



## Research Paper

### The Climate Crisis: Impact on living being and Consequences across the Globe.

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**Abstract:** Climate change represents one of the most pressing challenges of the 21st century, exerting profound effects on natural systems, human societies, and global economies. Rising temperatures, shifting precipitation patterns, intensifying extreme weather events, and accelerating sea-level rise are no longer distant projections. They are present realities. These impacts are unevenly distributed, disproportionately affecting vulnerable populations in developing nations while sparing few communities worldwide from some form of disruption. This chapter examines the far-reaching consequences of the climatic crisis across geographic, ecological, and socio-economic dimensions. It explores how the interplay between environmental change, policy responses, and adaptive capacity shapes outcomes, and it underscores the urgent need for coordinated, science-driven regulations to mitigate further harm. Climate change is reshaping the planet's physical, ecological, and socio-economic systems at an unprecedented pace. Driven largely by anthropogenic greenhouse gas emissions, the crisis manifests through rising global temperatures, altered precipitation patterns, melting ice sheets,

sea-level rise, and increased frequency of extreme weather events. These changes have cascading effects on biodiversity, human health, food and water security, economic stability, and geopolitical relations. The impacts are unevenly distributed, disproportionately affecting vulnerable populations and ecosystems. This chapter synthesizes current scientific knowledge on the multifaceted consequences of climate change worldwide, explores regional disparities, and evaluates regulatory and policy frameworks aimed at mitigation and adaptation. The evidence underscores the urgent need for coordinated international action to safeguard planetary and human well-being.

**Keyword:** Climate change, human societies, global economies, climatic crisis, policy responses. Anthropogenic,

#### **Introduction:**

The global climate crisis is no longer a matter of scientific debate but an observable reality. Over the past century, human-induced greenhouse gas emissions have significantly altered the Earth's atmospheric composition, trapping heat

and disrupting climate systems. This chapter investigates the consequences of these disruptions, drawing on interdisciplinary research to capture the scale and diversity of impacts. Human-induced climate change has transformed from a distant environmental concern into an immediate global emergency. The Intergovernmental Panel on Climate Change (IPCC) has repeatedly confirmed that rising atmospheric concentrations of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O are the primary drivers of global warming, resulting in profound environmental, social, and economic disruptions (IPCC, 2023). This chapter examines the diverse consequences of the crisis across continents, highlights vulnerable systems, and discusses regulatory measures. Climate change has emerged as one of the most pressing challenges of the 21st century, profoundly affecting ecosystems, biodiversity, and human societies across the globe. Rising greenhouse gas (GHG) emissions, primarily from fossil fuel combustion, deforestation, and unsustainable land-use practices, have led to unprecedented global warming, with the Intergovernmental Panel on Climate Change (IPCC) confirming that the Earth's average surface temperature has already increased by approximately 1.1°C above pre-industrial levels (IPCC, 2021). These climatic shifts are not only environmental concerns but also socio-economic, political, and ethical issues that directly impact the survival and well-being of all living organisms.

The consequences of the climate crisis are multifaceted. For humans, extreme weather events such as heat waves, floods, droughts, and hurricanes have increased in frequency and intensity, threatening food security, water availability, and public health (World Health Organization, 2021). Rising sea levels and coastal erosion endanger the livelihoods of millions, particularly in low-lying island nations and

densely populated deltas (Nicholls and Cazenave, 2010). For wildlife, altered habitats, shifting migration patterns, and increased extinction risks are now well documented, with nearly one million species currently threatened with extinction due to climate-driven factors (IPBES, 2019).

Furthermore, the climate crisis exacerbates existing inequalities by disproportionately affecting vulnerable populations in developing countries who contribute the least to global emissions but face the most severe consequences (UNFCCC, 2022). These dynamics highlight the urgent need for collective global action through policy interventions, adaptation strategies, and mitigation measures. This chapter seeks to explore the consequences of the climate crisis across the globe, emphasizing its impact on living beings humans, animals, and ecosystems while also addressing the urgent need for comprehensive climate governance and sustainable practices to safeguard the planet's future.

### **Physical and Environmental Consequences**

**Rising Temperatures and Heat waves:** Average global temperatures have risen by approximately 1.2°C since pre-industrial times, intensifying the frequency and severity of heat waves. Regions such as the Middle East, South Asia, and parts of Africa are experiencing prolonged heat stress, threatening human health, reducing agricultural productivity, and straining energy systems. Global mean surface temperature has increased by about 1.1–1.2°C since pre-industrial levels. Intensifying heat waves in Europe, South Asia, and North America have led to excess mortality, crop failures, and infrastructure stress.

The World Meteorological Organization (WMO) and UK Met Office report there's an 80% chance that at least one annual

global temperature record will be broken between 2025 and 2029, and 70% likelihood that the five-year average temperature surpasses the Paris Agreement's 1.5 °C threshold. There's even a small yet notable 1% chance of reaching 2 °C warming within the decade. In July 2025, global temperatures remained alarmingly high: 1.25 °C above pre-industrial levels, making it the third-warmest July on record. The 12-month average surged to 1.53 °C, temporarily exceeding the Paris target .Europe is experiencing a severe, record-breaking heat wave, with temperatures soaring well above historical norms up to 12 °C higher in parts of southwest France (e.g., Bordeaux). Coastal wildfires have spread across the Balkans, and heat-related fatalities continue to mount. In late May to mid-June 2025, an extreme heat wave affected numerous European countries. One analysis estimates around 2,300 deaths, with 65% directly attributable to human-induced climate change

#### **India and Pakistan (2025 Heat wave):**

An early and intense heat wave began in April 2025, lasting through July 10, with temperatures reaching up to 48 °C (Sri Ganganagar, Rajasthan). Hundreds of millions faced thermal stress, and health and agriculture sectors saw widespread disruption Additional reporting highlights April heat surges of 5–8 °C above normal. For example, Barmer Reached 46.4 °C on April 8, shattering April records. Power infrastructure, crop health, and human well-being were severely impacted Forecasts from the India Meteorological Department (IMD) warned of above-normal heat waves from April to June 2025, affecting most Indian states with elevated risks to vulnerable groups At the India Heat Summit 2025, scientists cautioned that heat waves in India may become longer extending from one week to up to two months and could even occur

during monsoon season, becoming particularly dangerous due to high heat and humidity.

**Impact on Human:** Heat waves elevate the risk of preterm births, cardiovascular events, cognitive declines, and dementia-related health crises, particularly among vulnerable groups mental health is also affected: in India, rising wet-bulb temperatures correlate with increased depression risk, highlighting a need for better adaptation strategies

**Melting Ice and Sea-Level Rise:** Polar ice sheets in Greenland and Antarctica are losing mass at alarming rates, contributing to global sea-level rise. Coastal communities from the Pacific Islands to Bangladesh face increasing inundation risk, forcing migration and threatening cultural heritage. Greenland and Antarctic ice sheets are losing mass at record rates, contributing to sea-level rise projected to exceed 0.6 m by 2100 under high-emission scenarios (IPCC, 2023). Low-lying nations like Kiribati and Maldives face existential threats. One of the most visible and alarming consequences of the climate crisis is the accelerated melting of ice sheets, glaciers, and sea ice, leading to significant contributions to global sea-level rise. Over the past century, global average sea levels have risen by approximately 20 centimetres, with an accelerated rate in recent decades (IPCC, 2021). This rise is primarily attributed to two processes: the thermal expansion of seawater as it warms and the loss of land-based ice, particularly from the Greenland and Antarctic ice sheets (Church and White, 2011).

**Melting of Polar Ice Sheets:** The Greenland Ice Sheet has experienced substantial mass loss, averaging approximately 279 gigatons per year between 2006 and 2015 (Shepherd et al., 2020). Similarly, the Antarctic Ice Sheet has lost around 148 gigatons annually during the same period. These losses are

largely irreversible on human time scales, and projections suggest that even limiting global warming to 1.5°C may not prevent further destabilization of ice sheets (IPCC, 2019). Glaciers across the Himalayas, the Andes, and the Alps are retreating at unprecedented rates, threatening freshwater supplies for billions of people who depend on seasonal melt water for agriculture, hydropower, and drinking water (2019). The Himalayan region, often called the “Third Pole,” is particularly vulnerable, as it stores more ice than anywhere outside the Polar Regions. If current warming trends continue, nearly two-thirds of Himalayan glaciers could disappear by 2100 (Bolch et al., 2019).

**Consequences of Sea-Level Rise:** Rising seas pose a direct threat to coastal ecosystems and human populations. Low-lying regions such as Bangladesh, the Nile Delta, and small island states in the Pacific and Indian Oceans face existential threats, including permanent inundation, loss of arable land, and salinization of freshwater and increased vulnerability to storm surges (Nicholls and Cazenave, 2010). According to the World Bank (2019), by 2050, more than 140 million people may be displaced internally due to sea-level rise and related climate impacts, creating “climate refugees.”

The melting of reflective ice surfaces (albedo effect) exposes darker land and ocean areas, which absorb more solar radiation and further accelerate warming—a dangerous positive feedback loop (Notz and Stroeve, 2016). Additionally, permafrost thawing in Polar Regions releases methane and carbon dioxide, further amplifying greenhouse gas concentrations (Schuur et al., 2015). The combined effect of melting ice and sea-level rise not only threatens ecosystems and biodiversity but also has profound implications for human security, global economies, and geopolitics. The urgent

need for mitigation and adaptation strategies, including coastal defences, managed retreat, and emission reduction, cannot be overstated.

**Changing Precipitation Patterns:** Shifts in rainfall patterns are disrupting water availability. Some areas suffer prolonged droughts, while others face increased flooding. This volatility undermines food security, particularly in regions heavily dependent on rain-fed agriculture. The hydrological cycle is becoming more erratic. Increased droughts in the Sahel and extreme floods in Pakistan (2022) exemplify climate-driven water instability (World Bank, 2023).

**Biodiversity Loss and Ecosystem Disruption:** Coral reefs are bleaching, forests are burning, and species migration patterns are shifting. Ecosystem collapse not only affects biodiversity but also weakens natural carbon sinks, accelerating climate change feedback loops. Coral bleaching, deforestation, and habitat fragmentation have accelerated species extinction rates, undermining natural carbon sinks and ecosystem services. Biodiversity, which encompasses the variety of life on Earth genes, species, and ecosystems, is fundamental for maintaining ecological balance and supporting human survival. However, biodiversity loss has accelerated due to anthropogenic pressures such as deforestation, habitat fragmentation, pollution, climate change, and overexploitation of natural resources. This loss not only threatens species survival but also disrupts ecological processes, destabilizing ecosystems that provide essential services such as food, water purification, pollination, carbon sequestration, and climate regulation (Cardinale et al., 2012).

**Drivers of Biodiversity Loss:**

**1. Habitat Destruction and Fragmentation:** Expansion of agriculture,

logging, and urbanization remain the primary drivers of habitat loss, resulting in the decline of species populations and genetic diversity (Newbold et al., 2015).

**2. Climate Change:** Rising temperatures, changing precipitation patterns, and extreme weather events are forcing species to migrate or adapt, often leading to population declines (Bellard et al., 2012).

**3. Pollution:** Chemical contaminants, plastics, and nutrient runoff degrade terrestrial and aquatic ecosystems, directly harming species (Rockström et al., 2009).

**4. Overexploitation:** Unsustainable hunting, fishing, and harvesting accelerate extinction risks (IPBES, 2019).

**5. Invasive Species:** The introduction of non-native species disrupts ecological balance, leading to competition, predation, and spread of diseases (Simberloff et al., 2013).

#### **Consequences of Biodiversity Loss:**

**Ecosystem Instability:** Reduced biodiversity weakens ecosystem resilience, making them more vulnerable to collapse under stress (Hooper et al., 2012).

**Loss of Ecosystem Services:** Biodiversity underpins services such as pollination, soil fertility, water purification, and climate regulation. Declines in these services directly affect food security and human well-being (Díaz et al., 2006).

**Food and Health Security Threats:** Reduced genetic diversity in crops and livestock increases vulnerability to pests and diseases, while biodiversity loss also contributes to the emergence of zoonotic diseases (Keesing et al., 2010).

**Cultural and Ethical Dimensions:** Many communities depend on biodiversity for cultural identity, traditional medicine, and livelihoods. Its loss erodes cultural heritage and knowledge systems (Mace et al., 2012).

#### **Socio-Economic Consequences**

##### **Public Health Impacts**

Climate-related health risks include heat-related illnesses, the spread of vector-borne diseases, and respiratory issues from wildfire smoke and air pollution. Vulnerable populations in urban slums, refugee camps, and rural areas are most at risk. Heat-related mortality, malnutrition, and the spread of vector-borne diseases such as malaria and dengue are rising. Climate change also exacerbates mental health stress from displacement and disaster trauma (WHO, 2023).

**Food and Water Security:** Agricultural yields are declining in many regions due to heat stress, altered rainfall, and soil degradation. Freshwater resources are under strain from both drought and contamination from floods. Agricultural productivity is declining in regions like Sub-Saharan Africa and South Asia due to prolonged droughts and unpredictable rainfall. Freshwater shortages threaten billions globally (FAO, 2022).

**Economic Disruption:** Extreme weather events damage infrastructure, disrupt supply chains, and cause economic losses running into billions of dollars annually. Tourism, fisheries, and agriculture-based economies are particularly exposed. Extreme weather events caused over \$300 billion in economic losses in 2022 alone, with vulnerable economies hit hardest (WMO, 2023).

Climate change has become a significant driver of global economic disruption, impacting productivity, trade, employment, and financial stability. Extreme weather events, shifting agricultural yields, infrastructure damage, and health burdens caused by climate-related factors impose direct and indirect costs on economies worldwide. According to the World Bank (2020), climate change could push over 100 million people into poverty by 2030, primarily due to economic shocks from food insecurity, health crises, and loss of livelihoods. One

of the most visible economic impacts is the destruction of infrastructure and supply chains by extreme weather events. Hurricanes, floods, and wildfires result in billions of dollars in damages each year. For instance, the United Nations Office for Disaster Risk Reduction (UNDRR, 2021) reported that weather-related disasters caused \$2.97 trillion in economic losses between 2000 and 2019, nearly doubling the previous two decades. Agriculture and fisheries, which are highly climate-sensitive, face disrupted productivity due to erratic rainfall, ocean warming, and acidification. This directly affects food prices, rural incomes, and global trade patterns (FAO, 2022). Similarly, labour productivity is declining in many regions due to rising temperatures, with the International Labour Organization (ILO, 2019) estimating that heat stress could result in the loss of 80 million full-time jobs globally by 2030, equivalent to \$2.4 trillion in economic losses.

Financial markets are also increasingly vulnerable. The Network for Greening the Financial System (NGFS, 2021) warns that unmanaged climate risks could destabilize banking systems and insurance sectors due to rising claims and stranded assets in fossil fuel industries. Moreover, insurance premiums are rising rapidly in disaster-prone regions, leaving many communities underinsured or uninsured. At the macroeconomic level, climate change is projected to reduce global GDP significantly. A study by Burke, Hsiang, & Miguel (2015) found that for each degree Celsius increase in global temperature, global income could decline by about 12%. More recent projections by Swiss Re Institute (2021) suggest that unchecked climate change could shrink the global economy by up to 18% by 2050. Thus, climate-induced economic disruption extends beyond immediate damages, threatening long-term growth, social

equity, and financial stability worldwide. Proactive adaptation and mitigation strategies, including resilient infrastructure, diversification of supply chains, and low-carbon transitions, are critical to reducing these risks.

### **Regulatory and Policy Responses:**

**International Frameworks:** The United Nations Framework Convention on Climate Change (UNFCCC) provides the foundation for international climate governance. The Paris Agreement (2015) represents a landmark accord in which 196 countries committed to limiting global temperature rise to well below 2°C above pre-industrial levels, with efforts to restrict warming to 1.5°C. Nationally Determined Contributions (NDCs) serve as the primary mechanism for countries to outline and update their climate action commitments (UNFCCC, 2015). Additionally, the Kyoto Protocol (1997) and subsequent mechanisms such as carbon trading laid the groundwork for emission-reduction obligations. The Glasgow Climate Pact (COP26, 2021) further emphasized phasing down unabated coal power and enhancing financial flows to developing countries to support adaptation and resilience (UNFCCC, 2021). The Paris Agreement remains the central global accord for climate action, aiming to limit warming to 1.5°C. However, national commitments (NDCs) still fall short of this target. The Paris Agreement (2015) remains the cornerstone for global climate governance, with targets to limit warming to well below 2°C, ideally 1.5°C.

### **National and Local Regulations:**

Countries are implementing diverse measures—carbon pricing, renewable energy targets, reforestation programs, and climate-resilient infrastructure. The effectiveness of these policies depends on enforcement, funding, and public support. Carbon pricing, renewable energy

mandates, and climate-resilient infrastructure are being adopted. Many countries have implemented domestic climate laws and policies to comply with international agreements. For instance, the European Union (EU) adopted the European Green Deal (2019), aiming to achieve carbon neutrality by 2050 through stringent emission-reduction targets, renewable energy expansion, and a carbon border adjustment mechanism (European Commission, 2019). Similarly, countries like the UK, Canada, and Japan have enacted net-zero legislation. In developing economies, policies often focus on renewable energy adoption, sustainable agriculture, and disaster risk reduction. India, for example, has expanded its solar capacity through the National Solar Mission, while also implementing the National Action Plan on Climate Change (NAPCC) to address adaptation and mitigation (Government of India, 2008).

**Carbon Pricing and Market Mechanisms:** Carbon pricing, through carbon taxes and emission trading systems (ETS), has emerged as a critical regulatory tool to internalize the environmental costs of carbon emissions. The World Bank (2022) reported that over 68 carbon pricing initiatives are in place globally, covering about 23% of global GHG emissions. Examples include the EU Emissions Trading System (EU ETS), Canada's federal carbon tax, and China's national ETS launched in 2021 (World Bank, 2022).

**Adaptation and Resilience Policies:** Regulatory responses also focus on adaptation to minimize the adverse effects of climate change on vulnerable communities and ecosystems. The Sendai Framework for Disaster Risk Reduction (2015–2030) emphasizes resilience building, disaster preparedness, and risk-informed development planning (UNDRR, 2015). National governments are

increasingly adopting climate-resilient infrastructure standards, early warning systems, and climate-smart agriculture initiatives.

**Financial and Institutional Mechanisms:** Financing is a central element of climate governance. The Green Climate Fund (GCF) was established to support developing nations in mitigation and adaptation, with a goal of mobilizing \$100 billion annually by 2020, though this target has faced challenges (OECD, 2021). Financial institutions are also integrating climate risk into lending and investment decisions, guided by frameworks such as the Task Force on Climate-Related Financial Disclosures (TCFD), but ambition gaps persist (UNEP, 2023).

### **Conclusion:**

The climatic crisis is both a present emergency and a long-term challenge. Its consequences are complex, interconnected, and inequitable, demanding immediate and sustained action. While the impacts are already visible, the future trajectory depends on the political will, economic resources, and societal commitment to meaningful climate action. Regulation, innovation, and global cooperation will determine whether the crisis deepens or a sustainable, resilient future emerges.

The climatic crisis is not a singular event but a complex system of interlinked disruptions. Scientific consensus is unequivocal: without immediate, aggressive mitigation and adaptive measures, consequences will escalate beyond manageable thresholds. Regulatory frameworks, bolstered by strong political will and public engagement, are essential to prevent catastrophic outcomes.

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