

CLIMATE CHANGE IMPACTS AND VIETNAM'S RESPONSES

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Introduction

Climate change refers to long-term alterations in average climate conditions and statistical indicators like variability and extreme events. According to the Intergovernmental Panel on Climate Change (IPCC) (2018, 2019), by 2017, global temperatures had risen by approximately 1.0°C above pre-industrial levels, with more rapid warming in recent decades—about 0.87°C between 2005 and 2016. Land areas, especially the Arctic, are warming 2–3 times faster than the global average. From 2009 to 2018, land surface temperatures rose 1.44°C, while ocean surfaces rose 0.89°C. In response, the Paris Agreement mandates all nations to reduce greenhouse gas (GHG) emissions transparently and accountably, aiming for net-zero emissions by 2050. COP-26 established a global roadmap for significant GHG reductions, accelerating the shift toward clean, low-carbon energy and ending coal use. This transformation will influence global politics, economics, and trade. Vietnam, recognizing its specific vulnerabilities, has implemented a range of climate response strategies nationwide, focusing on renewable energy, circular economy, forest protection, and ecosystem conservation.

Causes of climate change

Climate change is caused by both natural factors and human activities. While natural causes include changes in Earth's orbit, solar activity, volcanic eruptions, and shifts in atmospheric CO₂ levels, the IPCC reports confirm that human-induced greenhouse gas (GHG) emissions are the primary driver of global warming. Since the pre-industrial era—especially since the mid-20th century—human actions have significantly altered Earth's climate system, including the atmosphere and geosphere. Key contributors to GHG emissions include the energy, industry, transport, and construction sectors (about 65%), deforestation (18%), agriculture (14%), and other activities like waste disposal (3%), leading to climate system imbalance.

Climate change impacts in Vietnam

In Vietnam, the impact of climate change (CC) is very clear. By the end of the century, if sea levels rise by 100 cm due to CC, then: (i) 13.20% of the Red River Delta area is at risk of being flooded; (ii) 1.53% of the land area of the central coastal provinces from Thanh Hoa to Binh Thuan is at risk of being flooded; (iii) 17.15% of the area of Ho Chi Minh City and about 4.84% of the area of Ba Ria - Vung Tau province is at risk of being flooded; (iv) 47.29% of the area of the Mekong Delta is at risk of being flooded¹. Over the past decade, continuous high temperature records in Vietnam have been set during the summer months, seriously affecting people's health and socio-

¹ Chiến lược phát triển kinh tế - xã hội 2011- 2020. <http://dsi.mpi.gov.vn/8/91.html>

economic activities, especially in urban areas; heavy rains causing flooding have continuously occurred in large cities². According to the IPCC assessment, Vietnam is one of the countries vulnerable and severely affected by climate change. If the sea level rises by 1m, it is estimated that about 5.3% of the natural area will be flooded, 10.8% of the population will be affected, about 10.2% of GDP will be damaged, 10.9% of urban areas will be flooded, 7.2% of agricultural areas will be affected and 28.9% of low-lying areas will be flooded³. The 2022 "Vietnam Climate and Development Report" highlights Vietnam's high vulnerability to climate change, ranking 13th among 180 countries on the Germanwatch Global Climate Risk Index (2000–2019). Rising extreme heat events have increased health risks, harmed livelihoods, and disrupted ecosystems. Coastal and low-lying areas face severe risks from sea level rise, and by 2035–2044, millions more people could be affected by major floods each year. Climate change has begun to significantly disrupt Vietnam's economy, with estimated losses of \$10 billion (3.2% of GDP) in 2020 alone—a figure projected to grow. Key sectors like agriculture and fisheries are being severely impacted, while rising temperatures reduce labor productivity, increase cooling costs, and worsen public health. Rapid emissions growth over the last two decades has contributed to severe urban air pollution, leading to substantial health and productivity losses. Without effective adaptation, up to one million people could fall into extreme poverty by 2030. Vietnam's position as the world's third-largest rice exporter is at serious risk without urgent mitigation and adaptation efforts.

The Mekong Delta – a key agricultural hub of Vietnam is one of the most severely impacted region by climate change, which is facing negative threats from climate change, including drought, saltwater intrusion, land subsidence, and coastal erosion. This region is vital for national food security, water resources, and the livelihoods of nearly 21 million people. Recent studies show that the Delta is sinking at an average rate of 0.96 cm per year due to over-extraction of groundwater. Combined with sea-level rise of about 0.35 cm per year, the region is at high risk of flooding. By the end of the century, sea levels could rise by up to 80 cm, potentially submerging half of the Delta⁴.



² Nguyễn Hữu Tài và nnk, 2020. Nghiên cứu cơ sở lý luận và thực tiễn xây dựng luật biến đổi khí hậu của Việt Nam. BCTK đề tài KHCN cấp Bộ TNMT

³ Bộ TNMT, 2022. Kịch bản Biến đổi khí hậu. NXB TNMT và Bản đồ Việt Nam

⁴ <https://moitruong.net.vn/tac-dong-cua-bien-doi-khi-hau-doi-voi-vung-dong-bang-song-cuu-long-56680.html>

Saltwater intrusion has worsened due to upstream dam construction on the Mekong River, reducing freshwater flow. This leads to early, prolonged saltwater penetration, harming agriculture and domestic water supplies. The 2016 saltwater crisis affected 600,000 people and damaged 160,000 hectares of land. Additionally, 286 km of the 744 km coastline is severely eroded, shrinking farmland and threatening homes. A key cause is the 96% reduction in sediment flow from upstream dams, causing sediment imbalance and coastal instability.



*Saltwater intrusion in the Mekong Delta
(occurs 1 to 1.5 months earlier than in previous years)*

Climate change responsive solutions

Vietnam has recognized the dual need for both adaptation and mitigation. Through a series of national strategies and action plans—most notably the National Climate Change Strategy to 2050 and the implementation of Resolution No. 78/NQ-CP—the country is aligning its development path with global climate commitments. These efforts reflect a holistic approach, integrating climate considerations across sectors and promoting sustainable practices such as climate-resilient agriculture, technological innovation, sustainable urban planning, and improved water resource management.

To address the challenges of climate change in the Mekong Delta, key solutions focus on developing climate-resilient agriculture by promoting adaptive farming systems, expanding organic and high-efficiency agricultural practices, and optimizing agricultural value chains. Technological innovation is also prioritized, including the development of resilient crop varieties and improving agro-processing and preservation techniques. In addition, urbanization and infrastructure development are being accelerated sustainably, with efforts to establish an integrated transportation network connecting urban centers via expressways and inland waterways. The economic structure of the region is being realigned according to local ecological characteristics to promote sustainable growth, while adaptive strategies are embraced to live with natural phenomena such as flooding, drought, and saline intrusion. The local government also emphasize the important role of water resource management in this region which should focus on efficient and rational use tailored to regional

ecological conditions with some solutions such as prioritizing freshwater storage during dry seasons, promoting circular water systems, and reducing groundwater extraction to prevent land subsidence and erosion.

Conclusion

Climate change poses a profound and escalating threat to Vietnam, with particularly severe impacts on vulnerable regions such as the Mekong Delta. As global temperatures continue to rise, Vietnam faces increasing challenges including sea-level rise, extreme weather events, saltwater intrusion, land subsidence, and economic disruption—especially in agriculture, fisheries, and public health. The Mekong Delta, as a critical agricultural and ecological hub, exemplifies the urgency of comprehensive climate response strategies.

However, addressing climate change in the Mekong Delta and across Vietnam requires not only effective policy implementation but also long-term investment, science-based decision-making, and strong collaboration among government agencies, local communities, businesses, and international partners. Strengthening resilience and transitioning to a low-carbon economy will be essential not only for mitigating future risks but also for safeguarding national food security, economic stability, and the livelihoods of millions. Vietnam's proactive approach can serve as a model for other climate-vulnerable nations, provided that efforts remain consistent, inclusive, and forward-looking.

References

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4. <https://moitruong.net.vn/tac-dong-cua-bien-doi-khi-hau-doi-voi-vung-dong-bang-song-cuu-long-56680.html>