M. A. KHALID, D. S. MALIK, R. A. BALIKAI,
BASEEM TAMINI, K. K. YADAV & P. R. YADAV *Editors*

## ENVIRONMENTAL PROBLEMS, PROTECTION AND POLICIES

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This book on "Environmental Problems, Protection and Policies" goes on to highlight the unfavourable conditions created by the human approach to nature. In other words, this book highlights what environmental pollution is! It can be understood how important the issue of environmental pollution is in the situation where even the air we breathe is threatened with pollution. The book contains 30 chapters encompassing different aspects of environmental problems, protection, and policy issues. This book summarizes the Green technologies for sustainable development, Soil pollution, Microplastic pollution in the aerial, soil and marine ecosystem, Plastic pollution, Water pollution, Ozone layer depletion, Biodiversity loss, Air pollution, Marine pollution, Deforestation, Acid rain, Environment degradation and disasters, Human impact on the environment, Pollution and its impact on animal and human health, and Light pollution as the driving force behind loss of biodiversity.

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# CLIMATE RESILIENCE: BASIC CONCEPTS AND UNDERSTANDING FOR CLIMATIC STUDY

**Ambrina Sardar Khan[1]*, Mohd. Kashif Khan[1] and Prateek Srivastava[2]**

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**ABSTRACT : Climate resilience is a crucial concept in the face of increasing climate change impacts. As global temperatures rise, extreme weather events become more frequent and sea levels continue to rise, societies and ecosystems are at greater risk. Climate resilience encompasses a set of strategies and measures aimed at building the capacity of systems and communities to adapt, withstand and recover from these impacts. This abstract provides an overview of the key aspects related to climate resilience. The chapter begins by defining climate resilience as the ability of a system or community to anticipate, absorb, adapt to and recover from climate change impacts, while maintaining essential functions and structures. It emphasizes the integration of climate considerations into decision-making processes, the implementation of adaptation and mitigation measures and the promotion of sustainable development practices. Basic concepts related to climate resilience are then presented. These concepts include adaptation, which involves adjusting to reduce vulnerability and increase resilience; mitigation, which focuses on reducing greenhouse gas emissions to limit climate change; vulnerability, which refers to the susceptibility of a system or community to climate change impacts; and resilience-building, which entails implementing strategies to enhance capacity to withstand and recover from climate change. The other important concepts highlighted in the chapter include risk assessment, which evaluates potential climate-related risks and their impacts; adaptive capacity, which relates to the ability to adjust and respond to climate change; cross-sectoral collaboration, emphasizing the importance of integrating efforts across different sectors and stakeholders; nature-based solutions, which harness ecosystem functions to enhance resilience; climate justice, ensuring equitable distribution of costs and benefits; and long-term planning, considering future scenarios and developing strategies for changing conditions. The chapter provides a comprehensive overview of climate resilience, highlighting its importance in addressing climate change impacts. Understanding and implementing the basic concepts related to climate resilience is crucial for building a sustainable and resilient future.**

***Key words :*** Climate resilience, terminology, adaptation, mitigation, vulnerability.

## Introduction

Climate resilience has become a critical concept in addressing the challenges posed by climate change. As the Earth's climate continues to change, societies and ecosystems face increased risks and vulnerabilities. Climate resilience encompasses a range of strategies and measures aimed at building the capacity of systems and communities to adapt, withstand and

recover from the impacts of climate change. It involves integrating climate considerations into decision-making processes, implementing adaptation and mitigation measures and promoting sustainable development practices.

Climate resilience can be defined as the ability of a system or community to anticipate, absorb, adapt to, and recover from the impacts of climate change, while maintaining essential functions and structures. It involves developing strategies and implementing actions to reduce vulnerability and enhance adaptive capacity. Climate resilience is a comprehensive approach that encompasses various sectors, including infrastructure, agriculture, ecosystems, economies, and human well-being. It recognizes the interconnectedness of social, economic and environmental systems and aims to promote sustainable and resilient development pathways (Werners *et al*, 2021).

**Different Definitions by many Organizations**

1. "The ability of a system or community to anticipate, absorb, adapt to and recover from the impacts of climate change, while maintaining its essential functions, structures and identity" (Intergovernmental Panel on Climate Change, IPCC 6$^{th}$ Assessment Report).
2. "The capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure, while also maintaining the capacity for adaptation, learning, and transformation" (IPCC, 2022).
3. "The capacity of a social-ecological system to absorb disturbances, undergo change, and reorganize while retaining essentially the same function, structure, identity and feedbacks" (National Academies of Sciences, Engineering and Medicine, Report, 2021).
4. "The ability of a system or community to effectively cope with, adapt to, and recover from the impacts of climate change in a way that protects and enhances overall well-being, minimizes inequalities and maintains ecological integrity" (United Nations Framework Convention on Climate Change, UNFCCC).
5. "The capacity of individuals, communities, institutions, businesses, and systems within a geographic area to survive, adapt and grow despite the chronic stresses and acute shocks they may experience" (Rockefeller Foundation).
6. "The ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate, including shocks, such as extreme weather events and stresses, such as gradual environmental changes" (United Nations Development Programme, UNDP).
7. "The capacity to maintain or transform system functioning in the face of external stressors, enabling the continued provision of critical ecosystem services and supporting sustainable development" (Convention on Biological Diversity).
8. "The ability of a system or community to persistently maintain or regain its functions, structures, and identity, while also adapting and transforming in response to changes and disturbances related to climate" (World Bank).

9. "The capacity of a system or community to absorb and recover from disturbances and adapt to changing conditions, while maintaining key functions and structures and minimizing the risk of reaching critical thresholds or irreversible changes" (Global Resilience Partnership).
10. "The ability of systems and societies to navigate, absorb, and adapt to changes, disturbances and shocks, while continuously learning, innovating, and transforming in pursuit of sustainability" (Resilience Alliance).

**Concepts of Climate Resilience :** Climate resilience refers to the ability of individuals, communities, organizations, and systems to anticipate, prepare for, respond to, and recover from the impacts of climate change and related environmental stressors. It involves building adaptive capacity and implementing strategies to minimize the adverse effects of climate change, while also seizing opportunities that might arise from a changing climate (Vivekananda *et al*, 2014).

**Cross-sectoral Collaboration :** Climate resilience requires collaboration and coordination across different sectors and stakeholders. It involves integrating climate considerations into various decision-making processes, promoting knowledge sharing, and fostering partnerships between governments, communities, businesses, and civil society organizations (Pollock *et al*, 2019).

Some of the initiatives could be:

1. **Nature-based Solutions :** Nature-based solutions involve utilizing the functions and services provided by ecosystems to enhance climate resilience. This approach emphasizes the conservation, restoration, and sustainable management of natural resources and ecosystems to provide benefits such as flood protection, water regulation, carbon sequestration, and biodiversity preservation (Nature-Based Solutions Policy Platform, 2018).
2. **Long-term Planning :** Climate resilience necessitates a strategic and forward-thinking stance, encompassing the evaluation of future climate projections, the analysis of enduring risks and consequences, and the formulation of adaptive strategies accommodating evolving conditions (Adger *et al*, 2013; Hinkel *et al*, 2013). To fortify against climate challenges, an enduring planning framework is essential, entailing the anticipation of forthcoming climate patterns, the comprehensive evaluation of enduring hazards and repercussions, and the implementation of strategies and measures adopt at accommodating dynamic conditions (Adger *et al*, 2013; Hinkel *et al*, 2013).

**Objectives of Climate Resilience study**

The objectives and goals related to climate resilience aim to enhance the capacity of systems, communities and ecosystems to withstand and adapt to climate change impacts. These objectives are inspired by the SDGs and the World Bank report 2012. The United Nation's concern towards the climate change supplement these goals mentioned below:

1. **Enhance Adaptive Capacity :** The objective is to strengthen the ability of communities, institutions and systems to anticipate, respond and adapt to climate change impacts,