

# **IMPACT OF CLIMATE CHANGE AND ITS IMPORTANCE ON HUMAN PERFORMANCE**



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**Kripa Drishti Publications, Pune.**

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## **PREFACE**

Thermal comfort is that condition, which expresses satisfaction with the thermal environment. Alternatively, the zone of thermal comfort is the span of conditions where 80% of sedentary or slightly active persons find the environment thermally acceptable. Whereas high temperatures and humidity provide discomfort sensations and sometimes heat stress. Therefore, the evaluation of the thermal sensation is often a crucial matter for outdoor working environments. Thermal sensation depends on the subject-environment heat transfer which is strictly related to subjective variables (metabolic rate and clothing thermo-physical properties) and four environmental variables (air temperature, mean radiant temperature, air velocity and relative humidity), according to the energy balance equation. Since long, the temperature-humidity index (THI), and the wet bulb globe temperature (WBGT) were used for evaluating heat stress levels; and the predictive mean vote (PMV) was used for evaluating human thermal comfort. The physiological effective temperature (PET) and the universal thermal climatic index (UTCI) were used for evaluating thermal comfort and heat stress as well; both being in the temperature scale. PET, a thermal index that gives an estimation of the thermal sensation, the corresponding heat stress level and the standard effective temperature (SET) index describes the relationship between thermal sensation and discomfort. Earlier studies reported that, increase in local ambient temperature during hot and humid seasons in the world could create unhealthy environments for people who are not able to protect themselves; both general living environments and working environments are affected. The risks of excessive heat exposure are greater in tropical developing countries where large work forces perform manual and heavy tasks for long periods under very hot and humid conditions with minimal access to cooling intervention; India, being a tropical country is no exception to it. Moreover, the agricultural work is most commonly seasonal, and during summer harvest, workers often spend long hours under hot and humid condition, performing arduous physical labour. Moreover, adverse thermal environment at work is further being aggravated by the phenomenon of global warming which is affecting all walks of our life, including living and working environments, and in the process creating health threats for millions of people worldwide. Over the last 100 years, the average temperature of the air near the Earth's surface has risen by a little less than 1°C and it is estimated to go up further by 1.8 to 4.0 °C (estimated average 3.0°C) by 2100 AD depending on actions to limit GHG emissions. The human resources who are exposed to excessive heat in course of their livelihood earning, especially in low and middle income tropical countries, are at highest risk in respect of their health and wellbeing. India being a tropical country is no exception to it. The impact of rise in ambient

temperature is not confined to agricultural output; it has an impact on the work performance of human being associated with occupational activities in informal sector especially those carried out in the open under the sky particularly agriculture. Hence rise in ambient temperature, a major determinant of thermal aspect of working environment, may have some impact on the health status of the individuals working in the open – air non mechanized agricultural field daily for a considerable period of time. India is characterized by strong temperature variations in different seasons ranging from mean temperature of about 10°C in winter to about 40°C in summer season. The temperatures start to increase all over the country in March and by April central Indian land mass becomes hot with daytime maximum temperatures reaching about 40°C at many locations. And there are reports that physical work capacity and work-performance are getting affected due to adverse thermal conditions prevailing in the working environment in different occupations including agriculture.

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# CONTENT

<b>1. Insights on Impact of Climate Change and Adaptation of Biodiversity - <i>Prashantkumar B. Sathvara, J. Anuradha, Sandeep Tripathi, R. Sanjeevi</i>.....</b>	<b>1</b>
1.1 Introduction:.....	1
1.2 Projected Climate Change: .....	4
1.3 Implications of Climate Change On Biodiversity: .....	5
1.4 Impact of Climate Change On Biodiversity of Natural Ecosystems:.....	5
1.5 Climate Change and Biodiversity: .....	5
1.6 Adaptation:.....	6
1.7 Conclusion: .....	7
1.8 Reference: .....	8
<b>2. Impacts of Climate Change on public health: Concerns and Options - <i>Pooja Arora, Smita Chaudhry</i> .....</b>	<b>10</b>
2.1 Introduction:.....	10
2.2 Effects of Climate Change On Human Health:.....	11
2.2.1 Heat-Related Illnesses: .....	12
2.2.2 Air Pollution: .....	12
2.2.3 Waterborne Diseases: .....	13
2.2.4 Food and Water Scarcity: .....	13
2.2.5 Mental Health: .....	14
2.2.6 Vector-Borne Diseases:.....	14
2.2.7 Allergies and Other Respiratory Conditions: .....	15
2.2.8 Mitigation of Climate Change in Context of Public Health:.....	15
2.3 Conclusion: .....	16
2.4 References:.....	16
<b>3. Climate Change and Biodiversity - <i>Rajabhuvaneswari Ariyamuthu, S.Lavanya</i> .....</b>	<b>18</b>
3.1 Introduction:.....	18
3.2 Climate Change:.....	19
3.3 Various Biodiversity and Related Climate Change:.....	20
3.3.1 Island Biodiversity and Climate Change:.....	20
3.3.2 Dry and Sub-Humid Lands Biodiversity and Climate Change: .....	20
3.3.3 Polar Biodiversity and Climate Change:.....	21
3.3.4 Forest Biodiversity and Climate Change: .....	21
3.3.5 Marine and Coastal Biodiversity and Climate Change: .....	22

3.3.6 Mountain Biodiversity and Climate Change: .....	22
3.3.7 Inland Waters Biodiversity and Climate Change:.....	22
3.3.8 Agricultural Biodiversity and Climate Change: .....	23
3.4 Effects of Recent Climate Change On Biodiversity:.....	24
3.4.1 Higher Temperatures: .....	24
3.4.2 Coral Bleaching: .....	24
3.4.3 Co <sub>2</sub> Expansion and Plant Growth: .....	24
3.5 Water Resources and Rise in Sea Level: .....	24
3.6 Effects of Climate Change On People:.....	25
3.7 Conclusion .....	25
3.8 References:.....	26

#### **4. Impact of Climate Change On Human Health and Communities -**

*Dr. Ravindra Singh, Shalini Tiwari, Pushpa Tripathi* ..... 27

4.1 Introduction:.....	27
4.2 Climate and Human Health: An Ancient Time:.....	29
4.3 Climate Change and Extreme Weather:.....	29
4.3.1 Main Convention On Climate Change: .....	30
4.4 Global Climate Change and Human Health:.....	31
4.4.1 Global Climate and Green House Effect:.....	31
4.4.2 Change On Aquatic Ecosystems in Alaska: .....	32
4.4.3 Traditional Environmental Health: .....	32
4.4.4 Global Climate and Civilization: .....	32
4.5 Climate Change in India: .....	33
4.5.1 Effect of climate change in India: .....	33
4.6 International Consensus On Global Climate Change: .....	35
4.7 Role of Climate Factors On Human Health: .....	35
4.7.1 Air Quality and Related Health Effects:.....	36
4.7.2 Water and Infectious Diseases: .....	36
4.7.3 Vector-Borne Infectious Diseases:.....	37
4.7.4 Impact of Heat Stress: .....	37
4.7.5 Health Impacts of Other Types of Global Environmental Change:..	37
4.8 Potential Health and Climate Change:.....	38
4.9 Adaptation and Climate Change: .....	39
4.9.1 Adaptive Capacity:.....	40
4.10 National Assessments of Health Impacts of Climate Change:.....	40
4.11 Effect of Climate Change On Community Structure:.....	42
4.12 Challenges for Scientists Studying Climate Change and Health: .....	43
4.13 Reference: .....	43

#### **5. Mitigating the Impact of Climate Change on Human Performance -**

*Dr. Neha Shekhawat*..... 47

5.2 Strategies for Mitigating the Impact of Climate Change on Human Performance: .....	48
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5.2.1 Adaptation Strategies: .....	48
5.2.2 Health Interventions:.....	48
5.2.3 Education and Awareness: .....	49
5.2.4 Green Initiatives:.....	50
5.2.5 Policy Changes: .....	51
5.3 Conclusion: .....	51
<b>6. Climate Change Impacts on Human beings - Saif Mohammed Saleh Ansari, Bhagyashree Keshewani, Kambhoji Manju Bhargavi, S. Ravichandran, R. M. Madhumitha Sri .....</b>	<b>52</b>
6.2 Factor Affecting Climate Change: .....	54
6.3 Impact of Climate Change on Human Health:.....	54
6.3.1 Alzheimer’s Disease (AD): .....	55
6.3.2 Parkinson’s Disease: .....	56
6.3.3 Cardiovascular Disease: .....	57
6.3.4 Multiple Sclerosis: .....	58
6.3.5 Chronic Obstructive Pulmonary Disease (COPD):.....	58
6.3.6 Tuberculosis (TB): .....	59
6.4 Discussion: .....	60
6.5 References:.....	61
<b>7. Soil Pollution and its Adverse Effects on Human Health - Kambhoji Manju Bhargavi, S. Ravichandran, Archana Rai, Jyoti Rajput.....</b>	<b>64</b>
7.2 Causes of Soil Pollution: .....	65
7.3 Impacts of Soil Pollution: .....	66
7.4 Soil Pollution Prevention:.....	67
7.5 Conclusion: .....	68
7.6 References:.....	68
<b>8. Environmental Sustainability Through Rain Water Harvesting - Nikita Sharma,S.Ravichandran, Tejasvi Pandey .....</b>	<b>70</b>
8.1 Introduction:.....	71
8.2 Need for Rainwater Harvesting:.....	72
8.3 Conclusion: .....	74
8.4 References:.....	74
<b>9. Environmental Degradation and Human Health – Nandini Kundu,S.Ravichandran .....</b>	<b>76</b>
9.1 Introduction:.....	77
9.3 Air Pollution:.....	77
9.3 Water Pollution: .....	78
9.4 Toxic Pollutants: .....	79



9.5 Deforestation:.....	80
9.6 Solid Waste Pollution:.....	80
9.7 Global Warming:.....	81
9.8 Drought, Desertification, And Water Scarcity:.....	81
9.9 Conclusion .....	81
9.10 References:.....	82

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