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Hong Kong Economic Policy Green Paper 2025

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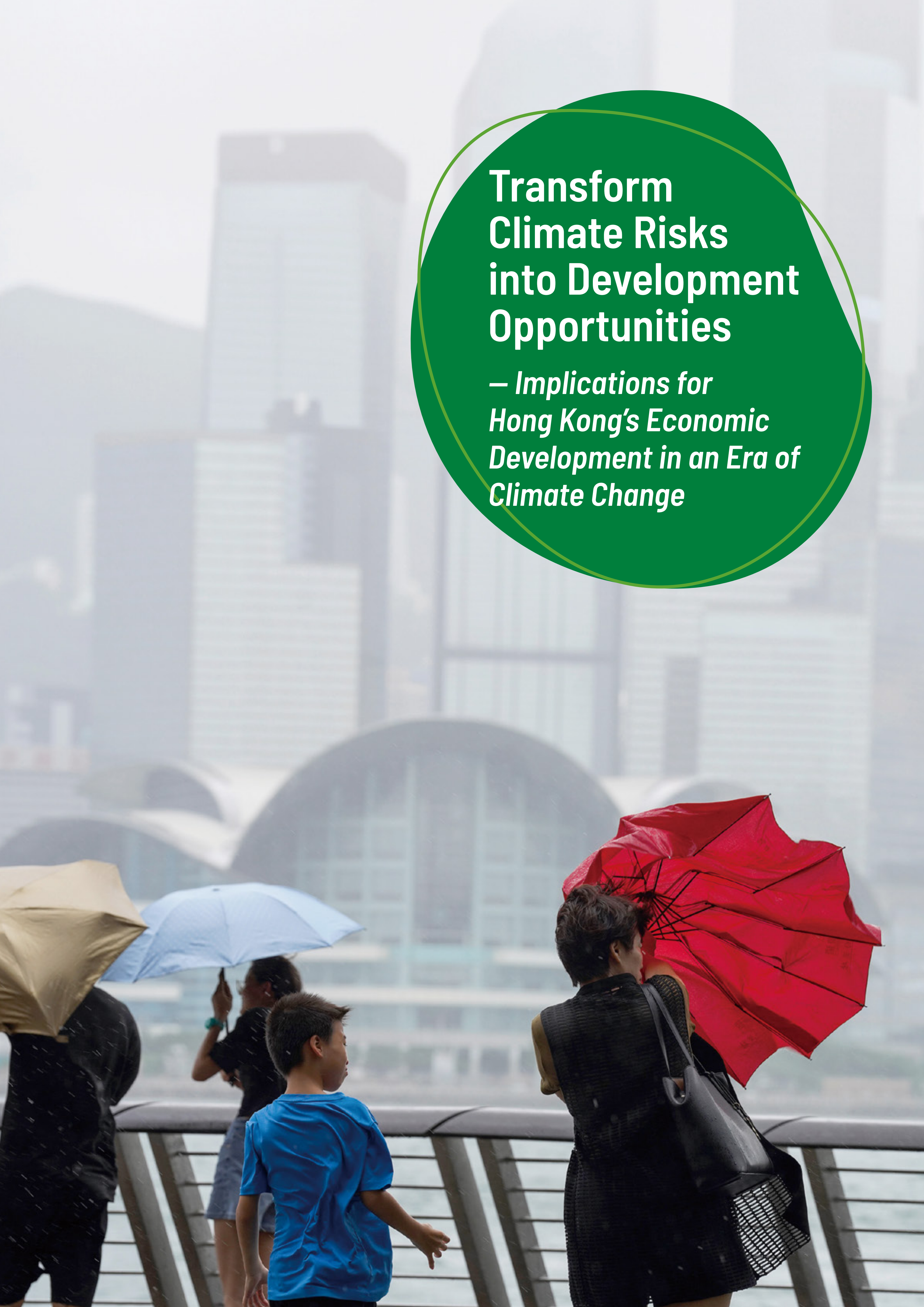


Transform Climate Risks into Development Opportunities

— *Implications for Hong Kong's Economic Development in an Era of Climate Change*

Guojun He Qidan Wang Vivi Hu Cheng Bi

1 Introduction

According to the World Economic Forum's Global Risks Report (2024), three key climate issues have been identified as critical challenges facing humanity: extreme weather events, critical change to earth systems, and biodiversity loss and ecosystem collapse. The current warming of 1.44°C, compared to pre-industrial times, is already causing disruptive global economic impacts (NASA, 2023).

As a coastal city with low-lying terrain, Hong Kong is frequently affected by extreme weather events and has experienced multiple climate disasters in the past decades. Two climate risks are particularly concerning: the occurrence of severe typhoons and rising sea levels. On the one hand, strong tropical cyclones bring heavy rainfall, strong winds, storm surges, and flooding, often disrupting economic production and negatively affecting vulnerable areas and people. On the other hand, most of the economic activities in Hong Kong are concentrated in low-latitude regions, making the economy particularly susceptible to the damages caused by sea level rises.

In the following chapter, we first summarize the major climate risks Hong Kong has been exposed to, with an emphasis on typhoons and sea level rise. Taking "Saola," a recent typhoon, as an example, we review the impact of its path, surge height, and wind intensity. Next, we focus on how typhoons and sea level rises would affect public housing and conduct scenario analysis on the potential economic losses under different climate pathways. Finally, we provide policy recommendations for adaptive strategies to enhance climate resilience and mitigate risks.

2 Overview of Climate Risks in Hong Kong

Hong Kong has been warming up in the last century. Analysis from the Hong Kong Observatory (HKO) showed that the average mean temperature has increased by 0.14°C per decade from 1885 to 2023.

That number reached 0.30°C per decade from 1994 to 2023. Consistent with this trend, the annual average number of hot nights from 2001 to 2023 has increased by 67.18%, while the number of cold days has decreased by 18.19%, relative to 1991-2000 averages.[1] The sea level is also steadily rising, with a growth rate in mean sea level of 31 mm per decade at Victoria Harbor from 1954 to 2023.

Meanwhile, Hong Kong has experienced more typhoons and heavy rainfall in the last two decades. These weather events, including storm surges, strong winds and coastal flooding, have caused significant damages.

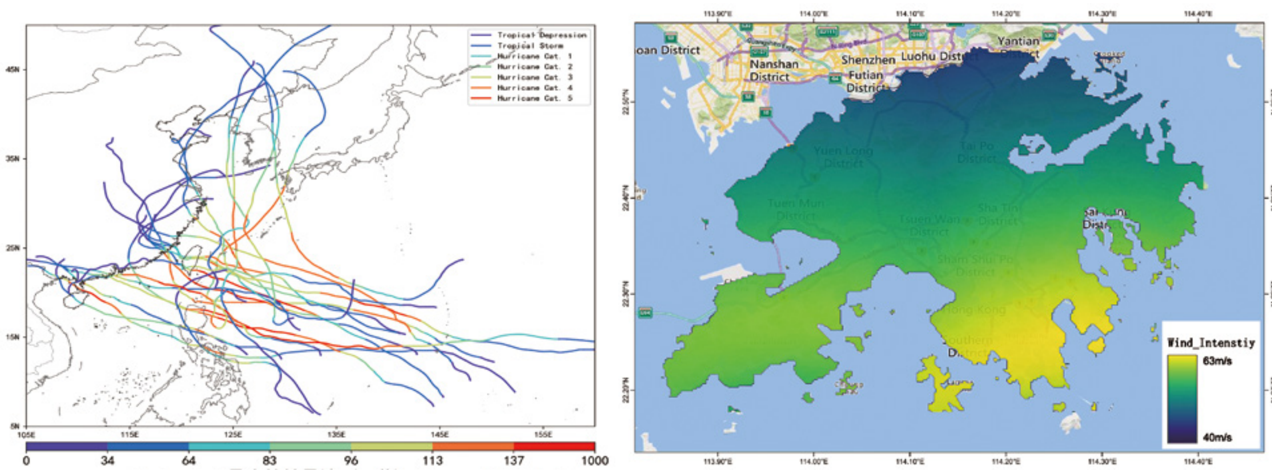
2.1 Typhoons: The Most Frequent Climate Disaster in Hong Kong

With its back to the northwest Pacific Ocean, Hong Kong is bordered by a range of east-west mountains to the north and a vast ocean to the south, making it highly susceptible to typhoons. The city's temperature and humidity provide ample moisture for tropical cyclones, creating ideal conditions for typhoon formation.

Figure 1. Historical typhoon tracks and intensity from 2014 to 2023.

Panel A. Historical Typhoon Tracks

Panel B. Historical Typhoon Intensity



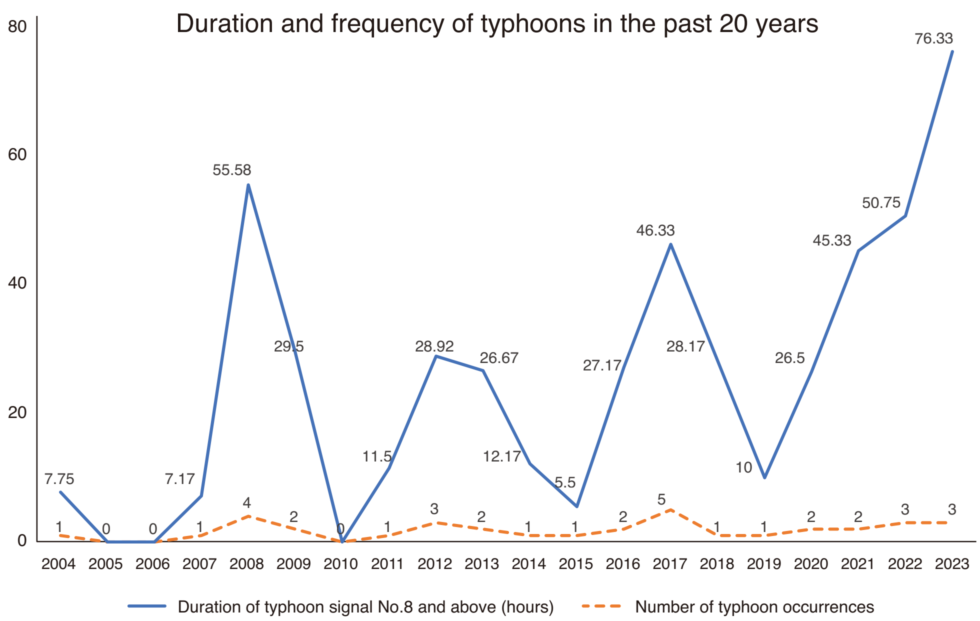
Notes: This figure shows the analysis of typhoons affecting Hong Kong with two panels. Panel A (Left) shows the statistical representation of typhoons in the northwest Pacific region from 2014 to 2023. Typhoons are categorized by intensity levels equal to or exceeding Category 3 typhoons, which is significant for Hong Kong. The depicted line segments represent typhoon trajectories, with a color gradient from purple to red indicating increasing storm intensity. The maximum intensity recorded is capped at ≤137 knots, or 210 km/h, with the peak observed in 2023. Panel B (Right) illustrates the historical record of the maximum intensities of typhoons impacting Hong Kong. Peak intensities across different regions range from 40 m/s to 63 m/s. (Data source: YoujiVest Climate Lab)

1 According to the Hong Kong Observatory's definition, a hot night is a night with a minimum temperature of 28°C or above, and a cold day refers to a night with a minimum temperature of 12°C or below.

Figure 1 summarizes typhoon activity affecting Hong Kong and mainland China from 2014 to 2023. Panel A shows that many typhoons have made landfall in Hong Kong and nearby areas, making Hong Kong a particularly vulnerable site for typhoon-related damage. Panel B further examines historical typhoon intensity patterns in Hong Kong, revealing an increase in intensity from the northwest to the southeast, with Hong Kong Island being the most affected. Hong Kong Island is not only the economic center of Hong Kong but also a densely populated area with significant production activity. Buildings and infrastructures in the area face elevated risks when strong winds strike, especially those directly exposed to high wind speeds.

Figure 2 summarizes the duration and frequency of typhoons (Signal No.8 or higher) in the past two decades. We observe that Hong Kong has been hit more frequently by typhoons, while the duration of severe typhoons has also increased. Notably, three severe typhoons struck Hong Kong in 2023, resulting in a cumulative 76 hours of Signal No.8 or higher. Hurricane Signal No. 10 was issued during the passage of "Saola," Storm Signal No. 9 was issued during the passage of "Koinu," and Gale or Storm Signal No. 8 was issued during the passage of "Talim."

Figure 2. The number and duration of typhoons occurring in Hong Kong each year from 2004 to 2023.



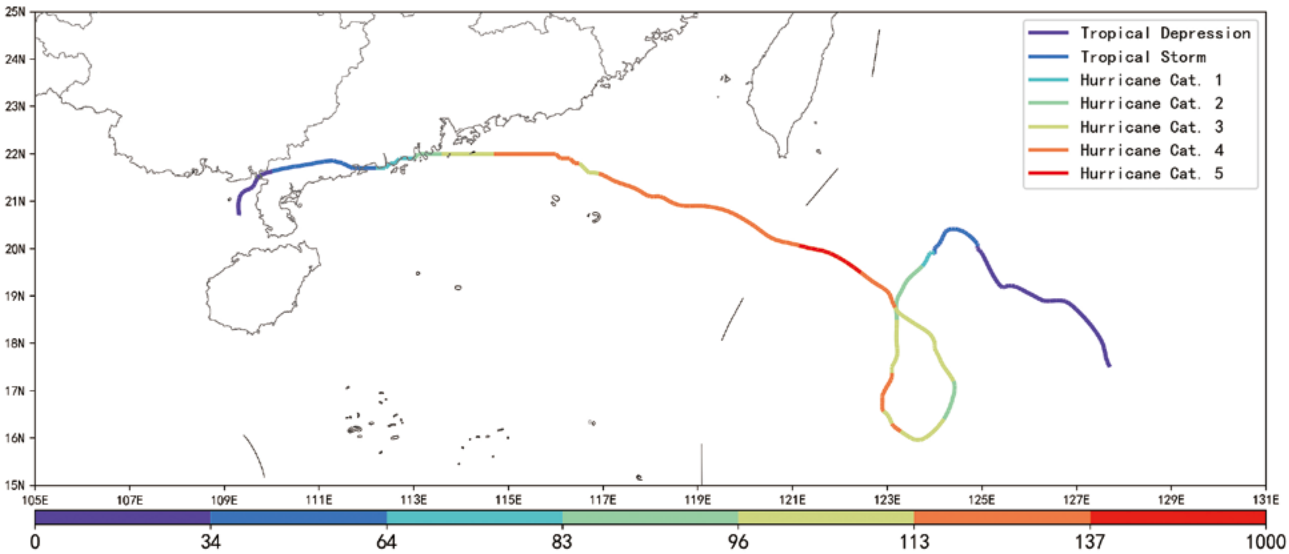
Notes: The blue line represents the annual cumulative duration of typhoon Signal No. 8 or above issued by the HKO. The yellow dotted line represents the number of typhoons making landfall or severely affecting the region each year. The cumulative duration of typhoon signal No. 8 and above shows a significant surge in 2023, the highest record in two decades. (Data source: Hong Kong Observatory)

2.2 Devastating Consequences of Super Typhoons: Recent Experiences

Multiple super typhoons have hit Hong Kong in the past few years. These extreme weather events threaten ordinary people's livelihoods and cause significant economic losses, mainly through impacts on properties and other assets. In 2018, for example, Super Typhoon "Mangkhut" (Signal No. 10) struck Hong Kong on September 16, leading to an estimated direct economic loss of more than HK$4.60 billion (Choy et al., 2020).

A recent example is Super Typhoon "Saola," the third tropical cyclone to impact Hong Kong in 2023, prompting the HKO to issue a No. 10 Signal. At its center, "Saola" reached a maximum sustained wind speed of 210 kilometers per hour, setting a new record in Hong Kong's typhoon history. Figure 3 plots the path of "Saola", which formed in the Pacific Ocean, made its first landfall in Hong Kong, and subsequently impacted Guangdong Province in China.

Figure 3. Observed path of "Saola" in 2023.



Notes: The trajectory and intensity map of "Saola." The color intensity from purple to red represents the escalating severity of the typhoon's influence. "Saola" demonstrated considerable force, with wind speeds ranging from 96 to 113 knots. (Data source: YoujiVest Climate Lab)

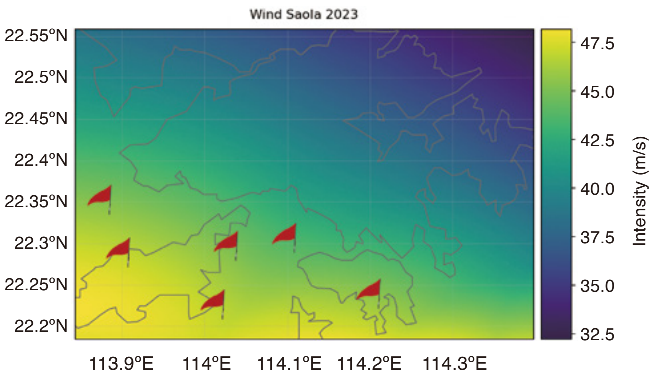
Figure 4A shows the wind intensity during "Saola." We observe that the southwestern parts of Hong Kong, including areas such as Ngong Ping, Sha Chau, Cheung Chau, Ping Chau, Tsing Chau (as flagged in Figure 4A), and the southern part of Hong Kong Island, experienced more pronounced wind impacts.

The strong winds led to severe destruction, including shattered glass, fallen trees, and damaged infrastructures. In addition to the strong winds, "Saola" also triggered a storm surge, causing a rapid rise in tidal levels. Figure 4B shows that the rise in the tidal level was mainly concentrated in the bays, especially in the bay areas of Sha Tin, Tai Po, and Tai O. The water brought by the storm surge not only destroyed many boats in the bays but also caused widespread floods that eroded coastal lands, roads, and properties. Many parts of Hong Kong experienced waterlogging on streets, traffic congestion, and significant delays in public transportation.

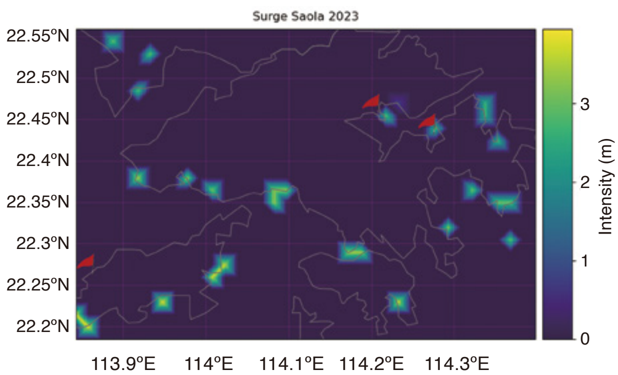
According to the Hong Kong Insurance Authority, the total gross claims caused by "Saola" and a subsequent black rainstorm reached HK $1.9 billion. The most insurance claims were for property damage and business interruption, with a total compensation of HK $1.64 billion. Employee compensation, automotive, and travel claims amounted to HK $210 million.

Figure 4. Typhoon "Saola's" impact on wind and storm surge.

Panel A. Observed Wind Intensity of "Saola".



Panel B. Observed Surge Height of "Saola".



Notes: The figure shows the distribution of impacts from "Saola" across regions in Hong Kong in two panels. Panel A (Left) shows the distribution of wind intensity impacts. The intensity gradients range from blue to yellow, indicating increasing strength. The highest wind intensities were recorded from the southwest to the northeast of Hong Kong within a range of 32.5 m/s to 47.5 m/s. Panel B (Right) displays the distribution of storm surge intensity impacts. The intensity of the storm surge, measured by the height of the surge, is indicated by a color gradient from blue to yellow. (Data source: YoujiVest Climate Lab)

2.3 Sea Level Rise: Hong Kong's Major Climate Risk in the Long Run

In 2023, the global mean sea level was 101.4 millimeters above 1993, the highest in the satellite record from 1993 to the present (NOAA, 2023). According to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR6) and the National Oceanic and Atmospheric Administration,[2] on a high emissions pathway triggering rapid ice sheet collapse, the sea level could rise by up to 2 meters in 2100 compared to 2000. For Hong Kong, 5–6 meters of coastal defenses would be needed, affecting an estimated 82% of the Hong Kong government's total revenues (China Water Risk, 2022). According to the HKO, Victoria Harbor's annual mean sea level grew by 31 mm per decade from 1954 to 2023.

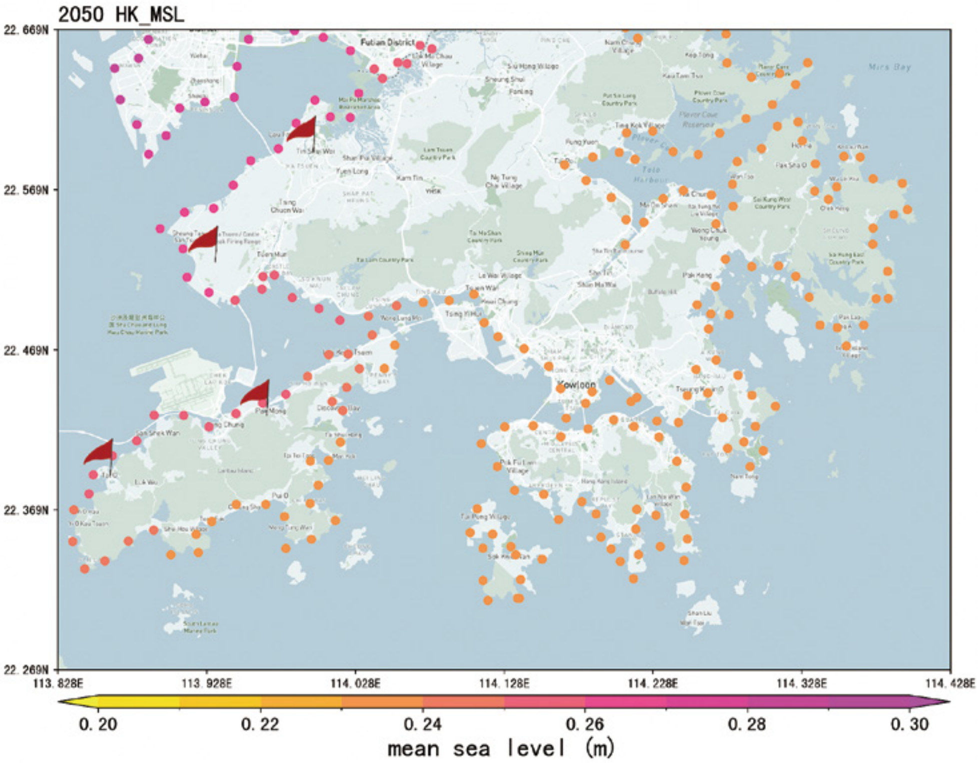
Figure 5 projects the sea level rise in Hong Kong by 2050 based on our analysis of sea-level data. The year 2050 is a key point because Hong Kong, like many other countries and regions, has committed to achieving net zero by that year.

A rising sea level will cause severe economic and property losses, increase the probability of coastal flooding, and affect nearby residents. For example, Shen et al. (2022) estimate that a rise in sea level would affect approximately 8,500 square meters of land near Victoria Harbor under RCP4.5 by 2060.[3] Combined with the projections in Figure 5, western and north-western regions such as Tin Shui Wai, Tuen Mun, Tung Chung, and Tai O would be at particularly high coastal inundation risk (as flagged in Figure 5).

2 IPCC AR6, the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. It is a comprehensive and authoritative assessment of the current state of knowledge on climate change, its impacts, and potential future risks, as well as the options for adaptation and mitigation.

3 RCP4.5, Representative Concentration Pathways Scenarios, include time series of emissions and concentrations of the full suite of greenhouse gases and aerosols and chemically active gases, as well as land use/land cover. RCP4.5 is an intermediate stabilization pathway in which radiative forcing is stabilized at approximately 4.5 W/m^2 after 2100.

Figure 5. Projected regional mean sea level rise for Hong Kong in 2050.



Notes: In 2050, the mean sea level in Hong Kong is projected to rise by 0.2 to 0.3 meters. The chromatic gradient from yellow to purple signifies increasing sea-level heights. The western areas of Hong Kong predominantly exceed 0.24 meters in sea-level elevation. (Data source: YoujiVest Climate Lab)

3 Case Study: Future Climate Risks and Public Housing in Hong Kong

There is an urgent need to understand what the future climate will look like in Hong Kong and how various climate risks will affect the economy. Constrained by our research capacity, we cannot provide a comprehensive assessment in this report. Instead, we pick a few high-risk locations in Hong Kong and demonstrate how granular climate data and climate-risk analysis can be helpful for decision-making. Moreover, we focus on one specific type of property: public housing. The reason for analyzing public housing is twofold. First, most of Hong Kong's vulnerable groups, including low-income (Census and Statistics Department of the Government of HKSAR, 2024), high-density (GovHK, 2022), and elderly (Peng and Maing, 2021) populations, live in public housing units. These groups often have the least knowledge and capacity to understand and respond to climate risks. Second, public housing is owned by the government, so our analysis can have direct policy implications.

3.1 *Site Selection*

We map the distribution of public housing units against 26 low-lying or windward areas susceptible to storm surges and waves. The results are summarized in Figure 6. The pentagram markers indicate units facing high typhoon and rising-sea-level risks. The red pentagrams represent low-lying areas with the highest rising-sea-level-rise. The blue map markers represent Hong Kong's 239 public housing units. We observe that public housing units are predominantly located in these areas with relatively fragile infrastructure, making them more vulnerable to storm surges, waterlogging, and strong winds. The yellow pentagrams identify seven regions that would be severely affected by storm surges. The purple pentagrams represent three areas facing significant threat from overtopping waves.[4]

Figure 6. Public housing exposed to climate risks and the locations.

Location Map of Public Housing and Risk Areas

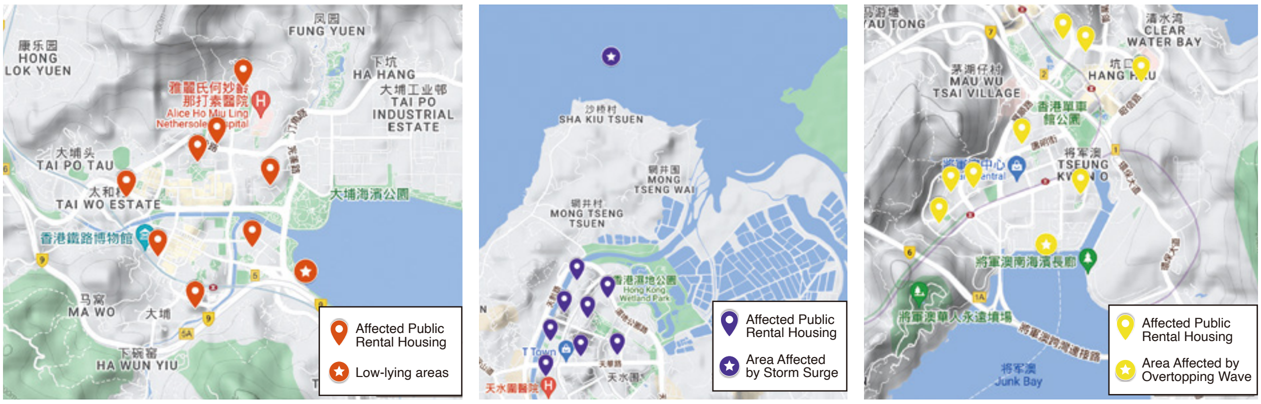
Notes: The map shows the location of public housing units and areas prone to flooding or wind disasters in Hong Kong. Red pentagrams denote low-lying areas. Yellow pentagrams indicate regions susceptible to storm surges. Purple pentagrams represent areas vulnerable to overtopping waves. The blue map markers indicate all public housing estates in Hong Kong. (Data sources: Hong Kong Housing Authority, Drainage Services Department)

4 Overtopping waves are those that exceed the crest elevation of a sea defense structure, such as a seawall or levee, and flow over the top, potentially causing flooding and erosion on the landward side.

Figure 7 zooms in on the map and highlights the public housing units most affected by low-lying risk, storm surge risk, and overtopping wave risk. These areas are near Lam Tsuen River in the Tai Po District, the Northwest New Territories, and the southern part of Tseung Kwan O. Table 1 provides the names of these public housing units, which we identify as high-climate-risk properties.

Figure 7. Public housing units exposed to significant climate risks and the location distribution.

Panel A. Low-lying Affected Areas | Panel B. Storm-surge Affected Areas | Panel C. Overtopping-wave Affected Areas



Notes: This figure illustrates the areas most impacted by the risk of low-lying storm surges and overtopping waves. Panel A (Left) depicts the areas around Tai Po Lam River Village in the Tai Po District, marked by a red pentagram indicating the area with the highest low-lying risk in Hong Kong. The red map icons represent public housing units near risk points . Panel B (Middle) shows the Northwest New Territories, with a purple pentagram highlighting the area that is most at risk from storm surges in Hong Kong. The purple map icons indicate public housing units near risk points. Panel C (Right) presents the southern part of Tseung Kwan O, where a yellow pentagram signifies the area with the greatest overtopping wave risk in Hong Kong. Yellow map icons denote public housing units within this region that are close to risk points. (Data sources: Hong Kong Housing Authority, Drainage Services Department)

Table 1. List of public housing affected by three specific risks.

Public Housing Affected by Low-lying Areas	Public Housing Affected by Storm Surge	Public Housing Affected by Overtopping Wave
Kwong Fuk Estate	Tin Heng Estate	Yee Ming Estate
Wan Tau Tong Estate	Grandeur Terrace	Shin Ming Estate
Po Heung Estate	Tin Chak Estate	Choi Ming Court
Fu Shin Estate	Tin Yat Estate	Kin Ming Estate
Tai Wo Estate	Tin Yan Estate	Sheung Tak Estate
Tai Yuen Estate	Tin Yuet Estate	Ming Tak Estate
Fu Heng Estate	Tin Ching Estate	Hau Tak Estate
Fu Tip Estate	Tin Wah Estate	King Lam Estate

For the following analysis, we select the public housing units affected by typhoons and sea level rise in these regions, highlighted in blue in Figure 8.

- Kwong Fuk Estate, affected by low-lying risks
- Tin Heng Estate, affected by storm surges
- Yi Ming Estate, affected by overtopping waves

Figure 8. Locations of the selected public housing units for research.

Location of Selected Public Housing

Notes: The map icons denote the location of various public housing estates, with the blue icons highlighting those near three specific risk areas. Areas identified include Kwong Fuk Estate in the Tai Po District, at risk of low-lying risks; Tin Heng Estate in the Yuen Long District, at risk of storm surges; and Yee Ming Estate in the Tseung Kwan O District, susceptible to wave overtopping. (Data sources: Hong Kong Housing Authority, Drainage Services Department)

3.2 Physical Climate Risks Assessment: Methodology and Climate Scenarios

(1) Overview of the Methodology

Our climate-risk assessment involves the following key steps: real estate data and historical climate-risk data collection; climate-risk analysis that combines general circulation model, regional climate model, and economic data; scenario simulations based on different future pathways; quantification of climate-risk impacts; data visualization and output.

Table 2. Key steps and data & models for physical risks assessment.

Main Steps	Data Sources & Models
Physical Risks Identification	▪ Gather real estate data in Hong Kong, including property locations and asset types. ▪ Obtain historical hazards data for the region, including frequency, intensity, etc.
Physical Risks Analysis	▪ General Circulation Models ▪ Regional Climate Models ▪ Historical Observations ▪ Geospatial Data ▪ Economic Data
Climate Scenarios Analysis	▪ SSP1-RCP2.6 ▪ SSP2-RCP4.5 ▪ SSP4-RCP6.0 ▪ SSP5-RCP8.5
Physical Risks Quantification	▪ CLIMADA Model https://wcr.ethz.ch/research/climada.html
Data and Model Integration, Visualization	▪ YoujiVest Climate Risk Model

(2) Climate Scenarios

The Shared Socioeconomic Pathways (SSPs) are projected climate change scenarios defined by the IPCC AR6.[5] The combined SSP-RCP scenarios, summarized in Table 3, are among the most commonly used global climate scenarios. They combine baseline SSPs with different emissions trajectories (based on the RCPs). We adopt the combined SSP-RCP scenarios to project future climate extremes in the selected sites, taking both emission trajectories and socioeconomic development into account.[6]

Table 3. Different climate scenarios and implied temperature rises.

Time horizon	Near-term (2030)	Mid-term (2050)	Long-term (2080)	Long-term (2100)
Scenario		*Temperature increasing (°C)*		
SSP1-2.6	1.47	1.76	1.83	1.76
SSP2-4.5	1.49	1.97	2.46	2.63
SSP4-6.0	1.49	2.05	2.80	3.16
SSP5-8.5	1.60	2.48	4.05	5.05

Data source: The data derives from Our World in Data, https://ourworldindata.org/

5 SSPs, Shared Socioeconomic Pathways, describe plausible future narratives for socioeconomic development, while RCPs outline possible pathways for greenhouse gas emissions and atmospheric concentration levels (IPCC).

6 SSP-RCP Scenarios, sometimes referred to as the 'SSPX-Y scenarios', combine the baseline SSPs with RCP scenarios from the IPCC's fifth assessment reporting period. The SSP-RCP scenarios impose global warming targets on the baseline SSP scenarios using the radiative forcing levels of the RCP scenarios.

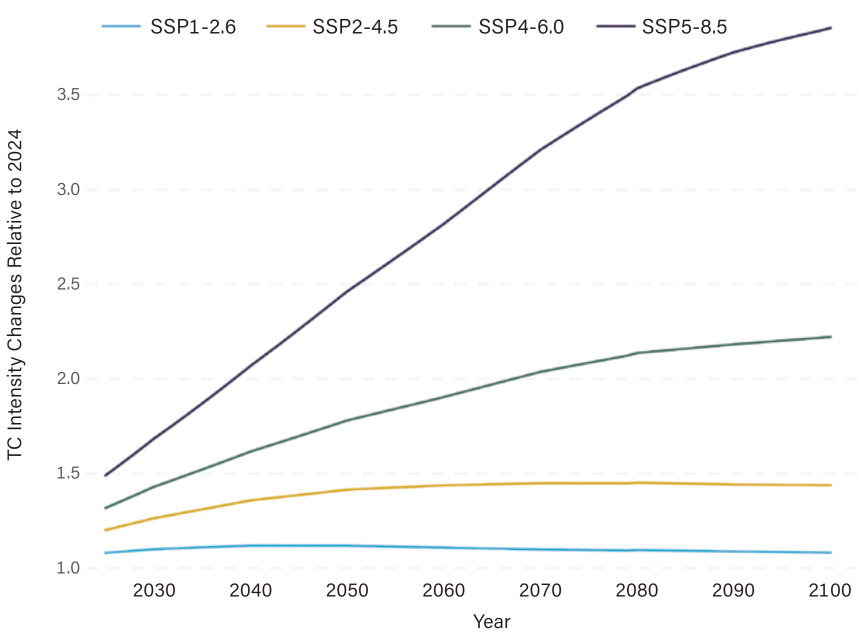
(3) Key Assumptions & Limitations

- The government owns public housing units, so they lack accurate market values. Our study estimates physical value loss and infers their values using the prices of the five nearest Home Ownership Scheme units. We then use the weighted average prices (based on the distance and building age difference of the five nearest Home Ownership Scheme units) to infer their values.
- This analysis does not incorporate the climate adaptation measures already in place, which may change the estimation results.
- Current understandings of emissions and socioeconomics constrain climate models. They may fail to anticipate future technological advancements or policy changes, overlook local climate characteristics, and underestimate extreme events, affecting the modeling outputs.

3.3 Results

We start by visualizing the projected typhoon intensity under different climate pathways in Figure 9. We project the extent of change in typhoon intensity relative to 2024 under various scenarios between the present and 2100. Under the high emissions scenario (SSP5-8.5), typhoon intensity is projected to increase significantly, more than 3.5 times relative to 2024. In contrast, in the low emissions scenario (SSP1-2.6), while typhoon intensity may rise slightly in the short term, after reaching a peak around 2050, the intensity is expected to decrease gradually.

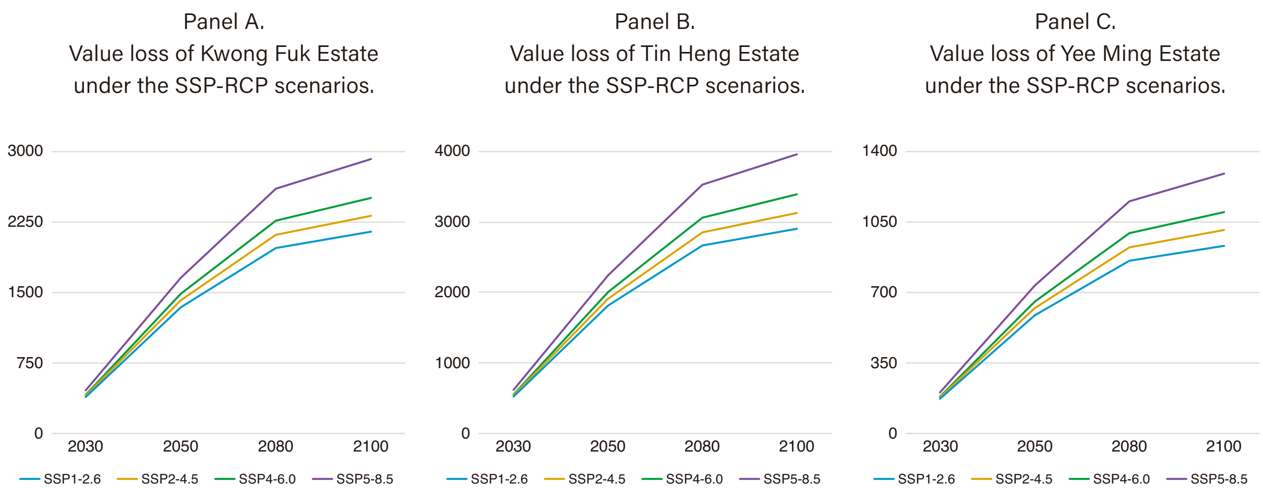
Figure 9. Projected typhoon intensity under different combined SSP-RCP scenarios.



Notes: Projected changes in typhoon intensity relative to 2024 across various combined SSP-RCP scenarios from 2024 to 2100. The blue, yellow, green, and purple line segments represent the SSP1-2.6, SSP2-4.5, SSP4-6.0, and SSP5-8.5 scenarios, respectively. The SSP5-8.5 scenario exhibits a significantly higher and more rapidly increasing typhoon intensity than other scenarios. Typhoon intensity continuously strengthens in all scenarios except for SSP1-2.6, which shows a slight decline after 2050. (Data source: YoujiVest Climate Lab)

Next, we summarize the expected economic losses under different climate pathways for the selected public housing units in Figure 10. Panel A demonstrates the results for Kwong Fuk Estate; Panel B is for Tin Heng Estate, and Panel C is for Yee Ming Estate. The value loss trends are consistent across the three public housing units under four combined SSP-RCP scenarios, with risks increasing over time. Significant value losses are anticipated even under the most optimistic (the low emissions pathway) scenario (SSP1-2.6). For example, a loss of HK $2,639.75 million for Tin Heng Estate would occur based on our projection. In more extreme cases, the potential loss in asset value would increase to HK $2915.45 million for Kwong Fuk Estate, HK $3,956.91 million for Tin Heng Estate, and HK $1288.15 million for Yee Ming Estate.

Figure 10. Projected value losses of the selected public housing units.

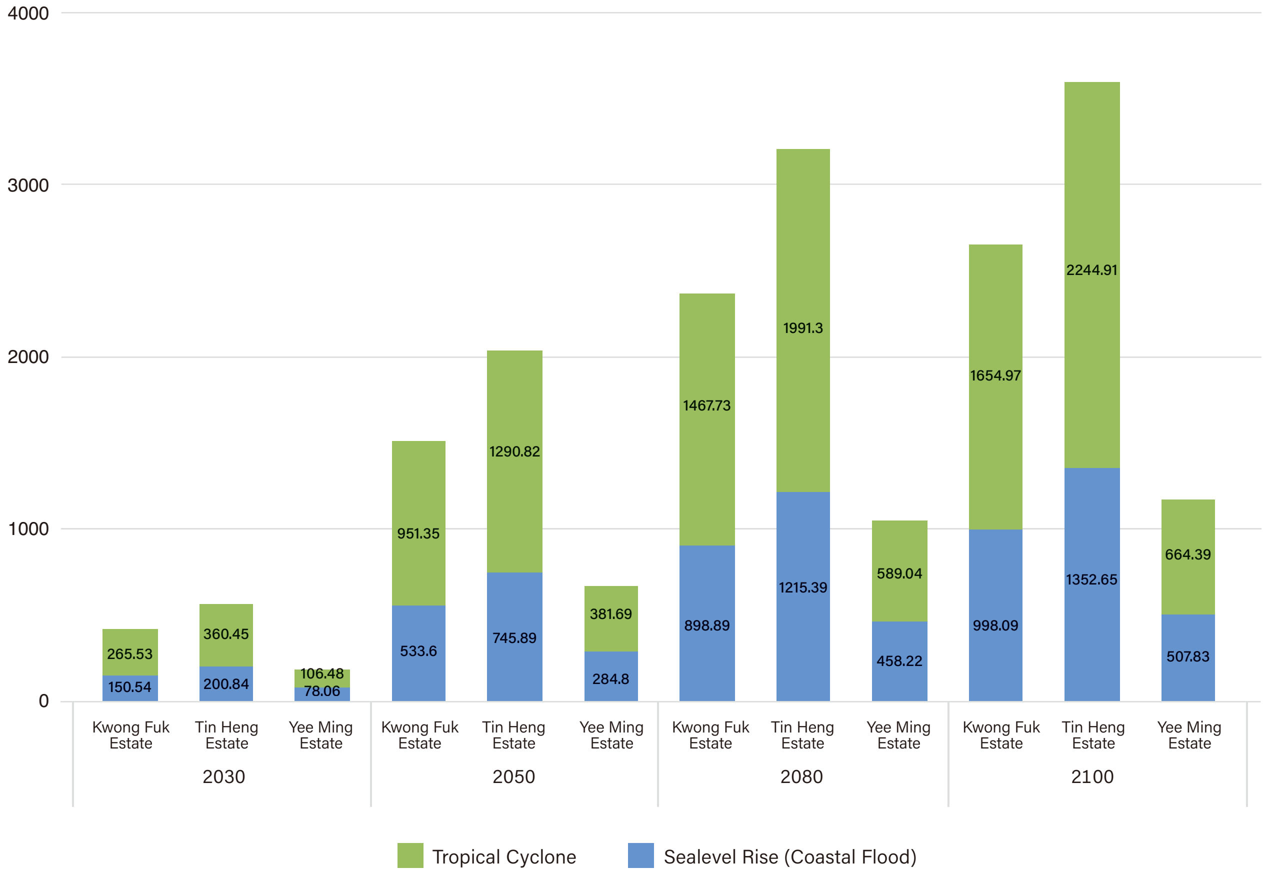


Notes: The figure presents the value losses for the selected public housing units under various climate scenarios. Panels A, B, and C illustrate the projected value loss changes for three selected public housing estates from the present until 2100 under four combined SSP-RCP scenarios. Different colors represent distinct climate scenarios, with purple indicating the high carbon emission scenario (SSP5-8.5). The upward trend suggests that value losses are increasing over time. (Data source: YoujiVest Climate Lab)

Figure 11 summarizes the asset value losses under the SSP5-8.5 scenario. We further distinguish the specific factors causing these losses. The results indicate that Tin Heng Estate would suffer the most severe losses, followed by Kwong Fuk Estate and Yee Ming Estate.

Importantly, our analysis shows that the potential damages caused by sea level rise can be more severe, especially in the long run. It is projected that the asset loss due to sea level rise for the three public housing estates by 2100 would reach around HK$4,500 million, significantly higher than that caused by typhoons. By 2050, the value loss due to flooding for all selected public housing could be tripled.

Figure 11. Projected value losses of public housing caused by typhoons and sea level rise under SSP5-8.5 scenario across time horizons.



Notes: Under the SSP5-8.5 scenario, the value losses faced by three selected public housing units due to typhoons and sea level rise across different time horizons (2030, 2050, 2080, and 2100) are summarized. The figure illustrates the primary risks these public housing units would face and the relative value losses for these risk types. (Data source: YoujiVest Climate Lab)

4 Hong Kong Current Climate-related Policies and Regulations

Several government bodies in Hong Kong have designed strategies and actions to address growing climate risks. Meanwhile, financial regulators also consider climate risks a pivotal threat to Hong Kong's future economy and financial stability, having implemented a series of regulations to better manage climate risks in the financial sector.

4.1 Governmental Departments

In 2016, the Civil Engineering and Development Department (CEDD) established the Climate Change Working Group on Infrastructure (CCWGI) to coordinate departments adapting to climate change. The CCWGI regularly revises various infrastructure design standards and reviews the resilience of existing infrastructure under climate change.

CEDD began a consultancy study in 2019 to review low-lying coastal or windy locations. The department investigated storm surges and waves to assess the impacts caused by sea level rise in these locations. Furthermore, CEDD has continuously improved the Hong Kong Slope Safety System and formulated strategies to prepare for the threat of landslides caused by extreme rainfall, including prevention, preparedness, and education.

The Drainage Services Department (DSD) has updated its drainage system design to factor in climate change in its Stormwater Drainage Manual. It now addresses rainfall increase and sea level rise caused by climate change.

The Highways Department has also leveraged the HKO's climate scenario analysis during road drainage design. The Development Bureau oversees urban planning and development strategies. Its development initiatives incorporate green building practices, sustainable design, and climate-resilient infrastructure.

4.2 Financial Regulators

The Hong Kong Monetary Authority (HKMA) has focused on climate-risk management since 2019. As a banking supervisor, the HKMA focuses on building banks' resilience against climate risks and climate-risk management capabilities. The HKMA has enhanced climate risk management for financial sectors and launched a pilot climate-risk stress test for Hong Kong's banking sector in 2021.

The Securities & Futures Commission of Hong Kong (SFC) plays a crucial role in overseeing and regulating companies' environmental, social, and governance (ESG) and climate-related disclosures. The SFC and the HKMA also co-chair Hong Kong's Green and Sustainable Finance Cross-Agency Steering Group and support the government's climate strategies.

The Hong Kong Stock Exchange (HKEx) also advocates for increased awareness and transparency around financial risks related to climate change.

5 Policy Implications

If climate risks are tackled appropriately, they can be transformed into development opportunities. To better adapt to climate change, we provide the following policy recommendations.

5.1 Data Integration and Comprehensive Climate-Risk Analysis

The Hong Kong government is instrumental in gathering data on weather patterns, topography, buildings and infrastructures, and socio-economic conditions. However, data integration is largely non-existent in Hong Kong, making it difficult for researchers to comprehensively analyze how climate risks affect different aspects of the economy. We recommend that the government create a geo-coded data platform that integrates these datasets to support comprehensive climate-risk analysis. This will serve as the cornerstone for researchers to identify the buildings and infrastructures exposed to high climate risks so that the government can target vulnerable populations and coordinate efforts across different units.

5.2 Adaptative Retrofits for Old Buildings and Infrastructures

For existing buildings and infrastructures, we suggest gradually conducting adaptative retrofits for high-risk regions, which include measures to improve energy efficiency, enhance structural integrity, use resilient materials, and increase their capability to withstand floods, storms, and heat waves. Noting that the Hong Kong government has implemented several initiatives to renovate old buildings, it is important to incorporate more climate-resilient designs in this process. For new buildings, the location selection needs to consider rising sea levels. It is important to highlight that properties in low-lying areas will have lower asset value in the medium to long term, and such value shifts may influence the pricing patterns of Hong Kong's properties. Leveraging geographic conditions, nature-based solutions can also be effective in adaptively protecting and strengthening infrastructures and buildings.

5.3 Targeting Vulnerable Groups

Vulnerable groups, such as older people and low-income families, are often disproportionately affected by climate extremes due to limited resources and mobility. When developing climate adaptation policies, these groups should be given more attention. This includes providing more social protection, targeted support, and climate-related education to these groups.

5.4 Improving the Climate Disaster Prediction, Warning and Response System

The Hong Kong government has made great efforts through various initiatives and measures to minimize the impacts of extreme weather events. Nevertheless, it is important to continuously summarize past experiences, adjust current response strategies, and ensure rapid recovery in the future.

Among various things that the government can do, we believe it should consider integrating the disaster prediction, warning, and emergency response systems. It is well understood that disaster prediction is often tricky. The government can consider setting up a competitive fund for climate risk analysis and disaster prediction. Climate-risk products with the highest predictive power during each extreme climate event (based on ex-ante/real-time information) should be rewarded. Meanwhile, real-time disaster data should be collected from social media and other sources for swift planning and responses.

5.5 *Developing the Climate Catastrophe Insurance and Reinsurance Market*

Insurance and reinsurance could also be essential tools for coping with climate catastrophes. Some early examples include Mexico's FONDEN disaster fund and the Caribbean Catastrophe Risk Insurance Facility, which build shared-risk mechanisms for post-disaster reconstruction and recovery. As a global financial center, Hong Kong has many insurance and reinsurance companies with professional experience and risk assessment capabilities. Given its relevance to Hong Kong, the government should consider developing the city into a hub for climate catastrophe insurance and reinsurance products. Doing so requires close collaboration between regulatory bodies, insurance and reinsurance companies, climate experts, and other stakeholders.

5.6 *Supporting Early-Stage Climate-Tech Companies and Application of Climate-Adaptation Technologies*

Supporting early-stage climate-tech companies and applying climate adaptation technologies are crucial for addressing Hong Kong's climate risks. The government should consider providing financial support to help climate-tech startups develop and scale up their technologies. In addition, the government should design incentives for companies in Hong Kong to adopt climate-adaptation technologies, such as tax incentives, subsidies, and procurement preferences. Demonstration projects can be initiated to showcase the effectiveness of climate adaptation technologies in real-world settings.

5.7 *Paying Attention to Transition Risks*

Apart from the physical risks discussed in this report, risks arising from transitioning to a low-carbon economy and shifting towards sustainable practices are also worth our attention. The Hong Kong Climate Action Plan 2050 includes ambitious interim targets to cut carbon emissions by 50% before 2035 from the 2005 level. This will require systemic changes in regulations, technology adoption, market preferences, and more. The government should evaluate viable pathways to achieve these targets and assess the impacts of climate transition risks on Hong Kong's economy, environment, and society.

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