

Chapter 6. Hai Phong, Viet Nam

Chapter 6 examines the threat of natural hazards to Hai Phong, Viet Nam, and how the government can build greater resilience to them. The chapter is divided into three sections.

The first section examines the “natural hazards” that pose the greatest risk to Hai Phong. It identifies and presents the risks which require the most urgent adaptation and mitigation actions.

The second section assesses key policies and activities that are currently being implemented in Hai Phong to increase the city’s resilience. It also proposes strategies and recommendations using the “systems thinking” approach that can be applied to increase the resilience of critical urban services and functions before, during, and after disasters.

The third section focuses on governance and analyses a number of public engagement and communication issues making important recommendations in that regard. The policy assessment particularly focuses on Hai Phong Port.

This chapter draws on the key findings of the OECD study “Green Growth in Hai Phong, Viet Nam” (OECD, 2016). It has also benefited from discussions held during the fourth Knowledge-Sharing Workshop ‘Green Growth in Port Cities’ in Hai Phong (24-25 June, 2015).

Main Points

- The city and port of Hai Phong are vulnerable to climate-induced risk such as **tsunamis, flooding, ocean storm surge** as well as a longer-term threat of **sea level rise**. By 2070, under a business as usual scenario more than 4.7 million of the population and a high proportion of the city's assets will be exposed to coastal floods. Previous disasters such as Son Tinh Typhoon in 2012 had a devastating impact on the city estimated at VND 1 000 billion (around USD 330 million, PPP). Given Hai Phong's economic importance in the region, adaptive capacities for resilient urban planning, infrastructure management and emergency response should be an overarching objective for the local government and port authorities.
- **Hai Phong port lacks a comprehensive and integrated floodwater management plan or strategy**. Hence, building preparedness and response capacities in the port is crucial. Ensuring that land-use and infrastructure planning takes into consideration future downscaled climate change projections for Hai Phong is equally important. Institutional synergies need to be created to improve the knowledge and resources of all stakeholders.
- **Hai Phong lacks a Local Resilience Action Plan (LRAP) and should mainstream one** into the city's normal planning and budgeting processes as well as via transfers from the national government.
- Promoting interconnectedness of climate-resilient infrastructure, critical public functions, and land-use planning in a **holistic integrated "systems thinking" manner** should be explored. This increases the adaptive capacity and resilience of Hai Phong to prepare for and recover from disasters and climate change, while shifting development toward urban green growth pathways.
- Expanding Hai Phong's financial resources will promote sustained financing and investment of the DRM strategy. **Opportunities exist for the city to explore new insurance modalities and innovative financing** to ensure investments in climate-resilient infrastructure and to cover the costs of recovery, rebuilding, as well as indirect economic losses and damages incurred. "Soft" institutional capacity must complement "hard" DRM measures. This includes participation of a broad spectrum of stakeholders in a transparent process of meaningful, open engagement and collaboration in resilient efforts. Currently, in most cases, the local government and its citizens are simply informed of decisions already made at much higher levels of government that are more distant from the situation and which may not adequately consider unique local circumstances and preferences or needs.

Natural disaster risks

With 1.96 million inhabitants, Hai Phong is the third-largest urban area in Viet Nam. Hai Phong's city government has the status of a province, along with the other four large cities in Viet Nam (Ha Noi, Ho Chi Minh City, Can Tho and Da Nang). Hai Phong is divided into 15 administrative units (7 urban districts, 6 rural districts and 2 island districts) (Figure 6.1). The unit of analysis in this report is Hai Phong City.

Figure 6.1. Map of Hai Phong by district



Source: Based on GADM database. Available at: <http://gadm.org/>.

Hai Phong is located at the mouth of the Cấm River along the northern extremity of the Red River Delta Basin. Given its location and surrounding topography, the city has a history of flooding going back centuries. Natural disaster risk is a potentially critical obstacle to green growth in Hai Phong. In 1881, the city was almost destroyed by a typhoon that killed 300 000 residents. An extensive system of dikes and canals has been built to contain the Cấm River and other rivers in the area to irrigate the rich rice-growing delta. Thus, for centuries flood control has been an integral part of the Red River Delta and Hai Phong's public policy.

Floods are becoming increasingly frequent and more destructive as population growth and large tracts of natural hinterland are developed. Among cities with populations greater than one million, Hai Phong is among the top 10 coastal cities with highest population exposure

to coastal floods in the world, with 794 000 persons being exposed as of 2007, while it is projected that more than 4.7 million will be exposed by the 2070s, under a scenario taking into account climate, subsidence and socio-economic changes. While Hai Phong is not among the top 20 cities with the most exposed assets, it is nevertheless among the top 15 cities with the highest proportional increase (from the current situation) in exposed assets by the 2070s, under the same scenario (Hanson, *et al.*, 2011).

Hai Phong lies directly along one of the most frequent paths for Pacific typhoons that originate in and around the Philippines and reach the Asian mainland through the Gulf of Tonkin. Severe tropical cyclones are expected to take place every 5 or 10 years in Hai Phong, and the annual total number of storms is on the rise (City of Hai Phong, 2015). In 2012, the Son Tinh typhoon caused Hai Phong a loss of property estimated at VND 1 000 billion (around USD 330 million, PPP), and the destruction or damage of many businesses and infrastructure, including 63 wrecked ships and 8 collapsed marine management stations. This typhoon was the most severely devastating disaster in Hai Phong over the past ten years but the city also suffered from similar disasters in 2005, 2008, 2009, 2010 and 2011, which bore impacts on the port facilities. For example, the 2008 storm overturned 202 containers and destroyed 2 ship cranes (City of Hai Phong, 2015).

Hinterland areas that once retained rainwater run-off and allowed it to infiltrate into the soil and groundwater have been urbanised. Downstream of the city of Hai Phong, drainage systems have not been sufficiently developed to deal with the increasing run-off water. During the process of rapid urbanisation, many vulnerable settlements and households have been established in flood-prone areas in the city, such as along drainage canals, creeks, rivers, or in low-lying areas. Moreover, many natural coastal defences such as mangrove forests and estuary wetlands have disappeared, mainly due to activities of local communities such as shrimp aquaculture.

The presence in the port of harmful substances, materials and critical facilities such as oil, hazardous waste in containers, sludge, poses an additional risk factor linked to floods and storms. The intensity of climatic events and the lack of proper treatment and handling of such materials create a risk of environmental contamination during floods and storms.

Assessment of DRM policies

Local Resilience Action Plans in the port

This assessment has found that Hai Phong, particularly its port, lacks appropriate resilience measures. Indeed, because of its importance in the regional economy and the infrastructural developments, the low resilience of Hai Phong port to typhoons and floods could result in severe economic repercussions in the region. Similarly, port activities can also increase the vulnerability of the city: for instance, unregulated or uncontrolled ship-generated wastes, port operations (e.g. inadequate temporary storage and pre-treatment of stormwater run-off from port terminals), and land reclamation for port development projects can be factors of risk. The 2012-25 Environmental Conservation Programme of the City of Hai Phong features a project of an estimated budget of VND 4 billion to strengthen communication systems to warn vessels in case of typhoons. However, no comprehensive emergency response strategy exists, and little is known about preparedness plans for staff.

The assessment nonetheless found a few interesting programmes related to increasing local resilience, including a partnership among the City of Hai Phong, the City of Seattle (United States) and Peace Winds America, an international NGO. The City of Seattle is a historical

sister city of Hai Phong, and the partnership between the two cities has been established within the framework of the Sister Cities Disaster Preparedness Programme of USAID, which aims to increase business resilience and public-private co-ordination on disaster risk planning. The project will conduct risk assessments, preparedness planning, hazard mapping, and business continuity trainings and consultations. It is expected that more than 2 000 businesses will engage with civil authorities in substantive planning and training activities until end of 2016 (USAID, 2014). It is therefore a timely opportunity to include private port stakeholders working on port facilities but also all businesses whose activities are port-related.

For these individual programmes to function more effectively, it is important to prepare a local resilience action plan (LRAP) to increase the port's adaptive capacity. The LRAP should be a joint effort by the central government, the local government and relevant port authorities and operators. It should address Hai Phong port's unique challenges. The following are key issues to be considered:

1. Reducing exposure to risks by making projections of future potential threats and damages using downscaled global climate change models. Early warning systems should be set up in each port terminal and triggered by weather forecast and also sensors such as gauge stations in the Cam Ca River. Response capacities should also be developed to ensure the economic resilience of the port. In this regard, port companies should develop business continuity plans to minimise the impact of disasters on their activities;
2. Building flexible infrastructure such as semi-permeable surfaces in each terminal. Hai Phong port currently lacks resilience strategies incorporating adaptive infrastructure and could consider integrating several design concepts into any new commercial and industrial development projects larger than one acre in dock and maintenance areas of the port. These concepts may include the use of pervious surfaces (permeable pavements and surface structures), and the planning of land slopes and gradients to ensure drainage or retention in designated zones (OECD, 2014). Similar options should be explored in the port of Hai Phong, and integrated as requirements for building permissions;
3. Tracking the purchase of all hazardous materials in the port, and ensuring their safe and responsible use, storage, and final disposal with a "cradle-to-grave" manifest system that tracks possession of these materials to affix responsibility and liability. Qualified personnel should be trained to contain accidental releases of hazardous chemicals and other substances and containment plan could be set up jointly between the City of Hai Phong and port authorities/operators, so that both parties share resources and co-ordinate emergency response in case of disaster;
4. Providing the equipment, training, and other resources available and on-site to effectively prevent or control any contingency from turning into a "human-made" disaster. The local government and the port authority should train emergency response staff and revise emergency response plans on an on-going basis. The protocols and procedures should reflect changing risks and be based on experience gained in running mock emergency response drills. Periodically, the plan should be reviewed by an independent third party to ensure that it captures all of the main expected threats but is flexible enough to respond effectively to unexpected threats/risks; and

5. Establishing unencumbered access to top port management – accompanied by external review or shared responsibility – for the safe operation of the port, and its most immediate recovery from a disaster like a typhoon.

Land-use policies

The geographical characteristics and rapid urbanisation trend of Hai Phong pose a critical challenge on land use. The entire Red River Delta region including Hai Phong, backed by the steep rises of the forested northern highlands to the west and north, has low elevations averaging about three metres above sea level. In terms of sea-level rise and storm surge, recent assessments show that over 70% of the Red River Delta region's surface area used for residential, commercial and industrial purposes is at risk of a 5-metre high flood by 2050 (Neumann, *et al.*, 2015; OECD, 2016). In addition, Hai Phong has a high density of rivers averaging 0.6 to 0.8 km per 1 km²; storms can increase damage to infrastructure or create floods by increasing water level in the numerous waterways.

It is observed that recent urban development has expanded from the south of Cam River to the south-east and west as well as north-west towards Ha Noi. Most of the inner-city areas are filled up by urban land use. It is estimated that 475 square kilometres of new land is required for urban development to accommodate 1.5 million new urban residents in the next 10 years (OECD, 2016). An effective land-use policy is needed to enhance city resilience by steering development in Hai Phong away from risk-prone areas.

The City Master Plan of Hai Phong, targeting 2050, guides the city's land use through the Detailed Planning and Zoning Regulations. If such a plan is to be effective, legal assurance is needed that the city master plan is aligned with all the long-term thematic and sectoral plans and strategies. However, mechanisms to ensure such alignment are not very clear. For instance, Hai Phong has a long-term Flood Control Master Plan to 2025. Although it has strong influence on long-term land use planning and zoning codes in critical areas for groundwater recharge and retention of surface water run-off, no co-ordination mechanisms are found between the two master plans.

Urban infrastructure

The local government and the port authority are currently implementing several measures to build resilience of the port-city to typhoons and floods, including:

- Construction of dikes and pumps along the coast or the rivers. For the period 2012-25, 14 dike/embankment renovations or construction projects of an estimated total budget superior to VND 3 000 billion have been listed within the environmental protection programme of the City of Hai Phong;
- Construction of retention ponds in the city to retain stormwater and prevent flooding of inhabited urban areas (including port areas); and
- Creation of a system of anchorage under port cranes, to ensure their stability during a storm. For the period 2012-25, VND 65 billion has also been committed to renovate river ports and seaports, including construction of safe anchorage for larger ships during storms.

Currently, only one project of VND 5 billion has been listed in the 2012-25 Environmental Conservation Programme to prepare for climate change and sea level rise in Hai Phong. Public and port authorities should ensure that land-use and infrastructure planning at the port takes into consideration future downscaled climate change projections for the Hai

Phong area and northern Viet Nam. Such planning should assess the combined risks for sea level rise, storm-surge levels and tidal levels for the interior sections of the old port located along the river).

Currently, a monitoring network of river or stream gauge stations measures the water surface level as well as the discharge or flow of water. In addition, a network of early warning system (EWS) would be installed along the six major rivers that flow into or near Hai Phong. Gauge stations can be fully automated, capable of sampling water quality, and be linked up to satellites and data processing/communication centres via telemetry. Such capabilities are being developed with donor assistance to track storm systems in the western Pacific Ocean. It is not known whether they are being developed to monitor inland run-off from the mountainous areas to the west of Hai Phong.

Assessment of DRM governance structure

Horizontal and vertical co-ordination

Hai Phong is one of the five provincial cities of Viet Nam directly supervised by the national government, leading to complex governance arrangements for DRM. In general, the features of the local administrative system in Viet Nam suggest that it is a highly hierarchical system, with lower levels of government co-ordinated through the central government. In the case of Hai Phong, the governance structure is even more complex as Hai Phong port authority, which is directly managed by the central government, plays a key role in developing and implementing the city's DRM policies (OECD, 2016).

This assessment has found that there is a lack of knowledge and resources among public and private stakeholders who should do what in order to build the resilience of the Hai Phong port. For example, the lack of national-level planning to help federal and state coastal managers develop adaptation plans is a barrier to effective resilience. Considering its authority in port development and its knowledge of coastal resilience issues in the whole country, the central government of Viet Nam should play a leading role in encouraging and supporting the adoption of a local port resilience action plan. Other plan-based strategies that can be reinforced include data storage plans, emergency responses and recovery plans, and work-to-ID funding streams. These plans often involve practices such as drills and event reconstructions, simulation of post-storm actions, and storm preparations (OECD, 2014).

The creation of disaster units in each terminal of the port is a promising initiative. Although detailed information on the function and co-ordination mechanisms of these disaster units was not available within the scope of this study, they can connect a wide range of stakeholders related to DRM in Hai Phong port and facilitate much broader co-operation and co-ordination.

On a broader spatial perspective, the study also found that there is a lack of co-ordination mechanisms between the city of Hai Phong and surrounding provinces on DRM. Cross-border cooperation is especially important to prepare for and respond to flood risks at the Red River Delta Basin including Hai Phong. The national government, with the support of provinces and province-level cities, could develop the concept of functional urban areas in Viet Nam and a metropolitan planning framework to build synergies. The Ministry of Planning and Investment and relevant national ministries can help build mechanisms for collaboration across levels of government to improve the strategic metropolitan planning framework. Hai Phong could also consider creating a metropolitan planning institute to

coordinate across sectors and levels of government. Such an institute could serve as the regional planning authority, and could be charged with preparing long-term plans, providing technical assistance, proposing integrated metropolitan development projects and preparing mechanisms for evaluation (OECD, 2016).

The study also found that lack of skills and incentives, and of any formal mechanism for working together, is a major challenge to establishing and strengthening horizontal linkages across agencies. For example, the 2009 Law on Urban Planning does not specify any procedure for cross-sectoral co-ordination of urban planning at the city level. The authority responsible for urban planning is requested to collect comments from relevant stakeholders, but no clear incentive or mandate is in place to engage in integrated urban planning. Another constraint for establishing inter-sectoral linkages is the capacity of staff with the skills to conduct cross-sectoral planning. Line ministries tend to be predisposed towards controlling and/or monitoring inputs, rather than processes and outcomes (OECD, 2016).

Disaster risk financing

Hai Phong lacks the adequate financial resources to meet the scale of its resilience needs and will need to include a financial component to pay for the necessary investments. So far, Hai Phong has used traditional financing instruments and approaches to pay for public amenities and service improvements, such as “balance sheet” funds from city and municipality coffers, transfers from the provincial and central governments, and concessional financing from international donors, such as the JICA, ADB and World Bank. Hai Phong is allowed to keep only 15-20% of the local taxes it collects from residents and businesses in the city, and none of the customs revenues collected from port duties. The rest goes back to central government coffers where it is then redirected and used to meet the needs and demands of citizens across the entire country. Since the city of Hai Phong has very strict limits on its authority to impose taxes locally to generate revenues, it must depend mostly upon transfers from the central government, and international donor financing acquired through projects negotiated by central government agencies.

The most likely means for Hai Phong to obtain additional DRM funds may be through leveraged private sector funds incentivised by public sector involvement via various risk mitigation instruments like public-private partnerships (PPPs). However, aligning public and private sector interests can be difficult and it might be more pragmatic and practical for cities like Hai Phong to investigate emerging and innovative forms of financing, (Table 2.5), such as financing from national or regional development banks through “green bonds,” or with socially motivated “social impact investors” interested in forming joint green investment projects with the city, or through the creation of community savings groups, which then “federate” or aggregate into larger, self-sustaining micro-financing mechanisms to obtain greater economies of scale and better financing rates and terms from local banks and private lenders. As regards the financing of the resilience to disasters, it may also comprise more *ex-ante* parametric insurance policies to insure investments in climate-resilient infrastructure and to cover the costs of recovery and rebuilding, as well as for indirect economic losses and damages incurred.

Hai Phong’s range of freedom when it comes to changing policies or programmes is strictly limited by central government authorities to redirecting its own local budget items. Measures could include increasing funds to clean out drainage canals or to initiate public awareness-raising campaigns to inform citizens about the public health benefits of maintaining household septic systems for instance, but these choices would all come at the expense of other local programmes and expenditures. Catalysing informal public-

private partnerships with local business leaders is important to consider. City governments like Hai Phong should act as interlocutors or “honest brokers” facilitating the creation of new, innovative associations and relationships with civil society and the private sector.

Stakeholder engagement

The top-down approach taken for most decision-making processes in Viet Nam does not lend itself well to the multi-dimensional and largely unexpected impacts of climate change and natural disasters. Information about “on-the-ground” impacts in real-time is lacking, and this requires open lines of two-way communication from the affected areas to response teams acting on that information. The current governance approach in non-emergency situations consists of “one-way” communication which inhibits innovative and more nuanced responses to issues that are better tailored to local conditions, preferences and needs.

In Hai Phong, the city implemented an action plan between 2013 and 2015 to raise public awareness about DRM through community participation. The action plan was based on a national project, the National Strategy for Prevention and Mitigation of Natural Disasters with the Vision 2020, which aims to mobilise resources to ameliorate disaster response, prevention and mitigation and to minimise loss to human life, property and damage to natural, cultural and environmental assets (City of Hai Phong, 2015). Presently, however, in most cases, the local government and its citizens are simply informed of decisions already made at much higher levels of government, which may not adequately reflect local preferences and needs.

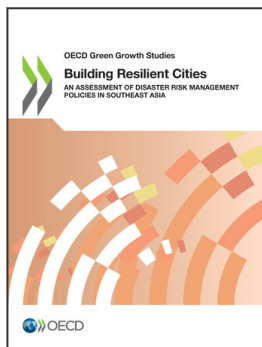
For Hai Phong to be more successful in building better DRM, it will be necessary for a broader spectrum of representatives to participate in a transparent and meaningful stakeholder process. Any such initiative should encourage ordinary citizens and leaders from civil society organizations, and communities to participate more fully in the design, implementation and maintenance of public resilience efforts. There are many advantages that could be gained by adopting a more collaborative approach of actively engaging citizens in making decisions, rather than just having lower levels of government agencies carry out decisions made by others at higher levels of government who are removed from the unique local conditions, perspectives, and preferences. Although Hai Phong officials cannot unilaterally change many of these governance processes, they can encourage the central government to continue to expand its current policies of allowing participation among agencies at the local levels as well as other stakeholders in the community, civil society, and the private sector.

Main policy recommendations

- Develop a Local Resilience Action Plan to identify and spatially map the most exposed and vulnerable people, places, and public assets and critical services, for both the port and the city.
- Take into consideration future downscaled climate change projections into land-use and infrastructure planning at the port, such as the rise of sea levels and storms intensity.
- Check the important port infrastructures and assets for hazardous substances and set up a containment plan.
- Train the emergency response staff, regularly revise the emergency response plan, and set up emergency response systems with real-time monitoring.
- Include plans for adaptive management of infrastructure, such as the use of pervious surfaces (permeable pavements and surface structures), and the planning of land slopes and gradients to ensure drainage or retention in designated zones.
- Develop the concept of functional urban areas and a metropolitan planning framework. It is especially important to address flood risks at the Red River Delta Basin including Hai Phong.
- Create metropolitan planning institute to coordinate across sectors and levels of government.
- Involve citizens and leaders from the private sector, civil society organisations, and local communities to participate more fully in the initial design, prioritisation, implementation, and maintenance of public investments and resilience efforts.
- Develop business continuity plans for port companies to minimise the impact of disasters, and form public-private partnerships with shipping, operating and other port companies.

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