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Vietnam's policies and strategies for climate change response and environmental protection

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Abstract **Original Research Article**

The study applies a combination of methods to initially analyze important climate trends in Vietnam; Systematize strategic policies of the Party, ministries and sectors on climate change response; Review the system of policies, laws, programs and action plans of Vietnamese Government and respective ministries and sectors. The results indicate that Vietnam is experiencing significant impacts of climate change, characterized by rising temperatures, irregular rainfall, stronger storms, and rapidly increasing sea levels. Over the past 60 years, the average temperature has increased by nearly 0.9°C, winters have become warmer, and heatwaves have become more intense. Extreme rainfall, drought, saltwater intrusion, and flooding are becoming increasingly severe, particularly in the Mekong Delta. Vietnam has established a comprehensive framework of directives and policies aimed at responding to climate change, safeguarding the environment, and ensuring the sustainable management of natural resources. Resolution 24-NQ/TW designates these efforts as a strategic priority through 2050. A wide array of national strategies, action plans, and programs has been implemented in parallel with the refinement of the legal and institutional framework. Ministries, sectors, and all 63 provinces and municipalities have developed corresponding climate-response plans to ensure coherent and effective implementation.

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1. Introduction

Climate change is happening strongly and is one of the challenges for all countries in the world in many fields. Vietnam's economy is heavily dependent on agricultural production and is among the five countries most severely affected by climate change (CC) [1]. The impacts of CC extend across multiple sectors — including natural resources, energy, food security, livelihoods, poverty, and development policies — posing significant challenges to national sustainability [2], [3]. Among all sectors, agriculture is the most vulnerable due to its direct exposure to extreme climate events such as landslides, flash floods, droughts, storms, heavy rainfall, cold spells, and frost, along with irregular weather patterns, pest outbreaks, sea-level rise, and saltwater intrusion [4]. Mountainous provinces and coastal regions are the most affected areas, where CC not only threatens livelihoods and food security but also exerts broad impacts on local socio-economic development and environmental stability. According to the Global Climate Risk Index by Germanwatch, Vietnam ranks 6th among the world's top ten countries most vulnerable to climate risks [5]. The impacts of CC in Vietnam are evident across multiple dimensions. A 1-meter rise in sea level could result in the loss of approximately 5% of national land area—mostly agricultural land—reduce agricultural output by 7%, affect 11% of the population, and cause an estimated 10% GDP decline [6]. CC also leads to increased average temperatures, erratic rainfall, rising sea levels, and higher frequency and intensity of natural disasters such as droughts, heatwaves, floods, and tropical storms [7]. Furthermore, secondary and synergistic impacts may occur as CC interacts with socio-economic and political factors, exacerbating overall consequences.

Over the past six decades (1958–2018), Vietnam's climate has exhibited complex changes. Both average temperature and precipitation have increased, with more frequent extreme heat days nationwide. Although cold days have decreased, severe cold spells and rare snow or frost events have been recorded in northern mountainous provinces

(notably in 2008, 2015, and 2016) [8]. Heavy rainfall events have become more frequent and intense, with increasingly unpredictable patterns. These changes have altered cultivation conditions and cropping calendars, increased the incidence of pests and diseases, and created additional challenges, causing severe losses to agriculture and threatening the long-term sustainability of the production system.

Therefore, this study aims to initially analyze important climate trends (temperature, rainfall, drought, saltwater intrusion, sea level rise, etc.) in Vietnam; Systematize strategic policies of the Party, ministries and sectors on climate change response; Review the system of policies, laws, programs and action plans of Vietnamese Government and respective ministries and sectors. The research results will provide an important basis to assess the relevance, completeness and implementation capacity of current policies. At the same time, it is an essential basis to evaluate the effectiveness and limitations in policy implementation. On that basis, solutions can be proposed to improve policy effectiveness and adapt to climate change in the coming time.

2. Research methods

2.1. Data collection and synthesis method

The study collected available data, figures and documents from reliable domestic and international sources.

+ Collected meteorological and statistical reports from the Ministry of Natural Resources and Environment (MONRE), the General Department of Meteorology and Hydrology, IPCC, UNDP, World Bank (WB), and FAO, among others.
+ Compiled data on temperature, rainfall, storms, sea level rise, and socio-economic damages.
+ Reviewed relevant research studies, scientific articles, and national reports on climate change.

2.2. Comparative method

+ Compared climate change indicators among regions (North–Central–South) or between different time periods (e.g., before 1980 vs. after 2000).
+ Compared Vietnam's data with that of Southeast Asia or global averages to determine the relative severity of climate change impacts.

2.3. Data analysis and processing method

+ Utilized meteorological datasets on temperature, precipitation, storms, and sea level rise from the past 30–60 years.
+ Employed statistical software such as Excel, SPSS, R, or Python to calculate trends, averages, standard deviations, and correlations.

3. Results and discussion

3.1. Climate change status in Vietnam

a) Changes in temperature and precipitation

Observational data from 1958–2018 show significant fluctuations in temperature and rainfall across Vietnam.

Temperature:

The national annual average temperature increased by approximately 0.89°C during 1958–2018. Particularly, in 1986–2018, the rise reached 0.74°C, indicating a stronger warming trend. Maximum temperatures and the frequency of hot days increased in all major climatic regions. In 2019, Vietnam recorded one of its highest temperatures ever—43.4°C in Ha Tinh Province—demonstrating the intensification of heat extremes. Urban heat island effects have also become more pronounced in major cities such as Hanoi and Ho Chi Minh City, where rapid urbanization reduces natural cooling.

Precipitation:

Average national rainfall increased by about 2.1%, though spatial patterns vary significantly. Rainfall rose in Southern regions (e.g., Mekong Delta, Southeast), while declining trends were recorded in Northern provinces. Extreme rainfall indices (Rx1day, Rx5day) decreased in the Red River Delta but increased sharply in the South Central Coast and Central Highlands, contributing to frequent flash floods and landslides—for example, the severe floods in Quang Nam and Quang Ngai during the 2020 storm season.

Extreme Weather Events:

Extreme climatic events have become more frequent, intense, and unpredictable. Hot days and heatwaves have increased nationwide, while cold spells and frost days have declined in Northern highland areas such as Sa Pa. Drought severity has intensified in the Red River Delta, affecting agriculture and water supply, while becoming less severe in parts of Central and Southern Vietnam. The number of strong tropical storms affecting Vietnam has tended to rise, with storm tracks gradually shifting southward. Recent examples include Typhoon Damrey (2017) and Typhoon Molave (2020), both of which caused widespread damage in the South Central region.

b) Sea level rise trends

Hydrological and satellite data confirm a significant rise in sea level along Vietnam's 3,260-km coastline.

Most coastal stations recorded sea-level rise rates of around 2.7 mm/year (1958–2018). The highest rate, 6.7 mm/year, was observed at Cua Ong Station in northern Vietnam. From 1993–2018, the national average sea-level rise accelerated to 3 mm/year.

Satellite measurements show the South China Sea (East Sea) rising at 4.1 mm/year, with the central basin experiencing the fastest increase (6–7.2 mm/year). Along Vietnam's coastline, the estimated rise was about 3.6 mm/year.

These trends directly threaten low-lying and economically important areas. The Mekong Delta, where more than 50% of the land lies below 1 meter above sea level, is experiencing severe saltwater intrusion. In the dry season of 2015–2016 and 2019–2020, salinity encroached more than 80 km inland, damaging hundreds of thousands of hectares of rice and fruit crops. Coastal erosion has also intensified in provinces like Ca Mau, Soc Trang, and Ben Tre, where dozens of meters of shoreline disappear annually.

3.2. Policies and strategic directions for climate change response and environmental protection in Vietnam

In the face of escalating climate change challenges, the Party and the State have introduced multiple directives aimed at proactively responding to climate change, protecting the environment, and strengthening natural resource management. Across successive Party Congresses—from the Sixth Congress in 1986 to the most recent ones—objectives and orientations related to climate change response have been consistently emphasized and updated (Vo Tuan Nhan, 2017).

According to Resolution No. 24-NQ/TW dated June 3, 2013, issued by the 7th Plenum of the 11th Party Central Committee, proactively responding to climate change, enhancing natural resource management, and protecting the environment are identified as critical and decisive issues that profoundly influence national development. The Resolution establishes a fundamental objective for 2050, stating that Vietnam will "proactively respond to climate change; exploit and use natural resources rationally, efficiently, and sustainably; ensure environmental quality and ecological balance; and strive to achieve environmental indicators comparable to those of developed industrialized nations in the region.". After five years of implementing Resolution No. 24-NQ/TW, the Politburo issued Conclusion No. 56-KL/TW on August 23, 2019, reiterating major tasks and solutions: (1) raising awareness and responsibility in disaster prevention, climate change adaptation, and natural resource and environmental management; (2) improving the legal framework, mechanisms, and policies on climate change response and environmental protection; and (3) strengthening inspection, supervision, law enforcement capacity, and addressing urgent issues.

In addition to policies directly focused on climate change, related content is mainstreamed across various strategic documents, such as:

- The National Master Planning Orientation for 2021–2030, vision to 2050;
- Resolution No. 13-NQ/TW (January 16, 2012) on infrastructure development;
- Resolution No. 36-NQ/TW (October 22, 2018) on sustainable marine economic development;
- Resolution No. 55-NQ/TW (February 11, 2020) on the orientation of national energy development strategy.

Based on these Party guidelines, the National Assembly, Government, and ministerial bodies have enacted numerous legal documents to facilitate climate change response, environmental protection, and natural resource management. On December 5, 2011, the Prime Minister approved the National Climate Change Strategy under Decision No. 2139/QĐ-TTg. Subsequently, the National Action Plan on Climate Change for 2012–2020 was issued under Decision No. 1474/QĐ-TTg, outlining 65 specific programs, schemes, and projects assigned to ministries. The plan also identifies 10 priority programs for 2012–2020, such as the National Target Program on Climate Change and the National Science and Technology Program on Climate Change. In 2022, the Prime Minister approved the updated National Climate Change Strategy toward 2050 under Decision No. 896/QĐ-TTg.

Vietnam is also an active party to international climate change agreements. At COP26 in December 2021, Vietnam joined nearly 150 countries in committing to achieving net-zero emissions by 2050.

The National Assembly has enacted multiple laws that incorporate climate change and environmental protection provisions. Environmental protection measures were first included in the 1992 Constitution. The 2013 Constitution further strengthened the responsibilities of the State, organizations, and individuals in environmental protection. Vietnam's legal framework on climate change and environmental protection has become increasingly comprehensive and rigorous, ensuring sustainable development and safeguarding environmental quality. Key laws include: the Law on Environmental Protection (2020), Law on Disaster Prevention and Control (2013), Land Law (2013), Law on Water Resources (2014), Law on Hydrometeorology (2015), Law on Irrigation (2017), Law on Forestry (2017), Fisheries Law (2017), Law on Crop Production (2018), Law on Livestock Production (2018), Law on Biodiversity (2018), and the Law on Marine Resources and Environment (2018).

In addition to the legal framework, Vietnam has implemented numerous programs and national plans related to climate change adaptation and international commitments, such as: the National Target Program on Climate Change (2011–2015; 2016–2020), the Support

Program to Respond to Climate Change, the National Science and Technology Program for Climate Change (Decision No. 2630/QĐ-BKHCN), the Science and Technology Program for Climate Change Adaptation, Natural Resource and Environmental Management (2016–2020), the National REDD+ Program to 2030, and the approval of the Paris Agreement (Resolution No. 93/NQ-CP, 2016).

Various regional and sectoral development projects, particularly in vulnerable areas, have also been approved, such as:

- Scheme on Developing Climate-Resilient Urban Areas (2623/QĐ-TTg, 2013); Master Plan for Irrigation in the Mekong Delta to 2050, considering climate change and sea level rise (1397/QĐ-TTg, 2012);
- Master Plan for Irrigation in the Central Region to 2050 (1588/QĐ-TTg, 2012); Resolution 120/NQ-CP on Sustainable Development of the Mekong Delta in Response to Climate Change (2017);
- The Comprehensive Action Program for implementing Resolution 120; Mekong Delta Regional Master Plan for 2021–2030, vision to 2050 (287/QĐ-TTg);
- Comprehensive Program for Sustainable Agriculture Adaptation in the Mekong Delta to 2030, vision to 2045.

A series of national action plans on climate change have also been issued:

- National Action Plan on Climate Change (2012–2020, Decision 1474/QĐ-TTg); National Adaptation Plan 2021–2030, vision to 2050 (2020);
- Plan for Implementing the Paris Agreement (2016);
- National Action Plan for Agenda 2030 on Sustainable Development (2017);
- Vietnam Green Urban Development Plan to 2030 (2018).

At the ministerial level, ministries have developed sectoral climate action plans. Notable examples include:

- Ministry of Natural Resources and Environment's Climate Action Plans for 2011–2015 (Decision 2418/QĐ-BTNMT) and 2016–2020 (Decision 672/QĐ-BTNMT);
- Plan for Implementing the Climate Change Response and Green Growth Program (2016–2020, Decision 2967/QĐ-BTNMT);
- Ministry of Agriculture and Rural Development's Action Plans for 2011–2015 and 2016–2020 (Decision 543/QĐ-BNN-KHCN; Decision 819/QĐ-BNN-KHCN).

  Other ministries—including Construction, Transport, Industry and Trade, Health, and Education—have also developed climate response plans for their sectors.

At the local level, all provinces and centrally governed cities have formulated and issued action plans to respond to climate change and environmental protection.

4. Conclusion

Vietnam is experiencing increasingly severe impacts of climate change, reflected in rising temperatures, erratic rainfall, more extreme weather, and rapid sea-level rise. Over the past 60 years (1958–2018), the national mean temperature has increased by 0.89°C, including 0.74°C during 1986–2018. The number of hot days and maximum temperatures have surged, especially in the Central and Northern regions, while cold days have sharply declined—indicating warmer, shorter winters. Average annual rainfall increased by 2.1%, though unevenly distributed: increasing in South Central Coast, Central Highlands, and Southern regions, but decreasing in the North. Extreme rainfall has intensified in the Central and Highland regions, heightening the risk of flash floods, landslides, and inundation, while droughts have become more common in the North. Strong storms are gradually shifting southward, with increasing frequency and intensity. Sea levels in Vietnam have risen by 2.7–3.6 mm/year, higher than the global average, with some sites (e.g., Cua Ong) recording 6.7 mm/year. Satellite data indicate that the South China Sea is rising by 4–7 mm/year, threatening low-lying coastal and delta regions. According to Report on the National plan to adapt to climate change for the period 2021 - 2030, vision to 2050, by the end of the 21st century, temperatures could rise by 1.6–4.2°C, rainfall by 15–25%, and sea level by 53–73 cm. A 1-meter rise could inundate nearly 50% of the Mekong Delta. Climate change is profoundly affecting Vietnam's economy, food security, water resources, and ecosystems. Vietnam has developed a comprehensive framework to address climate change through strategic directives of the Party and State. Resolution 24-NQ/TW (2013) identifies climate change response, natural resource management, and environmental protection as critical priorities, with a vision toward 2050. Subsequent policies strengthen legal systems, institutional capacity, and disaster prevention. The government has issued national climate strategies, action plans, and sectoral programs, while actively engaging in global commitments such as the Paris Agreement and COP26. Numerous laws, regional plans, and ministerial actions further integrate climate adaptation across sectors. All provinces and municipalities have developed corresponding climate-response plans to ensure coherent and effective implementation.

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