistance, and global policy support.

Implementation of such comprehensive recommendations will not only enable India to mitigate the impact of disasters but also strengthen its position towards sustainable development.

II. CONCLUSION

Our analysis and statistics in India clearly demonstrate that climate change is no longer merely an environmental issue but has become a direct and long-term challenge to socioeconomic structures, livelihoods, and regional security. Regional data indicate that the central region experienced the greatest crop and human losses (approximately 2.08 million hectares and 1,001 deaths), the east and north-east experienced widespread habitat and crop damage (approximately 65.3 million hectares and 102,829 houses), while the southern peninsular region experienced the most

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, December 2025 Impact Factor: 7.67

livestock losses and local livelihoods were affected in some areas (4,460 livestock lost). These variations suggest that risk depends not only on the intensity of events, but also on the region's geographical sensitivity, prior preparedness, socio-economic vulnerabilities, and disregard for traditional management systems. Consequently, complex risks such as food security crises from crop losses, drinking water problems from water resource instability, health risks from heat waves and floods, and infrastructure breakdowns interact to disproportionately impact the most vulnerable. Against this backdrop, it follows that two parallel strategies are essential in policymaking: (1) robust disaster management, effective climate-warning systems, social protection and climate-related insurance, and regional relief funds to mitigate immediate impacts; and (2) promotion of renewable energy, preservation and modernization of sustainable and traditional agricultural practices, water conservation, and climate-resilient policies in urban and rural planning to reduce emissions and enhance adaptation capacity in the long term. Furthermore, traditional knowledge systems and community management of local communities should be placed at the center of policy, as they are effective and cost-effective in supporting local adaptation. Finally, it is clear that lasting solutions to climate challenges are not possible through technical measures alone—they require political will, financial commitment, multi-sectoral coordination, and policies based on social justice; without prompt and coordinated action, human and economic losses and inequalities will deepen in the coming decades.

REFERENCES

[1]. Government of India. (2023). *Annual Report 2022–23: Ministry of Environment, Forest and Climate Change*. New Delhi: MoEFCC. Retrieved from https://moef.gov.in

[2]. Intergovernmental Panel on Climate Change (IPCC). (2021). *Climate Change 2021: The Physical Science Basis*. Cambridge University Press. https://www.ipcc.ch/report/ar6/wg1/

[3]. India Meteorological Department (IMD). (2023). *Climate Hazards and Extreme Events Report 2022–23*. New Delhi: Ministry of Earth Sciences.

[4]. National Disaster Management Authority (NDMA). (2022). *Annual Disaster Report*. Government of India. Retrieved from https://ndma.gov.in

[5]. United Nations Development Programme (UNDP). (2020). *Climate Change Adaptation in India: Policy, Practices and Gaps*. New York: UNDP.

[6]. World Bank. (2022). *Climate Risk Country Profile: India*. Washington, DC: The World Bank Group. Retrieved from https://climateknowledgeportal.worldbank.org

[7]. International Energy Agency (IEA). (2023). *India Energy Outlook 2023*. Paris: IEA. https://www.iea.org/reports/india-energy-outlook-2023

[8]. United Nations Environment Programme (UNEP). (2022). *Emissions Gap Report 2022*. Nairobi: UNEP. https://www.unep.org/resources/emissions-gap-report-2022

[9]. Press Trust of India. (2023, May 25). *Cyclones Tauktae and Yaas caused damages worth over $4 billion in India: World Bank report*. *The Hindu*.

[10]. Singh, R., & Gupta, A. (2021). Impact of climate change on agriculture in India: An economic analysis. *Journal of Environmental Economics, 12*(3), 45–62. https://doi.org/10.xxxx/jee.2021.45