

Feasibility Study

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DISASTER RISK TRANSFER SOLUTIONS FOR URBAN SETTINGS IN VIET NAM



With the collaboration of



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ABBREVIATIONS

100RC	- 100 Resilient Cities (100RC) program
ACCCRN	- Asian Cities Climate Change Resilience Network
ACDM	- ASEAN Committee on Disaster Management
ADB	- Asian Development Bank
ADMM+EWG HA/DR	- ASEAN Defence Ministers' Meeting Plus Experts' Working Group on Humanitarian Assistance/Disaster Relief
ADPC	- Asian Disaster Preparedness Center
AED	- Annual Expected Damage
AHA Center	- ASEAN Coordinating Center for Humanitarian Assistance on Disaster Management
ARF DiREx	- ASEAN Regional Forum's Disaster Relief Exercise
ASEAN	- Association of Southeast Asian Nations
BMZ	- German Ministry of Economic Cooperation and Development
CBDRM	- Community-based Disaster Risk Management
CCCO	- Climate Change Coordination Offices
CCFSC	- Central Committee for Flood and Storm Control
CCNDPC	- Chairman of the Central Committee for Natural Disaster Prevention and Control
CCRIF-SPC	- Caribbean Catastrophe Risk Insurance Facility Segregated Portfolio Company
NSCNDPC	- National Steering Committee for Natural Disaster Prevention and Control
CRED	- Centre for Research on the Epidemiology of Disasters
CRS	- Catholic Relief Services
DARD	- Departments of Agriculture and Rural Development
DMC	- Disaster Management Centre
DMHR	- Disaster Management and Humanitarian Response
DMPTC	- Disaster Management Policy and Technology Center
DRF	- Disaster Risk Financing
DRR	- Disaster Risk Reduction
ECA	- Economics of Climate Adaptation
EM-DAT	- Emergency Events Database
ENSO	- El Niño–Southern Oscillation
FAO	- Food and Agriculture Organisation
FDI	- Foreign Direct Investment
GCF	- Green Climate Fund
GDP	- Gross Domestic Product
GSO	- General Statistics Office
GWP	- Gross Written Premium
IAV	- Insurance Association of Viet Nam
IDF	- Insurance Development Forum
IMF	- International Monetary Fund
IOM	- International Organisation for Migration
ISA	- Insurance Supervisory Authority
ISF	- InsuResilience Solutions Fund
JICA	- Japanese International Cooperation Agency
JMA	- Japan Meteorological Agency
JRC	- European Commission's Joint Research Centre
KfW	- German Development Bank
M2M	- Machine to Machine
MARD	- Ministry of Agriculture and Rural Development
MOC	- Ministry of Construction
MoF	- Ministry of Finance
MOLISA	- Ministry of Labor, Invalids, and Social Affairs
MONRE	- Ministry of Natural Resources and Environment
MPI	- Ministry of Planning and Investment

NCHMF	- National Centre for Hydro-Meteorological Forecasting
OECD	- Organisation for Economic Co-operation and Development
PDC	- Pacific Disaster Center
PJICO	- Petrolimex Joint Stock Insurance Company
PMU	- Project Management Unit
PPCs	- Provincial People's Committees
PPP	- Purchasing Power Parity
PTI	- Post and Telecommunication Joint Stock Insurance Corporation
PVI	- Petro Vietnam Insurance
SEADRIF	- Southeast Asia Disaster Risk Insurance Facility
SECO	- State Secretariat for Economic Affairs, Government of Switzerland
UCCRTF	- Urban Climate Change Resilience Trust Fund
UN	- United Nations
UNDP	- United Nations Development Programme
UNDRR	- UN Office for Disaster Risk Reduction
UNEP	- United Nations Environment Programme
UNFPA	- United Nations Population Fund
UNICEF	- United Nations Children's Fund
USAID	- United States Agency for International Development
VinaRe	- Vietnam National Reinsurance
VINASARCOM	- National Committee for Incident, Disaster Response, Search and Rescue
VMHA	- Viet Nam Meteorological and Hydrological Administration
VNDMA	- Viet Nam National Disaster Management Authority
VNRC	- Viet Nam Red Cross Society
WB	- World Bank
WRI	- World Resource Institute
WTO	- World Trade Organization
WTW	- Willis Towers Watson

EXECUTIVE SUMMARY

1. WTW, AXA Climate, and Guy Carpenter conducted a feasibility study for the InsuResilience Solutions Fund (ISF) to assess the setting up of disaster risk transfer solutions for climate-vulnerable cities in Viet Nam. The feasibility study was carried out from November 2021 to February 2022 through desktop research and based on the data available from an Asian Development Bank (ADB)/WTW project in Hue City and an Economics of Climate Adaptation (ECA) study by ISF in Can Tho City. The data was augmented by two ECA workshops with the Can Tho City officials, led by the Climate Change Coordination Office (CCCO) of Can Tho, including presentations by ADB, WTW, and Hue City officials at the workshop in November 2021.

2. The feasibility study confirmed that the **key climate hazards** to Viet Nam's largest and most vulnerable cities are flood (in particular riverine floods) and typhoons due to most larger cities being located on the coastline or in low-lying deltas. Climate change will likely increase the severity and frequency of flood risk and the severity of typhoon risk. Viet Nam's high rate of urbanization highlight the need for cities to develop new tools to manage the financial consequences of disaster events. The level of urbanization is forecast to reach 62% by 2050.¹ This surge in population carries with it rising urban exposure in terms of a commensurate growth in infrastructure and the built environment, increasing urban economic concentration, and expanding peripheral poor populations in parts of the cities' most vulnerable to flood and typhoon. While urban populations are generally better off than rural ones, the daily average income per capita of the lowest income quintile in urban Viet Nam populations is around PPP USD 9² leaving many living in urban areas still unable to cope effectively during severe natural disasters.³

3. The study has identified that despite significant investment in better planning, the Government of Viet Nam still faces a **funding gap** after disasters. The current financing capacity of Viet Nam meets only about 21% of the estimated need just for emergency reconstruction and recovery.⁴ Viet Nam could see losses of over 9 % of GDP per capita in the case of a major disaster, and only about 5 % of assets in the country are covered by insurance.⁵

4. Viet Nam does have a strong legal basis for **disaster risk management** including the 2014 Law on Natural Disaster Prevention and Control. Financial sources are identified as state budget funds, natural disaster prevention and control funds, and voluntary contributions. These ringfenced funds are managed by Provincial People's Committees (PPC). Disaster funds exist at the provincial level managed by the PPCs and disbursed by the Departments of Agriculture and Rural Development (DARD). These funds, for which at least 58 out of 63 provinces have issued legal documents, cover disaster prevention and control activities (e.g., emergency response activities) but not financing and insurance for reconstruction. From 2015 to 2020, over VND 520 billion were disbursed for disaster control purposes.⁶

¹ Viet Nam Population Projection for the Period 2019-2069, General Statistics Office of Viet Nam, 12-2020 (p 44)

² Statistical Yearbook of Vietnam 2020 (General Statistics Office, 2020)

³ Strengthening City Disaster Risk Financing - ADB, 2015

⁴ World Bank – Speech by Ousmane Dione, World Bank Country Director for Viet Nam, given at the Vietnam National Conference on Disaster Risk Management on 29 March, 2018 <https://www.worldbank.org/en/news/speech/2018/03/29/vietnam-national-conference-on-disaster-risk-management>.

⁵ Towards Integrated Disaster Risk Management in Viet Nam (WB/ Global Facility for Disaster Reduction and Recovery (GFDRR), 2017)

⁶ Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic (UNDP publication, 2022)

However, there is uncertainty whether the provincial level Disaster Management Funds could be used to purchase insurance premiums for public assets.⁷ In addition, a central Natural Disaster Prevention and Control Fund is soon to be set up and managed by the Ministry of Agriculture and Rural Development (MARD) for relieving and supporting natural disaster response activities that are beyond the local response capacity. An important inclusion in the Decree that sets up the central fund is the provision for the purchase of disaster risk insurance for commune-level disaster prevention. The UNDP Viet Nam office has informed this study that despite the fact that the Decree 78 allows for the Fund to be used for now only for purchase of life and accident insurance for staff involved in emergency response at the commune level, it provides a cashflow for disaster risk management activities, and can be a potential entry point as a financial resource for insurance solutions (and potentially premium payments) in the long run. This will require introduction of amendments to the policy documents governing the fund. That also incentivizes greater engagement between government and the insurance industry to understand risk financing needs and develop the relevant insurance solutions that can be incorporated within the broader disaster risk management strategy of the government.⁸ In terms of disaster risk management stakeholders, the National Steering Committee for Natural Disaster Prevention and Control (NSCNDPC) serves as the primary decision-making and implementational body at the national level with its Standing Office the Viet Nam Disaster Management Authority (VNDMA), being under the MARD.⁹

5. Viet Nam has a robust **non-life insurance sector**: disaster risk insurance stakeholders include 32 local non-life insurers led by Bao Viet Insurance and PetroVietnam Insurance (PVI); five domestic brokers and international reinsurers including two locals ViNaRe and PVIRE. These insurers typically reinsure a large portion of their risk. Disaster risk insurance is only covered as an add-on to existing property, construction and erection all risks insurance policies with very low penetration rates. While public assets are insured for fire and explosion, disaster insurance for flood and typhoon is very low to non-existent.

6. There are a number of **catastrophe modelling and data** initiatives in Viet Nam that could accelerate the development of disaster risk transfer solutions. This includes the Climate Risk Index, an online platform developed by UNDP, MARD and MONRE which has datasets on climate change profiles, hazards disaggregated by region and socio-economic development among other indicators. A number of flood models for Viet Nam also exist as well as the SEADRIF platform set up by the World Bank to pool South East Asian countries' disaster risk.

7. While **parametric insurance** is permitted in Viet Nam, take up of such policies has been limited in the past. Nevertheless, the **ADB/WTW Hue City project** will be piloting a typhoon parametric insurance cover to provide fast financing for emergency response. A typhoon **indemnity policy** is also being structured to cover longer-term reconstruction and the flood cover will only consist of an indemnity cover due to the more complex nature of flood risk and the time needed to develop a robust parametric flood model. The study found that the same principles could be applied to a potential disaster risk solution in other Vietnamese cities although there may be scope to develop a parametric flood cover if the timeline was sufficiently long.

8. Viet Nam's laws and regulations, specifically the **Law on Management and Use of State Property 2017**, clearly provide for disaster risk insurance for high-value and high-risk public assets, that insurance can cover either on an indemnity or parametric basis. However, the lack of a formal pathway for disaster insurance procurement sanctioned by the Prime Minister has resulted in the inability of the Peoples' Committees of Provinces and Cities to allocate state budget to the purchase of disaster insurance for public assets. Moreover, the list of assets to be insured is not yet confirmed since there is

⁷ IDF Viet Nam meeting with Can Tho organised by UNDP on 31 May 2022 at which Can Tho DONRE, CCCO, and other Provincial level stakeholders were present.

⁸ Input directly from UNDP Viet Nam office, 12 April 2022

⁹ Centre for Excellence in Disaster Management and Humanitarian Assistance, Viet Nam Disaster Management Reference Handbook, December 2021

no formal methodology approved by the State for asset classification as “high-risk and high-value”. The Ministry of Finance (MoF) is responsible for devising such a list and the Insurance Supervisory Authority (ISA), on behalf of MoF, has created a taskforce to pilot public assets insurance until 2025. Asset selection and implementation plans will be submitted to the Prime Minister’s office for a decision expected in 2022. In parallel, based on ADB/WTW’s Hue City project, the People’s Committee of Thua Thien Hue province has submitted a list of public assets, initially composed of municipal buildings and bridges, to the Central Government of Viet Nam for approval which provides a valuable precedent for possible public assets classification and approach to be adopted nationwide.

9. **The Hue City project** and further research revealed that there is a lack of a comprehensive **database of public assets** at city, provincial or national government agency/Ministry level. Developing such a database would be a first step in setting up an indemnity disaster insurance cover for cities’ public assets. Ownership of each asset would be another key criteria to ascertain in order to understand which entity would pay premium/receive payouts for a potential risk transfer solution. Moreover, to ensure ownership and sustainability of the project, specific activities will be agreed for joint implementation with relevant government institutions (i.e., development of the database for public assets jointly with ISA/MoF). And for this purpose, a **project management unit** is proposed to be set up within ISA to help coordinate and support project implementation while managing internal government procedures (i.e., navigating internal government requirements and obtaining relevant approvals).

10. For the feasibility study, based on available data through desktop research, it was determined that the relevant factors to assess the initial candidate cities would be: the history of floods and typhoon; their status as a municipality or large city; population size; and socio-economic and natural disaster data sets spanning over forty years. As a result, **Can Tho, Hai Phong, Da Nang, Bien Hoa and Nha Trang were identified as initial candidates to assess in the study.**

11. For the main project, it is envisaged that through detailed **engagement with the Government of Viet Nam, at Central, Provincial and City level**, a longer list of potential cities will be agreed. Factors which could drive the choice of cities include predominant hazards, social profile, data availability, current level of risk understanding or institutional preparedness, political sponsorship, ability to pay premium, geographical diversification and size. A weighted ranking system designed by WTW will then be applied to the long list of cities that have been identified to finalise and prioritise the list of cities for implementation of disaster risk financing measures, including disaster risk insurance.

12. In terms of **cities’ appetite to take out disaster risk insurance**, there are at least two Vietnamese cities, aside from Hue City, that are potentially interested. The two ECA workshops held by ISF culminated in a Letter of Interest issued by the People’s Committee of Can Tho City on 24 December 2021 declaring their support to a proposed ISF-funded Public-Private Partnership project led by the Insurance Development Forum (IDF) (Appendix 1). Furthermore, the Da Nang Commanding Committee for Natural Disaster Prevention and Control, Search and Rescue and Civil Protection (the CCNDPC/SR) has issued a Letter of Support to UNDP on 17 April 2022 (Appendix 9) indicating their interest in obtaining more information and their willingness to participate in a project concerning disaster risk insurance for public assets in Da Nang. In addition, UNDP’s and ADB’s engagement with ISA and MoF has been successful in bringing to the agenda of the Central Government of Viet Nam the matter of natural disaster risk financing measures, including disaster risk insurance, to be implemented at a national level. In this regard, a Concise Concept Note was jointly developed by UNDP, ADB, KfW and IDF industry members on 21 October 2021 (Appendix 6) and submitted to ISA/MoF with the objective of conducting a multi-stakeholder workshop at national level and to obtain issuance of a “Letter of No Objection” to proceed with the design and implementation of a disaster risk insurance solution for selected cities in Vietnam. Pursuant to such engagement, on 15 February 2022, a Letter of No Objection was issued by ISA/MoF (Appendix 8) indicating their commitment to the proposed project which will also facilitate engagement with further cities across Viet Nam.

13. On the basis of the results of this feasibility study, IDF project partners intend to submit a revised and enhanced Concept Note to the ISF requesting funding for a 24-month project to develop and

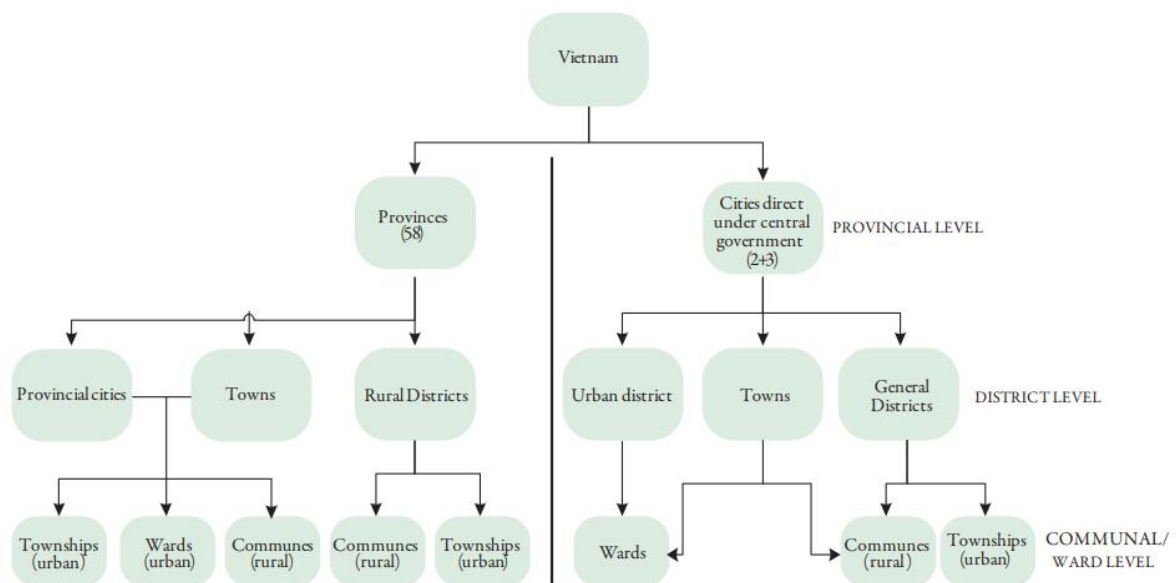
implement a new insurance scheme to enhance the resilience of poor and vulnerable population in selected cities in Viet Nam through disaster risk transfer solutions to protect public assets in application of the ‘Law on Management and Use of State Property’ 2017 and Decree 151 of 2017. The high-level modelling capacity built during the main project will be leveraged in further projects to precisely quantify the economic benefit and cost of climate change adaptation measures. This will eventually allow risk reduction investments which have a positive effect on the city's risk profile and lead to more efficient and sustainable risk transfer. ADB and KfW have expressed interest to facilitate the financing required for risk reduction investments.

1. DISASTER RISK MANAGEMENT AND INSURANCE LANDSCAPE

1.1 OVERVIEW

Viet Nam is the 66th largest country in the world and has a population of over 96 million¹⁰, making it the 15th most populous country in the world and the 3rd most populous country in ASEAN¹¹. Viet Nam has several cities with a population of more than one million, namely, Ho Chi Minh City, Ha Noi, Hai Phong, Can Tho, Da Nang, and Bien Hoa. There are 30 cities with at least 100,000 people and more than 50 cities with populations between 10,000 and 100,000.

Viet Nam is a one-party Republic with a unicameral legislature and a government, the main executive power, headed by the Prime Minister. Viet Nam has 58 provinces and 5 municipalities which are under the Central Government’s overall control. However, each has their own People’s Committee which is responsible for implementing policy, executing laws and orders, and managing the provincial departments. The 58 Provinces and 5 centrally run Municipalities have People's Councils which appoint People's Committees which are the Executive Body of the Provinces/Municipalities. Viet Nam’s local administration is organized at three levels, namely, Provincial, District, and Commune (see Figure 1c).



Source: Urban Solutions (2011)

Figure 1c: Viet Nam’s regional and urban administration hierarchy

Source: World Bank, 2011, Viet Nam Urbanization Review

¹⁰ Viet Nam General Statistics Office: “Completed Results of the 2019 Viet Nam Population and Housing Census”

¹¹ ASEAN Disaster Management Reference handbook, 2015, Centre for Excellence in Disaster Management and Humanitarian Assistance (CFE-DMHA)

The Provincial and District level have People's Councils and People's Committees. Each of the Provinces and Districts have their own Departments, for example, Department of Justice, Department of Health, etc. However, policies and laws are issued by the Central Government, while the Provinces/Municipalities are responsible for organising the implementation of such policies and laws under the 'supervision' of the Central Government. The People's Committees are deemed to be the local government equivalent of the Executive arm of the Central Government of Viet Nam. The People's Committee is headed and led by a chairman with all decisions made through a collegial process.

A high proportion of the country's population (75%)¹² and economic assets, including irrigated agriculture, are located in coastal lowlands and deltas, while rural areas face issues of poverty and deprivation. Rapid urbanisation and industrialisation have also increased pressures on urban systems in certain areas of the country and along the coastline.¹³ Regional governments' capacities are often inadequate to meet increasing demand of housing, utilities, and city services for ever-increasing city populations. Uncontrolled settlements generating slums and squatters on the riverbanks and waterways reflect the deteriorating conditions of the urban poor, who are among the groups most vulnerable to flood risk, water pollution, and environmental degradation occurring in major cities. A share of 27% of urban population lives in slums.¹⁴ Because of its dense coast, Viet Nam has been ranked among the five countries likely to be most affected by climate change.¹⁵ It has been estimated that climate change will reduce national income by up to 3.5% by 2050.¹⁶

Viet Nam has a high rate of urbanisation which has increased rapidly from 20% in 1990 to 33% in 2014 and is forecast to reach 62% by 2050.¹⁷ A UN projection suggests that the urban population will exceed the rural population by 2040 (see Figures 1a and 1b).

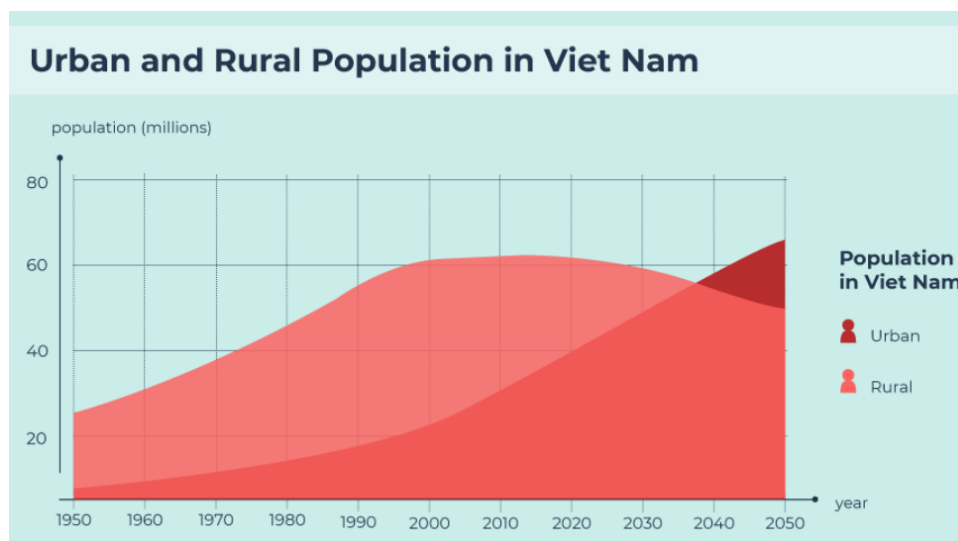


Figure 1a: Urban and Rural Population in Viet Nam

Source: Urbanisation and Urban Development in Viet Nam I Infographic (urbanet.info)

¹² Urbanisation and Urban Development in Viet Nam I Infographic (urbanet.info) Urbanet is a knowledge transfer platform on sustainable urban development backed by BMZ/GIZ. <https://www.urbanet.info/vietnam-urban-development-infographics/>

¹³ IOM 2016: Assessing the Evidence: Migration, Environment and Climate Change in Vietnam, s.l.: s.n.

¹⁴ Asian Disaster Preparedness Centre (ADPC), Disaster Risk Reduction in Viet Nam, Status Report 2020

¹⁵ World Bank-ADB Climate Risk Country Profile – Viet Nam

¹⁶ Arndt, C., Tarp, F., & Thurlow, J. (2015), The economic costs of climate change: A multi-sector impact assessment for Viet Nam. Sustainability: 7: 4131–4145 (quoted in ADPC, Disaster Risk Reduction in Viet Nam Status Report 2020)

¹⁷ United Nations. 2014. World Urbanization Prospects: The 2014 Revision - Highlights. ST/ESA/SER.A/352. United Nations Department of Economic and Social Affairs, Population Division, New York; General Statistics Office, 2019, Viet Nam Population Projection for the Period 2019-2069

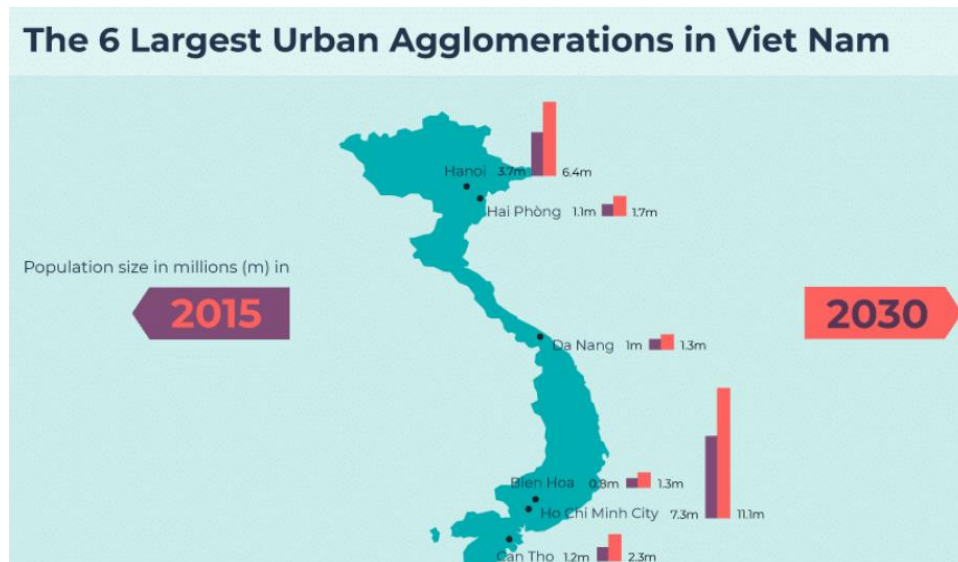


Figure 1b: The 6 Largest Urban Agglomerations in Viet Nam
Source: Urbanisation and Urban Development in Viet Nam I Infographic (urbanet.info)

This surge in urban population carries with it rising urban exposure in terms of a commensurate growth in infrastructure and the built environment, increasing urban economic concentration, and expanding peripheral poor populations in parts of the cities which are most vulnerable to natural hazards¹⁸ (see Table 1).

Sector	value-added as percent of GDP (constant 2000 US\$)	1985 (A)	1990	2000	2008 (B)	Change (B-A) 1985-2008
Agriculture		37.2	33.6	24.5	18.5	-18.7
Industry		26.2	26.1	36.7	43.2	16.9
(Manufacturing alone)		15.9	13.9	18.6	25.2	9.3
Services		37.0	40.3	38.7	38.3	1.3
Total		100.0	100.0	100.0	100.0	0.0

Table 1: Changing economic structure of Viet Nam
Source: World Bank, 2011, Viet Nam Urbanization Review

This rapid urbanisation combined with rising climate change exposure highlights the need for cities to develop new tools to manage the financial consequences of disaster events. For any disaster risk financing tool proposed at the city level, it will be important to ensure that Central Government support is secured as well as that of the relevant People’s Committees in charge of disaster-prone cities. The Committees will be the organ of the Government responsible for implementing any risk transfer scheme. This study will identify the appropriate entity/ies authorised to execute risk transfer schemes as well as the fund flow process and responsibility for payment of premiums and receiving of claims pay-outs.

¹⁸ ADB. Strengthening City Disaster Risk Financing in Viet Nam, 2015

The Feasibility Study will focus on disaster risk transfer solutions for municipalities/cities/provincial cities which are the most vulnerable to climate flood and typhoon risks and have a large population as well as socio-economic and natural disaster data sets spanning over 40 years. Using these filters, the following five initial candidate cities were identified: Can Tho City, Hai Phong, Da Nang, Bien Hoa, and Nha Trang. For the main project, a scoring mechanism will be derived and agreed with the Insurance Supervisory Authority within the Ministry of Finance in order to determine a final list of candidate cities. The scoring mechanism will not only take hazard and vulnerability into account, but also the level of engagement and high-level political sponsorship.

As shown in green in Table 2.1 below, Can Tho, Hai Phong, and Da Nang are among five municipalities which are at the same level as provinces with significant importance in terms of politics, economy and culture in Viet Nam. Moreover, KfW carried out an Economics for Climate Adaptation analysis in Can Tho, the contents of which have informed this report.

Name of City	Area (SqKm)	Population (2019-2020)	Population Density (2020) (Person/ km2)	Municipality since
Ho Chi Minh City	2.095.5	9,227,600	4476	1955
Ha Noi	3.324.5	8,246,000	2455	1945
Hai Phong	1.527.4	2,053,500	1315	1955
Can Tho	1.439.2	1,240,700	862	2003
Da Nang	1.285.4	1,169,500	910	1996

Table 2.1: Five municipalities in Viet Nam with equal status to provinces due to size
Source: General Statistics office Viet Nam website: <https://www.gso.gov.vn/en/>

Bien Hoa, Hue City, and Nha Trang (shown in Table 2.2) are provincial cities governed at the province level. Hue City is also relevant to the study, not as a candidate city, but because there is already a complementary initiative by ADB to develop a disaster risk financing tool there which will be leveraged. Ho Chi Minh and Hanoi have been excluded from the list of initial candidate cities due to their size and number of public assets, which implies a much larger project beyond the budget requested for this project. The Feasibility Study will therefore use the learnings of ADB and KfW's work to define methodologies; identify the gaps in knowledge, understanding, data and modelling; and determine a strategy to meet these gaps.

Name of City	Province	Area (Sq Km)	Population (2019-2020)	Year to become a city
Bien Hoa	Dong Nai	264.08	1,055,414	1976
Nha Trang	Khanh Hoa	251	422,601	1977
Hue City	Thua Thien-Hue	265.99	652,572	1929

Table 2.2: Relevant cities for Feasibility Study which are not municipalities, but rather provincial cities governed by the province.

Source: General Statistics Office Viet Nam website: <https://www.gso.gov.vn/en/> Source: Viet Nam National Population and Housing Census 2019 publication: "Completed Results of the 2019 Viet Nam Population and Housing Census".

1.2. NATIONAL FLOOD AND TYPHOON RISK

The Feasibility Study focuses on developing disaster risk financing tools for major cities aiming at their most significant natural hazard risk which is flood and typhoon. This section will detail the impact of flood and typhoon at a national level and how climate change will exacerbate these hazards in the future.

1.2.1 Floods

Viet Nam has extremely high exposure to flooding (ranked joint 1st in the World with Bangladesh), including, riverine, flash, and coastal flooding and also has high exposure to tropical cyclones and their associated hazards (ranked 8th in the World).¹⁹

Floods are the most frequent and deadliest hazard in Viet Nam and have caused 68.8 % of all casualties between 1990-2014.²⁰ Although the Emergency Events Database (EM-DAT) data indicates that Typhoons (Tropical Cyclones) caused the highest economic impact overall during the period 1900 to 2018, the World Bank has stated that in 2020, flood represents the largest risk by economic impact from natural hazards affecting Viet Nam.²¹ Almost all the provinces and cities in Viet Nam are affected by floods of varying intensity and duration. Most parts of the country receive an annual average of 2,000 mm of rainfall, apart from the highlands in the northern and southern regions which have an average of 3,000 to 4,000 mm, respectively.²² One of the major natural risks the country faces is riverine and coastal flooding due to its topography and socioeconomic concentration: Viet Nam's coastline is 3,200 kilometres long and 75% of its population live in coastal areas and low-lying deltas.²³ Monsoon season is from May to November, but floods (both fluvial and pluvial) are particularly damaging in October and November.²⁴

Viet Nam's two main river basins comprise two major deltas, the Mekong and Red river deltas, which provide water and fertile land for agriculture, aquaculture, households, and other productive sectors. They also expose the populations in their vicinity to flooding. Viet Nam's water resources stretch across the country, comprising 2,360 major rivers and streams, smaller deltas, and river basins along the Northern Central and Central Coastal Areas, which also translates to high flooding exposure.²⁵

Flooding (fluvial and pluvial) is linked to the two-phase El Niño–Southern Oscillation (ENSO). Historical data show that El Niño tends to depress average rainfall while La Niña, the cool phase which typically occurs the year after an El Niño event, increases it, causing extensive damage from floods and heavy rainfall. However, the impact varies across the country. While both phases decrease average rainfall in the north, only El Niño depresses rainfall in the center and south of Viet Nam, while La Niña increases rainfall in both²⁶. Indeed, the historical floods in Viet Nam shown in Figure 2 reveal their cyclical pattern which helps predict future events.

¹⁹ World Bank-ADB Climate Risk Country Profile for Viet Nam 2020

²⁰ PreventionWeb, 2014, quoted in Disaster Risk Reduction in Vietnam Status Report 2020, ADPC and UNDRR

²¹ World Bank-ADB Climate Risk Country Profile for Viet Nam 2020

²² Japan International Cooperation Agency (JICA), 2015; According to the World Bank's Climate Change Knowledge Portal: "Mean rainfall over Vietnam does not show any significant increase or decrease on a national level since 1960. The proportion of rainfall falling in heavy events has not changed significantly since 1960, nor has the maximum amount falling in 1-day or 5-day events. On a sub-national level some changes are significant: the general trend has been towards increased rainfall in central regions, and reduced rainfall in northern and southern regions. El Niño remains a major influence of trends in precipitation" - <https://climateknowledgeportal.worldbank.org/country/vietnam/climate-data-historical>

²³ Global Facility for Disaster Reduction and Recovery (GFDRR) 2015

²⁴ ISF/KfW/ETH Zurich: Executive Summary, Can Tho, Viet Nam Compound Flood Risk & Heat Waves

²⁵ UNDRR Disaster Risk Reduction in Vietnam, Status Report 2020

²⁶ Striking a Balance Managing El Niño and La Niña in Vietnam's Agriculture, World Bank 2019, <https://documents1.worldbank.org/curated/en/769121554207974851/pdf/Striking-a-Balance-Managing-El-Ni%C3%B1o-and-La-Ni%C3%B1a-in-Vietnam-s-Agriculture.pdf>

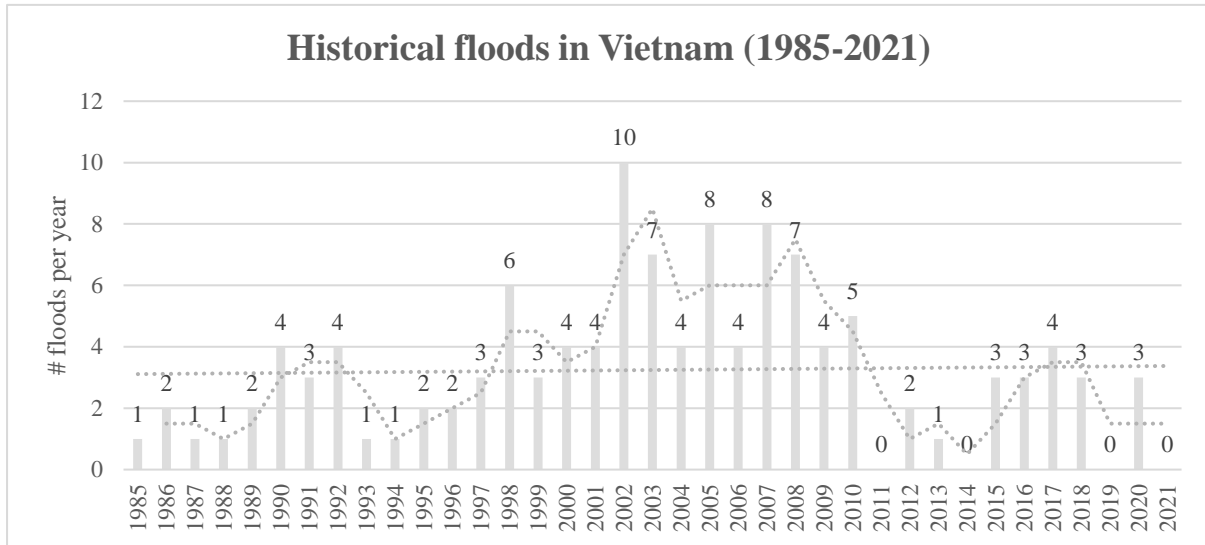


Figure 2: Historical floods in Viet Nam 1985-2021

Source: Dartmouth Flood Observatory, 2021: <https://floodobservatory.colorado.edu/Archives/ArchiveNotes.html>

Figure 3 illustrates the spread of historical floods (fluvial, pluvial and coastal floods) and their severity* (three classes: 1, 1.5 and 2, depending on the number of displaced population, the number of casualties, the flood extent and the return period of the event) since 1985 across the country. According to Dartmouth Flood Observatory, the highest number of severe historic floods have occurred in the central region near Hue province and Da Nang city as well as the low lying Red River delta including around Hai Phong city and the North Mountains and midlands in the north. The southern low-lying Mekong delta has been less severe flooding with one occurring near Can Tho.

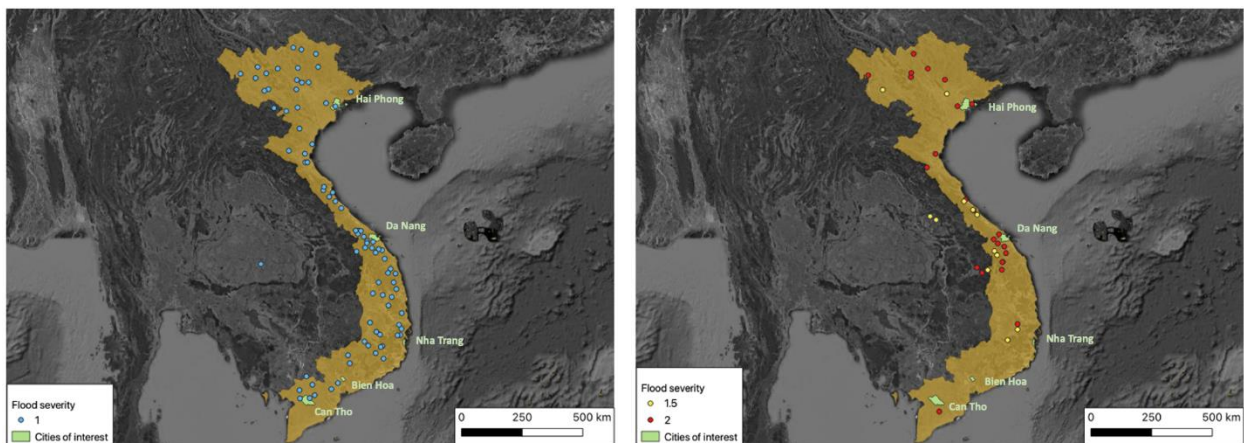


Figure 3: Historical Floods in Viet Nam since 1985.

*Every historical flood event is attributed a severity class, which can be 1, 1.5 or 2. **Class 1:** Large flood events, occurring once every 10 to 20 years **Class 1.5:** Very large events, occurring once every 20 to 100 years. **Class 2:** Extreme events, occurring less often than once every 100 years. Source: Dartmouth Flood Observatory, 2021; AXA Climate, 2022.

1.2.2 Typhoons

Viet Nam also has significant exposure to typhoons, with a particularly high rate of landfall along its northern coast, as shown in Figure 4a which depicts historical typhoon tracks from 1970 to 2015.²⁷ The typhoon season in Viet Nam typically ran from June through to the end of November in the past.

²⁷ World Bank-ADB Climate Risk Country Profile for Viet Nam 2020

However, there are studies that indicate that there may be a small potential shift of cyclone activity away from summer months and towards the winter.²⁸

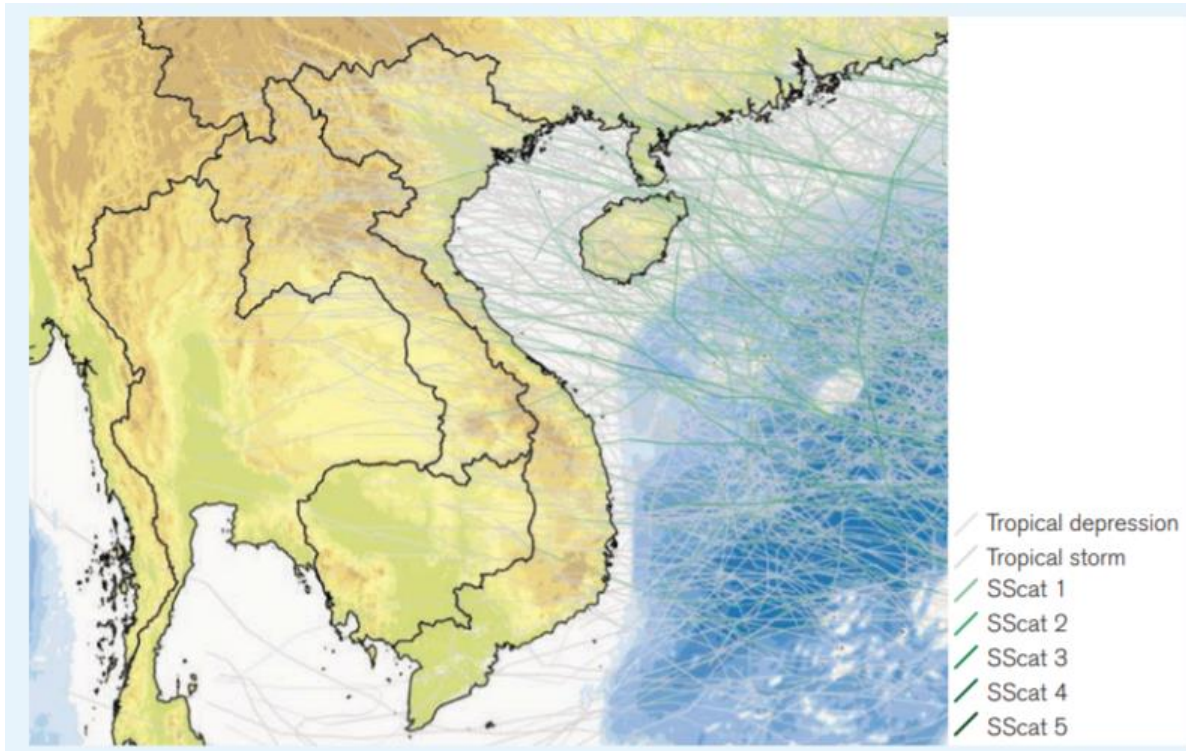


Figure 4a: Typhoon Tracks 1970 - 2015

Source: UNEP Global Risk Data Platform. Assessed on Nov 26, 2018. URL: <https://preview.grid.unep.ch/index.php?preview=map&lang=eng>

In the recent past, Viet Nam has experienced an average of four to six typhoons annually, between April to September in the southwest of the country (for example around Can Tho), August to November in the central coastline (for example around Da Nang), and October to March in the north-eastern region (for example around Hai Phong). Numerous smaller scale storms also make landfall in Viet Nam throughout the year (see Figure 4b). These typhoons and storms are accompanied by strong wind, tidal waves, storm surges, and incessant rainfall, with the potential to cause catastrophic damages in the country (see Figure 5). They also have high spatial variability, with central and coastal provinces at higher risk²⁹ (see Figure 6).

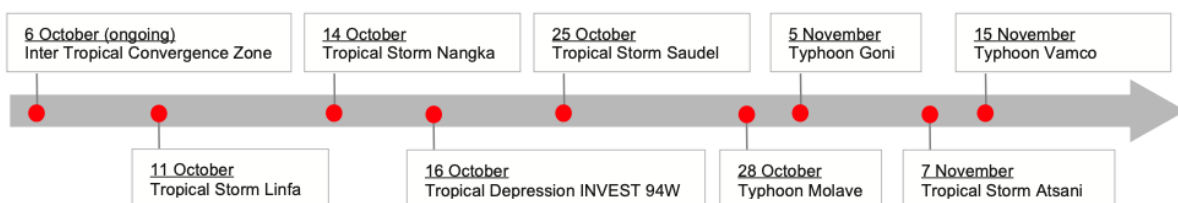


Figure 4b: Timeline of weather systems between October and November 2020

²⁸ Wang, C., Liang, J., & Hodges, K. I. (2017). Projections of tropical cyclones affecting Viet Nam under climate change: downscaled HadGEM2-ES using PRECIS 2.1. Quarterly Journal of the Royal Meteorological Society: 143: 1844–1859

²⁹ UNDRR Disaster Risk Reduction in Vietnam, Status Report 2020

Source: Centre for Excellence in Disaster Management & Humanitarian Assistance, Viet Nam Disaster Management Reference Handbook December 2021

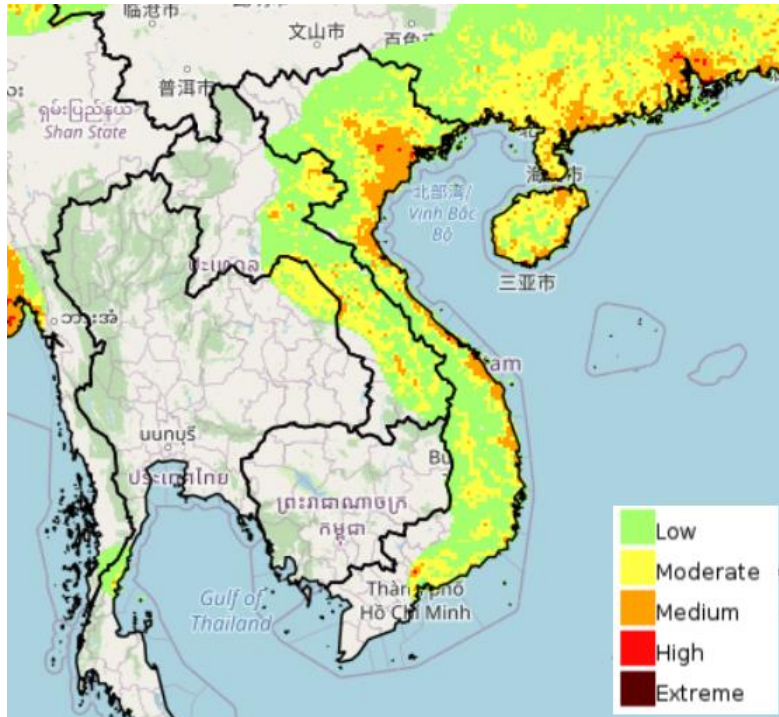


Figure 5: Tropical Cyclones Mortality Risk in Viet Nam
Source: UNEP Global Risk Data Platform



Figure 6: Storm Frequency in Viet Nam measured between 1960 and 2017 (UNDP 2020)
Source: UNDRR Disaster Risk Reduction in Viet Nam, Status Report 2020

1.2.3 Flood and Typhoon Loss Impact Nationally

Flood represents the largest risk by economic impact in the country, accounting for an estimated 97% of average annual losses from natural hazards.³⁰ A World Resource Institute’s (WRI) flood tool estimates that, assuming protection for up to a 1-in-25 year event, 930,000 people annually are affected by flooding in Viet Nam and there is a USD2.6 billion expected annual impact on GDP.³¹

According to then Central Steering Committee for Natural Disaster Prevention and Control, which has since been renamed to the National Steering Committee for Natural Disaster Prevention and Control, the country has suffered an average annual loss of 1-1.5 % of the GDP over the past three decades for all natural hazards.³² In 2016 alone, Viet Nam had to absorb a loss of an estimated USD1.8 billion in the aftermath of the typhoon Son-Tinh, alongside flooding and lesser storms occurring throughout the country between June and December.³³ Overall, floods and storms have caused largest economic damages from the total measured impacts.³⁴ Emergency Events Database (EM-DAT), a natural disaster loss database managed by the Centre for Research on the Epidemiology of Disasters (CRED), estimates floods to have caused USD4.3 billion in damage and affected 32.9 million people in Viet Nam from 1900 to 2018, ranked below typhoons which are estimated to have caused almost USD10 billion in damage and affected 53.3 million people (see Table 3). Riverine floods are seen to cause most of the damage in terms of types of flood risk.

Disaster Type	Disaster Subtype	Events Count	Total Deaths	Total Affected	Total damage ('000 US\$)
Drought	Drought	6	0	7,860,000	7,399,120
Epidemic	Others	1	16	83	0
	Bacterial disease	1	598	10,848	0
	Parasitic disease	1	200	0	0
	Viral disease	8	395	97,027	0
Flood	Others	16	1,012	2,011,287	160,055
	Coastal flood	6	804	4,353,316	749,000
	Flash flood	13	481	912,607	516,700
	Riverine flood	52	3,644	25,637,158	2,896,407
Landslide	Avalanche	1	200	38,000	0
	Landslide	4	109	40	0
	Mudslide	1	21	1,034	2,300
Storm	Others	10	323	219,280	145,035
	Convective storm	8	160	4,513	10,100
	Tropical cyclone	92	18,869	53,272,568	9,967,657

Table 3: Natural hazards impacts in Viet Nam from 1900 to 2018 (Emergency Events Database (EM-DAT) of the Centre for Research on the Epidemiology of Disasters (CRED). Assessed on Nov 26, 2018. URL: <https://www.emdat.be/>)

While Viet Nam is highly exposed to flood and typhoon risk among other hazards, the country is deemed to have moderate levels in its coping capacity in the face of humanitarian crises as assessed by the European Commission’s Joint Research Centre (JRC), a science and knowledge service for policy advice. The JRC developed INFORM, a composite indicator measuring a country’s risk of humanitarian crises vulnerability based on socio-economic factors, and poor and vulnerable groups. Viet Nam is deemed to have physical exposure to flood at the maximum score 10/10 and to typhoon at 7.9/10, with

³⁰ World Bank-ADB Climate Risk Country Profile for Viet Nam 2020

³¹ WRI (2018), The World Resources Institute’s AQUEDUCT Global Flood Analyzer. Available at: <https://floods.wri.org>

³² Flash flood/flood 64.6%, rainfall/hailstorm 5.2%, storm 20.2% - PreventionWeb, 2014 cited in DRR Report 2020

³³ Viet Nam News, 2017

³⁴ Japanese International Cooperation Agency (JICA), 2018

an overall natural hazard risk of 7.2/10 as shown in Figure 7. The JRC estimates the country to be moderately lacking in the ability to cope (4.2/10) mainly due to governance and disaster risk reduction issues although vulnerability is judged to be low (1.8/10).³⁵ The latter is due to Viet Nam being considered to have relatively few people classified as poor and/or vulnerable (e.g., no uprooted people, not many children under 5 years old, not much food insecurity or health issues) although inequality is deemed to be not insignificant at 3.8/10.

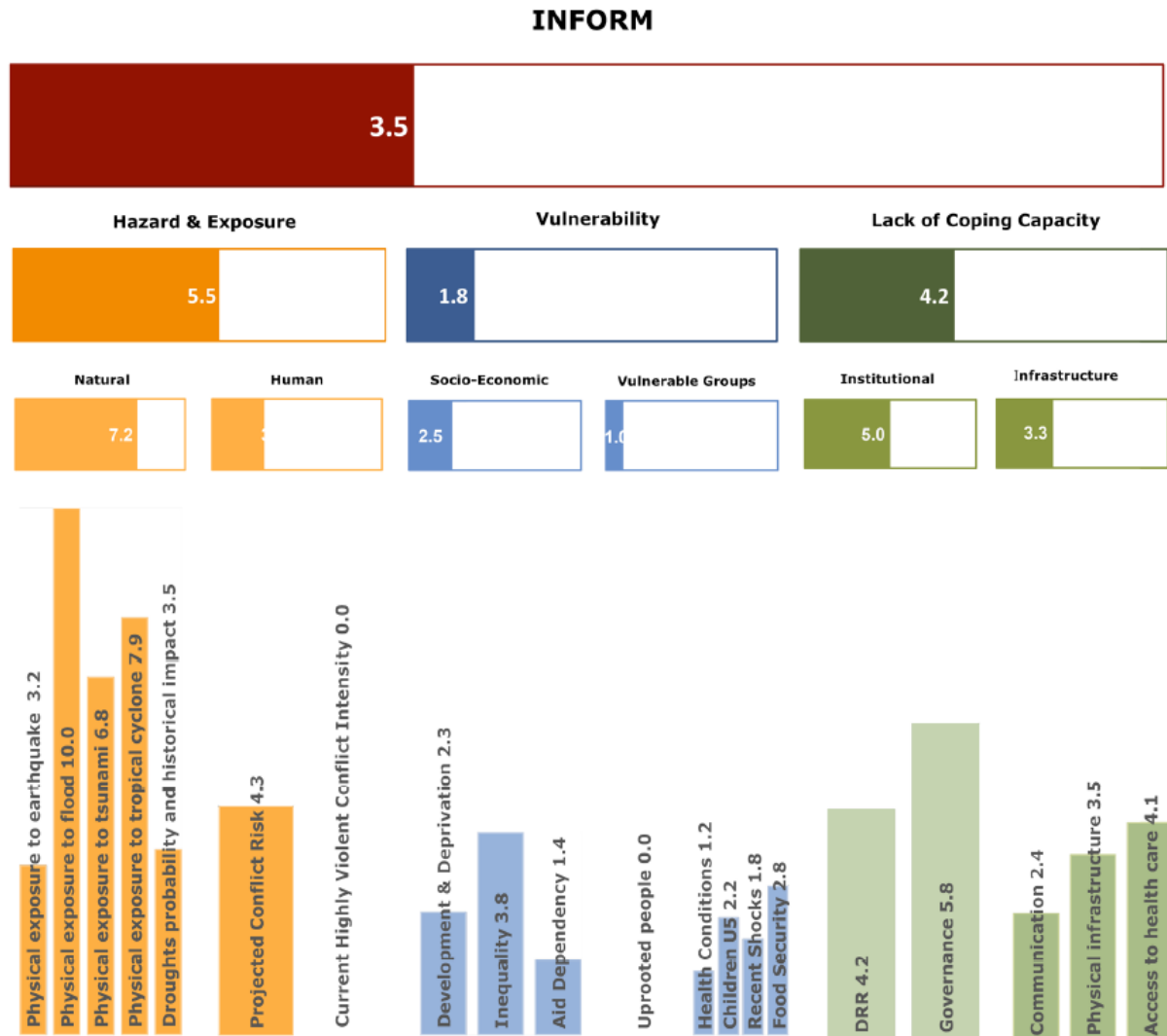


Figure 7: Inform Risk Index for Viet Nam
Source: Viet Nam Disaster Management Reference Handbook 2018

1.2.4 Projected impact of climate change on typhoon and flood risk

Climate change is a serious concern in Viet Nam with the expectation that it is likely to exacerbate the impacts and increase the frequency of hydro-meteorological hazards, rendering them more unpredictable and destructive. As a consequence, changes in rainfall intensity and in storm patterns are among the challenges that could be experienced in the future.

³⁵ INFORM gives each country a risk score of 1-10 (1 being the lowest and 10 the highest) for each of the dimensions, categories, and components of risk, as well as an overall risk score. The higher the score the more vulnerable a country is.

Climate change projections on global tropical cyclone intensity and frequency show a general trend of reduced cyclone frequency but an increased intensity and frequency of the most extreme tropical cyclones.³⁶ According to the World Bank-ADB Climate Risk Country Profile for Viet Nam, further research is therefore required to better understand potential changes in cyclone seasonality and routes, and the potential for cyclone hazards to be experienced in unprecedented locations.³⁷ Known climate change risks include sea-level rise enhancing the damage caused by typhoon-induced storm surge and the possibility of increased wind speed and precipitation intensity. Previous work by the World Bank, albeit based on older climate projections, has highlighted the potentially significant growth in the area of Viet Nam that would be exposed to storm surge under increased sea-levels and storm intensities.³⁸ Studies estimate that without adaptation, 9% of national GDP will be at risk from the impact of a 1-in-100-year storm surge impacting the Red River Delta region in 2050.³⁹ Storm surge is found to be a major contributor to the economic costs of climate change on a national level beyond 2050.⁴⁰

Climate change impacts may make frequent events as important as rare ones in terms of exposure; for instance, a 25-year flood under future climate conditions exposes more people than a 200-year flood under current conditions. In Viet Nam, a third of the population is already exposed to a 25-year flood, assuming no protection (such as dikes and drainage systems), which can make a large difference in the flood hazard particularly in well-protected areas. In these well-protected areas, flood maps may overestimate the flood hazard. When including climate change, the percentage of population exposed increases by 13-27%, depending on the severity of sea level rise. This increase in exposure is due to the concentration of the population in coastal areas. For a 50-year flood, more than a third (38%) of today's population is already exposed. Given climate change, this percentage of the population is expected to increase by 7-21% (resulting in overall exposure of between 40 and 48%) for the same return period (50-year). For a 100 year and 200-year flood under a high climate scenario, more than half of the population of Viet Nam would be exposed.⁴¹

For absolute exposure, the largest number of people exposed are found in the Mekong Delta, the Red River Delta, and the Southeast Coast; however, the relative exposure (that is, the percentage of the district population which is exposed to floods) shows a larger spread. Most areas in the country, including the North Central Coast and the Northeast, have high percentages of their populations residing in flood-prone areas.⁴²

1.3. COMPLEMENTARITIES BETWEEN EXISTING DISASTER MANAGEMENT INITIATIVES & STAKEHOLDERS

This section will examine the existing disaster management initiatives, identify stakeholders involved, and detail synergies in general. It is important to understand the existing disaster risk management landscape including stakeholders and mechanisms currently in place to assess gaps and complementarities. A more detailed analysis of key stakeholders who may be important to the proposed project will be covered in section 3.

³⁶ Walsh, K., McBride, J., Klotzbach, P., Balachandran, S., Camargo, S., Holland, G., Knutson, T., Kossin, J., Lee, T., Sobel, A., Sugi, M. (2015). Tropical cyclones and climate change. *WIREs Climate Change*: 7: 65–89

³⁷ World Bank-ADB Climate Risk Country Profile for Viet Nam 2020

³⁸ Dasgupta, S., Laplante, B., Murray, S. and Wheeler, D. (2009), *Sea-level Rise and Storm Surges: A Comparative Analysis of Impacts in Developing Countries*. The World Bank. World Bank-ADB Climate Risk Country Profile for Viet Nam 2020

³⁹ Neumann, J., Emanuel, K., Ravela, S., Ludwig, L., & Verly, C. (2015). Risks of Coastal Storm Surge and the Effect of Sea Level Rise in the Red River Delta, Viet Nam. *Sustainability*: 7: 6553–6572

⁴⁰ Arndt, C., Tarp, F., & Thurlow, J. (2015). The economic costs of climate change: A multi-sector impact assessment for Viet Nam. *Sustainability*: 7: 4131–4145

⁴¹ WBG Working Paper: Exposure to floods, climate change and poverty in Viet Nam, 2016

⁴² WBG Working Paper: Exposure to floods, climate change and poverty in Viet Nam, 2016

Natural disasters in Viet Nam are a long-term burden on public financing and will eventually have an impact on the Government's overall expenditure and ability to manage fiscal balances. Despite the existing budgetary provisions which set aside 2-5 % of the available resources for disaster contingencies at the national and provincial levels, the costs of reconstruction and recovery habitually exceed the financial capacities. Indeed, recurring hazards and major disasters contribute to persisting funding gaps for these costs.⁴³

The Government is working to ensure Disaster Risk Reduction (DRR) remains a top priority, developing several important legal documents, strategies, and plans to assess its risk and response to disaster management. The National Strategy for Disaster Prevention, Response and Mitigation to 2020 (2007) as well as the Action Plan National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020 (2007) were put in place with very specific goals and timelines. The aim of these policies and plans mobilized resources to effectively implement disaster prevention, response, and mitigation until 2020 but also aimed to contribute significantly to ensuring the country's sustainable development, national defence, and security. Additional priorities include minimising the loss of life and properties, the damage of natural resources and cultural heritages, and the degradation of environment.⁴⁴

In accordance with **Decree 94/2014/ND-CP**, a **Disaster Management Fund (DMF)** was established⁴⁵ collected and maintained at provincial level, managed by the Provincial People's Committees, and disbursed by the provincial Departments of Agriculture and Rural Development (DARD). The establishment of the DMF was part of an effort to "socialise" disaster prevention and control, alleviate the burden on State Budget and promote mutual support. The funds do not receive any allocation from the State Budget for capitalization or operation, and operate on a not-for-profit basis.⁴⁶ As defined under the State Budget Law 2015 (Article 4.19) the DMFs are a non-budgetary public fund and subject to regulations under the State Budget Law 2015 and Decree 163/2016/ND-CP on financial management and reporting only and do not have to follow the budgeting and approval process for the State Budget. DMFs have been expected to have a more flexible and timely expenditure mechanism. DMFs provide an additional source of post-disaster funding to the State Budgets. However, there are constraints, including the unclear governance structure, lack of funding strategy and restricted funding model, limited guidance on eligibility for funding and use of the funds, triggers for funding or processes for fund disbursement and execution following disasters.⁴⁷ The details about the ownership, corporate governance, and control structure of the Fund are not clear. Moreover, the use of this Fund lacks an integrated approach for disaster preparedness and risk management. The regulated eligible expenditures cover only disaster prevention and control activities provided in Article 10(3) of the Law on Natural Disaster Prevention and Control. Eligible expenditure categories do not cover disaster risk financing and insurance.

In terms of fund operation and governance, the capacity to manage the governance, operation and use of the Fund across different levels of government is similarly unclear since the implementing rules and regulations have not been detailed. The provincial-level DARD or the Provincial Steering Committee for Flood and Disaster Prevention and Rescue (CCFSC) oversee the management and spending of the fund.⁴⁸ ***In terms of fund collection***, according to data published on the Vietnam Disaster Management

⁴³ United Nations Development Program (UNDP), 2015

⁴⁴ Center for Excellence in Disaster Management & Humanitarian Assistance. Viet Nam Disaster Management Reference Handbook, 2018

⁴⁵ While the Decree to set up the NDCP funds was in 2014, the funds had been established in 56 provinces by early 2018 with funding collected from 41 provinces.: page 76 of <https://openjicareport.jica.go.jp/pdf/12323879.pdf>

⁴⁶ Draft for Consultation - Funds for natural disaster prevention and control in Viet Nam: A Review, World Bank, DRFIP, 2018

⁴⁷ Draft for Consultation - Funds for natural disaster prevention and control in Viet Nam: A Review, World Bank, DRFIP, 2018

⁴⁸ Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic (UNDP publication, 2022)

Authority portal,⁴⁹ as of March 2022, the Fund has been capitalized for 62 out of 63 provinces with regular cashflow reporting done to the VNDMA⁵³, with the total accumulative value of VND 4,647.6 billion, equivalent to US\$ 200,760,259.18. Average monthly in-flow is VND 16.6 billion, equivalent to US\$ 717,062. VNDMA is in charge of monthly updates for provincial fund capitalisation and expenditure.

In terms of use of this Fund, it is seen that an integrated approach for disaster preparedness and risk management has not been in place. The regulated eligible expenditures cover mainly post-disaster response activities as promulgated in the Article 10(3) of the Law on Natural Disaster Prevention and Control. That aforementioned article provides a broad mandate for the fund as a financial instrument, allowing it to be used for general disaster prevention and control activities by the state and subnational governments; at the same time, the law is prescriptive in its list of activities eligible for its funding. Priority for funding from the DPCFs is given to post-disaster response, including (i) emergency relief for food, water, medical supplies, and other immediate needs for those affected by natural disasters, (ii) support for repair of housing, health facilities, and schools, and (iii) hygiene and sanitation response in disaster-stricken areas.

It is further reported by the Ministry of Agriculture and Rural Development of Viet Nam (MARD) in 2021⁵⁰ that expenditure from the provincial/city Disaster Management Funds has focussed mainly on administrative costs (3%), training and awareness programmes on natural disaster prevention, installation of rain gauge stations, monitoring and warning systems for natural disasters, developing evacuation scenarios, plans and mock drills for natural disaster prevention and control at commune level, and urgent reparation of natural disaster prevention and control works.⁵¹

The **Decree No. 78/2021/ND-CP** on the setting up and management of **Central Disaster Prevention and Control Fund (Central DMF)** was issued on 1 August 2021 by the Government of Viet Nam (effective 15 September 2021) and, in terms of that Decree, a Central Natural Disaster Prevention and Control Fund will be managed by the Ministry of Agriculture and Rural Development whilst Provincial-level natural disaster prevention and control funds will be managed by the People's Committees of Provinces and Centrally-controlled cities. This Decree replaces Decree No. 94/2014/ND-CP and Decree No. 83/2019/ND-CP dated November 12, 2019 of the Government (amending and supplementing a number of articles of the Government's Decree No. 94/2014/ND-CP). This Decree (No. 78/2021/ND-CP) was issued to overcome the limitations of Decree 94, such as unclear fund management structure, variances in accounting and financial reporting, and loose classification of Fund contributions that posed difficulties for oversight by MARD. According to the said Decree, the said funds shall have legal status with their own seals and may open accounts at state treasuries and commercial banks legally operating in Viet Nam.⁵² This Fund will be used for the purpose of relieving and supporting natural disaster response activities that are beyond the local response capacity with priority given to emergency relief such as food, drinking, water and medicines; supporting the repair of houses; hospitals, and schools; resolving wastewater and sanitation issues, etc.⁵³

The sources for capitalization of the Central DMF are:

- Donation, compulsory and voluntary contributions and entrustment of domestic and foreign entities and individuals. contributions, sponsorships and voluntary support to the Central Disaster Prevention and Control Fund of organizations and enterprises shall be included in deductible expenses when determining taxable incomes of enterprises;

⁴⁹ <https://www.un-spider.org/viet-nam-disaster-management-authority-vdma> and <http://dmc.gov.vn/?lang=en-US>

⁵⁰ Ministry of Agriculture and Rural Development, Viet Nam, 5 Year Report of Disaster Management Fund, Summary, BC-BNN-PCTT, 2022 (translated by UNDP)

⁵¹ Ministry of Agriculture and Rural Development, Viet Nam, 5 Year Report of Disaster Management Fund, Summary, BC-BNN-PCTT, 2022 (translated by UNDP)

⁵² Ministry of Agriculture and Rural Development, Viet Nam, 5 Year Report of Disaster Management Fund, Summary, BC-BNN-PCTT, 2022 (translated by UNDP)

⁵³ Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic (UNDP publication, 2022)

- Re-allocation from the Provincial DMFs according to the Decision of the Prime Minister;
- Interest from deposit accounts; and,
- Other legal sources (if any).

The relationship between the Central DMF and the 63 Provincial DMFs is as follows:

- Central DMF has the following responsibilities:
 - Regulate and re-allocate financial resources for the Provincial DMFs; and,
 - Provide guidelines, monitor and supervise the management and use of funds which have been regulated/re-allocated from the Central Fund to the Provincial DMFs.
- Provincial DMFs have the following responsibilities:
 - Receive, manage and use provisions from the Central DMF;
 - Transfer funds to the Central DMF according to the Prime Minister's Decision;
 - Subject to the inspection and supervision of the Central DMF for the financial resources provided by the Central DMF; and,
 - Report on the management and use of provincial funds to the central fund management agency for consolidation.

Simply put, the Central DMF will collect funds of all central-level entities and individuals. It also oversees the collection and expenses of Provincial DMFs and provides balancing and re-allocation among the Provincial DMFs. For instance, if Hai Phong has a significant surplus while there is little demand for disaster prevention and control activities due to lower levels of disaster in Hai Phong, subject to the Prime Minister's approval, the Central DMF may request Hai Phong to transfer a specified amount to the Central DMF, and then transfer amounts to other provinces, i.e., Phu Yen or Dak Lak due to their higher demand for disaster recovery support but low capitalization.

There is a provision in the Decree No. 78/2021/ND-CP for the fund to support emergency projects for natural disaster prevention, control, and remediation. This Decree promulgates the provision for the purchase of disaster related life insurance for commune level staff involved in disaster prevention.⁵⁴ However, it is expected that the procedures with regard to the operation of the funds will take up to two years to be finalised and approved for implementation.⁵⁵

The Government has also prioritised partnerships with neighbouring nations. As a member of the Association of Southeast Asian Nations (ASEAN), Viet Nam has the support of neighbouring nations to strategise recovery and assistance in the event of an emergency. In addition to helping Member States build capacity, ASEAN plays an important role in addressing cross-border hazards for multiple countries. ASEAN provides a venue where all members are equal and can raise trans-national disaster-related issues that may not be addressed through other multilateral venues.⁵⁶ ASEAN has established key groups which enhance disaster preparedness and strengthen regional security cooperation. Some of the most notable entities include the ASEAN Coordinating Center for Humanitarian Assistance on Disaster Management (AHA Center), the ASEAN Defence Ministers' Meeting Plus Experts' Working Group on Humanitarian Assistance/Disaster Relief (ADMM+EWG HA/DR), and ASEAN Regional Forum's Disaster Relief Exercise (ARF DiREx). The ASEAN Ministerial Meeting and ARF Inter-Sessional meeting on Disaster Relief are two additional forums for exchanging multinational lessons learned and best practices on reducing risk and enhancing resiliency to inevitable disasters. The ASEAN Committee on Disaster Management (ACDM) is ASEAN's core disaster management policy-making body formed in 2003.

⁵⁴ Article 16.1 (c) of Decree No. 78/2021/ND-CP

⁵⁵ Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic (UNDP publication, 2022)

⁵⁶ Center for Excellence in Disaster Management & Humanitarian Assistance, ASEAN Disaster Management Reference Handbook 2015

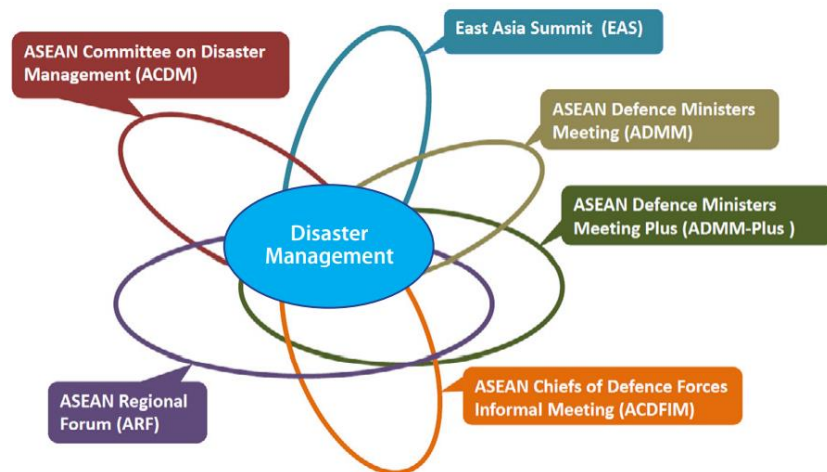


Figure 8: Key Groups in Disaster Management (ASEAN)

Source: Center for Excellence in Disaster Management & Humanitarian Assistance, ASEAN Disaster Management Reference Handbook 2015

The South East Asia Disaster Risk Insurance Facility (SEADRIF) is a regional platform that provides participating nations with advisory and financial services to increase preparedness, resilience, and cooperation in response to climate and disaster risks. It was created by the World Bank following a template established in the Caribbean (CCRIF SPC) and elsewhere. SEADRIF is under the political umbrella of ASEAN+3. SEADRIF has far broader ambitions than the initial programme, including⁵⁷:

- Serve as a forum for sharing knowledge and good practices.
- Promote shared investments in public goods to support the understanding of risk.
- Sustain political momentum – driving engagement and progress on disaster and climate shock management.

Current SEADRIF members are Cambodia, Indonesia, Lao PDR, Myanmar, Philippines, Singapore and Viet Nam plus Japan, China and Republic of Korea (ASEAN+3 countries). All participating countries sign the SEADRIF Memorandum of Understanding. The Viet Nam National Disaster Management Authority (VNDMA) has been assessing Viet Nam’s participation in SEADRIF through a feasibility study. The country agreed to become a member of the platform in February 2022. It is understood that signing the MoU does not bind the country to purchase insurance from a SEADRIF vehicle, but does indicate a willingness to co-operate with other members to reduce and manage catastrophe risks.

SEADRIF has received grant funds for three purposes:

- Initial capitalization;
- Operating expenses;
- Technical services and risk management support to member countries.

These grants are funded by Japan and Singapore.

SEADRIF capitalisation is ongoing and as at the end of 2021 USD 10.1 million has been funded by the World Bank, with initial setup funded by Japan and Singapore.⁶¹

The structure of the SEADRIF facility is complex and is composed of the following four tracks:

⁵⁷ <https://seadrif.org/who-we-are/>

1. The SEADRIF Trust: a legal arrangement for SEADRIF open to all ASEAN+3 countries and governed by the Council of Members that will provide overall strategic direction for SEADRIF.
2. SEADRIF Sub-Trust(s): an arrangement(s) for a sub-group(s) of SEADRIF member countries and development partners to develop and govern specific initiatives.
3. The SEADRIF Trustee: holds the legal title to the assets of SEADRIF Trust and is the sole shareholder of the SEADRIF Insurance Company.
4. The SEADRIF Insurance Company: a general insurance company registered in Singapore.

The key function of SEADRIF insurance program is to pool country-level disaster risks into one diversified regional portfolio. Potentially this should provide the participating countries with an access to the international reinsurance markets on competitive terms.

The SEADRIF Insurance Company was incorporated in Singapore in April 2019 as a licensed insurance company (Direct Insurer, General) under the Singapore Insurance Act.⁵⁸ The Insurance Company is fully owned by SEADRIF member countries through an Intertrust company acting as Trustee of the SEADRIF Trust and regulated by the Monetary Authority of Singapore (MAS). It is governed by a Board of Directors comprising three professionals with decades of experience in the insurance industry.

SEADRIF Insurance Company offers one insurance product which is a national level parametric flood insurance emergency response cover, although currently only Laos has a policy (the coup in Myanmar prevented their subsidised participation). Laos' premium is donor funded, as was the captialisation of SEADRIF, running costs are also subsidised.

The SEADRIF Flood Risk Monitoring Tool is used to monitor flood events and to calculate a payout if the flood event is triggered as defined by the insurance contract.

The World Bank has commissioned consultants to review how SEADRIF may evolve, including the services and products it could eventually offer. One option could be to offer reinsurance capacity to existing and/or proposed national insurance schemes, although that would require a substantial injection of capital and internal expertise. Its evolution is likely to be complementary rather than competitive to a sub-national insurance scheme such as proposed here.

Policies and strategies to address climate change in Viet Nam

Asian Cities Climate Change Resilience Network (ACCCRN), launched in 2008 by the Rockefeller Foundation, funded and supported the creation of provincial Climate Change Coordination Offices (CCCO's) in three Vietnamese cities of Can Tho, Quy Nhon and Da Nang. The role of CCCO's is threefold:

1. Providing and improving knowledge of local climate change impacts and interpreting climate data for the use of other city departments;
2. Coordinating climate action plans across sectors and identifying climate risks; and,
3. Capacity building of other provincial government bodies to better understand and apply resilience plans.

The 100 Resilient Cities (100RC) program in Can Tho, supported by the Rockefeller Foundation, provided support to develop resilience strategies against impact of climate change. A local Climate Resilience Office (CRO) has been established to mandate and execute the program. The program was concluded in July 2019 with the creation and delivery of Can Tho Resilience Strategy (2030), which focuses on leadership and strategy, infrastructure and environment, economy and society, and health and wellbeing.

The Central Government of Viet Nam has formulated several National and Sub-national Policies related to disaster management:

⁵⁸ <https://eservices.mas.gov.sg/fid/institution/detail/228060-SEADRIF-INSURANCE-COMPANY-PTE-LTD>

National Policies:

1. National Target Program to Respond to Climate Change (Decision No. 158/2008/QD-TTg dated December 2, 2008), and subsequent National Strategy to implement some of its provisions (2139/2011/QD-TTg), all updated for the period 2012-2015 in Decision 1183/2021/QD-TTg)
2. Ministry of Construction has requested all provinces to consider the impacts of climate change when planning and approving urban development Change (Decision No. 2623/2013/QD-TTg dated 31/12/2013).
3. Ministry of Planning and Investment has prepared guidelines to support prioritization of climate adaptation actions in preparation of SEDP (Decision 1485/2013/QD-BKHDT dated 17/10/2013).
4. Ministry of Agriculture and Rural Development: Disaster Risk Reduction (DRR) policy (GoV Decision 1002/2009/QD-TTg on CBDRM dated 13/07/2009) and urban DRR guidelines.
5. Viet Nam's National Adaptation Plan (NAP) for the period 2021-2030, Vision 2050 (ongoing process)
6. Intended Nationally Determined Contribution (INDC) of Viet Nam (2016-2050) to meet the needs of the Paris Agreement.
7. National Action Plan for SDG 2030: promulgated as per Decision No.622/QD-TTg (May 2017) identified 115 specific targets corresponding to the global SDG targets. Targets 8.10, 10.3, and 10.5 specifically relate to insurance and 11.5 specifically relates to disaster risk reduction.
8. Resolution No. 76/NQ-CP issued in June 2018 approves the tasks and responsibilities of specific stakeholders in disaster prevention and control. Its specific goals by 2025 are to reduce 30 % of losses to human population caused by disasters compared to the period 2015-2020, to improve infrastructure resilience and capacity building for staff responsible for disaster risk management, and to modernize and upgrade the disaster forecasting and monitoring system. In terms of policy, the Resolution urges ministries to promulgate concrete incentives and encouraging policies for private sector players to provide DRI and finalize regulations for disaster prevention and control fund and DRI to be flexibly and effectively used for disaster preparedness and control.⁵⁹

Sub-National Policies:

1. Can Tho's (100RC's) Resilience Strategy Framework (2030), 2019
2. Master Plan for Socio-Economic Development of Can Tho City through 2020 with vision towards 2030 (Decision No. 1533/QD-TTg)
3. Master Plan of the Can Tho City till 2030 and with a vision to 2050 (Decision No:1515/QD-TTg)
4. Government Resolution 120 /NQ-CP on Sustainable and Climate-Resilient Development of the Mekong Delta of Viet Nam
5. Can Tho Climate Change Activities Strategy in the Period 2015-2030, Can Tho's People's Committee, 2015

Disaster risk modelling initiatives

A common, open access hazard model will be essential to allow cities to properly assess their risk, identify appropriate disaster risk finance and disaster risk reduction measures and also to allow insurers and reinsurers to properly understand and rate the business such that the insurance is sustainable and affordable. A number of initiatives currently exist which provide information relevant to the development and/or calibration of such a system.

⁵⁹ Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic (UNDP publication, 2022)

One of the most recent initiatives is the development of Viet Nam’s Climate Risk Index, which is an online platform developed jointly by the UNDP, MARD and MONRE. It collates updated climate and hazard risk information from various sources (in all 63 provinces) into one database, visualized into maps and graphs to support public use⁶⁰. Datasets include information that covers socio-economic development, climate change profiles (including future projections), major hazards disaggregated by region, a comprehensive vulnerability index of key sectors, as well as a risk index of the whole country.⁶¹

Another initiative is the MIKE flood software, developed by DHI (international water software development and engineering consultancy firm), a modelling tool for analysing flood events in the entire Huong River Basin. It has potential for future applications that have been explored by conducting User Group Meetings with government agencies and other stakeholders.⁶² The tool consists of 1D and 2D simulation engines, useful for all types of floods, and thus can be utilised for functions such as flood forecasting, flood management and mitigation, flood risk analysis, flood hazard mapping, flood contingency planning, dam breach and flood defence failure impact studies, integrated urban, river and coastal flood modelling, and climate change assessments.⁶³

Quang Nam Province has been implementing a novel flash flood monitoring and early warning system using machine to machine (M2M) and cloud computing technology with the support of technical partners, which could be mainstreamed nationwide as well.⁶⁴

A pluvial, fluvial and tidal flood model was developed on the open-source risk modelling platform CLIMADA for the ECA Can Tho study by ISF. The high-resolution flood modelling included the development of a 2D flood model in collaboration with the German Aerospace Centre (DLR) and a high resolution LIDAR digital elevation model (DEM) with 5m resolution. This was the highest accuracy possible in the region. The DEM was enhanced by buildings locations using the latest generation of high-resolution satellite imagery provided by DLR. The aim is to update the model in future in cooperation with the City of Can Tho. Exposure focused on eight different types of assets: (people, houses, schools, medical facilities, administration buildings, road networks, electricity grids and natural resources) based on household level field surveys, experts interviews and real estate proxies as well as a structural valuation.

National agencies involved in disaster risk management

The commanding system for natural disaster prevention and control in Viet Nam is based on inter-sectoral cooperation, which is reflected in the full representation of all ministries and sectors under the leadership and direction of the Minister of Agriculture and Rural Development (MARD). MARD, as Permanent Vice Chairman of the National Steering Committee for Natural Disaster Prevention and Control (NSCNDPC), formerly the Central Committee for Natural Disaster Prevention and Control, coordinates Disaster Management and Humanitarian Response (DMHR) with the Viet Nam National Disaster Management Authority (VNDMA) acting as the Office of the Central Steering Committee. Moreover, the NSCNDPC coordinates with the National Committee for Incident, Disaster Response, Search and Rescue (VINASARCOM) to provide directions and guidance to localities during the response to natural disaster events. VINASARCOM is responsible for the conduct of Search and Rescue (SAR) operations during a disaster. VINASARCOM is also the go-to Military Unit in Viet Nam for Incident Command in the event that the disaster requires military support. VINASARCOM, if needed, can call upon the Ministry of Defence to support the relief efforts. The Ministry of Defence will then use resources such as the Viet Nam’s People Army and the Viet Nam People’s Air Force to support

⁶⁰ UNDP, 2020

⁶¹ Disaster Risk Reduction in Viet Nam - Status Report 2020

⁶² DHI, 2015 cited in Disaster Risk Reduction in Viet Nam - Status Report 2020

⁶³ MIKE FLOOD (mikepoweredbydhi.com)

⁶⁴ Government of Viet Nam, Waseda University & the KDDI foundation, 2015, cited in Disaster Risk Reduction in Viet Nam - Status Report 2020

VINASARCOM during a disaster; however, the Minister of Defence is in charge of directing the military assets. At the local level, the Commanding Committees for Disaster Prevention and Control, Search and Rescue are responsible for disaster response in provinces, cities, districts, and communes.⁶⁵

Another key agency in disaster response in Viet Nam is the Disaster Management Policy and Technology Center (DMPTC). The DMPTC was established under the VNDMA, and it was established after the merger of the Disaster Management Center and the Water Resource Consultant and Technology Transfer Center in August 2017. The Center has five professional divisions including: Organization and Administration Division, Planning and Finance Division, Technology Application and Database Management Division, Policy and Training Division and Disaster Management and Dike Technical Division.⁶⁶

The National Centre for Hydro-Meteorological Forecasting (NCHMF) is a national meteorological service of Viet Nam. It belongs to Viet Nam Meteorological and Hydrological Administration (VMHA) under the Ministry of Natural Resources and Environment with authority to issue forecasting/warning information for weather, climate, hydrology, water resource, marine weather (i.e., hydro-meteorology) and provide hydro-meteorology services.

The list in Appendix 5 sets out some of the key entities that are involved in disaster management in Viet Nam.

Disaster Risk Initiatives by Private entities and/or through Public Private Partnerships (PPPs)

ADB Disaster Risk Financing Projects:

In December 2015, the Asian Development Bank published a report on ‘Strengthening City Disaster Risk Financing in Viet Nam’⁶⁷. The paper presents a summary of disaster risk financing solutions for the cities of Can Tho and Hue City and, by extension, for other cities in Viet Nam. The project included the development of disaster risk models, financing gap analysis, and review of legislative and regulatory considerations. Disaster risk financing solutions were identified, focusing on insurance, credit, and capital market instruments.

The report found large funding gaps for both cities with regard to the largest recent event and also modeled worst case events. For example, in 2013 Hue’s annual budget for disaster recovery was only VND 38 billion. Hue reported no additional sources of funding that could be relied on with certainty to meet post-disaster relief, early recovery, and reconstruction needs. In the case of the 1999 flood, provincial and central governments provided additional assistance (totaling VND38 billion), but this amounted to only 30% of the support requested and 20% of the actual damage incurred.

Similarly Can Tho, disaster losses of VND238 billion were reported for the 2011 flood (the largest reported historical loss event), but only VND5.4 billion was available from city resources to meet disaster expenses and VND54 billion was received from other sources. These resources, together totalling VND59.4 billion, were substantially less than the minimum (2%) of contingency funding theoretically available to the city.

Following up on this project, ADB launched in 2019 the ‘Disaster Risk Financing for Hue City’ project in Viet Nam, working with WTW.⁶⁸ The goal is to improve the management of impacts from extreme weather and climate change by enhancing financial, regulatory, and institutional frameworks and putting in place disaster insurance for the city’s public assets. Through the ADB project, the city would become the first in Viet Nam to apply the ‘Law on Management and Use of State Property’. The

⁶⁵ Center for Excellence in Disaster Management & Humanitarian Assistance. Viet Nam Disaster management Reference Handbook, 2018

⁶⁶ Center for Excellence in Disaster Management & Humanitarian Assistance. Viet Nam Disaster management Reference Handbook, 2018

⁶⁷ <https://www.adb.org/sites/default/files/publication/176535/strengthening-city-disaster-risk-financing-viet-nam.pdf>

⁶⁸ UCCRTF, SECO, the Rockefeller Foundation are the donors funding the project

proposed insurance products consist of a hybrid solution, complementing indemnity with a parametric insurance cover with grant-based premium subsidy that will facilitate the process of creating the required legal basis to procure insurance in compliance with the Law. A component is being added to the ADB project to provide Hue City the capacity to perform economic cost benefit analyses of adaptation measures allowing to prioritize disaster risk reduction investment complementing risk transfer solutions. The wider benefit is to promote and incentivise more efficient and sustainable adaptation measures (including insurance solutions) and to further mitigate the impact of disasters (beyond public assets) on private assets of the poor and vulnerable population and their local livelihoods, providing socio-economic stability post-disaster. This project component, while not a task under this IDF project, could be a template for how studies allowing cities to identify and prioritise disaster risk reduction investments can be performed.

ADB is also conducting a study supporting the Government of Viet Nam on ‘Climate Resilient Inclusive Infrastructure for Ethnic Minorities (CRIEM) for five South Central Coastal Provinces’, the provinces being Binh Dinh, Khanh Hoa, Phu Yen, Quang Nam, and Quang Ngai. A key component of this project is the integration of climate risk into public asset and rural infrastructure design and an improved hydro-meteorological data system to enhance the resilience of municipal and rural communities that often include a large population of ethnic minorities. WTW has been supporting this programme and a final study is expected within the first quarter of 2022. Some cities in the provinces covered in this ADB CRIEM project may be included in this IDF project’s long list of candidate pilot cities (as explained further in Section 4.2, Process for City Selection).

ISF Disaster Risk Financing Projects:

In January 2020, the InsuResilience Solutions Fund (ISF), a program funded by German Development Bank (KfW) in its mandate for the German Ministry of Economic Cooperation and Development (BMZ), launched an ‘Economics of Climate Adaptation (ECA) study in the city of Can Tho’ covering flood (pluvial, fluvial and tidal) and heat. This methodology combines climate risk assessment and cost benefit analyses of adaptation measures including insurance solutions using the open-source risk modelling platform CLIMADA and involves comprehensive engagement of all relevant stakeholders.

Between April and September 2020, the ISF and AXA Climate, in cooperation with ETH Zurich, carried out a study on ‘Current and future climate risk in Viet Nam and measures to reduce expected damage’. The study focused on typhoon wind and storm surge impact on people, agriculture, and residential housing in 2020 and 2050, and included a cost benefit analysis on coastal protection adaptation measures using the open-source risk modelling platform CLIMADA. The study found that climate change would likely increase expected damage to residential houses from storm surge by 11-16% and from wind to agriculture by up to 50% by 2050. It found that investing USD 1.8 billion in mangroves, gabions, and sea dykes would help in reducing the potential losses due to risk by almost USD 48.8 billion. The results are expected to support government authorities to enhance their climate adaptation strategy through risk reduction and risk transfer solutions.

UNDP Disaster Risk Financing Projects:

UNDP supported a number of studies in Viet Nam, which are expected to improve the Central Government’s understanding of developing its disaster risk finance strategy and the need to develop disaster-related insurance products. The studies also focused on helping to identify issues related to the design of architecture of national probabilistic multi-hazard risk models and core risk management applications for public investment planning, risk financing, impact-based early warning systems, and investing in infrastructure resilience. They covered local insurance market assessment, assessing feasibility of insurance schemes for flood- and storm-resilient housing, including the support for community-based livelihoods in coastal areas.

UNDP carried out a diagnostic study, which was completed in January 2022, aiming to document and assess the landscape of inclusive insurance and risk finance in Viet Nam and to understand how best to

integrate disaster risk financing into development frameworks and investments. It also aims to better understand the exposure of public assets to risk in the event of a disaster and to open up opportunities for dialogues among key stakeholders in strengthening inclusive insurance and risk finance for Viet Nam. This will lay the groundwork for designing insurance solutions that help address the country’s development challenges. The diagnostic study findings and recommendations will serve as the basis for a 3-year country program to support the Viet Nam government and insurance industry in priority areas of enabling environment and market development for inclusive insurance and risk finance.

In addition, UNDP is implementing a 5-year Coastal Resilience Project⁶⁹ funded by the Green Climate Fund (GCF), which focuses on the disaster-prone coastal provinces of Viet Nam, in the following Province (City):

1. Quang Ngai (Quang Ngai city);
2. Quang Nam (Tam Ki city);
3. Quang Binh (Dong Hoi city);
4. Thua Thien Hue (Hue city);
5. Thanh Hoa (Thanh Hoa city);
6. Nam Dinh (Nam Dinh city); and,
7. Ca Mau (Ca Mau city).

The project has three components. The first is to support construction of 4,000 storm and flood resilient houses for poor and highly disaster - exposed people in 100 communes. This target has been achieved, and an additional 1,000 homes are planned to be built in 2022-2023. The second component is about regeneration and plantation of 4,000 hectares of mangroves as storm/cyclone buffer zones. The third component is for increased access to enhanced climate loss and damage data for private and public sector application in all 28 coastal provinces in Vietnam. The disaster risk financing work falls under the component 3. A disaster risk insurance product for public assets at city level, which is being proposed as part of the IDF project, is the first initiative for UNDP on supporting development of a specific insurance product in Viet Nam. UNDP’s Coastal Resilience project also focuses on disaster risk reduction and climate change adaptation and has built strong working relationships with relevant government agencies, including Viet Nam’s Disaster Management Authority (VNDMA) and other key ministries involved in risk reduction and adaptation policy development in the country. As part of this project, UNDP has helped VNDMA to develop disaster damage and loss databases, which can eventually be used for risk analyses and insurance product development. The loss and damage database, being set up by VNDMA covers impact of all disaster events throughout the country. The database has been under development but not yet finalised, by consolidating the existing scattered database and data of VNDMA and elsewhere. VNDMA has agreed that they will provide support to UNDP-supported DRI projects, including the IDF project. In addition, UNDP has set up “climaterisk.org”, which profiles main hazards for all 63 provinces the country focusing on drought susceptibility, flood and coastal erosion. It also provides data on vulnerability of agriculture production and water infrastructure. UNDP is planning to update this database in 2022. This project also includes identification of risk financing options for coastal communities as well as coastal cities and towns. UNDP will potentially consider expanding the reach of this initiative to urban areas of the seven coastal provinces where it has built strong working relationship with Provincial People’s Committees (PPCs). This is complementary to the planned IDF project. Specific locations will be discussed with the IDF team, and decisions on new urban cities will be taken jointly between UNDP and IDF team.

1.4. OVERVIEW OF VIET NAM INSURANCE INDUSTRY & EXISTING TYPHOON AND FLOOD COVERS

This section will provide context on Viet Nam’s insurance industry and the non-life insurance sector in particular, detailing existing natural disaster risk insurance covers with emphasis on floods and

⁶⁹ 2017-2022. The project received a no-cost extension to 2023

typhoons. It is prudent to ensure that any risk transfer solution that is recommended for Viet Nam’s cities is unique, relevant, and sustainable.

After joining the World Trade Organization (WTO) in 2006, foreign direct investment (FDI) inflows to Viet Nam expanded to 10 % of GDP. At the same time, Viet Nam’s insurance sector was transformed from a state-owned monopoly to a more open industry. Foreign insurers used joint ventures to partner with local entities to enter the Vietnamese market. Insurance activity became less concentrated: the number of insurance companies increased from 18 to 30 in the non-life segment in 2018. Insurance products increased in terms of quantity and quality. Insurance penetration has been continuously growing from 1.4 percent in 2006 (before liberalisation) to 2.4 % in 2018, as shown in Figure 9. Viet Nam’s gross written premium (GWP) has grown from VND 17.8 trillion (USD 1.1 billion) in 2007 to VND 107.8 trillion (USD 4.8 billion) in 2017, indicating a 20.8 % CAGR (Compound Annual Growth Rate) and making Viet Nam one of the fastest-growing markets in the region (for comparison, GWP growth rates in ASEAN: Philippines – 11.5 percent, Thailand – 11.8 percent, Malaysia – 7.9 percent).⁷⁰

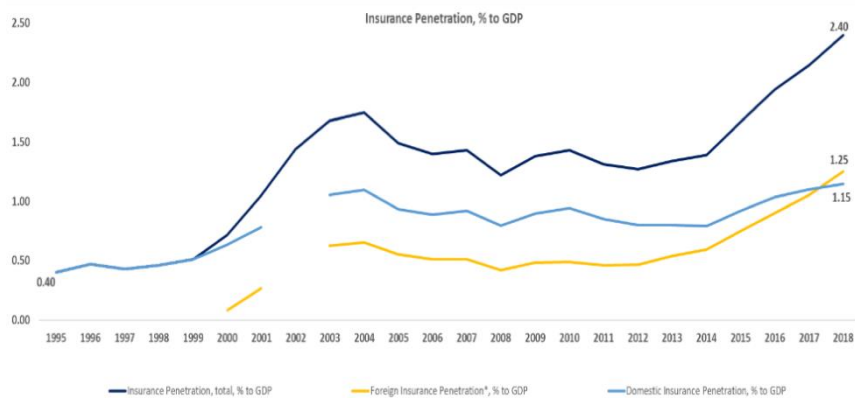


Figure 9: Insurance Penetration (% to GDP)

Source: AXCO; authors’ calculations.

* The data by companies in 2002 is not available to calculate foreign GWP

Viet Nam's non-life GWP expanded by 9.7 % in 2018 and reached a value of VND 32.2 trillion (USD 1.4 billion), reflected by low non-life penetration (0.58%). This is markedly different from 10 years ago where both the life and non-life markets were the same size. The key drivers of non-life premium growth in recent years have been the growth of GDP and related industrial and commercial activities; the introduction of new forms of compulsory insurance; and the growth of the middle class, in which individuals are able and willing to protect their assets through personal insurance⁷¹. The three largest product lines are motor, property, marine, aviation and transport, which account for 96 % of GWP in non-life.⁷²

⁷⁰ WBG-Disaster Risk Financing and Insurance Program. Can International Competition Drive Insurance Market Growth? June 2020

⁷¹ AXCO, 2019

⁷² WBG-Disaster Risk Financing and Insurance Program. Can International Competition Drive Insurance Market Growth? June 2020

The breakdown of the insurance industry in Viet Nam at the end of 2019 is depicted in Figure 10 below. As of 2021, there are 32 non-life insurers and 19 life insurers (one fully domestic, all others with some foreign investment), two reinsurance companies, and 21 insurance brokers operating in Viet Nam.⁷³ The non-life market is dominated by the original domestic insurers, with the top five accounting for 58.4 % in 2018. Eight of the non-life companies are 100 % foreign-owned while others have minority foreign shareholders.⁷⁴

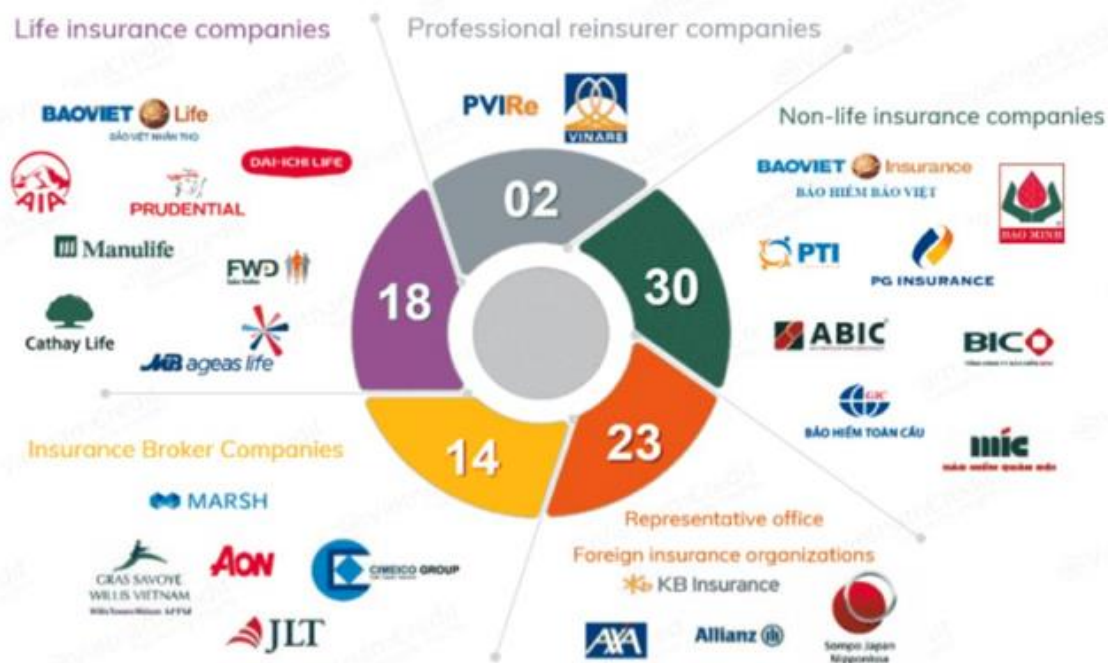


Figure 10: Insurance Industry in Viet Nam 2019

Source: AXCO, 2019

The top five national insurers in 2020 in terms of revenues from premiums were: Baoviet Holdings (Bao Viet) holding a market share of 17.10 percent; Petro Vietnam Insurance Joint Stock Corporation (PVI) with 13.06 percent; Post and Telecommunication Joint Stock Insurance Corporation (PTI) with 10.52 percent; Bao Minh Insurance Corporation (Bao Minh) with 7.58 percent; and Petrolimex Joint Stock Insurance Company (PJICO) with 6.19 percent.⁷⁵

Local companies include AAA, Agricultural Bank Insurance, BIC (a subsidiary of Bank for Investment and Development of Viet Nam), Bao Tin, GIC, Great Mountain JSC, Hung Vuong JSC, Military Insurance, Petrolimex Joint-Stock Insurance Company (PJICO), Nha Rong Insurance (Bao Long), Petrovietnam Insurance (PVI), Post Office Insurance, SVIC, Union Insurance, VietinBank Insurance, VNA Insurance, Vietnam National Reinsurance (VinaRe) and VASS. Joint ventures include Samsung Vina Insurance and Bao Viet Tokio Marine Insurance. Foreign groups with a presence on the ground include AIG, QBE, Liberty Mutual, Fubon Insurance, MSIG, and Chubb (non-life).⁷⁶

⁷³ See Table in Appendix ZZ for details of enterprises operating in Viet Nam’s insurance industry

⁷⁴ WBG-Disaster Risk Financing and Insurance Program. Can International Competition Drive Insurance Market Growth? (June 2020)

⁷⁵ ISA Report quoted in UNDP Country Diagnostic for Vietnam, 2021 – Development of Inclusive Insurance and Risk Financing

⁷⁶ WBG-Disaster Risk Financing and Insurance Program. Can International Competition Drive Insurance Market Growth? (June 2020)

The foreign GWP in the non-life sector is only 9.4%. The state retains a 100 % shareholding in one non-life company, Vietinbank Insurance Company, and has shareholdings of less than 100 % in ViNaRe, Bao Viet, Bao Minh, BIC Insurance Corporation, and PVI Insurance Corporation. In 2018, Bao Viet Insurance and PetroVietnam Insurance (PVI) were the market leaders, with a combined market share of 35.9%. Local insurers tend to dominate personal lines, but most lack the capacity and expertise to create a significant presence in commercial lines.⁷⁷

Overview of insurance market

19/07/2021 15:00:26

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
1. Market Structure							
Number of Enterprises	61	61	63	64	65	67	71
- Non - Life Insurers	30	30	30	30	31	31	32
- Life Insurers	17	17	18	18	18	18	18
- Professional Reinsurers	2	2	2	2	2	2	2
- Insurance Brokers	12	12	13	14	14	16	19
2. Financial Capacity							
- Total Asset (VND bil.)	171,607	202,378	248,247	316,487	395,215	462,964	573,225
- Accumulated Technical Reserves (VND bil.)	95,222	119,897	146,524	189,029	241,710	291,713	364,793
3. Investments (VND bil.)	127,061	160,258	198,150	249,134	324,262	378,504	468,563
4. Premiums (VND bil.)	67,479	84,498	103,208	131,106	160,586	185,400	220,705
- Insurance premiums	55,877	70,162	87,364	107,709	133,146	160,184	185,960
+ Non-life Business	27,522	31,891	36,866	41,594	46,970	53,366	56,669
+ Life Business	28,355	38,271	50,497	66,115	86,176	106,819	129,291
- Investment Income	11,603	14,336	15,845	23,396	27,440	25,216	34,745
- Insurance Penetration (%)	1.71	2.02	2.29	2.62	2.85	3.07	3.55
+ Non-Life Business	0.70	0.76	0.82	0.83	0.83	0.88	0.91
+ Life Business	0.72	0.91	1.12	1.32	1.53	1.77	2.08
+ Investment Income	0.29	0.34	0.35	0.47	0.49	0.42	0.56
- Insurance Density (VND' 000)	744	922	942	1,150	1,406	1,660	1,906
5. Contribution to socio-economic stabilization	38,589	48,339	52,542	74,950	91,653	93,596	122,196
- Claim payments and Insurance payouts (VND bil.)	21,788	23,571	25,609	31,889	39,260	43,761	48,768
- Technical Reserves(VND bil.)	16,801	24,767	26,933	43,061	52,393	49,836	73,428
6. Employment (employees and agents)	439,173	584,719	603,089	773,541	929,562	1,068,151	1,102,297

Table 4: Overview of Insurance Market in Viet Nam 2021

Source: Viet Nam Ministry of Finance⁷⁸

⁷⁷ WBG-Disaster Risk Financing and Insurance Program. Can International Competition Drive Insurance Market Growth? (June 2020)

⁷⁸ Viet Nam Ministry of Finance
https://vst.mof.gov.vn/webcenter/portal/mof/r/o/tender6/stipulation9/stipulation_chitiet4?showFooter=false&showHeader=false&dDocName=MOFUCM205190&_afLoop=13781636236947522#%40%3F_afLoop%3D13781636236947522%26dDocName%3DMOFUCM205190%26showFooter%3Dfalse%26showHeader%3Dfalse%26_adj.ctrl-state%3Djiupgz1p9_179

Total insurance revenue in 2019 reached VND 406.9 trillion, an increase of 22.7% compared to 2018.⁷⁹ In 2019, the total insurance expenditure reached VND388.4 trillion, an upturn of 25.7% compared to that in 2018.⁸⁰ Insurance premium revenue for the whole market in nine months of 2021 was estimated to increase 13% over the same period in 2020 (in the third quarter of 2021, up 7%), of which non-life insurance sector increased by 5%.⁸¹

Under Decree 73/2016/ND-CP (defining the details of implementation of the Law on insurance business and the Law on amendments to certain articles of the Law on insurance business) and in accordance with insurance practice in Viet Nam, most insurers do not retain any risk (non-life) that is more than 10% of the company's equity, ceding it to reinsurers. Generally smaller risks are retained by the local insurers up to approximately 60% with approximately 40% ceded to reinsurers. However, in the case of motor and health insurance policies, the risk is retained up to 90%. About 70% of reinsurance premiums are ceded in the form of treaty while the remaining is in the form of facultative reinsurance.⁸²

There is a large protection gap in Viet Nam, where less than 5% of losses due to disasters are covered by insurance, as compared to 50% in high-income countries. This protection gap is also prevalent beyond disaster losses, resulting in increased expenses in healthcare and heightened number of property, livelihood, and agriculture losses that impact on the future livelihoods of citizens.⁸³

The UNDP Diagnostic Study conducted for Viet Nam reports that an enabling environment for inclusive insurance and risk financing is important not only to protect lives, livelihoods, and property from the impact of disasters but also to provide coverage for sustainably protecting healthcare, employment, and agricultural supply chains. A multi-aspect disaster risk financing (DRF) with the help of insurance could potentially reduce losses from disasters through a range of innovative risk financing tools, such as parametric insurance and insurance-backed social protection.⁸⁴

According to the UNDP Country Diagnostic Study, the Insurance Association of Viet Nam (IAV) has identified seven areas where international support is required in developing the insurance sector, specifically for climate and disaster risk insurance, such as:

- international expertise and insurance models need to be brought to Viet Nam;
- developing data collection formats and templates to support disaster risk insurance;
- conducting risk assessment for developing insurance products;
- standardization of insurance products;
- standardization of claims assessment formats and procedures;
- creating insurance awareness among stakeholders; and,
- building expertise for risk and loss assessment.

Flood and Typhoon insurance in Viet Nam

In Viet Nam, most insurance products for disaster risks mainly focus on agricultural insurance. There is no stand-alone insurance product catering only for floods and typhoons in the market in 2022. It is usual practise in Viet Nam to add flood and typhoon along with other perils when purchasing indemnity insurance cover for property. Disaster risks are covered under property, construction, and erection-risk

⁷⁹ General Statistics Office, Viet Nam. Statistical Summary Book of Viet Nam 2020

⁸⁰ General Statistics Office, Viet Nam. Statistical Summary Book of Viet Nam 2020

⁸¹ General Statistics Office, Viet Nam <https://www.gso.gov.vn/en/data-and-statistics/2021/10/socio-economic-situation-in-the-third-quarter-and-nine-months-of-2021/>

⁸² Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic (UNDP publication, 2022)

⁸³ *ibid*

⁸⁴ *ibid*

policies (all-risks or named perils policy including disaster risk) or covered by endorsement/rider to the fire insurance policy. Compulsory fire and explosion insurance policies include perils such as flood and typhoons although they are typically sub-limited. Whilst ‘flood’ is a universal expression, depending on the specific terminology used by the insurance carrier concerned, the peril ‘typhoon’ may be referred to as storm and tempest (a violent windstorm usually with rain). A standard proposal for a compulsory fire and explosion insurance with flood and typhoon (storm/tempest) cover is included in Appendix 4.

While parametric insurance is not commonplace in the Vietnamese market, at least one local carrier is offering parametric insurance for typhoon risk. Bao Viet⁸⁵ has partnered with Munich Re⁸⁶ to offer their parametric cover ‘One Storm’ to industrial clients and large corporations with a maximum limit of VND10 billion to VND100 billion (USD440,000 to USD4.4 million). The underlying wind speed data that triggers pay-outs is provided by the Japan Meteorological Agency (JMA).

Another entity providing parametric insurance cover is SEADRIF, a risk pool set up by the World Bank in 2019 to provide sovereign-level catastrophe disaster insurance and financing to Southeast Asian countries. The Singapore-incorporated insurance company is fully owned by the countries that are members of SEADRIF. Participating countries currently include Cambodia, Indonesia, Lao PDR, Myanmar, Philippines, Singapore, and Japan. VNDMA is currently assessing Viet Nam’s future participation in SEADRIF through a feasibility study.

Fire insurance is mandatory for all kinds of public assets while insurance against the risk of flooding and storms are compulsory for offices, working places, and infrastructures in the areas frequently affected by those perils.⁸⁷ The customers of property and casualty insurance in Viet Nam are mainly enterprises and private sector organizations. Public and state organizations and properties managed by these organizations (offices, schools, hospitals, cultural facilities, etc.) are not found to be insured against the risks of disasters.⁸⁸

Fire insurance for public property is freely offered by the domestic insurance markets, supported by national and international reinsurers. Experience in Hue under the ADB project has indicated that there is likely to be ample local interest in providing similar cover against tropical cyclone and flood. Delays are due to agreement on the methodology to determine high risk, high value public assets that the 2017 law requires to be insured against tropical cyclone and flood. It is understood that the Insurance Supervisory Authority in the Ministry of Finance is responsible to determine that methodology. The process developed in Hue by the ADB project cannot be deemed a pilot for that process but will help inform it. This project will similarly inform that process and, by having a PMU within the ISA/MoF, will directly inform the methodology to be employed. A second delay relates to municipalities being empowered to purchase the insurance, including understanding which budget the funding should come from. Again, the ADB’s Hue project will partially assist in this process, although as the initial Hue insurance will be funded by the ADB, it will only be a partial test. Both the final agreement of methodology to agree assets to be insured and the means to purchase the insurance will require a decree by the Prime Minister. Hue city requested agreement to proceed in advance of such a decree. The Prime Minister’s office has authorised the Ministry of Finance to respond to that request.

Every year a wide range of public properties is affected by natural disasters. Most, if not all, of these assets do not have insurance coverage against disaster risks. The government has recently issued regulations on insurance for public assets. However, the detailed modalities of such coverage as well as the list of public assets to be insured are still under discussion. Moreover, the Prime Minister’s Decision on Public Property Insurance, which was supposed to be finalized in 2021 has been postponed. According to Decree 151 from 2017,⁸⁹ the Minister of Finance was expected to submit to the Prime

⁸⁵ Baoviet website: https://www-baoviet-com-vn.translate.google.com/insurance/Bao-hiem-tai-san/Bao-hiem-Bao-nhiet-doi-One-storm/GeneralLandingPage/217/?_x_tr_sl=vi&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=sc

⁸⁶ MunichRe website: <https://www.munichre.com/en/solutions/for-industry-clients/one-storm.html>

⁸⁷ Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic (UNDP publication, 2022)

⁸⁸ *ibid*

⁸⁹ Decree No. 151/2017/NĐ-CP, Article 135

Minister for promulgation a list of specific assets that must be insured against storm and flood risks and a roadmap for implementation.⁹⁰

Property and casualty insurance business in Viet Nam has been growing. As shown in Figure 11 below, the direct written revenue has increased steadily every year, from USD252.12 million (VND5.73 trillion) in 2016 to USD315.48 million (VND7.17 trillion) in 2020. Direct claims have also increased from USD59.4 million (VND1.35 trillion) in 2016 to USD122.32 million (VND 2.78 trillion) in 2020. However, with significant reinsurance support, the actual amounts of claims paid by domestic insurers have remained low and within considerable limits, thus protecting their financial bottom line.⁹¹

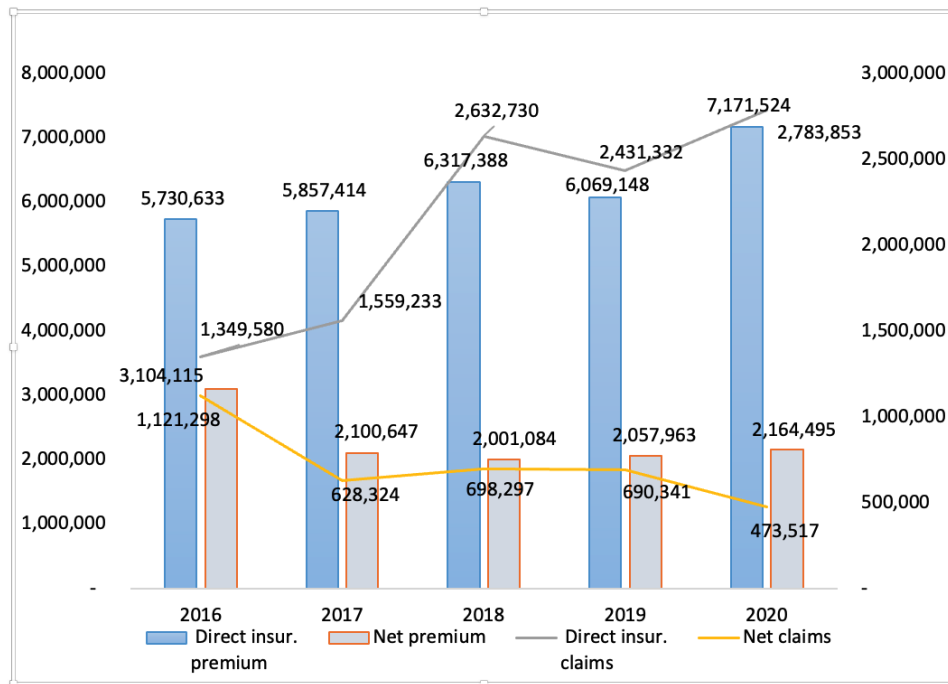


Figure 11: Property and casualty insurance in Viet Nam – 2016 to 2020 (in VND mln). Note: This includes the property and casualty insurance business, including disaster risk and accidental risk of property and engineering insurance, excluding data on compulsory fire and explosion insurance.

Source: Insurance Association of Vietnam Report 2021, quoted in Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic (UNDP publication, 2022)

In Viet Nam, there is no microinsurance coverage specifically to cover disaster risks. The currently available microinsurance products focus only on life and personal accident insurance.⁹²

In summary, the UNDP have stated in their Country Diagnostic for Viet Nam concluded in January 2022 that “Most public property in Viet Nam remains uninsured, especially against the risk of natural hazards. It appears that the government has the capacity and willingness to pay for the insurance premium to protect public property but the design for such an insurance scheme needs to be developed first. If compared with the fiscal expenses for losses caused by disasters every year, the insurance

⁹⁰ Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic (UNDP publication, 2022)

⁹¹ Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic (UNDP publication, 2022)

⁹² Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic (UNDP publication, 2022)

premium is a negligible amount. For this, suitable insurance product needs to be developed, with policy framework on insurance expenditures included in annual budgets, at both local and central levels.”⁹³

2. LAWS AND REGULATIONS

2.1 NATIONAL LAWS AND REGULATIONS ON INSURANCE AND DISASTER MANAGEMENT

National Approach

There are two core strategies which describe the objectives and approach of disaster risk management in Viet Nam. The first is the National Strategy for Natural Disaster Prevention, Response and Mitigation, which provides the foundations for disaster risk management and financing. The second is a law, on Natural Disaster Prevention and Control, which describes how disaster management is to be implemented and by which agencies.

The National Strategy for Natural Disaster Prevention, Response and Mitigation

Disaster risk management and financing has become increasingly proactive in Vietnam. The 2007 National Strategy for Natural Disaster Prevention, Response and Mitigation has been influential. It shifted the approach to ex-ante disaster risk reduction. Focusing on water-related hazards, including typhoons, the Strategy recognized hazards as a source of fiscal vulnerability and emphasised a decentralised approach. This was in recognition that local ownership of risk is an effective mechanism for disaster risk reduction.

The National Strategy for Natural Disaster Prevention and Control to 2030 with a Vision to 2050 (Decision 379/QD-TTg), which was approved by the Prime Minister on 6 April 2021, builds on this journey and includes the most guidance on disaster risk financing than any strategy before it:

“Article 11. Increase financial resources for disaster prevention:

Effectively use the local Disaster Prevention and Control Fund, the National Disaster Prevention Fund, and the Insurance for Natural Disaster Risk; to create a mechanism to mobilize domestic and foreign capital sources:”

Whilst the Action Plan of the Strategy states:

“Focus on directing the implementation of the following contents from now to 2030:

a) For non-construction: Complete legal documents; and Develop and issue policies to promote natural disaster risk insurance”

⁹³ Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic (UNDP publication, 2022), p 59

This is important because the Strategy is the framework for a series of policies which enable and deliver disaster risk management in Viet Nam. Related policies include deepening regional approaches to risk management and extending the legal weight of formal risk assessment in building codes.

The Law on Natural Disaster Prevention and Control

The Law on Natural Disaster Prevention and Control, effective May 2014, provides a legal basis for disaster risk management, addressing all hazards as part of a unified, systematic approach.

Financial sources are identified as state budget funds, natural disaster prevention and control funds, and voluntary contributions. These ringfenced funds are managed by Provincial People's Committees.

Annual expenditure estimates and state budgets must provide for natural disaster prevention and control. The budget is intended for articulating a management plan and to support implementation activities, such as construction and maintenance of defences and operation of the plan. Outlined priorities are for response and recovery, specifically emergency relief, repair, and health issues. Further investigation is required to understand whether this budget can be utilized for risk financing purposes. Risk mitigation is the central focus, though there is reference to risk transfer.

The key legislative documents as relevant to this IDF project are detailed in Table 5.

Law/strategy/plan/decree	Commentary
Law on Dikes No. 79/2006 / QH11. Issued in 2006	- Provides for anti-flood planning of diked rivers, dike planning, dike construction, repair, upgrading and solidification investment, dike management and protection, dike maintenance and use
National Strategy for Natural Disaster Prevention, Response and Mitigation. Issued in 2007	- Details approaches including the use of community-based disaster risk management, the integration of disaster risk assessments and awareness into infrastructure and urban planning, the creation of relevant databases, and the broader use of risk financing to mitigate the financial impact of disasters - Recognizes hazards as a source of fiscal vulnerability
Law on the national reserve No. 22 /2012/QH 13 Issued 20/11/2012	- Prescribes the formation, management, and use of the national reserves; the rights and responsibilities of organizations and individuals to the activities related to national reserves.
Law on natural disaster prevention and control No. 33/2013 / QH 13. Issued: June 19, 2013	- Provisions on activities, rights and obligations of agencies, organizations and individuals in natural disaster prevention and control. State management and resources to ensure natural disaster prevention
Law on state budget No. 83/2015/QH 13 Issued 25/6/2015	- Deals with the planning, implementation, audit, statement, and supervision of state budget; responsibilities and entitlements of agencies, organizations, units, and individuals relevant to state budget.
Law No. 15/2017/QH14 on management and use of public properties.	- Deals with state management of public property; policies on management and use of public property; rights and obligations of organizations and individuals in management and use of public property and Decrees and Decisions of the Government, Circulars of ministries
Decree No. 151/2017/NĐ-CP	- Supporting law no. 15/2017/QH14. Stipulates that: <ul style="list-style-type: none"> • Insurance is a financing instrument for transfer of risk for public property (article 133) • High-value and highly risky public property due to natural disasters, fires and other force majeure events shall be managed through insurance as a transfer of risk (article 1) • Public assets shall be managed through compulsory fire and explosion insurance as per Law for fire protection and fire-fighting • Public assets shall be managed through indemnity insurance or parametric insurance for storm, flood, and inundation. Public assets include building, structure belonging to offices

	(government), civil societies at the regions highly exposed to flood and storm, and infrastructure in regions highly exposed to flood and storm
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Table 5: Legislative and executive action on disaster risk management

Source: WTW’s compilation

The context to this work and the most relevant law is the Law on Management and Use of Public Property (Law No. 15/2017/QH14). Article 6 regulates that:

“Public property invested by the State shall be managed, operated, maintained, repaired, statistically and financially accounted for both exhibits and value; highly risky property due to natural disasters, fires and other force majeure events shall be managed through insurance or other instruments as regulated by law.”

This mandate is detailed by supporting decrees, primarily Decree No. 151/2017/NĐ-CP, stipulating that:

“Article 133 Financing instruments for natural disaster risk management:

insurance is a financing instrument for transfer of risk for public property;

Article 135. Insurance for public property:

1. High-value and highly risky public property due to natural disasters, fires and other force majeure events shall be managed through insurance as a transfer of risk
2. Public assets shall be managed through insurance as follows:
 - a. Public assets shall be managed through compulsory fire and explosion insurance as per Law for fire protection and fire-fighting; and
 - b. Public assets shall be managed through indemnity insurance or parametric insurance for storm, flood and inundation, including:
 - i) Building, structure belonging to offices (government), civil societies at the regions highly exposed to flood and storm; and
 - ii) Infrastructure in regions highly exposed to flood and storm.”

To enable this process, the Ministry of Finance (MoF) is responsible for devising a list of public property assets which are deemed to fall under the scope of this law and an implementation plan. The Insurance Supervisory Authority (ISA), on behalf of MoF, have created a taskforce to pilot public asset insurance from 2022 to 2025. Upon piloting, the methodology for asset selection and implementation plans will be submitted to the Prime Minister’s office for a Decision. This Decision, expected to be published in 2022,⁹⁴ will provide guidance to cities in Viet Nam on the purchase of disaster insurance for public assets.

2.2 BARRIERS TO APPLICATION OF 2017 NATIONAL LAW

A primary barrier to compliance with the 2017 Law on Management and Use of State Property is the lack of formal pathway for insurance procurement. This is awaiting the conclusions of the ISA Taskforce and submission to the Prime Minister’s office. Without the Prime Minister’s decision, cities are unable to allocate state budget to the purchase of insurance for public assets. The list of assets to be insured is also unknown as the assets classified as high-risk and high-value does not yet have an established methodology.

⁹⁴ Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic (UNDP publication, 2022)

There are additional barriers, some of which affect the creation of a formal pathway. Importantly, there is not yet a common and agreed method of assessing the definition of ‘high-risk’. One approach is to use a catastrophe risk model for all public assets across the country, though it is unknown whether there is a model of sufficient quality and with sufficient access to decision-makers and cities nationally. Another approach could be to use recorded loss histories of assets over a sufficient time period, although this is reliant on the quality of data collected and is backwards-looking in terms of risk level. These challenges will need to be overcome for the identification of a formal pathway. Since the definition of ‘high-risk’ and ‘high-value’ public assets has not yet been agreed on, in the ADB Hue project, the project team collected and mapped a Hue City public asset database and modelled flood loss impacts using a flood model to understand which assets can be considered high-value and high-risk.

The adequacy of the Vietnamese insurance market to absorb catastrophe risk is also a potential barrier. The introduction of high-risk, high-value assets to the market would be substantial. Though it is expected that the international reinsurance market will provide much capacity, the level of expected retentions and pricing by domestic insurers and by the Vietnam National Reinsurance Corporation (ViNaRe) are unknown. Storm, tempest, and flooding are currently insured on a percentage of sum insured basis, uninformed by catastrophe risk modelling. This pricing may not be appropriate to cover all high-risk, high-value assets. The technical basis of the current rating applied is unknown, but it does not appear to be risk adjusted: essentially, a common rate is applied where higher risk properties are offset by lower risk ones in a balanced portfolio, a cross subsidy. Selection of just higher risk properties without the weight of balancing low risk ones will mean that the overall premium pot is likely to be insufficient for the risks written. The catastrophe modelling approaches for this project will help to inform risk rating and ensure the coverage will be sustainable. Guidance from ISA to national insurers will be important to inform underwriting and develop a more risk-based approach. It is certain that international reinsurers will use risk-based methods—this will ultimately be a price driver to risk-adjusted pricing.

A more nuanced barrier is the potential use of parametric solutions. The Law describes parametric insurance as an acceptable, compliant option. Parametric products have a low adoption rate in Viet Nam currently. There may be uncertainty with a different form of product design amongst officials. Parametric insurance market pricing could also be more variable. One Storm, a parametric product launched in 2017 by Bao Viet Insurance Corporation, backed by Munich Re, did not sell well, being deemed too expensive. However, this should be seen as an opportunity to build awareness of an additional form of insurance which brings the differentiated characteristics of speed and objectivity as another tool to help manage the fiscal liabilities of disaster risk.

2.3 LOCAL REGULATIONS ON INSURANCE, DISASTER MANAGEMENT AND ASSET OWNERSHIP

Public assets are commonly defined as land; houses and other buildings attached to land; other assets attached to land; transportation; working equipment; and any other assets. Assets are also classified as those serving key national interests, including transport systems, irrigation systems, lighting, water supply and drainage, cultural works, and other infrastructure.

Article 4 of the 2017 Law on Management and use of Public Property classifies public assets/property further into seven categories. The first two categories – public property of authorities and organizations and infrastructural property – are deemed to be applicable to this project:

- “1. Public property used to manage and provide public services and ensure national security of competent state authorities, people’s armed forces, public service providers, authorities affiliated to Communist Party of Vietnam, socio-political organizations, socio-political and professional organization, social organization, social-professional organization or another

organization that is established according to regulations of law on associations... (hereinafter referred to as “public property of authorities and organizations”);

2. Infrastructural property serving national or public interests are technical infrastructure works, social infrastructure facilities, land areas, water areas or sea areas associated with infrastructure works, including: transport infrastructure, power supply infrastructure, irrigation infrastructure and response to climate change, urban infrastructure, industry cluster infrastructure, industrial zones, economic zones, high-tech zones, commercial infrastructure, information infrastructure, educational and training infrastructure, science and technology infrastructure, medical infrastructure, cultural infrastructure, sports infrastructure, tourism infrastructure and other infrastructure in accordance with provisions of law (hereinafter referred to as “infrastructural property”);”

Viet Nam utilises a decentralized system of management for public assets. Assets are assigned by the national government to national agencies, provincial entities, and city entities. Non-business units, armed forces units, political organizations, socio-political organizations, and professional organizations are also tasked with the management of some assets. These are established according to a multitude of legal provisions.

Broadly, management of public assets fall under the national-level ministries and People’s Committees of provinces or cities. This is described in Table 6.

Government agency/unit	Public assets managed
National-level ministry	<ul style="list-style-type: none"> • Assets used by administrative agencies and non-business units under ministries, ministry-level agencies and other central government agencies • Management of many assets falls under the ministries. For example, the Ministry of Transport manages national transport infrastructure of roads, railways, inland waters, maritime and aviation
People’s Committees of Provinces or Cities	<ul style="list-style-type: none"> • Assets used by local administrative agencies, public non-business units and local organizations, as well as assets decided by the state agency. This also includes assets assigned to local organizations. • Ministries retain the right to delegate management of some assets to relevant People’s Committees.

Table 6: Government agencies and public assets under their management
Source: summarized from the Law on Management and Use of Public Property

Currently, there is no standardised database of public assets in the initial candidate cities including the corresponding national government agency/Ministry or local government handling their management. Determining the ownership of the assets to be covered under the proposed disaster insurance solution will be conducted as a task under the main project. Based on preliminary consultations by the UNDP, ISA/MoF is potentially the appropriate government agency to host the comprehensive database. However, this work will require specific technical support by the project.

2.4 CURRENT ROLES AND RESPONSIBILITIES OF CITIES AND PROVINCES IN DISASTER MANAGEMENT

The Law on Natural Disaster Prevention and Control identifies the key agencies involved in disaster risk management. The National Steering Committee for Natural Disaster Prevention and Control (NSCNDPC) serves as the primary decision-making and implementational body at the national level. Its Standing Office is the Viet Nam Disaster Management Authority (VNDMA), which is under the

Ministry of Agriculture and Rural Department (MARD)⁹⁵. Key agencies involved in disaster management and their responsibilities are detailed in Table 7a.

Agency/committee	Role
Ministry for Natural Resource and the Environment (MONRE)	<ul style="list-style-type: none"> • Has primary responsibility for climate change coordination • Supported by the Ministry of Science and Technology in the development of climate science and its application to policy making.
Ministry of Agriculture and Rural Development (MARD)	<ul style="list-style-type: none"> • Has overarching responsibility for hazard management, mitigation and response.
Ministry of Construction (MOC)	<ul style="list-style-type: none"> • Responsible for all major public works and drainage systems
Ministry of Natural Resources and Environment (MONRE)	<ul style="list-style-type: none"> • Responsible for land use and planning
National Steering Committee for Natural Disaster Prevention and Control (NSCNDPC)	<ul style="list-style-type: none"> • Formerly the Central Steering Committee for Disaster Prevention and Control • Responsible for inter-agency coordination to assist the Government and the Prime Minister in organizing, directing, operating disaster prevention, response, and recovery on a national scale. The Steering Committee organisation chart, including its members, is shown in Figure 12a. The Deputy Prime Minister is the Chairman while the Minister of Agriculture and Rural Development is a Permanent Vice Chairman. It is the Prime Minister's discretion to appoint other Vice Chairpersons (the General Director of the VNDMA and the Head of the Ministry of Defence have acted as effective Vice Chairpersons).⁹⁶

Table 7a: Roles of government agencies in disaster risk management

Source: WTW's compilation

⁹⁵ Centre for Excellence in Disaster Management and Humanitarian Assistance, Viet Nam Disaster Management Reference Handbook, December 2021

⁹⁶ Ibid

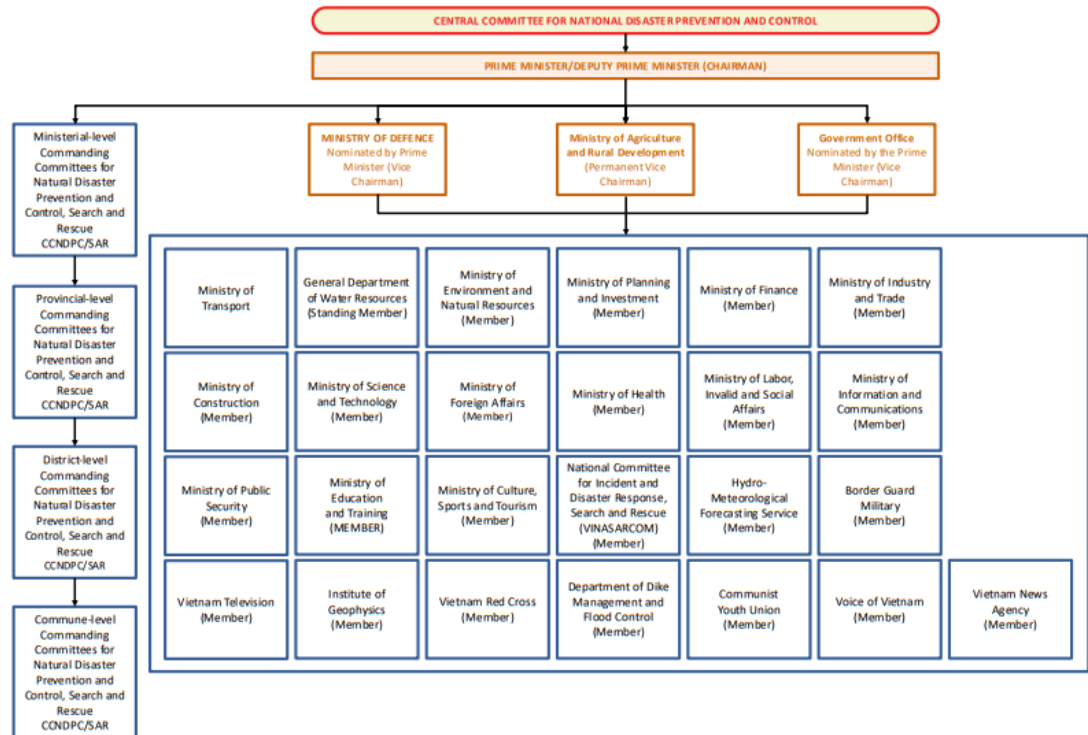


Figure 12a: Membership of the National Steering Committee for Natural Disaster Prevention and Control

Source: Centre for Excellence in Disaster Management & Humanitarian Assistance, Viet Nam Disaster Management Reference Handbook December 2021)

The National Strategy requires for each Ministry and province to have a sub-committee for Flood and Storm Control, including Ministry of Finance, Fisheries, Construction, Health, Industry, Transportation, Science and Planning.

The government has created a structure which extends to district and ward level and the Steering Committee for Natural Disaster Prevention and Control then works with Provincial, City, District and Ward Steering Committees on implementation. This mirrors the structure for Committees for Flood and Storm Control. At the local level, the Commanding Committees for Disaster Prevention and Control, Search and Rescue are responsible for disaster response in provinces, cities, districts, and communes.⁹⁷

Activities of provincial sub-committees tend to be centred on the development of disaster response and preparedness plans. Commune, district, provincial and ministerial level control plans must be updated annually, accounting for exposure changes(for example new properties, replacement properties, improvements to existing properties), defence improvements and to maintain a log of hazard events. The People’s Committees at all levels are responsible for developing and approving management plans. Provincial People’s Committees report plans to MARD and Ministry of National Defence.

The next tier of the country’s disaster risk management governance comprises the Central Committee for Flood and Storm Control (CCFSC) under MARD, which is responsible for the coordination of disaster risk management and reduction activities across various agencies. Similarly, the Disaster Management Centre (DMC) operates with the mandate on implementing of localized community-based disaster risk management (CBDRM).⁹⁸

⁹⁷ Center for Excellence in Disaster Management & Humanitarian Assistance. Viet Nam Disaster management Reference Handbook, 2018

⁹⁸ UNDRR/ADPC. Disaster Risk Reduction in Vietnam - Status Report 2020

2.5 CONCLUSION

There are several legislative and executive documents on disaster risk management, the most relevant to this project being the 2017 Law on Management and Use of Public Properties. This Law and other supporting decrees, primarily Decree No. 151/2017/NĐ-CP, mandates that high-value and highly risky public assets due to natural disasters, fires and other force majeure events be managed through insurance.

The 2017 Law categorises public assets into seven categories, of which the first two are deemed to be applicable to this project. These are public property of authorities and organizations, i.e. used to manage and provide public services, and infrastructural property, i.e. used to serve national or public interests which includes social, medical, education and training infrastructure facilities, among others. Broadly, management of public assets fall under the national-level ministries or the People’s Committees of provinces or cities.

However, there are barriers to compliance with the 2017 Law, namely the lack of an agreed upon definition of ‘high-risk’ public assets and a list of assets covered by this definition; the adequacy of the Vietnamese insurance market to absorb catastrophe risk; and the low adoption rate of parametric insurance in Viet Nam. A primary barrier is the lack of formal guidance on how the law should be enacted, including the processes and procedures for insurance procurement. Without the Prime Minister’s Decision, which is dependent on conclusions of the Insurance Supervisory Authority (ISA) Taskforce and their submission to the Prime Minister’s office, cities are unable to allocate state budget to the purchase of insurance for public assets. This Decision is expected to be published in 2022⁹⁹.

Furthermore, there will be a need to support setting up the database for public assets at the national level (within a relevant department of MoF), connected with Provinces/Cities allowing them to update and manage the provincial/city level data.

3. TARGET GROUP, STAKEHOLDER ANALYSIS AND PREMIUM FUNDING

3.1 TARGET GROUP – ULTIMATE BENEFICIARIES AND THEIR NEEDS IN TERMS OF ASSETS TO BE COVERED

Definition of poor and vulnerable people in the Disaster Management Law

The Viet Nam government presents a definition of poor and vulnerable people which is different from InsuResilience’s definition. The disaster management law¹⁰⁰ defines the poor and vulnerable as people, due to their characteristics and circumstances, likely to suffer more adverse impact from natural disaster than other groups. Poor and vulnerable groups in Viet Nam include children, elderly people, pregnant women, women nursing children 12 months old or younger, people with disabilities, people suffering from dangerous diseases, and poor people.¹⁰¹ The size of Viet Nam’s elderly population, a subset of this

⁹⁹ Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic UNDP publication, (2022)

¹⁰⁰ Article 3.4 of Law No. 33/2013/QH13

¹⁰¹ Centre for Excellence in Disaster Management & Humanitarian Assistance, Viet Nam Disaster Management Reference Handbook December 2021

poor and vulnerable group, has been increasing while the birth rate has dropped, accelerating the rate of population aging. By 2050, it is expected that the number of people 60 years and older will make up almost one-third of the total population and those 80 years and older will triple to almost 6% of the population.¹⁰² Additionally, poverty among the elderly is relatively high; in 2014, approximately 29% of older people (equivalent to 2.76 million people) received pension and social insurance support. These population trends among the elderly will expose a broader poor and vulnerable population to disaster risk, particularly among low-income groups highly exposed to hazards.¹⁰³

Regional governments' capacities are often not adequate to meet increasing demand for housing, utilities, and city services of a population that is rapidly migrating to cities. Uncontrolled settlements generating slums and squatters on the riverbanks and waterways reflect the deteriorating conditions of the urban poor, who are among the groups most vulnerable to flood risk, water pollution, and environmental degradation occurring in major cities. Lack of clean drinking water often contributes to the spread of vector-borne diseases such as diarrhoea, eye infections, cholera, dysentery and typhoid. Recurrent flood may also result in loss of contingency in the healthcare sector, especially during severe events.¹⁰⁴

A 2019 study examining the relationship between flooding and poverty in Viet Nam found that poor communities are more vulnerable to natural disasters as their incomes are more dependent on weather conditions; their housing and assets are less protected; and their health is more exposed to risks. People who are poor also have a lower capacity to cope with and adapt to shocks due to less access to savings, borrowing, or social protection.¹⁰⁵ These and other findings presented in succeeding parts of this section highlight the crucial role governments can play in helping the vulnerable, especially those in the rapidly growing urban areas, cope more effectively with natural disasters.

Average income per capita and poverty rates in urban and rural areas

Around 64% (or approximately 62 million people) of the total 97 million people in Viet Nam live in rural areas while 36% (roughly 35 million people) live in urban areas.¹⁰⁶ This population distribution is expected to change due to rapid urbanization in Viet Nam; as a result, by 2030, the share of urban population is expected to surpass rural population and reach 51 million.¹⁰⁷ Coastal areas, in particular, are experiencing rapid urbanisation with the development of industries attracting migration to coastal cities.¹⁰⁸

According to preliminary statistics from the Viet Nam General Statistics Office, the average daily income per capita of Viet Nam's urban population was higher than the average in rural areas and the average across the whole country (see Table 7b). As shown in the same table, the average daily incomes

¹⁰² "Situation of older people", HelpAge Vietnam, accessed 31 October 2021, <https://ageingasia.org/ageing-population-vietnam>; quoted in Centre for Excellence in Disaster Management & Humanitarian Assistance, Viet Nam Disaster Management Reference Handbook December 2021

¹⁰³ Disaster Risk Reduction in Vietnam: Status Report 2020", Asian Disaster Preparedness Center (ADPC) and UN Office for Disaster Risk Reduction (UNDRR)

¹⁰⁴ Disaster Risk Reduction in Vietnam: Status Report 2020", Asian Disaster Preparedness Center (ADPC) and UN Office for Disaster Risk Reduction (UNDRR); quoted in Centre for Excellence in Disaster Management & Humanitarian Assistance, Viet Nam Disaster Management Reference Handbook December 2021

¹⁰⁵ Bangalore, Mook, Smith, Andrew, and Veldkamp, Ted, "Exposure to Floods, Climate Change, and Poverty in Vietnam", World Bank, Policy Research Working Paper, No. 7765, 2016, Washington, DC, accessed 26 October 2021, <https://openknowledge.worldbank.org/handle/10986/24846>; quoted in Centre for Excellence in Disaster Management & Humanitarian Assistance, Viet Nam Disaster Management Reference Handbook December 2021

¹⁰⁶ Population, total - Vietnam | Data (worldbank.org)

¹⁰⁷ Viet Nam Population Projection for the Period 2019-2026, (Viet Nam General Statistics Office publication, 2020)

¹⁰⁸ Disaster Risk Reduction in Vietnam: Status Report 2020", Asian Disaster Preparedness Center (ADPC) and UN Office for Disaster Risk Reduction (UNDRR); quoted in Centre for Excellence in Disaster Management & Humanitarian Assistance, Viet Nam Disaster Management Reference Handbook December 2021

per capita in three of the initial candidate cities are all slightly lower than the urban population average (data for the other two initial candidate cities are not available).¹⁰⁹ When converted to US dollars, the daily average income per capita in urban populations is around PPP USD 25. However, as the average per capita income has limited informative value about the distribution of income within a population, the income distribution within some of the initial candidate cities is explained in the succeeding subsection.

Region/residence	(A) 2020 (preliminary) monthly average income per capita in thousand VND at current prices	(B) 2020 daily average income per capita in thousand VND (calculated by dividing Column A value by 30 days)	(C) 2020 daily average income per capita in USD PPP (calculated by converting Column B value to USD at USD 1 = VND 7,474 ¹¹⁰)
Whole of Viet Nam	4,249	141.6	18.95
Urban areas	5,590	186.3	24.93
Can Tho	5,031	167.7	22.44
Hai Phong	5,199	173.3	23.18
Da Nang	5,284	176.1	23.56
Rural areas	3,480	116.0	15.52

Table 7b: Monthly and daily average incomes per capita in Viet Nam and in urban and rural areas

Source: WTW's calculations using monthly average income data in the Statistical Yearbook of Viet Nam 2020 (Viet Nam General Statistics Office, 2020)

Income distribution data for selected cities: Can Tho City, Da Nang and Hai Phong

There is preliminary data on the 2020 average income per capita by income quintile in Can Tho, Da Nang, and Hai Phong. Average income per income quintile was computed by sorting surveyed individuals in ascending order according to their income and grouping the individuals equally into five groups. The first quintile then represents the poorest twenty percent of the population, and the fifth quintile represents the richest twenty percent of the population.

The data for Can Tho shows that a significant share of its population live under PPP USD 15 per day. As shown in Table 7e, the two lowest income quintiles in Can Tho, on average, live on less than PPP USD 15 per day (which is the InsuResilience's definition of vulnerable population) and the third income quintile lives on just around PPP USD 16. This means that around 60% of Can Tho's population live below PPP USD 16.

Income quintile	(A) Preliminary 2020 monthly average income per capita, in '000 VND	(B) 2020 daily average income per capita, in '000 VND (calculated by dividing Column A value by 30 days)	(C) 2020 daily average income per capita, in PPP USD
Can Tho			
Quintile 1	1,471	49.0	6.56
Quintile 2	2,692	89.7	12.01

¹⁰⁹ Statistical Yearbook of Viet Nam 2020 (Viet Nam General Statistics Office, 2020)

¹¹⁰ Purchasing-Power-Parity (PPP) source <https://www.chrisross.com/PPPConverter/>

Quintile 3	3,598	119.9	16.05
Quintile 4	4,754	158.5	21.20
Quintile 5	12,710	423.7	56.68
Da Nang			
Quintile 1	2,045	68.2	9.12
Quintile 2	3,203	106.8	14.29
Quintile 3	4,325	144.2	19.29
Quintile 4	5,976	199.2	26.65
Quintile 5	10,896	363.2	48.59
Hai Phong			
Quintile 1	2,404	80.1	10.72
Quintile 2	3,716	123.9	16.58
Quintile 3	4,640	154.7	20.70
Quintile 4	5,843	194.8	26.06
Quintile 5	9,432	314.4	42.07

Table 7c: Monthly and daily average incomes per capita in Can Tho, Da Nang, and Haiphong by income quintile
Source: General Statistics Office of Viet Nam (Statistical Yearbook of Viet Nam 2020)

Public assets benefiting poor and vulnerable populations

Research from the Organisation for Economic Co-operation and Development (OECD) and the International Monetary Fund (IMF) supports the idea that infrastructure is key to driving productive and long-term growth – they found that every dollar invested in infrastructure has a multiplier effect of 1.6x throughout the economy.¹¹¹ This underlines the centrality of infrastructure to the economic and, by extension, social impacts of disasters. Therefore, it is crucial for infrastructure, especially public assets which are essential to delivering public services, to be protected and resilient against risks, disaster risk being one of the most important. A public asset insurance scheme can also help strengthen the private insurance market, particularly where public access data and modelling are at the centre of the programme and may be shared with others in the public and private sectors. Such information may be used to develop new products, including micro-insurance, for the benefit of poor and vulnerable communities.

Disaster risk insurance for public assets can significantly contribute to the increased resilience of poor and vulnerable populations in urban areas by providing a timely and continuous flow of funds to governments after a natural disaster. Such funds can be used by the government for the following purposes:

- Rebuilding networked infrastructures necessary to allow for the proper functioning of a society and the reliable access of communities to water, electricity, and other basic necessities. These include infrastructure in energy, transportation, water, waste management and digital communications.¹¹²
- Rebuilding non-networked infrastructures to allow for the efficient functioning of government and its continuous provision of key social services (e.g., health, education, social welfare, disaster response) to communities in the immediate aftermath of a disaster.¹¹³ Non-networked infrastructures include schools, medical/healthcare centres, and government buildings. In a parametric insurance scheme, proceeds can also be used to fund pay-outs related to social services, disaster response, etc. Non-networked infrastructures include schools, medical/healthcare centres, and government buildings.

¹¹¹ IDF Practical Guide to Insuring Public Assets (Insurance Development Forum publication, 2019)

¹¹² IDF Practical Guide to Insuring Public Assets (Insurance Development Forum publication, 2019)

¹¹³ IDF Practical Guide to Insuring Public Assets (Insurance Development Forum publication, 2019)

Relevant public assets should be chosen in line with local growth, development, and poverty reduction priorities. This should be considered alongside high-risk, high-value assets, given the objective of the 2017 Law on Management and Use of State Property. By adopting both steps in evaluation, the assets selected will be socio-economically beneficial as well as compliant with the Law.

National and sub-national development plans can provide a first indication of critical public infrastructure. By linking with existing plans, the interest and demand of municipal governments as the prospective policyholders may be heightened. Ultimately, however, the list of prioritised public assets should be refined and determined based on the leadership of the respective municipal governments; priorities may differ between municipalities. Parametric insurance offers the opportunity to gear emergency response budgets to focus on the vulnerable, perhaps by supplementing social welfare programmes and/or developing livelihood protection programmes to providing direct payments to vulnerable families after a disaster event.

The below offers an indicative approach to selecting and identifying relevant public assets, using the example of Can Tho.

As set out in several national planning documents as well as focus areas of international development projects, (sub-) national infrastructure development, specifically in the areas of transport, waste (water) management and treatment, drainage and sanitation, are seen as a key driver for economic growth and poverty reduction in rural and urban areas. In line with this, the ‘Master Plan on Socio-Economic Development of Can Tho City through 2020 with a Vision toward 2030’ specifies several, municipally managed public infrastructure targets, which are deemed critical to ensure and promote economic growth, employment and income, and can be used as proxy for public assets relevant for municipal risk pooling.¹¹⁴ Given the Plan’s focus areas, these targets can furthermore be understood to directly support the Plan’s strategy to reduce poverty specifically by “encourag[ing] poor households to get rid of poverty by themselves through such support policies as investment in building infrastructure for production, product consumption, preferential credits, vocational training, job placement, etc. and promot[ing] vocational training, especially vocational training for rural laborers; and provid[ing] poor people with production knowledge and skills”.

Selected infrastructure investment targets identified in the Plan are:

Sector	Targets and sub-targets
Water and Sanitation	Access to water increased to 80-85% of rural population by 2020
	To increase the capacity and complete the water distribution system in districts
	To build new water supply systems for new urban areas, a number of townships, satellite urban centers, centralized clean water supply systems in the centers of communes and concentrated residential areas and closed water supply systems in residential area
	Rate of treated wastewater increased to 70-80%

¹¹⁴ Master Plan on Socio-Economic Development of Can Tho City through 2020 with a Vision toward 2030 (Decision No: 1515/QD-TTg) https://fsggmbh-my.sharepoint.com/:b:/r/personal/k_friess_fs_de/Documents/Vietnam%20IDF/Feasibility%20Study/Reference%20material/ExSummary_ECA_VIETNAM_FINAL.pdf?csf=1&web=1&e=cY8xLI – Quoted in UNU-EHS & Frankfurt School of Finance & Management (2021). Compound Flood Risk and Heat Waves in C  n Th   – Vietnam: Executive Summary. Bonn/Frankfurt: United Nations University / Frankfurt School of Finance & Management GmbH)

	Water drainage: To speed up the construction of the wastewater treatment zone and pump stations and soon put into use the wastewater treatment and drainage system in Cai Rang and Ninh Kieu districts
	To build water drainage systems and wastewater treatment systems in industrial parks and new urban areas
Waste	The rate of garbage, incl. all solid waste, collected and treated increased to 100% by 2020
	To complete the construction of a solid waste treatment plant in Phuoc Thai ward, O Mon district
	To invest in the regional-level medical and hazardous waste treatment plant
Electricity	The rate of households with access to electricity increased to 100% by 2015
	Speed up investment in completing and putting into operation the O Mon Electricity Center, the lot B-0 Mon gas pipeline and the gas distribution center
	Upgrade the electricity system and renew medium- and low-voltage power lines
Transport	Traffic system linking the inner city and adjacent areas developed with various large-scale transport forms
	Upgrade and complete urban infrastructure (transport network, electricity, water supply, wastewater and solid waste treatment, etc.)
Industry and construction	Build complete infrastructure for attracting investment in Hung Phu I, Hung Phu II, Thot Not, Bae O Mon and O Mon industrial park
	Speed up investment in urban areas, residential areas, resettlement urban zones, housing for students, workers and low-income earners, etc.
Education and training	Develop the school network, building physical facilities and schools toward standardization and socialization (also colleges and universities and vocational training)
Healthcare	To formulate a synchronous healthcare network from the municipal to the grassroots levels and build and develop the grassroots healthcare system for all people to enjoy an equal and effective healthcare and hi-tech healthcare services.
	To build and upgrade the Can Tho City General Hospital, the Tumor Hospital, the Heart Hospital, the Obstetrics Hospital, the Pediatrics Hospital, the Odonto-Stomatology Hospital, the Tuberculosis and Pulmonary Diseases Hospital, the Traditional Medicine Hospital and the HIV/AIDS Prevention and Control Center

	To consolidate and complete the grassroots health network and increase people's accessibility to quality health services
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Table 7d: Infrastructure investments in the Master Plan on Socio-Economic Development of Can Tho City through 2020 with a Vision toward 2030

Source: WTW's compilation

As this Master Plan details the list of 52 related infrastructure investment projects managed by Can Tho city, it can be used to complete a first selection of appropriate public assets. In addition, further public assets/infrastructure investments already completed should be considered. These prioritised lists of public assets developed by cities/provinces will need to feed into a national database to be housed within the MoF.

Upon determining a preselection of public assets exposed to natural hazard risk, the assessment framework in Table 7g can be applied in consultation with local government authorities and stakeholders to ensure the selection meets the requirements of the project. While not specifically mentioned below, such selection process should also ensure to exclude any public assets, e.g. certain types of energy infrastructure, which limit future insurability by further intensifying climate change and natural hazard risk.

Asset category	Name	(A) Share of poor and vulnerable population served (Weight: 0.4)	Column A Score*	(B) Description of service and relevance for poor and vulnerable population (Weight 0.6)	Column B Score**	Composite score
Healthcare/ Hospital	The Can Tho City General Hospital

* If share of poor and vulnerable population served is < 5%, score is 1; <10% is 2; < 20% is 3; < 30% is 4; < 40% is 5

** If relevance of service for vulnerable population is low, score is 1; medium is 2; high is 3

Table 7f: Proposed assessment framework to select public assets benefiting the poor and vulnerable population

Source: WTW

3.2 POSSIBLE POLICYHOLDER FOR THE DISASTER RISK INSURANCE AND FLOW OF INSURANCE PAY-OUT

The government body authorised to be the policy holder of a disaster risk insurance policy covering a public asset will depend on which government agency is assigned to manage that specific public asset. For instance, the policyholder of insurance for roads, railways, inland waters, maritime and aviation will most likely be the Ministry of Transport, which manages these public assets. Meanwhile, the policyholder of protection for a building or other structure used by local administrative agencies will be the Provincial, district, or city-level government agency managing that asset. The processes for sub-national governments to receive funds under indemnity contracts is well-defined as there is a current requirement to purchase fire and explosion protection. Storm and flood protection is available as an extension to that compulsory cover, an all-risks policy. Claims due to typhoons or floods will be handled in the same way.

The process for an indemnity claim settlement starts with the insured's submission of standard documents, such as the loss notification, original documents of the damaged properties, inspection or technical reporters from suppliers or manufacturers, the internal accident report, the police report, the reinstatement/replacement and salvage document, and the indemnity letter. The insurer and the insured agree on the level of the damage and the adequacy of the original sum insured. The claims will be paid to the insured only upon submission of a contract or invoice of repair or reconstruction of the insured building.

By contrast, parametric insurance (as explained in further detail in Section 4.4) does not insure a property up to its respective total sum insured; instead, in the case of a pure parametric cover, it pays a pre-set amount not on proof of direct damage occurring but on proof that a pre-defined event has occurred to a pre-defined magnitude in a certain area. As such, in the case of a public asset parametric insurance program, it is ideal to have just one policyholder receive the pre-set pay-out amount and distribute these to the beneficiaries in charge of repair and reconstruction of properties and immediate delivery of social services to poor and vulnerable groups. The Treasury Department of the city can be the recipient of such proceeds and add the amount to the city budget, which is then allocated to specific departments following standard processes. Unless an emergency has been declared by the national government, strict tendering rules will need to be performed for any work, e.g., building repairs, to be performed by the private sector.

Should cover, for example to offer livelihood protection payments to the poor and most vulnerable, be considered outside of the requirements of the 2017 Law on Management and Use of State Property, private sector firms may be asked to bid for services such as claims payment distribution, again via a public tender process.

3.3 PARTNERS NEEDED TO DEVELOP THE SOLUTION

There is strong hydro-meteorological expertise in Viet Nam, both in the national and province/city levels in the public sector (for example the Viet Nam Disaster Management Authority) but also in the private sector, with innovative networks of hydro-meteorological weather stations available. It will be important to leverage that expertise to better design a parametric insurance policy and, potentially, to provide data (both historical data for rating and near real-time data for index calculation) to the trigger. Engagement is also vital to ensure buy-in to the product structure and operation from city, provincial and national authorities; without such buy-in, the insurance is unlikely to be long-lived. Note that there are weather stations run at the national level augmented by ones operated by provinces and private firms. Consideration will need to be given to issues such as data access and quality, meeting the needs, and expectations of reinsurers; otherwise, prices for reinsurance (and so, insurance) will be higher.

It is also vital to engage with government officials to better understand historical events and their impacts, the sources of funding, and any issues (in terms of funding shortfalls, liquidity, and disaster response) that the event exposed. This work will help develop a link between the severity of the event, as modelled by the trigger with the level of insurance funding required.

Given ISA's central role in leading all insurance-related matters in the country, the agency is proposed to play a key role in the implementation of the project. A Project Management Unit (PMU) will be proposed to be set up within ISA, housing technical experts to help coordinate implementation of project activities at the national level, while facilitating and managing inter-governmental communications and procedures required to get relevant formal endorsements. In addition, technical experts of the PMU would help ISA with the technical set up of the database for public assets at the national level. The costs for such a PMU can be shared between the project, government, and other ongoing insurance-related projects. Details of such an arrangement will be discussed further with ISA and other development partners (ADB, KfW and UNDP) during project development phase.

The ability of government officials to communicate the purpose, functioning, and benefits of disaster risk financing solutions for public assets is key to the introduction and sustainability of any proposed

insurance scheme. A key component of this project is supporting the technical knowledge of relevant government authorities and officials.

This project may consider conducting a series of activities to strengthen understanding and capacity of national and subnational government officials on disaster risk financing and climate resilient public assets management. There may also be additional capacity development activities, including with the national insurance industry, primarily through the production of reports.

The project team would apply a participatory approach with stakeholders to promote the role of the government in owning the public asset insurance program. The capacity building activities will aim to strengthen awareness about the current exposure of public assets; explore the developing legal environment for financing and potential government funding sources for premium payments; and to build interest and knowledge amongst representatives for the use of a similar methodology and risk financing structure in other locations.

3.4 MINISTRIES AND AGENCIES – INVOLVED IN THE DISASTER RISK MANAGEMENT AND RISK TRANSFER PROCESS

Legislation identifies the key national agencies involved in disaster risk management. The National Steering Committee for Natural Disaster Prevention and Control (NSCNDPC) is responsible for inter-agency coordination to assist the government and the Prime Minister in organizing, directing, operating disaster prevention, response, and recovery on a national scale (Figure 13a). The NSCNDPC works with Provincial, City, District and Ward Steering Committees on implementation. Additionally, each Ministry, including Ministry of Finance, Fisheries, Construction, Health, Industry, Transportation, Science and Planning, and province has a sub-committee for Flood and Storm Control; this arrangement mirrors the structure of the NSCNDPC and the local government steering committees. Current roles and responsibilities of cities and provinces in disaster management is described in further detail in Section 2.4.



Figure 13a: Viet Nam Inter-Agency Coordination and NatCat risk level

Source: Centre for Excellence in Disaster Management & Humanitarian Assistance, Viet Nam Disaster Management Reference Handbook December 2021

The People's Committee plays an important role in disaster risk management since it is the executive office of the People's Council, the State administrative body in a locality (Figure 13b). The Law on Natural Disaster Prevention and Control provides more detail on the disaster risk management responsibilities of People's Committees (at all levels), which include:

1. Elaborating, approving, and implementing local plans on natural disaster prevention, control, and response;
2. Integrating natural disaster prevention and control contents into local socio-economic development master plans and plans;
3. Managing the implementation of masterplans on construction of urban centres, rural residential areas, technical infrastructure, and production suitable to local natural disaster characteristics;
4. Inspecting and urging the reserve of food, essentials, water treatment chemicals, curative medicines, medicines for epidemic prevention, means, supplies and equipment;
5. Building, repairing, consolidating, upgrading, managing and protecting local natural disaster prevention and control works;
6. Summarizing, making statistics on, and assessing damage caused by natural disasters;
7. Directing and organizing the implementation of measures to protect production when natural disasters occur; and,
8. Organizing the management and distribution of emergency relief money and goods.

Declaring a disaster-related emergency

<p>Prime Minister</p> <p>Declares large-scale disaster that is beyond the capacity for response and recovery of ministries and local authorities and on the advice of the NSCNDPC.</p>
<p>Ministers and Heads of Ministerial Agencies</p> <p>Declares disaster-related emergency which affects the work and infrastructure under their management on the advice of the provincial CCNDPC/SAR or specialized agencies affiliated with ministries and ministerial agencies.</p>
<p>Provincial People’s Committee Chairperson(s)</p> <p>Declares disaster-related emergency occurring in the province on the advice of the provincial CCNDPC/SAR.</p>

Figure 13b: Declaring a disaster-related emergency

Source: Centre for Excellence in Disaster Management & Humanitarian Assistance, Viet Nam Disaster Management Reference Handbook December 2021

Current legislation is silent on the roles of People’s Committees and national and local government agencies in processes around obtaining disaster risk insurance for public assets. Guidelines on this disaster risk insurances are expected to be formulated given the issuance of Decree No. 151/2017/NĐ-CP which requires that public assets be managed through insurance for storm, flood, and inundation. The Ministry of Finance, through the Insurance Supervisory Authority (ISA), is responsible for devising a list of public property assets which are deemed to fall under the scope of this law and a plan for implementing the provisions of this law. These policy documents, which would also provide guidance on allocating state budgets for the purchase of insurance for public assets, are yet to be finalized.

Nevertheless, it is crucial to involve at the early stages of this project the relevant People’s Committees, given their role integrating natural disaster prevention and control in socio-economic master plans, and the ISA, given the guidance they can provide on the implementation of the law on public asset insurance.

3.5 SOURCES OF FUNDING FOR PAYMENT OF PREMIUMS

Financial sources for natural disaster prevention and control include state budget funds, state budget reserves, financial reserve funds, natural disaster prevention and control funds, provincial disaster management funds, and voluntary contributions of organizations and individuals. Table 8 below lists the primary uses of these funds, as stipulated in the Law on Natural Disaster Prevention and Control, the Law on State Budget, and the Decree on the Establishment and Management of Disaster Management Funds. The two Laws do not specify if any of such government funds may be used for disaster risk insurance purposes; the Decree, however, allows the use of provincial disaster management funds for the purchase of disaster risk insurance cover for persons involved in commune-level disaster prevention and control. It may be explored further if these existing province disaster management funds may also be used for disaster insurance for public assets.

As described in further detail in Section 2.1, the Ministry of Finance is responsible for devising a list of public property assets which are deemed to fall under the scope of the 2017 Law on Management and Use of State Property. The Ministry is also tasked to produce a plan for implementing the provisions of the law, which may include guidance on the process for procuring insurance and budgeting for premium

payments. The taskforce of the ISA, acting on behalf of the Ministry of Finance, has yet to submit to the Prime Minister's Office its findings on its pilot of public asset insurance. Without the Prime Minister's Decision, informed by the findings of the ISA taskforce, cities are unable to allocate its budget to the purchase of natural hazard insurance for public assets. This draft Decision is expected to be published in 2022.¹¹⁵

Fund	The fund's use according to the relevant law	Found in
State budget funds, which include funds within annual expenditure estimates and state budget provisions	For elaboration of natural disaster prevention and control strategies and plans; construction, renovation and upgrading of natural disaster prevention and control works; natural disaster prevention and control activities; and regular operations of state management agencies in charge of natural disaster prevention and control	Law on Natural Disaster Prevention and Control
Natural disaster prevention and control funds, which are set up at the provincial level and managed by provincial-level People's Committees	For supporting natural disaster prevention and control activities, prioritizing: <ul style="list-style-type: none"> - Providing emergency relief in food, drinking water, medicine, and other essentials to those affected by natural disasters; - Supporting repair of houses, health establishments, and schools; - Handling environmental sanitation issues in natural disaster-hit areas. 	
Voluntary contributions of organizations and individuals	Must be allocated and used in accordance with the law on social funds and charity funds	
State budget reserve, which is 2%-4% of total budget expenditure	For unplanned expenditures on prevention and recovery of natural disasters, response to epidemics, and famine relief; performance of crucial national defence and security objectives, and other objectives that are their liabilities	Law on State Budget
Financial reserve fund	Used in case budget reserve is used up and not sufficient for disaster recovery	
Provincial disaster management funds	Support for natural disaster response activities; disaster aid assistance and relief; and disaster prevention activities, including buying insurance against disaster risk for participants the commune-level disaster prevention and control vanguards	Decree on Establishment and Management of Disaster Management Funds

Table 8: Financial sources for natural disaster prevention and control and their uses as found in the relevant laws

Source: WTW's compilation

Once the Prime Minister approves implementation of the 2017 Law on Management and Use of State Property, it is very likely that standard procurement processes for insurance purchasing will be followed.

The issuing entity, e.g. the city for a public asset insurance programme, will issue a public tender document. Tenders typically either compete on price, i.e. lowest qualifying bid wins, or on quality, i.e. the price is fixed and the firms compete on the breadth of cover offered and service standards. As no tariff applies for typhoon and flood insurance, it is likely that competition will be primarily on price,

¹¹⁵ Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic, UNDP publication, 2022

with the policy form given. Authorized insurers, or a consortium of up to eight insurers, can bid. Where they need reinsurance support, that reinsurance must be specified in advance. Major foreign reinsurers and reinsurers of at least 10% of total liability under a reinsurance agreement must be ranked at least BBB by Standard & Poor's or Fitch, B++ by A.M. Best, Baal by Moody's.¹¹⁶ Insurers, usually assisted by their reinsurance broker, need to confirm the price and reinsurance capacity prior to bidding for the contract. Where the cover falls within their existing reinsurance treaties, insurers set their own pricing consistent with the use of that treaty capacity. Where additional cover is required (e.g., if the event limit of an insurer's treaty is exceeded), the price of that reinsurance will necessarily drive the premium bid. Note that there is no mandatory cession to the Viet Nam National Reinsurance Corporation (ViNaRe); however, ViNaRe continues to have strong relationships with Vietnamese insurers. Typically, large companies will offer ViNaRe a substantial following share of their treaties whilst smaller insurers are likely to reinsure to ViNaRe directly, with risk being indirectly passed to the international reinsurance markets via ViNaRe's own retrocession treaties.

Another way to fund premiums for public asset disaster insurance is to secure external financial support in the form of grants or loans. The funding foreign/multilateral agency will pay premiums directly to the insurer; the beneficiary of the insurance policy will be the government agency, whether at the national/Ministry or local-level, managing the public asset. The relevant government agencies to be involved in the process of securing the external funding will be discussed further in the main project phase. Due to the lack of a supporting framework around cities' use of state budgets for disaster insurance premium, this alternative approach to obtaining premium funding may be more feasible in the short term. This method is being employed in Hue City for a pilot period with ADB funding the premium; however, even in this case, support from the Prime Minister's Office for employing this process still needs to be sought.

Government procurement processes for indemnity insurance purchase are well defined and tested by fire and explosion cover procurement. For parametric cover, where the local company experience and appetite is weaker, local insurers will rely far more on their reinsurance partners. For ADB's Hue project, it is proposed that indemnity and parametric insurance will be bundled in one policy, with the bidding insurers essentially competing on the sum of the indemnity premium and their fronting fee for the parametric section. With the parametric piece being brokered by an insurance broker into the international reinsurance markets, keen competition is expected. However, it is to be tested if this approach will be allowed where the premium is paid by the city rather than a donor.

3.6 CONCLUSION

The number of poor and vulnerable people according to the ISF's definition, i.e. living on less than 15 USD PPP or each of the five priority cities has been estimated using the general ratio for the whole country of 70%. It is noted as well that the Viet Nam government, in its disaster management law, presents an alternative definition of poor and vulnerable people, i.e., a group of people, due to their characteristics and circumstances, likely to suffer more adverse impacts from natural disasters than others. Poor communities are more vulnerable to natural disasters than higher-income groups as the former's incomes are more dependent on weather conditions, their housing and assets are less protected, and their health is more exposed to risks. People who are poor also have a lower capacity to cope with and adapt to shocks due to less access to savings, borrowing, or social protection.¹¹⁷ These findings highlight the crucial role governments can play in helping the poor and vulnerable, especially those in the rapidly growing urban areas, cope more effectively with natural disasters.

¹¹⁶ Decree No. 73/2016/ND-CP (details of implementation of the Law on insurance business and the Law on amendments to certain articles of the Law on insurance business).

¹¹⁷ Bangalore, Mook, Smith, Andrew, and Veldkamp, Ted, "Exposure to Floods, Climate Change, and Poverty in Vietnam", World Bank, Policy Research Working Paper, No. 7765, 2016, Washington, DC, accessed 26 October 2021, <https://openknowledge.worldbank.org/handle/10986/24846>; quoted in Centre for Excellence in Disaster Management & Humanitarian Assistance, Viet Nam Disaster Management Reference Handbook December 2021

Disaster risk insurance for public assets can contribute to the increased resilience of poor and vulnerable populations in urban areas by providing timely and continuous flow of funds to governments after a natural disaster. Such funds can be used by the government to rebuild (sub-) national infrastructure, specifically in the areas of transport, waste (water) management and treatment, drainage and sanitation, which, as set out in several national planning documents of the Viet Nam government, are seen as a key driver for poverty reduction in rural and urban areas. An assessment framework can be applied in consultation with local government authorities and stakeholders to ensure that the selected public assets which will be covered by the disaster risk insurance solution meet the requirements of the project. Viet Nam national and sub-national development plans can provide a first indication of critical public infrastructure to be selected for the project. By linking with existing plans, the interest and demand of municipal governments as the prospective policyholders may be heightened.

The government body authorised to be the policy holder of an indemnity disaster risk insurance policy covering a public asset will depend on which government agency is assigned to manage that specific public asset. In indemnity insurance, the processes for local governments to receive proceeds will follow existing standard requirements for insurance contracts for fire and explosion protection. The insured will submit the necessary documents and will agree with the insurer on the level of damage. Claims will be paid to the insured only upon submission of a contract or invoice of repair or reconstruction of the damaged structure.

Since a city public asset parametric insurance policy pays a pre-set amount not on proof of direct damage occurring but on proof that a pre-defined event has occurred to a pre-defined magnitude in a certain area, it is ideal to have one policyholder (ideally the Treasury Department of the city) receive the parametric insurance pay-out. The policyholder can add the pay-out amount to the city budget and allocate the amount to specific city government departments following standard processes.

City governments are unable to allocate state budget to the purchase of insurance for public assets without the Prime Minister's Decision supporting the 2017 Law on Management and Use of Public Properties. The Decree on the Establishment and Management of Disaster Management Funds allows provincial disaster management funds to be used to buy disaster risk insurance cover for persons involved in commune-level disaster prevention and control; it may be explored if such funds may also be allocated for purchasing disaster risk insurance for public assets.

Current legislation is also silent on the roles of the People's Committees and other national and local government agencies in processes around obtaining disaster risk insurance for public assets; further guidance on this may also be provided in the forthcoming Prime Minister's Decision. Once this Decision is approved and circulated, it is very likely that standard procurement processes for insurance purchasing will be followed.

It is crucial to engage the relevant People's Committees of the cities, given their role integrating natural disaster prevention and control in socio-economic master plans, and the ISA, in general, and the ISA taskforce, given the guidance they can provide on the implementation of the 2017 Law. It is also crucial to engage other entities in the public and the private sectors with hydro-meteorological expertise, with innovative networks of hydro-meteorological weather stations, and/or with an understanding of historical disaster events, their impacts, and any issues encountered in disaster response. To ensure buy-in of stakeholders in Viet Nam, it is critical to build capacities among these stakeholders in communicating the purpose, functioning, and benefits of disaster risk financing solutions for public assets.

4. TECHNICAL FEASIBILITY

4.1 METHODOLOGY FOR PUBLIC ASSET DATA COLLECTION

There are no existing comprehensive country-wide or city-specific databases of public assets in Viet Nam. Even though fire and explosion covers for public assets are compulsory, data with the granularity required for catastrophe modelling to estimate insurance premiums is not collected., for example building construction type, number of floors, existence of basements etc. Such comprehensive databases would help governments determine the exposure, insurability, and estimated premium for each of these assets. The UNDP notes that the ¹¹⁸ needs support in developing these databases, which would also include the assets' financial values.¹¹⁹

To begin the creation of an initial public asset database per city, the public asset data collection methodology employed in the ADB Hue project, as described below, can be replicated for this project. Appendix 11 shows a table listing possible data sources of this public asset database, as well sources of data needed to conduct other key project tasks, such as developing the appropriate flood or typhoon (wind) parametric triggers.

In the ADB Hue project, asset data in the city was collected through information obtained from government officials, with the MoF in Hue City coordinating the data requests and providing most of the data, and site surveys, with most information distilled from government records provided at the team's request. Where appropriate, datasets were cleansed and as far as possible, geocoding was validated. Asset data collected was uploaded to the Spatial Data Analysis Explorer (SPADE), an interactive cloud-based platform which hosts geospatial information launched by the ADB and Urban Climate Change Resilience Trust Fund (UCCRTF).

A database with risk-related information on over six hundred public assets was collated, which included buildings (for example government offices, hospitals, and schools), historical monuments, bridges, electricity stations or sub-stations, electricity transmission and distribution cables, and culverts or drainage connectors. The data collection process took roughly 6 to 12 months, with a team of four persons conducting site visits to Hue City.

Essential information on the characteristics of assets was also detailed to enable the hazard review and probabilistic modelling. This information included:

- Asset: descriptor, model occupancy class, construction type, number of storeys;
- Location: latitude/longitude and/or address;
- Financial: internal & external area size in square feet, replacement cost, value of contents. Asset valuations proved the greatest source of uncertainty. For insurance purposes, replacement costs, instead of book or market values, are the most appropriate valuation to indicate the cost of full reinstatement following damage. Valuations are from Decision 1291/QĐ-BXD 'Announcement of Capital of Construction Works and Combined Construction Price for Infrastructure' 2017.

Key assumptions in asset valuation were:

1. Bridge valuations used the average investment cost, adjusted for bridge size (as provided in the Decision);

¹¹⁹ Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic (UNDP publication, 2022)

2. Power station valuations also used the average of the investment cost, adjusted for capacity (as provided in the Decision);
3. Transmission and distribution lines used the average of the investment cost;
4. There are some assumptions on location and sequencing of some line-item assets, including transmission and distribution and culverts. Outliers were removed.

Although the methodology described above can be used for each of the selected pilot project cities, the robustness and availability of public asset data per city may vary. The indicative level of granularity of data available per city is yet to be known at this point and will only be understood after discussions with government officials and other stakeholders in the main project phase.

The aforementioned database will need to be housed centrally in the relevant department of MoF (i.e., ISA). However, additional capacity building and support will be required for this to ensure proper and timely engagement of relevant government offices which will own and maintain the databases, in close coordination with provinces and cities.

4.2 PROCESS FOR CITY SELECTION

This section defines the process and the score sheet to be used in the main project to determine a final city list.

A number of factors can drive the choice of cities for the main project, which include:

- *Predominant hazard*: A balance of cities which are each prone to the different types of flood risk (fluvial, pluvial and/or storm surge) and typhoon (wind) prone cities;
- *Social profile*: Larger urban/industrial cities or those dependent upon particular industries (for example tourism or shipping); wealth profile, comparing richer cities with those of a higher proportion of poor and vulnerable citizens;
- *Data availability*: In terms of exposure and vulnerability as informed by past events;
- *Current level of risk understanding or institutional preparedness*: Although broad uniformity is expected, some cities will be able to quickly engage within their existing climate and disaster management frameworks;
- *Willingness/political sponsorship*: Level of engagement within cities;
- *Ability to pay premium*: This will depend on the premium funding model and the degree of compulsion/enforcement. Some cities may be able to pay for the cover they need and may consider other types of insurance cover (for example livelihood protection for the poor and vulnerable or post-event funding for key industrial sectors) to protect its citizens beyond the confines of the 2017 Law;
- *Geographical diversification*: If a pooling structure is considered, the greater benefit will be gained by considering a pilot group of cities that are geographically diversified and, therefore, less likely to be affected by the same event(s).
- *Size*: Ho Chi Minh and Hanoi have been excluded due to their size and number of public assets. This could affect the size of the budget requested for the project. Additionally, if either of the cities were included, either city would dominate the portfolio of any resulting city pool.

For the main project, it is envisaged that through initial discussions with the ISA, a long list of potential cities (likely to be ten cities) will be created. The ranking system will then be used to finalise the list of cities for the pilot, which will be presented to the ISA for agreement.

A weighted ranking system will be used to determine which cities are to be included. Table 9 shows a Pugh matrix which can be used for this selection process. In this case, each criterion is given a score on a three-point scale; the system rewards positive scores more than it penalises negative ones. If the city contributes to improving diversification, data availability, etc., the city is given a positive score. The project would seek to populate such a table with the criteria for selection, their weights, and relative scores agreed on.

Criteria	Weighting	Potential cities and scores*		
		City 1	City 2	City 3
Data availability: exposure and vulnerability informed by past events	2	0	+	0
Social profile	3	0	+	+
Risk understanding or institutional preparedness	5	-	0	0
Willingness/political sponsorship	2	-	0	+
Ability to pay premium	5	-	-	0
Size	5	+	+	-
Diversification factor by predominant hazard	2	+	+	0
Diversification factor by location	2	0	0	0
Total points/score	54	57	71	61
Rank		3	1	2

* Legend:

- +: Good (4 points)
- 0: Average (2 points)
- : Bad (1 point)

*Table 9: Sample city scoring matrix
Source: WTW*

Initial candidate cities identified for this project include Hai Phong, Can Tho, Da Nang, Nha Trang, and Bien Hoa due to their status as municipalities/large cities, their large population, and socio-economic and natural disaster data sets spanning over forty years. It is expected that Hue City will also be in scope if agreed with the ISA. As mentioned earlier, Ho Chi Minh and Hanoi have been excluded due to their size.

The following section describes in detail the social and geographical importance of the initial candidate cities and shows the form of analyses needed prior to the city selection process.

4.3 PRELIMINARY RISK ANALYSIS AND NARRATIVE FOR CANDIDATE CITIES

After the selection of cities and public asset data collection, risk analysis would be a critical component to design a risk transfer solution. This section provides a brief narrative around the social and geographical importance of the initial five candidate cities, their hazard profiles, and key historical events affecting them. In the main project, these factors will be studied in more detail and expanded upon to include other criteria as provided in 4.2 for the selection and prioritisation of cities. Risk maps developed using Guy Carpenter’s internal flood model are provided to demostate the modelling approach and capabilities required to asses catastrophe risk in the selected cities. The main project will employ a more detailed probabilistic modelling approach for each city, the results of which will be used to develop the indemnity or hybrid (indemnity and parametric) risk transfer solutions.

Viet Nam

Flood is one of the main hazards in Viet Nam that frequently causes severe economic losses and casualties. The country has a long coastline of 3,200 km coupled with highly concentrated populations and economic assets located at river deltas and other low lying areas, exposing these areas to multiple hazards such as sea-level rise, storm surges, typhoons, and flooding.¹²⁰

Table 10 below provides the flooding characteristics in the main geographical regions of Vietnam along with the selected cities in these regions.

Geographical regions	Type of Flood	Main River	Tide Influence	Flooding Characteristics	Flood Control Measure	Selected Cities
Mekong Delta	Fluvial and pluvial	Hau river, Tien river	far inland with an amplitude between 3.5–4.0 m from the East Sea, and 0.8–1.2 m from the Gulf of Thailand	slow rising and receding of river water for 2–6 months, and rapidly between July and November	river dikes, drainage, floodwater discharge canals, and sluice gates	Can Tho
South Central Coast	Fluvial	Tra Khuc river, Ve river, vu Gia river, Thu bon river, Darang river	diurnal tid range between 0.2–1.5 m, short reach of tidal influence	short time of concentration, floodwaters rise rapidly, widespread flooding	river and sea dikes, several reservoirs	Nha Trang, Da Nang
North Central Coast	Fluvial and pluvial	Huong river, Han river, lam river, Gianh river	irregular diurnal tide between 1.2–2.5 m	water volume varies greatly year by year, water quantity during the flood season (October to December) constitutes 50–80% of the total annual volume	river dikes, estuarine and sea dikes, reservoirs and lagoons	Hue
Southeast	Fluvial and pluvial	Sai Gon river, Dong Nai river, Be river	the whole area is influenced by an irregular semidiurnal tide range between 1.2–2.5 m the Sai Gon-Dong Nai basin is strongly affected by a daily tidal regime with high water level amplitude	large variation between seasons, water discharge during the flood season (mid-June to November) accounts for 70–80% of the annual volume	River dikes, reservoirs	Bien Hoa
Northwest	Flash flood	Da river, ma river, Thao river	None	precipitation concentrated largely in the rainy season (November to April), flash floods occur together with landslides	River dikes	
Red River Delta	Fluvial, pluvial and flash floods	Day river, Duong river, Thai Binh river, Ninh co river, TraLy river, Ba Lat river, Van Uc river	varies between 0.5–2.5 m, tide influence reaches far inland (1 m of water level amplitude can be observed 120 km from the coast)	water volume in the river varies largely between the dry and wet season; pluvial flooding in Hanoi is mainly caused by local rainfall with strong seasonal variation	river and sea dikes, reservoirs for flow control, pumping stations for water drainage, and sluice gates	Hai Phong
Northeast	Flash flood	Chay river, lo river, gam river, Cau river, Thuong river, bang river, Bac Giang river, Ky Cung river	None	flood waters rise rapidly, peak discharge after 1–2 days of torrential rains	River dikes	

Table 10: Flooding characteristics in the main geographical regions of Vietnam

Source: Nguyen et. al.: Understanding and assessing flood risk in Vietnam: Current status, persisting gaps, and future directions

Using an internal Guy Carpenter flood model, relative flood risk rating maps were developed. The flood risk rating maps are developed using a notional value at 100 m grids. These risk rates are estimated by dividing estimated flood losses at each grid by this notional value. These relative risk rates provides the view of relative flood susceptibility in the country. These maps help in identifying the high and low flood risk region in the country, which in turn would be useful in prioritizing the potential cities as a part of project. As apparent from the map in the figure 14a below, the Mekong River delta, Red river delta, and the coastal regions remain most susceptible to flooding risk. The model will also be used to analyse the risks and asses the flood losses for the specific (or group) of assets class. The analysis results will be used to develop the appropriate risk transfer solution.

¹²⁰ Nguyen et. al.: Understanding and assessing flood risk in Vietnam: Current status, persisting gaps, and future directions

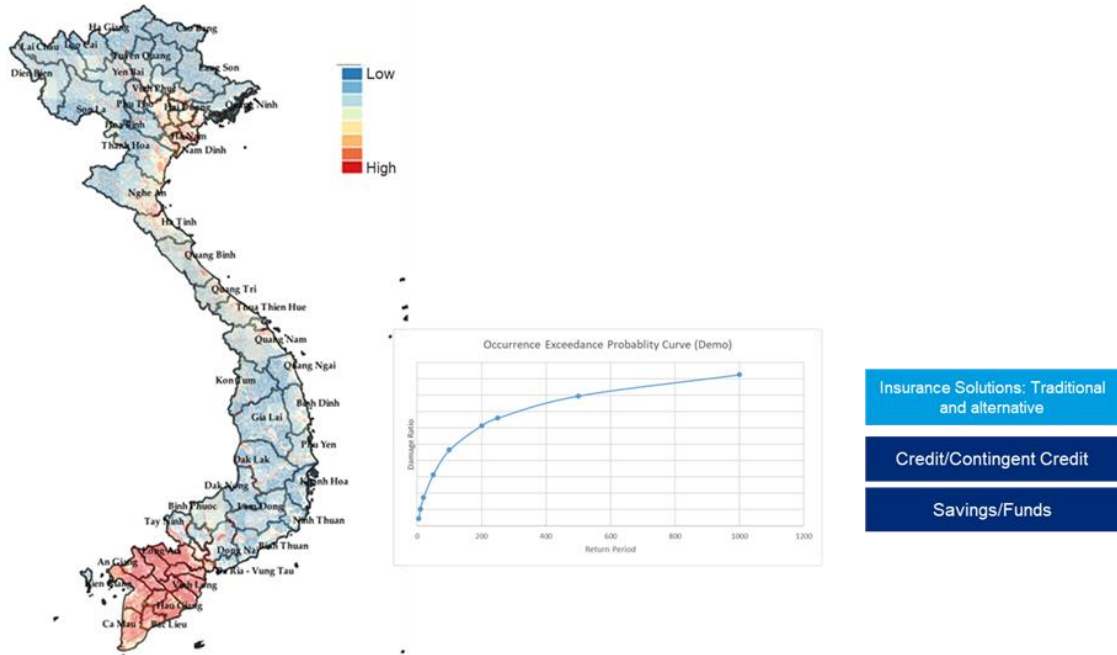


Figure 14a: Flood risk map for Vietnam
Source: Guy Carpenter

Figure 14b below shows an example of the average loss rating and severe loss rating, along with the impact of pooling the provinces. In this example, ratings are estimated using the loss divided by the total asset value in the respective province (note that the example shown is at province level). Here, the asset values, used for loss estimates, are the best estimate of the insurance industry exposures at province level. At this point the public asset data is not available at city level for a city-level analysis. For the average annual loss and 200-year return period, Can Tho shows the rating to be higher; however, the provinces, when pooled together, results in lower loss rating, demonstrating the advantage of diversification and the benefit of pooling the risk. The flood model will be used for the analysis at the individual city level, as well as the combined level. The benefits of pooling of the cities for risk transfer will be explored and the optimised solutions would be developed.

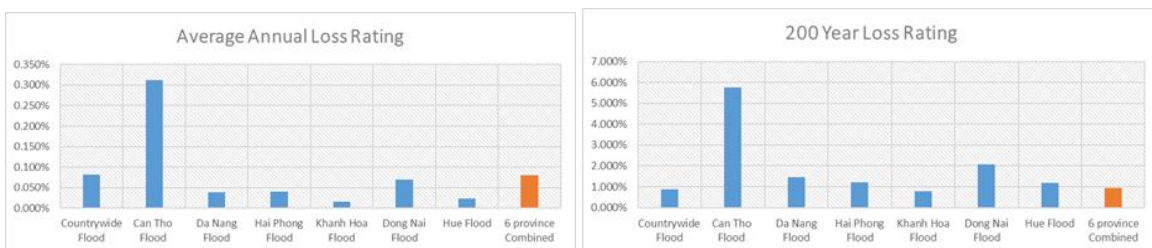


Figure 14b: Average Annual Loss (AAL) and 1 in 200 year loss rating for selected provinces
Source: Guy Carpenter

Historically, several regions in Viet Nam were affected by flooding. The charts in Figure 15 below show the number of flood events and the severity of flooding observed in the selected cities.

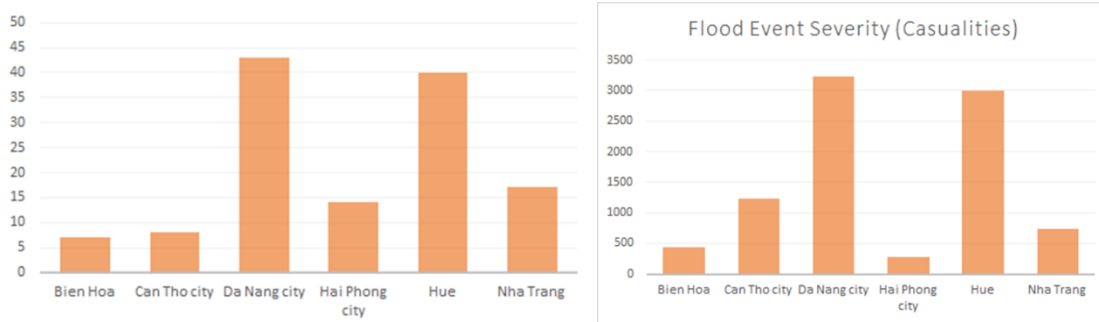


Figure 15: Number of Flood Events in Viet Nam (1985-2020), Severity of Flood Events in Viet Nam (1985-2020)
Source: AXA Climate; Dartmouth Flood Observatory, 2021

Other than regular pluvial and fluvial floods, typhoon is another relevant peril of concern in Viet Nam. On average, Viet Nam is affected by 4-6 land-falling typhoons each year. Figure 16 below shows the distribution of the landfall points along with central pressure and wind speed. The gridded population is also provided. The northern and central part of Viet Nam is more frequented by the typhoons, while the frequency of typhoons in southern Viet Nam is limited. The typhoons do occasionally cause significant damage due to associated flooding.

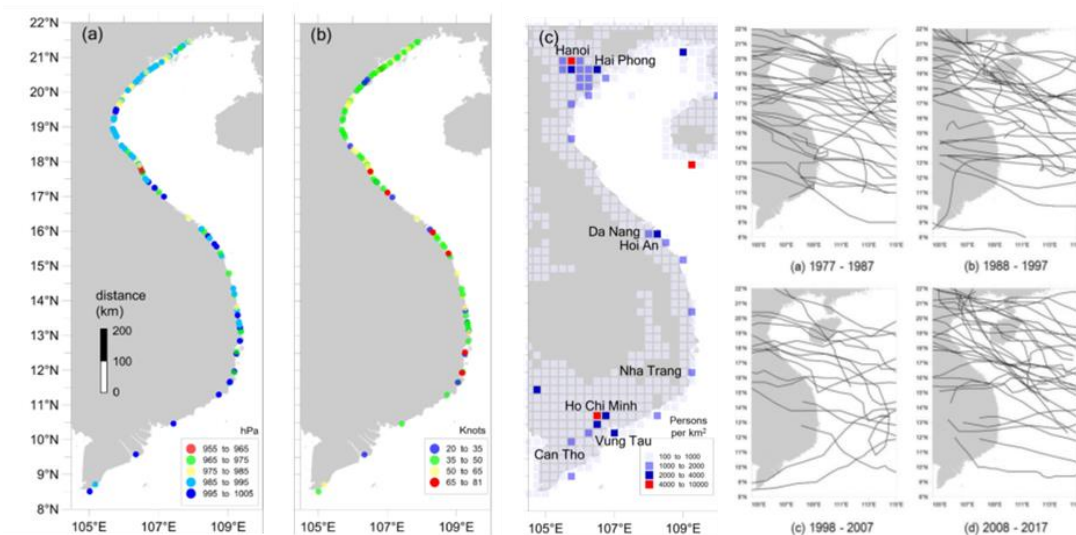


Figure 16: Typhoon landfalls from 1977 to 2017; (a) central pressure, (b) wind speed, and (c) population density in 2015 and the typhoon tracks

Source: Takagi: Statistics on typhoon landfalls in Vietnam: Can recent increases in economic damage be attributed to storm trends

As shown in Figure 17 below, the earthquake risk in most parts of Viet Nam is considered to be low, except in the north-western part of the country and to some extent the Red River Delta region of Viet Nam due to several faults running through the region.

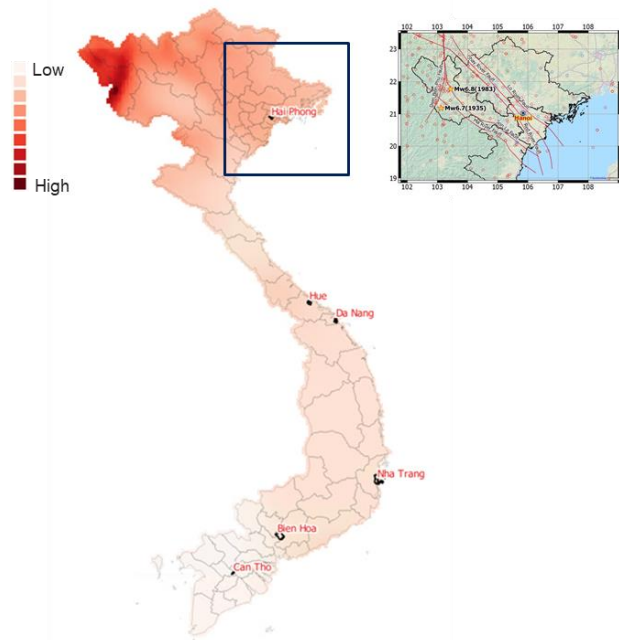


Figure 17: 475-year return period earthquake hazard map
Source: Global earthquake model and AIR Worldwide

Can Tho

Can Tho is the largest city in the Mekong River Delta region of Viet Nam and plays a major role in the socio-economic development of the region. The city development goal includes to shift the economic focus from traditional agriculture to industry, trade, services, tourism, and agro-businesses.

However, the city is affected with chronic seasonal flooding some of which leads to periodic flood disasters. Other disasters include riverbank erosion, saltwater intrusion, possible land subsidence, economic transition, and rapid urbanisation.¹²¹ Floods remains the main peril of concern in Can Tho. The general topography of Can Tho City is quite flat with altitudes ranging from 0.6 to 1.2 m above sea level. The city is affected by two main rivers, namely Can Tho River and Hau River, along with various smaller natural rivers and a dense system of channels. The channel system is connected to the Hau River along the city, which provides fresh water for residential and manufacturing needs as well as waterway transportation through the city.

The protection from flood by the dike system is low, with its main purpose being to protect agriculture from flooding. The residential buildings are located mostly along the roads or right on the banks of rivers and channels. The city is several kilometres inland but due to its flat topography, it is highly influenced by tides. The high tide period in Can Tho City is from September to February. Because of its location next to rivers that are influenced by the tide, Can Tho is affected by different types of flood, which often occur from September to November. Fluvial floods occur mainly in rural and semi-urban areas. Mixed floods resulting from fluvial, tidal and pluvial floods occur in urban areas, particularly in Ninh Kieu, Binh Thuy, and Cai Rang districts. These floods are further influenced by urbanization, encroachment and infrastructure development.¹²²

Land subsidence is also a potential threat to Can Tho. Studies have shown that land subsidence due to sustained long-term drainage and groundwater extraction is occurring in the region. Can Tho authorities

¹²¹ CAN THO, Vietnam, Enhance Urban Resilience, World Bank/GFDRR

¹²² Chinh et al. "Flood Loss Models and Risk Analysis for Private Households in Can Tho City, Vietnam

strongly believe that land subsidence is also threatening their city and, combined with sea-level rise, could lead to worsened seasonal flooding. The relationship between water supply, groundwater extraction, land subsidence, and flood protection is not well understood in Can Tho.¹²³ Figure 18 shows the urbanization rate and the susceptibility of the city due to its topography and flooding.

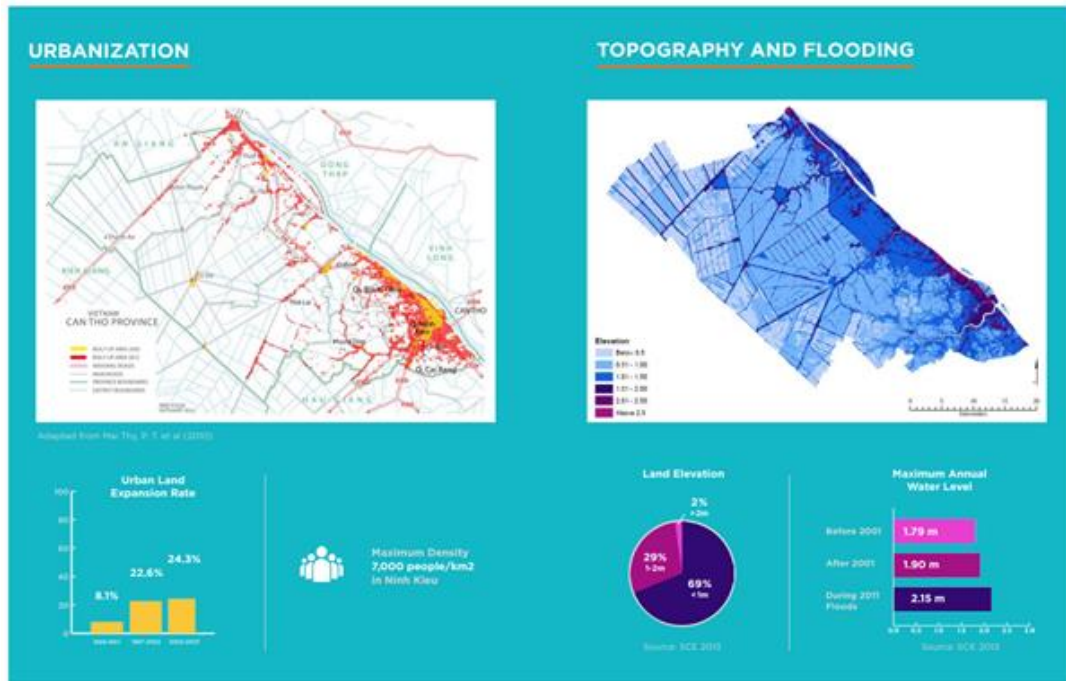


Figure 18: Urbanization and Topography and Flooding in Can Tho
Source: CAN THO, Vietnam, Enhance Urban Resilience

Can Tho’s location in the Mekong River Delta makes it one of the most susceptible cities to flood. The risk map in Figure 19 below shows that the city is located in one of the highest flood risk areas.

¹²³ CAN THO, Vietnam, Enhance Urban Resilience, World Bank/ Global Facility for Disaster Reduction and Recovery (GFDRR)

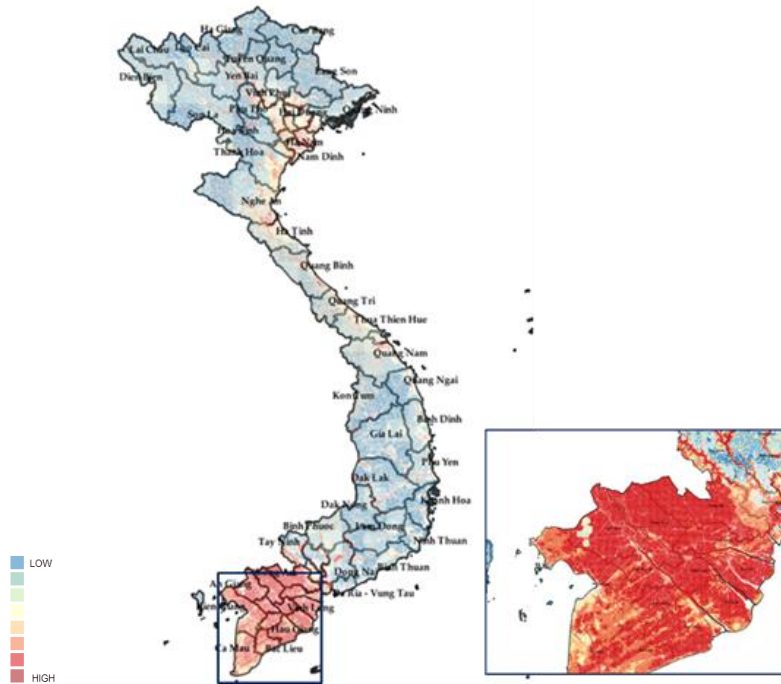
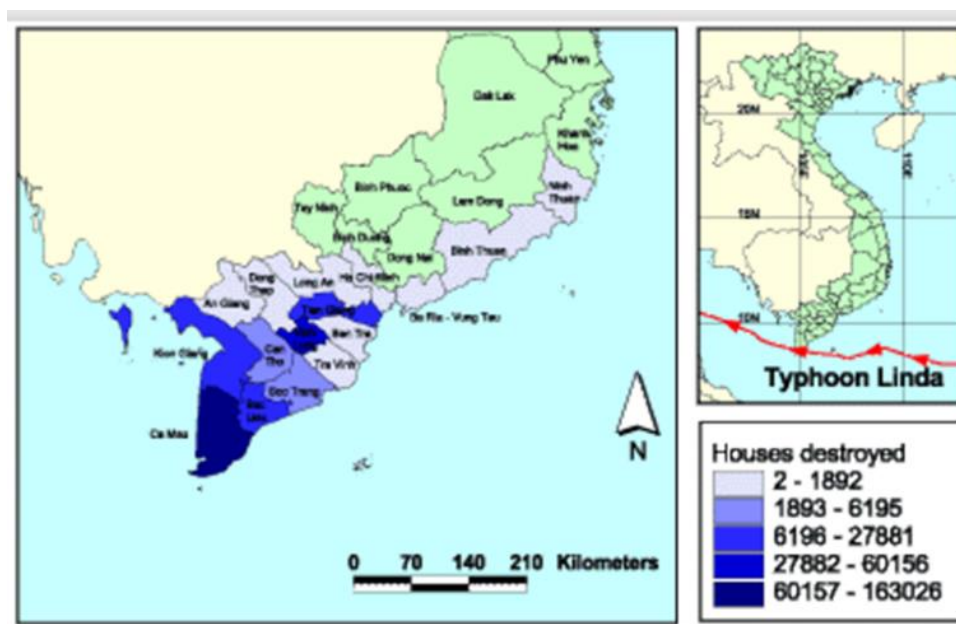


Figure 19: Flood Risk map for the city of Can Tho
Source: Guy Carpenter

Severe Tropical Storm Linda in 1997 remains one of the worst events to impact Can Tho primarily due to the flooding. It was one of the rare events to hit the extreme southern part of Viet Nam in the province of Ca Mau. The events in total claimed more than 3,000 lives, with several of those in Can Tho city (see Figure 21 below), and caused severe damage in the delta and the remote islands (see Figure 20 below) with total damage of around VND 7,200 billion.¹²⁴



¹²⁴ United Nations Development Programme (2003), "Summing-up report on disaster situations in recent years and preparedness and mitigation measures in Vietnam"

Figure 20: Houses destroyed during Tropical storm Linda, 1997
Source: Reliefweb

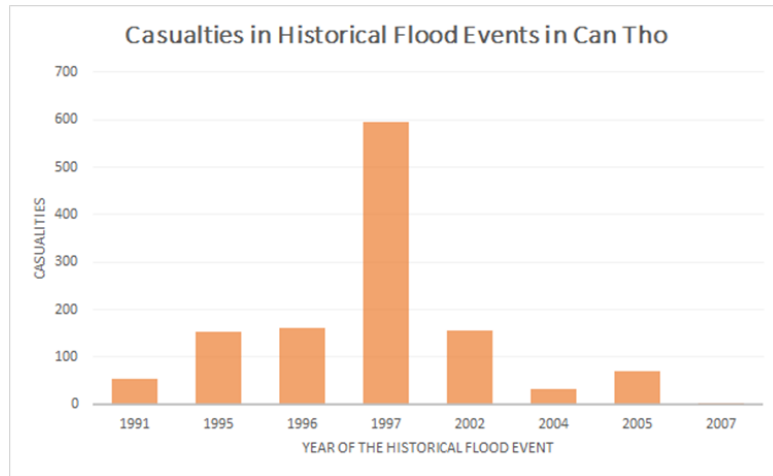


Figure 21: Casualties in the Historical Flood Events in Can Tho (1986-2020)
Source: AXA Climate

Can Tho is located in the southern part of Vietnam, where the typhoon frequency is quite low. However, there have been instances where the city has been affected by severe typhoons and associated flooding. Figure 22 shows main typhoon tracks from NOAA which impacted Can Tho area between 1985 to 2020. Figure 23 shows the frequency of different categories of typhoon impacting within 100 kms from centroid of the city based on the Joint Typhoon Warning Center (JTWC) from 1980-2019.



Figure 22: Main historical Typhoon Events in Can Tho (1985-2020)
Source: NOAA Hurricane Tracker

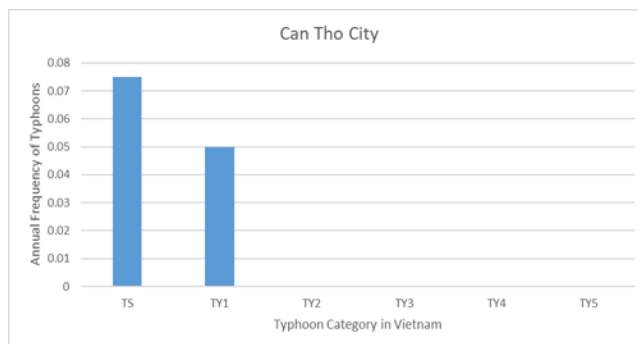


Figure 23: Typhoon frequency for city of Can Tho (1980-2019)
Source: Joint Typhoon Warning Center

Da Nang

Da Nang is one of the major port cities in Viet Nam. Due to its strategic location, the city forms the commercial and transportation hub in Central Viet Nam. With its easily accessible port, at the opening

end of the Han River, Da Nang is the leading industrial heart of central Viet Nam. It has been undergoing rapid urbanisation and industrialisation over the past decade resulting in a steady growth of the economy and spatial structure.¹²⁵ Urbanisation, human settlement and building of the industrial zones and infrastructure along with the decline in agricultural and aquaculture lands have led to the congestion of storm water drainages further exacerbating the flooding in the city.

Da Nang is affected by regular rain-driven flooding as well as flooding due to typhoons which impact Da Nang or the adjoining areas. Da Nang has two separate seasons, namely the rainy season (from August to December) and the dry season (from January to July), with main rainfall occurring in the months of October and November as shown in Figure 24 with the major typhoon events in Da Nang. Due to its location, Da Nang is also affected by typhoons relatively more frequently, with up to two storms or typhoons per year, and with the risk of storm surge. Figure 25 shows the frequency of tropical storms and typhoons impacting Da Nang area.



Figure 24: Key Historical Typhoon Events in Da Nang (1985-2020)
Source: NOAA Hurricane Tracker

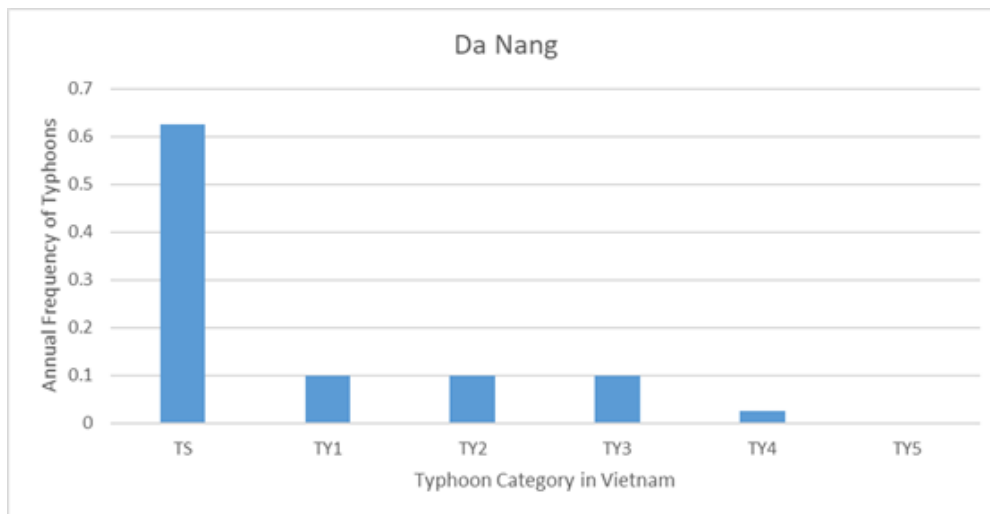


Figure 25: Typhoon frequency for city of Da Nang (1980-2019)
Source: JTWC

As shown in the risk map of Da Nang below, the city is at medium to high risk of flooding, mostly along the city’s coastal region.

¹²⁵ UNDP: Climate Change Adaptation and Disaster Risk Mitigation in Da Nang, Viet Nam

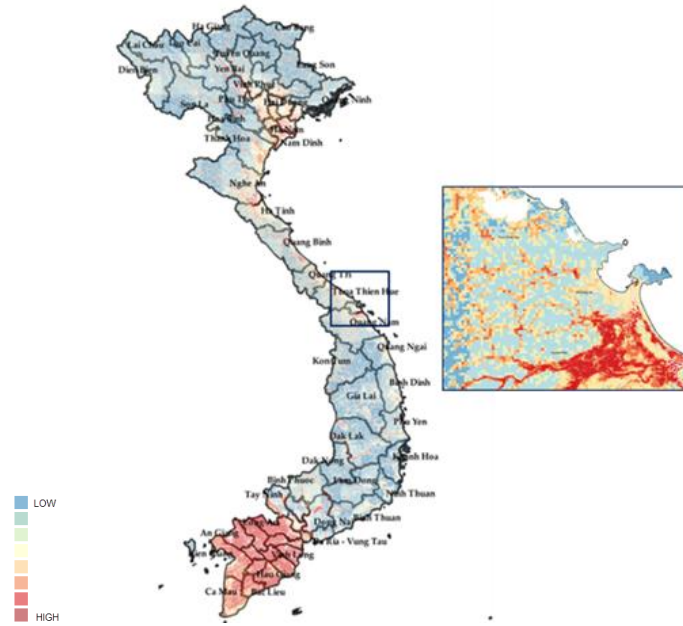


Figure 26: Flood Risk map for the city of Da Nang
Source: Guy Carpenter

The 1999 floods are one of the major floods impacting the city; many districts and communes in Da Nang were affected and damage to property was significant. Two upstream rivers, Vu Gia River and Yen River, caused the overflowing of the Han River. Typhoon Xangsane in 2006 was another major event to impact the city of Da Nang. The typhoon made landfall near Da Nang causing a total death toll of about 71 people, while in Da Nang 26 people got killed. The total damage from the storm was about VND10 trillion and the major structural damage was in the city of Da Nang.¹²⁶ Three years later, Typhoon Ketsana struck Central Vietnam, affecting Da Nang city. These recent events are part of the long history of casualties impacts from flooding in Da Nang as shown in the recorded data in Figure 27.

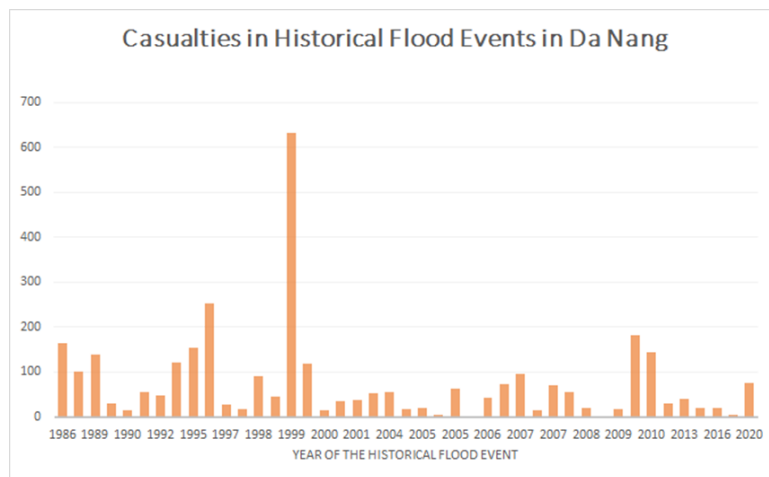


Figure 27: Casualties in the Historical Flood Events in Da Nang (1986-2020)
Source: AXA Climate

¹²⁶ Reliefweb

Hai Phong

Hai Phong is the third largest urban area in Viet Nam with around 2 million inhabitants. 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 located at the mouth of the Cam 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 development 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 Cam 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. Figure 28 shows the casualty impacts due to major flood events in Hai Phong.

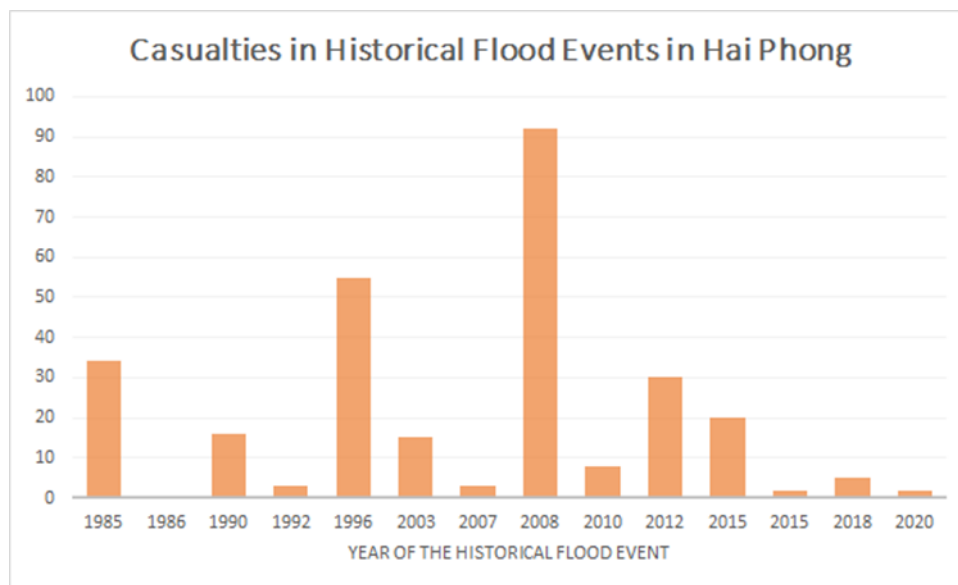


Figure 28: Casualties in the Historical Flood Events in Hai Phong (1985-2020)
Source: AXA Climate

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.¹²⁷ The city is affected by three to five tropical storms and typhoons per year and has been impacted by serious damage and losses in terms of people and properties. Figures 29, 30 and 31 below show the key historical events making landfall in Hai-Phong and the annual frequency of typhoon within 100 km of the city from 1980-2019.

¹²⁷ OECD Report: An Assessment of Disaster Risk Management Policies in Southeast Asia

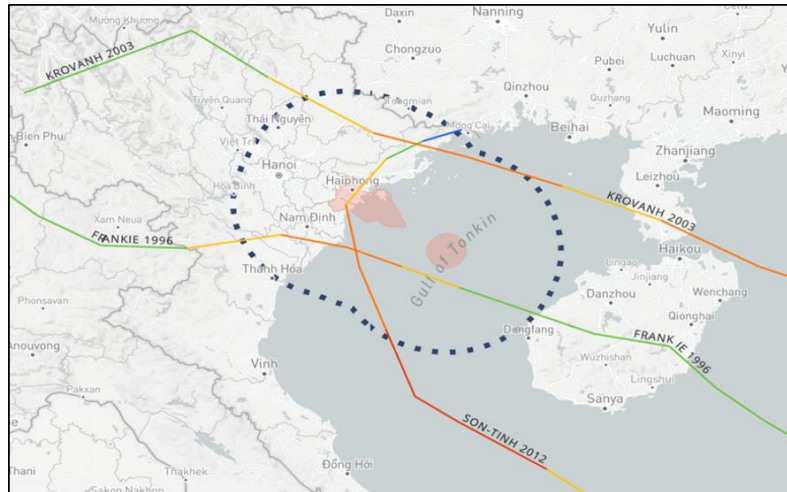


Figure 29: Key Historical Typhoon Events in Hai Phong (1985-2020)
Source: NOAA Hurricane Tracker

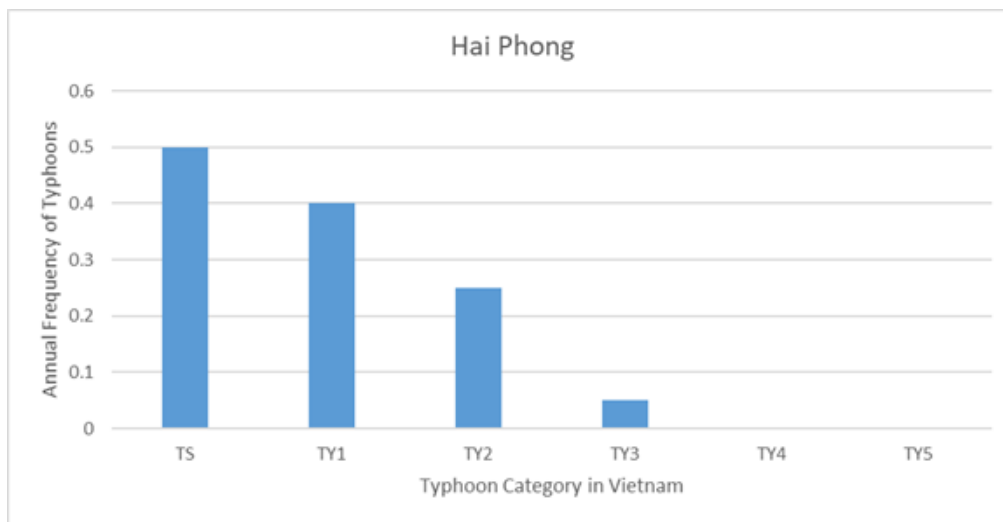


Figure 30: Typhoon frequency for city of HaiPhong (1980-2019)
Source: JTWC

Currently, the river overflow risk is low, but inundation risk caused by storm waters and storm surge is high. Urban flooding is also an issue because of the insufficient water drainage infrastructure.¹²⁸ In 2012, the Son Tinh typhoon caused Hai Phong a loss of property estimated at VND1,000 billion, and the destruction or damage of many businesses and infrastructure, including 63 wrecked ships and 8 collapsed marine management stations.

¹²⁸ Japanese International Cooperation Agency (JICA): Risk Profile Report- Hai Phong of Vietnam

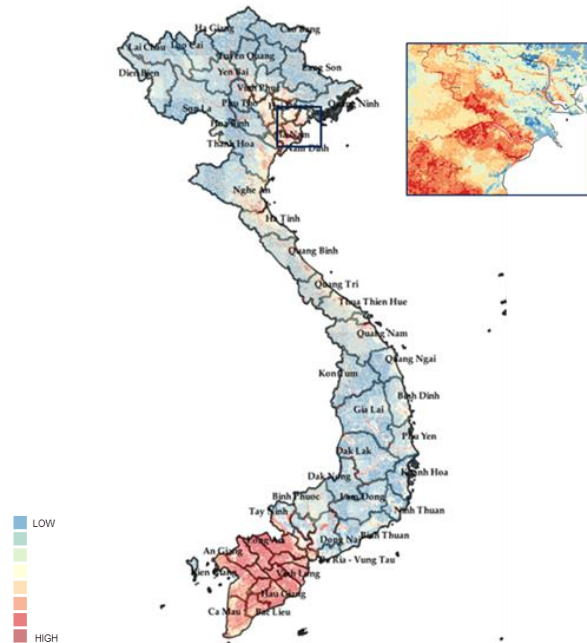


Figure 31: Flood Risk map for the city of Hai Phong
Source: Guy Carpenter

Hai Phong has low to moderate earthquake risk as well due to the presence of a fault system in the region and the liquefaction susceptibility. However, the region has not suffered any damage from any earthquake in past years.

Nha Trang

Nha Trang is the capital city of Khanh Hoa province, which is situated in the south central part of Viet Nam, approximately 500 kilometres northeast from Ho Chi Minh City. Cai river and Cua Be river divide Nha Trang into 3 sections: the North of Cai River, the South of Cua Be River and the inner part of Nha Trang City located between the two rivers. The rainy season lasts from October to December. In these three months, the amount of river discharge is 75-78% of the total river discharge in a year. The dry season lasts from January to September and the total discharge (mainly supplied from ground water) in the dry season is a third of the discharge occurring during the three months of the flood season.¹²⁹

¹²⁹ Khan et al. : Sustainability in the Coastal Urban Environment: Thematic Profiles of Resources and their Users

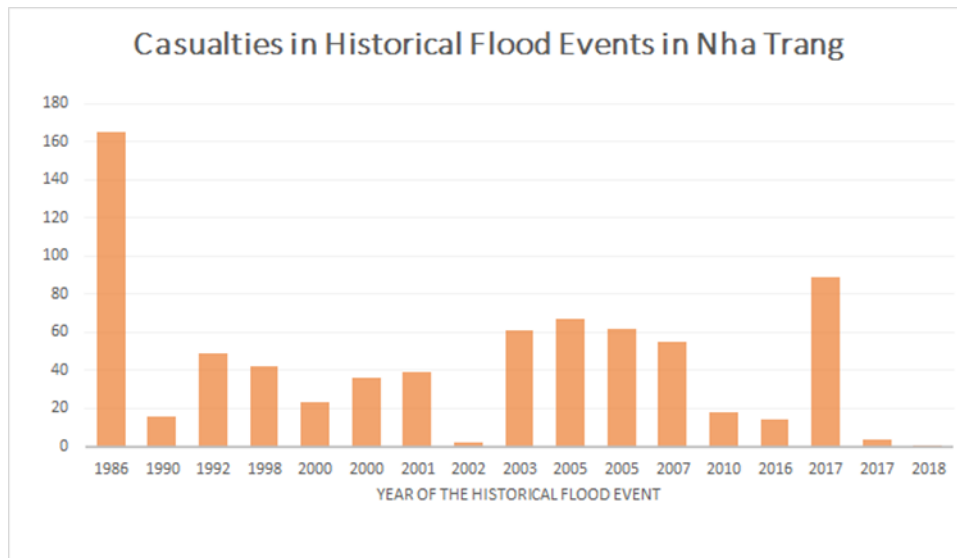


Figure 32: Casualties in the Historical Flood Events in Nha Trang (1986-2018)
Source: AXA Climate

Coastal flooding and flooding due to typhoons remains the largest risk for Nha Trang. The city was severely impacted by Typhoon Damrey in 2017, which affected the province of Khanh Hoa the most, as shown in the figure below. Typhoon Damrey made landfall on 4 November 2017, impacting 15 provinces in the South Central and Central Highlands regions. It directly hit Khanh Hoa province with wind speeds of up to 135 kilometers per hour. Though it rapidly weakened it carried heavy rainfall that caused flooding in 15 provinces. Typhoon Damrey is classified as level 13 in the Viet Nam tropical typhoon scale (equivalent to Category 2 of the Saffir–Simpson hurricane wind scale), and the strongest typhoon to strike Viet Nam since 2001. Damrey is one of the high casualty impact events in the recent years as shown in Figure 32.

Sector	Disaster Effect						Reconstruction Needs		Recovery Needs	
	Damage		Loss		Total		Total		Total	
	VND Million	USD Million	VND Million	USD Million	VND Million	USD Million	VND Million	USD Million	VND Million	USD Million
Social	3,680,768	162.15			3,680,768	162.15	6,895,496	303.77		
Housing	3,680,768	162.15			3,680,768	162.15	6,895,496	303.77		
Productive	145,693	6.42	5,200,727	229.11	5,346,420	235.53	211,255	9.31	1,971,892	86.87
Agriculture			1,495,151	65.87	1,495,151	65.87			635,000	27.97
Livestock	62,152	2.74	7,237	0.32	69,389	3.06	90,121	3.97	13,300	0.59
Fishery	83,541	3.68	2,058,294	90.67	2,141,835	94.35	121,134	5.34	730,000	32.16
Forestry			1,640,045	72.25	1,640,045	72.25			593,592	26.15
Infrastructure	570,436	25.13			570,436	25.13	570,436	25.13		
Irrigation and flood control	409,394	18.04			409,394	18.04	409,394	18.04		
Road Transportation	161,042	7.09			161,042	7.09	161,042	7.09		
TOTAL	4,396,897	193.70	5,200,727	229.11	9,597,624	422.81	7,677,187	338.20	1,971,892	86.87

Figure 33: Estimated Damage and Loss, and Recovery and Reconstruction Needs by Sector from Typhoon Damrey
Source: 2017 Vietnam Post-Typhoon Damrey Rapid Damage and Needs Assessment by KHANH HOA PPC

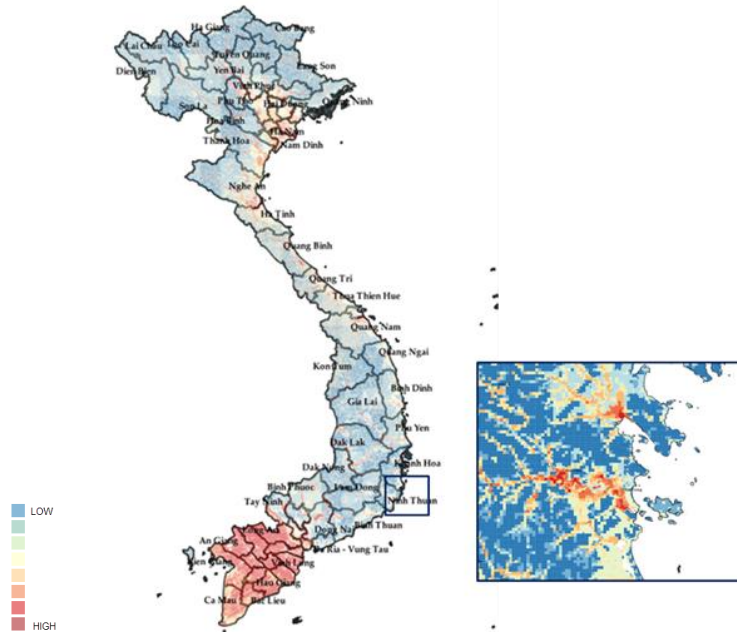


Figure 34: Flood Risk map for the city of Nha Trang
Source: Guy Carpenter

Most of the typhoons impacting the city are of lower intensity, as shown in the figure below, and primarily cause flooding due to rainfall associated with these typhoons.

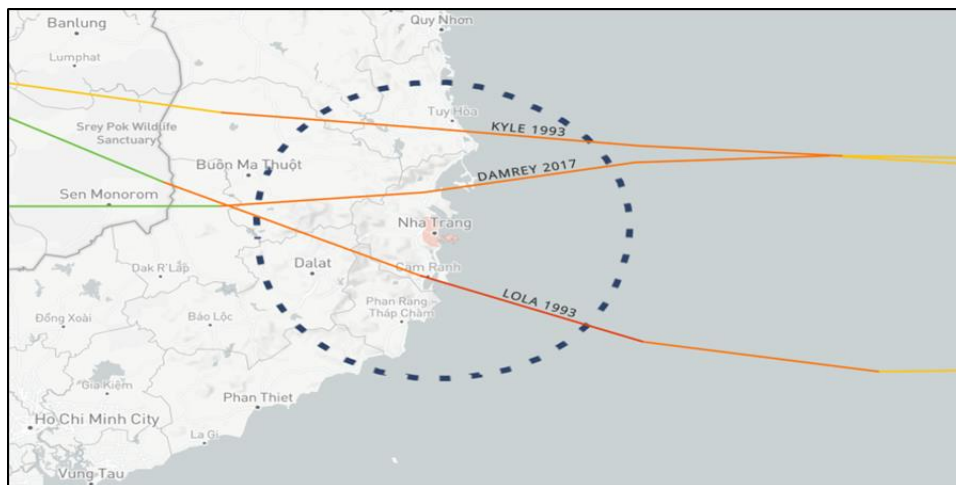


Figure 35: Historical Typhoon Events in Nha Trang (1985-2020)
Source: NOAA Hurricane Tracker

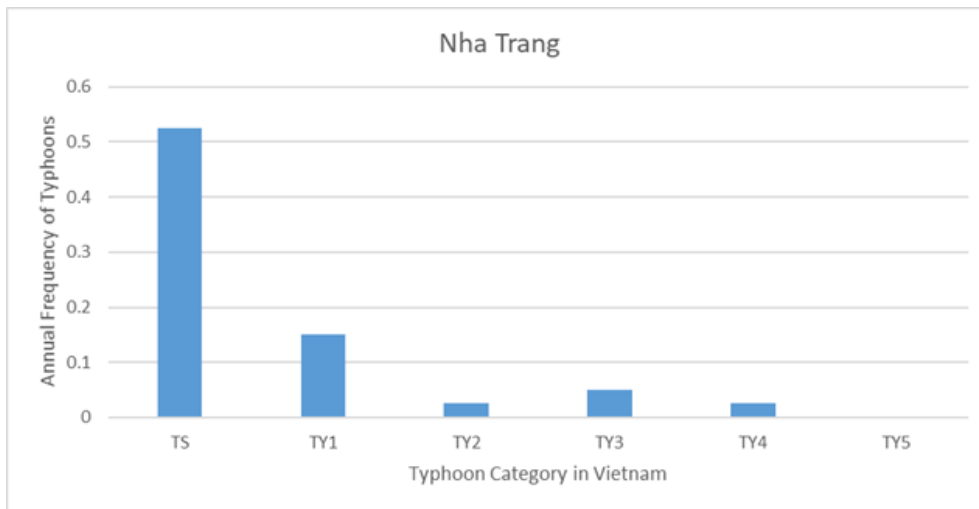


Figure 36: Typhoon frequency for city of Nha Trang (1980-2019)
Source: Joint Typhoon Warning Centre

Bien Hoa

Bien Hoa is the capital city of Dong Nai Province and part of Ho Chi Minh metropolitan area. Bien Hoa has several hospitals and a ceramics school. The city’s industrial park district had industries producing steel, metal products, refrigeration equipment, motorbikes, batteries, paper products, knitted textiles, chlorine, caustic soda, and radios and televisions; after restoration in the late 1970s, the industries extended to manufactured products such as paper pulp, pressed wood, rolled steel, tools, refined sugar, condensed and powdered milk, and tractors. Power is provided by the Dai Nham hydroelectric plant. Older industries include brick, tile, and pottery making and the production of construction stone through granite quarries. The city has a growing population; in 1999, population was 435,400 which grew to 652,646 in 2009 and to over one million according to the latest National Census. This makes Bien Hoa the only non-Centrally governed city with over one million residents.

The main river running through the city is Dong Nai River. The river plays an important role in the development of Bien Hoa City, Dong Nai Province in particular and the Southern Key Economic Zone in general. The major causes of flooding in Bien Hoa are rapid urbanisation, littering, construction works that illegally reclaim canals and drainage systems, and outdated sewage systems.¹³⁰

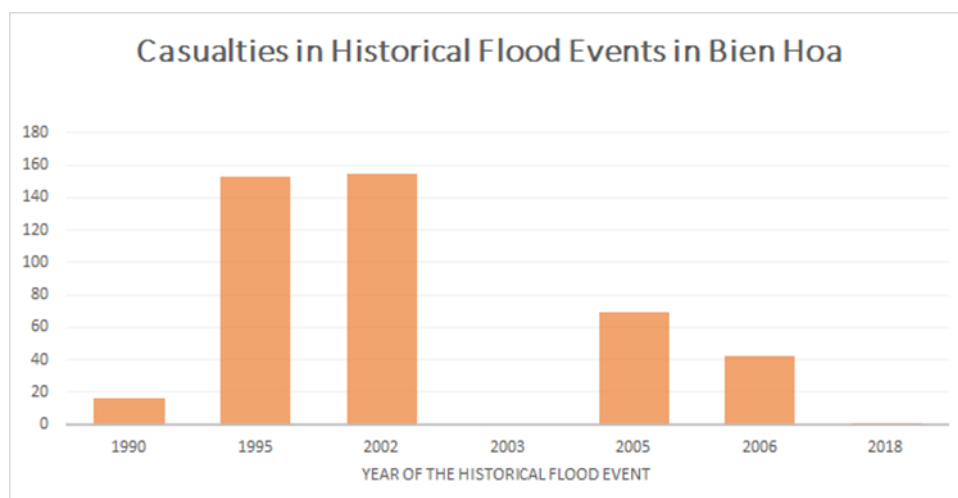


Figure 37: Casualties in the Historical Flood Events in Bien Hoa (1990-2018)

¹³⁰ <https://vietnamnews.vn/society/299116/new-dong-nai-flood-project.html>

Source: AXA Climate

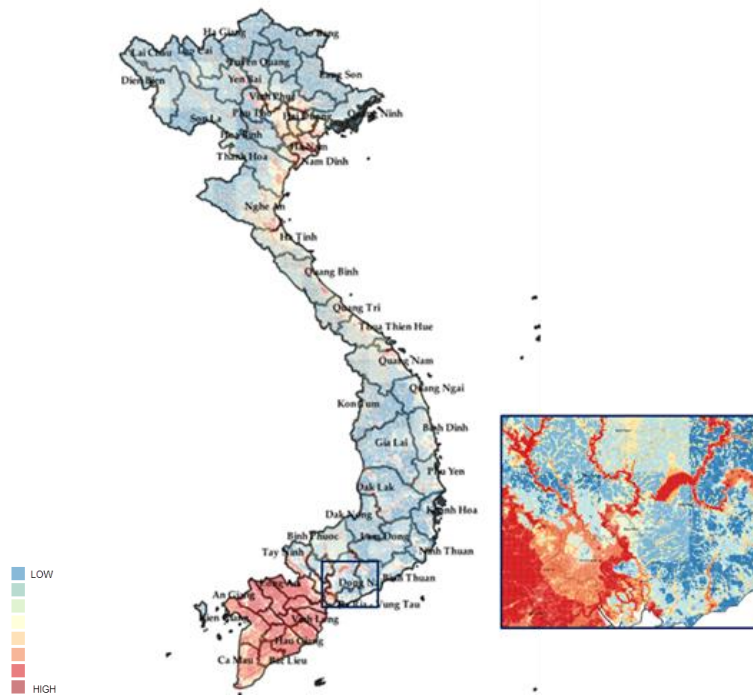


Figure 38: Flood Risk map for the city of Bien Hoa
Source: Guy Carpenter

The city is affected by typhoons, but most of them are the low category events and the widespread damage is due to the flooding associated with these typhoons. Figures 39 and 40 below shows the annual frequency of the typhoon impacting Bien Hoa.

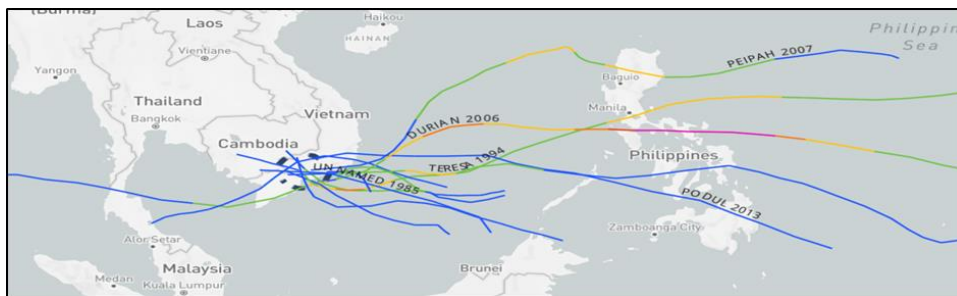


Figure 39: Key Historical Typhoon Events in Bien Hoa (1985-2020)
Source: NOAA Hurricane Tracker

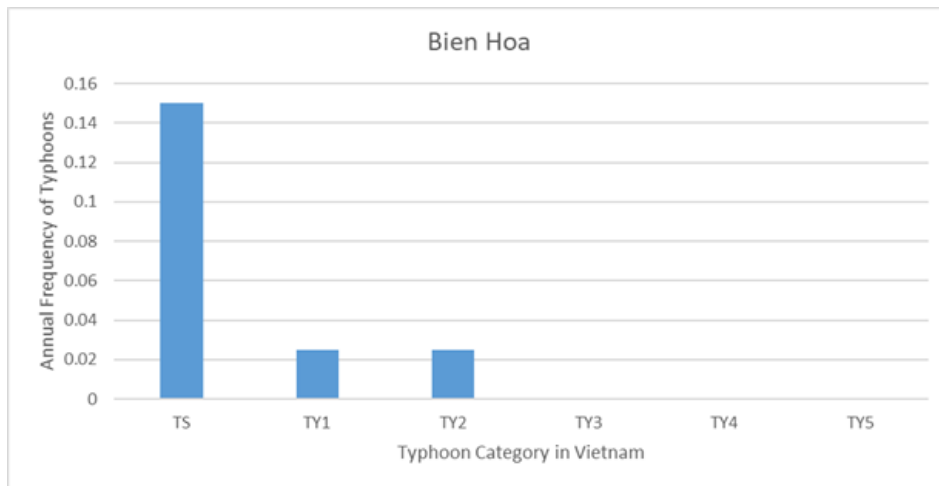


Figure 40: Typhoon frequency for city of Bien Hoa (1980-2019)
Source: JTWC

After a preliminary analysis of the topography of the five initial candidate cities, it could be observed that all of them are in low lying areas, which makes them prone to coastal and inland flooding. Notably, the ones near to the coast are at a higher risk.

4.4 PRODUCT STRUCTURE FOR CITIES

Disaster Risk Insurance

Insurance is a key tool within disaster risk financing strategies for national and sub-national governments. Risk is either retained or transferred with a variety of available instruments. These are illustrated in Figure 41 with insurance as an underlying risk transfer instrument. Importantly, insurance can span the continuum of emergency funding and reconstruction, depending on the specified needs of the entity.

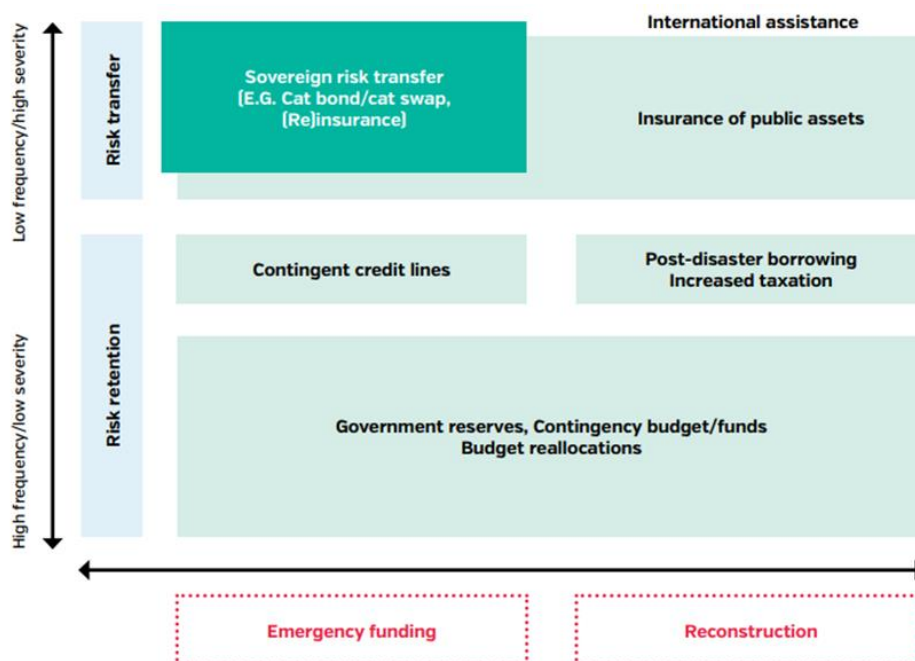


Figure 41: Tiered risk financing and relevant instruments

Source: Asian Development Bank. 2017. 'Assessing Financial Protection against Disasters: A Guidance Note on Conducting a Disaster Risk Finance Diagnostic'. Manila: Asian Development Bank.

Traditionally, disaster (or catastrophe) insurance has mainly concerned property coverage with business interruption/loss of profits insurance as an extension. This is routinely placed on an indemnity basis where the property portfolio insured has an assessed value (i.e., reconstruction cost) which represents the sum insured of the policy. After a disaster, the physical damage is assessed and a payment proportionate to the loss suffered and the terms of the original policy is made.

Recent years have witnessed increased interest, and innovation, in the objective of public sector disaster insurance. Emergency response schemes provide immediate post-event liquidity to governments. Such programs provide financing for appropriate emergency action, such as clearing debris, repairing critical infrastructure and providing emergency shelter. Growing interest is unsurprising given the attractiveness of *ex ante* arranging financing to secure cash flow in light of an exogenous shock.

To enable rapid pay-outs, these insurance products operate on a parametric basis. A parametric policy pays not on proof of a loss occurring but on proof that a pre-defined event has occurred to a pre-defined magnitude. Parametric policies are particularly suitable where objective and verifiable indices indicate the existence of an event (i.e., low rainfall for drought, declared storm category for windstorms). The ability to demonstrable functioning and market acceptability of parametric triggers is widening the art of the possible in insurance for disaster risk financing strategies.

International best practice conceptualizes three stages of post-disaster funding requirements: relief, early recovery, and reconstruction. These are visualized in Figure 42. Parametric emergency schemes target the first ‘Relief’ phase.

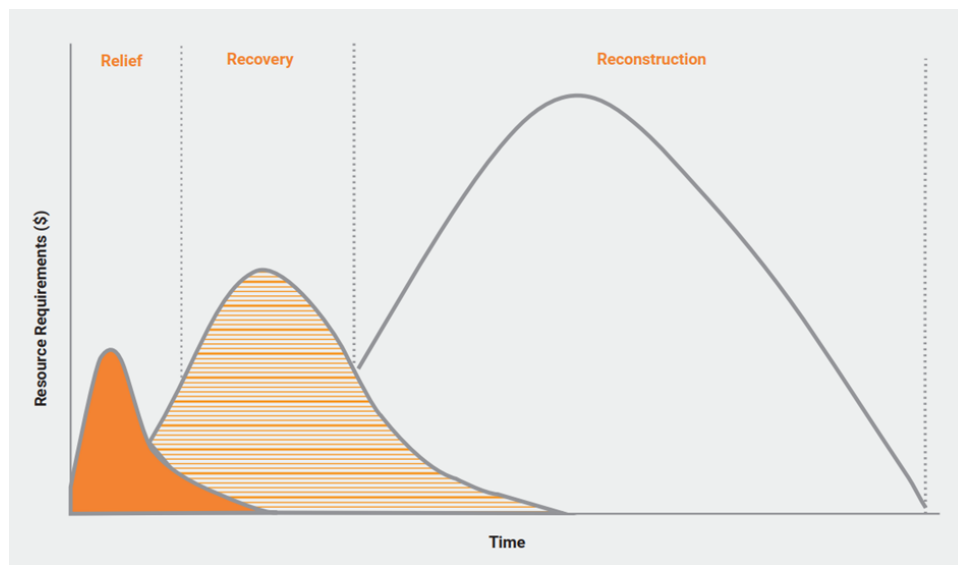


Figure 42: Financing requirements for emergency response

Source: Ghesquiere, F. and Mahul, O. 2010. *Financial Protection of the State Against Natural Disasters: A Primer*, Washington D.C.: World Bank

Traditional property indemnity insurance is well-suited for the reconstruction phase. An indemnification is appropriate for a large portfolio of property and for cases wherein prudent financial expenditure and management, such as on public sector balance sheets, is an overarching priority. Moreover, the government can introduce “build back better” provisions to increase resilience in the future.

Indemnity insurance is faced with the following two major problems in addressing a government’s financing need in the relief and early recovery phase:

- Indemnity insurance depends upon coverage of a defined ‘thing’ of value such as a building. If the building is damaged or destroyed, an assessment needs to be made of the cost of repair

and/or replacement. That assessment takes time, especially after a major disaster when there are many buildings to survey with a limited number of qualified staff and communications and transport infrastructure may not be functioning as per normal. Disputes are common not only concerning the amount of damage suffered and the cost to repair/reconstruct but also on the adequacy of the sum insured, the extent of coverage and the terms and conditions on the policy. For a well-designed, well-implemented policy where generating adequate funds for reconstruction is paramount, these loss adjustment delays are part of the cost of securing the certainty of ultimate, full payment.

- For relief and recovery, this inevitable delay on indemnity insurance claims settlement hinders the primary goal of speedy response. Immediate funding is required to shelter, feed and care for the victims; clear debris; and make emergency repairs to vital infrastructure. There would be additional costs to cities including loss of tax or tourist income, increased staff overtime, creation and maintenance of temporary health and education provision and other costs of enabling a return to normal social functioning. Such costs can be difficult to quantify; additionally, there may be concerns of ‘moral hazard’ as government action can influence the additional costs incurred. but more importantly the funds are required immediately, not at some point in the future. Since acting quickly also reduces the overall impact and cost of the disaster, it is important that funds are available immediately, not at some point in the future. All these factors point to a parametric solution being more appropriate.

It is possible, however, to estimate how much additional funding a (sub-)national government will require after an event of a given size, intensity and/or affected number of people, based upon historic loss data and studies of previous events. Understanding this relationship, plus having a solid understanding of the hazard, allows the creation of a parametric insurance product.

Parametric Insurance

Parametric insurance is a form of insurance that pays not on proof of loss but rather on proof of a defined event occurring. A pre-defined index is defined and the insurance product tracks the performance of the index. If set thresholds are breached (i.e., a Category 2 windstorm), a pay-out is triggered. This objective and verifiable structure means it is typically possible to determine whether a given event meets the criterion for payment very quickly after a catastrophic event occurs. Usually, the underlying data used to determine whether loss occurs are in the public domain. Parametric insurance can then pay very quickly and, therefore, is ideally suited for post disaster relief and early recovery.

The data requirements are much lower compared to indemnity schemes. For example, many public asset insurance programs are hampered by partial data on government buildings; values held are of book values rather than estimates of rebuilding costs and data about building attributes, such as construction, use, and number of stories, is sparse. This is largely incompatible with the information required by an insurance underwriter to model and rate/price an indemnity policy. By contrast, parametric insurance, in its purest form, requires good hazard data (also required for indemnity insurance) and a robust estimate of how much money is required for events of different sizes.

However, new methods do bring risks of their own. Basis risk is the risk that the performance of the parametric insurance does not track the loss experience of the insured. For example, a pure parametric cover may pay if ground shaking during an earthquake at a defined location exceeds a certain threshold amount, or if a tropical cyclone of a defined classification makes landfall on a defined area of coastline. If the event has particularly unusual features, for example, longer duration that causes damage greater than normally expected for an event of that type, it can lead to damage and/or emergency response requirements greater than predicted resulting in a lower insurance recovery, or no pay-out at all, than needed; this is known as basis risk.

Basis risk can be positive and negative as sometimes payment is triggered when actual losses are comparatively low. In the longer term, positive and negative basis risk will tend to cancel each other out, but this is not much comfort to a city suffering a negative basis risk event. It is possible to design a parametric policy with a bias to positive basis risk, but as that policy will pay more often, its cost will

be higher. Parametric insurance contracts can be designed to minimize basis risk; partially this can be achieved by using historical loss data to better understand the relationship between event parameters and loss, although data will always be sparse and sample error can mislead. There is a temptation to increase the complexity of a parametric trigger in an attempt to minimise basis risk, but greater complexity to contract structures inevitably leads to greater modelling needs and, therefore, cost. More importantly, it can also lead to a loss of transparency, potentially leading to “political basis risk” where the buyer does not fully understand the cover. However, the core advantage of speed of payment of parametric insurance remains.

It is often said that indemnity policies have no basis risk, but even in indemnity policies ultimate payouts may not meet expectation or need. Onerous policy conditions and warranties can prevent or reduce payment, for example, due to underinsurance.

The choice of indemnity versus parametric insurance depends on the balance between importance of certainty of payment and speed of payment. Hybrid solutions are possible; indemnity and parametric solutions can be combined into a single policy or linked policies, where the parametric section/policy provides immediate funding (albeit with some basis risk) whilst the indemnity section provides the ultimate certainty of full payment (subject to adequate sum insured and policy terms).

Forms of Parametric Insurance

There are many forms of parametric insurance, the broad categorisation of which is set out in Figure 43. The simplest form of parametric insurance is a pure parametric cover, for example, a ‘cat-in-a-box’ cover. If a defined disaster occurs within a certain defined area (for example the track of a tropical cyclone of category 2 or above passes within 25 km of the centre of a given city), then payment is made; otherwise, there is no payment. The advantage of this form of cover is that it is easy to understand and monitor. The disadvantage, however, is that basis risk could be significant. To illustrate, a tropical cyclone with low windspeed can still cause immense damage if it is associated with heavy rainfall and a severe storm surge. A simple cat-in-a-box index would not respond to such event subtleties. Nested cat-in-a-circle structures could also be used to reduce the basis risk.

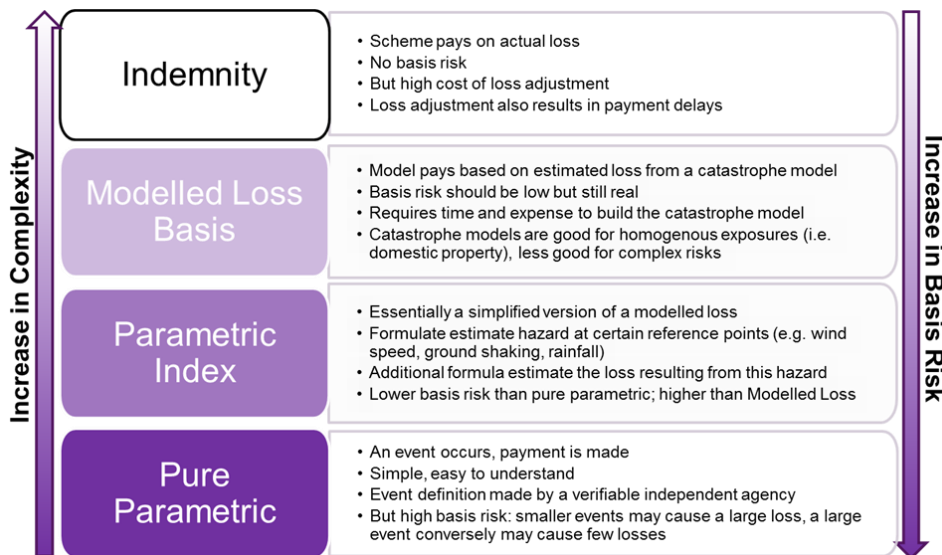


Figure 43: Comparison of insurance policy types: complexity against basis risk
Source: WTW

The most complex form of parametric insurance is known as ‘modelled loss’. This uses a complex probabilistic disaster model (otherwise known as a catastrophe model) to calculate the likely losses and, therefore, a common base for pricing traditional indemnity disaster insurance. Rather than the model

guiding on the likely impact of a loss (as in indemnity), the values produced by replicating a real event in the model are directly used to calculate parametric insurance pay-outs. Hence, the term 'modelled loss' is used.

CCRIF SPC, formerly the Caribbean Catastrophe Risk Insurance Facility or CCRIF, is a regional emergency response facility operating in the Caribbean and Central America, indeed the first such multi-sovereign parametric facility. CCRIF uses a modelled loss basis for its tropical cyclone and earthquake insurance. If a hurricane or earthquake occurs, the key attributes are entered in the model and a property loss estimate is obtained, which is the basis of a formulaic estimate of government response cost needs. This estimate of government cost needs is the basis of the pay-out a policyholder government will receive. For example, a government may decide to buy cover for tropical cyclones worse than it would typically experience every 10 years and the estimated property loss for that event may be USD50 million. If an event in the policy term generates a modelled loss of greater than USD50 million in the model, then an insurance recovery payment is made.

Modelled loss contracts should have low basis risk; indeed, CCRIF has suffered few basis risk events in its 14-year history for tropical cyclone or earthquake. However, this comes at a cost since an expensive, detailed probabilistic catastrophe model must be developed or licensed. If the government of a client country does not fully understand the kind of event that will trigger a loss, a 'political basis risk' event may occur, wherein a government does not fully understand the insurance cover it is buying. The government may thus make statements to its citizens that ultimately turn out to be untrue, placing acute political pressure on the facility.

An alternative is a halfway house between pure parametric deals and a modelled loss, which is a parametric index. Instead of using a model to attempt to more accurately account for the complexities of event intensity and impact, a published formula is used. For example, ground-shaking for an earthquake could be averaged by population over a geographic area; that weighted average ground-shaking is the trigger for the parametric cover. All formulae used for the trigger calculation are laid out in the policy document rather than hidden in a computer model. In truth, there is significant scope for parametric index covers to vary between the simple and the complex. Nevertheless, they do offer greater transparency and, if properly structured, can be easier to understand and to explain to stakeholders.

The 'correct' form of parametric trigger will depend upon the requirement, the sophistication of the buyer, and the availability of the data. Some forms may be more attractive in certain jurisdictions or to (re)insurance or capital markets, which would have price implications. Certainly, advice on structuring any parametric deal should always be obtained from unbiased market practitioners rather than ultimate risk takers, who invariably will have a conflict of interest.

Some hazards are better suited to a parametric approach than others. For tropical storm, maximum wind speed is well-correlated with damage. The case is similar for earthquake where local ground-shaking is a strong driver of loss. Flood is a more difficult hazard to model since it can be caused by multiple types of events, for example, coastal storm surge from a tropical cyclone, river or fluvial flooding for land near rivers, and intense flash flood overwhelming drainage systems in cities. For a low-lying coastal city on a river, all three can occur simultaneously or sequentially. There is no one single factor well-correlated to flood loss; maximum flood depth is popular, but water contamination, salination and speed of floodwaters, which are not necessarily captured at appropriate resolution and time-interval, are all influential as well. This is in stark contrast to windstorm events which are relatively monitored by satellites. Remote sensing for flood events is improving rapidly, but floods remain to be the most complex peril to model.

Floods are also subject to man-made forcing with planned or unplanned release of water from dams and reservoirs causing localized or widespread damage beyond what is anticipated or planned. These complications make the design of a parametric flood insurance product more difficult. Most frequently, this is done on a modelled loss basis, which requires the development of a credible flood model which robustly captures such concerns. Complex and innovative solutions for flood parametric covers are emerging. The SEADRIF parametric insurance covering Laos aptly demonstrates the complexity of modelling flood. The cover uses a combination of satellite imagery, on-ground data measurement, and catastrophe modelling to trigger the policy, and, via the catastrophe model, a means to rate the policy.

Policy issuance was delayed due to the complexities of this approach and the need to make reinsurers comfortable with the process.

An alternative solution is to revert to the ultimate, predominant cause of flooding, which is excess rainfall. It is highly possible to develop a parametric index cover which includes rainfall within river catchments as a reasonable proxy for loss or cash requirements after a disaster. This would simplify the calculation method and temper some of the outlined concerns.

What is Appropriate for Cities in Viet Nam -- Indemnity or Parametric or Both?

The 2017 Law on Management and Use of Public Property allows either indemnity or parametric insurance for public assets. However, two factors suggested that for building assets, especially, indemnity insurance is more appropriate:

1. Parametric insurance for catastrophe risk is not well-established in Viet Nam. Little risk is likely to be retained by local insurers, with the majority of risk being transferred to the international reinsurance market instead.
2. Procedures, process and policy forms are well-established for insurance of public buildings against fire, explosion and other perils. All risk policies for all risks, including natural catastrophes are widely available, with policy wordings established.

This would suggest that the path of least resistance will be to build upon existing capacity, policy forms, and procedures to extend public building insurance to cover typhoon and flood.

However, parametric insurance has attributes which, as seen in the ADB's Hue project and another ADB project in the South Central Provinces of Viet Nam, show appeal to Vietnamese cities and provinces. Discussions with Hue City government officials have shown a general dissatisfaction with the slow speed of indemnity payments and frustration with disputes over payment that can arise. Whilst parametric insurances are not certain to trigger for a major loss event, when the insurances do trigger, there is absolute certainty of the amount and timing of the claim very quickly after the event. The speed of payment also allows shortfalls in local and central reserves to be topped up quickly to enable a timely and efficient emergency response.

Parametric insurance can also be applied to infrastructure where traditional indemnity insurance may be difficult to obtain or where losses are difficult to assess. Such infrastructure includes historical monuments and horizontal infrastructure (for example roads).

Physical infrastructure damage and associated repair/replacement costs can be a small part of the overall human and economic impact of natural disasters. Restoring power and/or water infrastructure quickly by temporary emergency repair is critical as it saves lives and livelihoods; rebuilding hospitals and schools is less important than having the funding to continue to offer full health and educational services in the immediate aftermath of a disaster event and its recovery and rebuilding period. Similarly, for historical monuments, immediate action is particularly important to minimise damage to the irreplaceable.

Parametric insurance can also provide loss of income or additional cost of working. These factors can be difficult to calculate for governments given the actions of the government can influence the amount of the loss, which are a moral hazard issue for insurers and a matter of social imperative for governments. However, it may be possible to use historical events and/or planning data to estimate, for example, post-event lost taxation revenue, overtime and material costs, and/or loss of ticket receipts from historical monuments.

Proposed placement for Hue City

Whilst parametric insurance is not yet widely applied in Viet Nam, it clearly has much to offer. The

ADB Hue project aims to develop both indemnity and parametric programmes for Hue City, with the indemnity programme focusing on buildings and bridges and the parametric programme on emergency response. This not only provides valuable cover but also tests the ability to model, structure, and place both forms of insurance.

For the ADB Hue project, note that a relatively simple parametric structure, a nested cat-in-a-box structure for typhoon, was chosen. The reasons for this are threefold:

- The parametric structure suggested is similar to one already tested in the private insurance market and, therefore, meets regulatory approval and is known to the market.

The parametric product is open and transparent. For a market new to parametric insurance, a product which operates and pays (or does not pay) in a very transparent way is preferable to a more complex one which may still suffer basis risk but is effectively unverifiable by the client.

The product is well-known to insurance markets; hence, it likely to be well-priced with considerable competition from reinsurers to back the cover.

As flood is the predominant peril for Hue City, a parametric flood insurance trigger would be ideal, so that Hue City receives the benefits of both indemnity and parametric covers. For the test of concept, a simple, reliable, and relatable trigger is preferred to an experimental one. However, since appropriate data modelling is currently not available for a reliable flood trigger, a parametric flood insurance product for Hue City was not developed during the ADB project. Should additional resources necessary to conduct appropriate flood data modelling be provided for this IDF project, the potential to develop a robust flood trigger appropriate to each city will be explored.

Appropriate Amount and Probability of Payment of Cover

When considering appropriate levels of cover, it is important to understand the forms of existing post-loss funding available and how fungible they are. Typically, parametric buyers buy policies that attach, i.e. begin to pay, at around the 1-in-10 year return period level; paying is full for events that may be modelled for anywhere between 1-in-50 and 1-in-250 year events. Since parametric and indemnity insurance are used primarily for different purposes, their respective attachment points would typically differ from each other.

Clearly, the more frequently a parametric policy begins to pay out and pays out its maximum amount, the higher the premium will be, either as cash sum and/or as a rate to its sum insured (maximum payout). In reality, the cost of cover will often inform how much the insured chose to retain either as a deductible under an indemnity insurance or as the attachment point of a parametric cover.

In the Philippines, the ADB worked with the Philippines government to define a city insurance scheme in 2018 (to be implemented in 2022). It was observed that richer cities tended to ask about the cost of the insurance they would need whilst poorer cities tended to ask about the amount of cover they could get for a certain amount of premium within their budgets. In either case, it is important to understand the size and probability of events that will exhaust available local reserves and/or need liquidity before aid arrives and the available fund that a city has to pay for premiums.

Split of Premium between Indemnity and Parametric

The ADB Hue insurance purchase will be donor-funded as a test of concept. The split of cover between indemnity and parametric cover is driven primarily by the expected cost of the indemnity cover for identified high-risk, high-value buildings and bridges; this will test if insurance can be purchased for key government assets. Money remaining from the total donor-funded budget will be put towards parametric cover (as a separate policy), a true proof of concept within the Vietnamese market. Clearly, where premiums are funded from city budgets, needs and local priorities around emergency response versus reconstruction should dominate the split, given legal requirements are met.

Considerations for Practical Implementation

The Hue pilot test aims to provide cover for Hue over a period of up to two years. However, for longer term stability and viability, premium funding sources need to be identified and prioritized.

In Viet Nam there will be a legal requirement to buy cover, which will drive a minimum take-up, likely to be indemnity cover in the first instance. However, the legal minimum may not be the optimal purchase for each city, its economy, and its people, particularly the poor and most vulnerable. A process of engagement with the city and its key stakeholders, especially those responsible for finance and emergency response, would be key, as it is important to fully understand the financial resources of the city and its ability to respond, partially demonstrated by the availability of elaborate emergency response functions, control rooms, and early warning systems. It is vital to engage with these stakeholders considering their invaluable knowledge of local circumstances, and the importance of integration, which is a common theme in discussions among Viet Nam's city and provincial governments and the ADB. For example, local hydro-meteorological expertise needs to be recognised and experts' views (and possibly data and modelling) must be taken into consideration, both at national and sub-national levels. Most importantly, it is vital that any proposal does not look like a product imposed by consultants but a solution that is owned and deemed important by the city; only then can such a solution have long-term viability. One cookie-cutter approach across all cities cannot work; while there will be standard policy forms and common modelling and methods of assessment applicable for all, each city will have different needs and priorities that will need to be understood and considered.

Long-term viability will also be assisted by taking a coordinated approach. CCRIF SPC shows the value of collaboration, which, in CCRIF's case, was between Caribbean and Central American governments. Governments prefer budget certainty and do not like costs increasing unexpectedly considering the difficulty of finding additional funding during a fiscal year. Insurance pricing can be volatile, especially after a period of losses or a fundamental assessment of the true level of risk (this often follows a series of major losses). CCRIF has been able to demonstrate its ability to hold prices steady for client countries after loss events; while this is partially due to its collectivist approach and its buying power in the reinsurance market, it mainly due to CCRIF's ability to use its own capital to smooth out market distortions. A collective and collaborative insurance purchase would gain some of these benefits, but the creation of some form of pooling facility, capitalized by concessionary loans, may offer the optimal solution. However, such pools are significantly more complex and take much longer to create as was found in the Philippines.

As mentioned earlier, the long-term stability of any solution will depend on local ownership which will necessarily mean a transfer of knowledge and expertise. Whilst there is deep expertise at national and local levels in typhoon and flood hazards and risk management, there is less appreciation of the methods used by insurers to assess risk against return and the importance of disaster risk management, in all its forms, in building resilience and protecting the vulnerable. Capacity building will need to be at the heart and centre of any programme.

4.5 CONCLUSION

Viet Nam is exposed to typhoon and, especially, flood risks (fluvial, pluvial and storm surge, separately and in combination), which are likely to become more frequent and more severe with climate change. Although Viet Nam is a fast-developing country, parts of its population remain vulnerable to the impacts of a severe natural disaster. Developing insurance penetration is known to improve the resilience of such communities.

A number of factors will be considered when selecting the final cities for the project, including predominant hazard, social profile, data availability, current level of risk understanding or institutional preparedness, ability to pay premium, geographical diversification, and size. Through initial discussions

with the ISA, a long list of potential cities will be created. Through a weighted ranking system following the Pugh matrix format, the final selection of cities will be determined and presented to the ISA for agreement.

There are no existing comprehensive country-wide or city-specific databases of public assets in Viet Nam. The public asset data collection methodology used in the ADB Hue project can be used for each city. However, the indicative level of granularity of data available per city is yet to be known at this point and will only be understood after discussions with government officials and other stakeholders in the main project phase.

Indemnity insurance may be more appropriate for building assets in Viet Nam given that capacity, policy forms, and procedures for insurance of these assets against fire, explosion, and other perils exist and can be extended to cover typhoon and flood. Parametric insurance can be used for infrastructure where traditional indemnity insurance may be difficult to obtain or losses may be difficult to assess, e.g., historical monuments and for emergency response. It can also be used to quickly fund reliable delivery of full health and educational services, crucial in the immediate aftermath of a disaster.

Taking a coordinated approach, through collaboration among cities, is important to ensure long-term viability of public asset insurance cover, as seen in the creation of CCRIF SPC, a collaboration among Caribbean and Central American governments. The creation of a similar pooling facility for cities may be explored as an optimal solution albeit in the longer term as this facility is more complex and would take much longer to create.

Significant expertise in hydro-meteorological hazards and emergency response exist in Viet Nam, in government (both national and sub-national) and in the growing private sector. The insurance sector continues to develop but still lacks experience in parametric insurance. Quality of hydro-meteorological data is improving both at national and provincial levels. Catastrophe modelling is beginning to be established in the (re)insurance industry in Viet Nam although there is yet to be a freely available open-access model.

The time is ripe to build upon the experience of the ADB in Hue City to help the central government in Hanoi and sub-national governments in cities and provinces to put the law on management of public assets into operation; and to work towards developing a disaster risk insurance solution that is owned and deemed important by the city and addresses the city's unique needs and priorities. Building upon the ADB experience in Hue City, for longer term stability and viability of such a solution, premium funding sources will need to be identified and prioritized. The major prize of a public asset disaster risk insurance programme is not compliance but the greater resilience that a well-structured insurance programme, with indemnity and parametric elements as appropriate, will bring to the government, economy, and, most importantly, the people of Viet Nam, especially the poor and vulnerable.

Similarly, the methods of risk understanding and risk analysis developed in the (re)insurance industry over the past 40 years need to be shared more broadly with governments and the insurance industry in Viet Nam. This can only be beneficial for both parties, each building on the expertise of the other. Insurance stochastic modelling can provide a framework to assess the optimal strategies to manage, reduce and, where necessary, transfer risk, and thus help create a more resilient, safer population.

5. RECOMMENDATIONS FOR PHASE 2

The most relevant requirements for the disaster risk transfer solution are presented for the technical design of the product, in the selection of the target group, for governmental engagement and other relevant issues for the government and facilitate the participation of other insurance companies.

5.1 List of main requirements/necessary changes to be fulfilled by a new scheme to successfully address the challenge in Viet Nam.

(i) Willingness on the part of national and local government officials to support the main project:

Hue City has clearly indicated their interest in pursuing an insurance solution to transfer disaster risk in respect of selected public assets. Two workshops were also held with Can Tho City officials in the lead up to the feasibility study led by the Climate Change Coordination Office (CCCO) of Can Tho including a final workshop on 3 November which included a presentation by ADB, WTW, and Hue City officials about the Disaster Risk Finance Project for Hue City. The workshop culminated in a Letter of Interest issued by the People’s Committee of Can Tho City on 24 December 2021 declaring their support to a proposed ISF funded Public-Private Partnership project led by the IDF (Appendix 1). Furthermore, Da Nang city Commanding Committee for Natural Disaster Prevention and Control, Search and Rescue and Civil Protection (the CCNDPC/SR) has issued a letter of support to the UNDP indicating their interest in exploring disaster risk insurance for public assets (Appendix 9). In addition, UNDP’s engagement with the Insurance Supervisory Authority of Viet Nam (ISA) and Ministry of Finance (MoF) has been successful in bringing to the agenda of the Central Government of Viet Nam the matter of natural disaster risk financing measures, including disaster risk insurance, to be implemented at a national level. In this regard, ISA/MoF have reviewed the Concise Concept Note jointly developed by UNDP, ADB, KfW, and IDF industry members on 21 October 2021 (Appendix 6). The said Concise Concept Note was submitted with the objective of conducting a multi-stakeholder workshop at national level and to obtain issuance of a “Letter of No Objection” to proceed with the design and implementation of a disaster risk insurance solution for selected cities in Vietnam. Pursuant to such engagement, on 15 February 2022, a Letter of No Objection was issued by ISA/MoF (See Appendix 8).

Recommendation: Progress the engagement with Can Tho City, Da Nang City and other cities as possible candidate cities which will issue a letter of interest towards designing a city-based disaster risk insurance solution, whilst simultaneously engaging with the Central Government (e.g., ISA/MoF and other Central Government departments/agencies) to obtain support for setting up a Programme Management Unit (PMU) at the national level, preferably within MoF, for national coordination of setting up a national disaster risk insurance scheme for selected cities.

(ii) The need for a disaster risk transfer solution in Viet Nam:

The feasibility study clearly established that impacts of floods and typhoons to Viet Nam’s economy and population is extremely high; that there is a requirement for public asset insurance by law (Decree 151, Article 135); and that Viet Nam has a sufficiently robust insurance sector. However, disaster risk insurance was covered by the insurance sector only as an optional add-on to existing covers without adequate risk assessment and so appropriate rating; disaster risk insurance for assets owned by state-owned organisations is very low to non-existent. The implementation of an innovative disaster risk transfer solution to mitigate negative impacts of natural disaster at the sub-sovereign level will complement existing measures, providing an integrated approach and support to the national government’s efforts in helping the poor and vulnerable cope more effectively with natural disasters.

Furthermore, such efforts may also catalyse local adaptive capacity and strengthen local resilience in Viet Nam.

Recommendation: The scope for a disaster risk insurance solution to be developed for public assets in Viet Nam is high. It should be communicated to government stakeholders that the significant gain would be the greater resilience that a well-structured insurance programme, with indemnity and parametric elements as appropriate, will bring to the government, economy and most importantly the people of Viet Nam, especially the poor and vulnerable. Concurrently, the main project should have a separate workstream to engage entities in the public and the private sectors in Viet Nam with hydro-meteorological expertise and/or an understanding of historical disaster events, their impacts, and any issues encountered in disaster response. To ensure buy-in of stakeholders in Viet Nam, it is critical to build capacities among these stakeholders in communicating the purpose, functioning, and benefits of disaster risk financing solutions for public assets.

(iii) Type of disaster risk insurance to be implemented:

For Viet Nam, combinations of parametric and indemnity solutions may be considered given the different benefits offered by each solution: a parametric section provides immediate funding (albeit with some basis risk) necessary for immediate delivery of social services to poor and vulnerable groups, whilst the indemnity section provides the ultimate certainty of full payment (subject to adequate sum insured and policy terms) necessary for repair and reconstruction. Indemnity provides certainty that sufficient funds will be available to rebuild the covered assets (potentially to build back better) subject to confirmation of adequacy of the sum insured. Parametric insurance provides faster payment and greater flexibility lessening the short- and medium-term impacts on the local economy, minimising loss of life and of livelihoods. While typhoon parametric structures exist, parametric flood modelling is more complex and would need to be developed over a longer time frame.

Recommendations: The choice of the form of insurance will depend upon the needs of Vietnamese cities and central government. The effectiveness of different options can be demonstrated, with cost benefit analysis based on the risk modelling to be completed in the main project. A hybrid product would allow the benefits of both types of products to be garnered, but potentially at greater cost. The decision whether the type of insurance should be indemnity, parametric, or a hybrid, should be determined in the main project based in consultation with the government bodies nominated to make such determination.

(iv) Enabling Laws and Regulations in Viet Nam:

Viet Nam's laws and regulations clearly provide for disaster risk insurance for high-value and high-risk public assets; however, the lack of formal pathway for insurance procurement sanctioned by the Prime Minister has resulted in the inability of the Peoples' Committees of Provinces and Cities to allocate state budget to the purchase of insurance for public assets. Moreover, the list of assets to be insured is not confirmed yet since there is no formal methodology approved by the State for asset classification as 'high-risk and high-value'. The submission to the Prime Minister's office by MoF is expected to clarify these gaps and is expected in 2022.

Recommendation: Steps that have been taken in Hue City to develop a classification of public assets, could be further developed for recommendation to the Central Government of Viet Nam. It is also anticipated that the Prime Minister of Viet Nam will issue the formal Decision which will articulate the process and procedures for procurement of disaster risk insurance in 2022. However, in order to expedite this exercise and to ensure that the resulting procurement pathways are robust, the main project should consider offering solutions with regard to implementation of such measures in consultation with ISA and other relevant departments of MoF (e.g., Department of Public Assets) It is also important that the project stays engaged with ISA/MoF to ensure that the final list to be developed by MoF incorporates findings and recommendations from the work done in Hue City and Can Tho.

(v) Database of public assets:

The lack of a comprehensive database of public assets owned or managed at city, provincial or national government agency/Ministry level is one of the main issues to be resolved.

Recommendation: One of the first steps to be taken in the main project would be to determine the ownership of the public assets to be covered under the proposed disaster insurance solution and support MoF to finalise the list of assets (incorporating the lists from Can Tho and Hue City). Thereafter, the project would need to support MoF to develop a database that would serve the national and provincial governments of Viet Nam, including identifying the specific department (i.e., ISA) to host the database. A clear distribution of roles between MoF and provinces/cities on how these lists are developed would need to be considered in consultation through the main project. And finally, provide capacity building support for the operation and maintenance of such a database by government officials.

(vi) Payment of premium:

Viet Nam's high rate of urbanisation highlight the need for cities to develop new tools to manage the financial consequences of disaster events. Despite significant investment in better planning, the government of Viet Nam's current financing capacity only meets a fraction of the estimated cost for emergency reconstruction and recovery. The need for a disaster risk insurance scheme has been recognised (as mentioned above). The law is uncertain about which government body is authorised to be the policy holder of a disaster risk insurance policy covering a public asset, which is dependent on which government agency is assigned to manage that specific public asset.

Recommendation: Once the Prime Minister of Viet Nam approves implementation of the 2017 Law on Management and Use of State Property, it is very likely that standard procurement processes for insurance purchasing will be followed. However, in order to expedite this exercise, the main project will offer solutions, including protection/gearing of existing national disaster management funds in consultation with the relevant government departments (eg. VNDMA, MARD, ISA etc) and the People's Committees of the selected cities.

(vii) A disaster risk transfer solution that enhances the resilience of the poor and vulnerable population:

The indemnity element of the insurance solution will increase the amount of funds available after a flood or typhoon for the cities covered and, if including a parametric element, make that element of these funds available quickly. If these funds can be used in a timely and effective fashion, the impacts on lives, livelihoods and the local economy will be minimised, improving the conditions of poor and vulnerable households. Furthermore, the risk transfer will alleviate the dependence on ex-post budgetary allocations to manage the impacts of disasters. This gains significance in a lower middle-income country like Vietnam as disruption to public infrastructure (e.g., roads, railways, bridges, tunnels, water supply, sewers, electrical grids, telecommunications, etc.) and assets (e.g., schools, hospitals, etc.) can adversely impact the livelihoods of the poor and vulnerable population. The access to alternative financial resources can pave the way for an efficient and timely management of the risks.

Recommendation: Support the implementation of an innovative disaster risk transfer solution to mitigate negative impacts of natural disaster at the sub-sovereign level, that complements existing measures, providing an integrated approach and support to the national government's efforts in helping the poor and vulnerable cope more effectively with natural disasters. Furthermore, such efforts may also catalyse local adaptive capacity and strengthen local resilience in Viet Nam.

(viii) Identification of Cities for implementation of disaster risk insurance scheme:

The relevant factors to filter the initial candidate cities for the feasibility study were the history of floods and typhoon, status as municipalities/large cities, their large population, and data sets spanning over forty years. Based on these criteria, Can Tho, Hai Phong, Da Nang, Bien Hoa, and Nha Trang emerged as the five initial candidates. Can Tho headed the list due to the previously conducted ECA. On 24 December 2021 the People’s Committee of Can Tho issued a letter of support to the IDF Viet Nam feasibility study, nominating the Department of Natural Resources and Environment as their main focal point. Hence it follows that Can Tho should be one of the initial cities identified for the main project. Thereafter, Da Nang City’s Commanding Committee for Natural Disaster Prevention and Control, Search and Rescue and Civil Protection (the CCNDPC/SR) also issued a letter of interest regarding disaster risk insurance of public assets. Subsequently, a letter of support for the IDF Viet Nam project was issued by the Insurance Supervisory Authority of Viet Nam (ISA), Ministry of Finance, which gives clearance for the project to proceed in Viet Nam under the auspices of the Ministry of Finance and the supervision of the ISA. In these circumstances, it is possible that the Central Government of Viet Nam may decide to include further cities within the scope of the main project once it gets underway. Therefore, Can Tho, Da Nang and other cities could be considered for implementation of a disaster risk insurance scheme.

Recommendation: Through continued engagement with the Government of Vietnam, at Central, Provincial and City levels, a longer list of potential cities could be agreed on. Factors which could drive the choice of cities for national implementation could include predominant hazard, social profile, data availability, current level of risk understanding or institutional preparedness, political sponsorship, ability to pay premium, geographical diversification, and size. A weighted ranking system could then be applied to the long list of cities that have been identified to finalise and prioritise the list of cities for implementation of the disaster risk insurance scheme. However, due to the considerable engagement already underway it is recommended that Can Tho be considered the initial city as regards the revision of the Concept Note. Accordingly, the Concept Note to be revised to indicate: “Can Tho and other cities” where the target location is required to be mentioned.

(ix) Beyond risk transfer solutions for cities:

The high-level modelling capacity to be built during the main project will be leveraged in further projects (e.g., ADB and KfW projects for Hue City and Can Tho) to precisely quantify the economic benefit and cost of climate change adaptation measures. This will eventually allow for risk reduction investments which have a positive effect on the city's risk profile and lead to more efficient and sustainable risk transfer.

Recommendation: ADB and KfW have expressed interest to facilitate the financing required for risk reduction investments and could develop parallel and connected work streams that complement the main risk transfer project. The project will share complementarities with ADB and KfW for their aforementioned projects.

APPENDIX

Appendix 1 -Letter issued by the Can Tho City People’s Committee on 24 December 2021:

**THE PEOPLE’S COMMITTEE
OF CAN THO**

No: 6558 / UBND-KT

On: Confirming Can Tho’s participation in piloting the Feasibility Study for the development of the project City-Level Disaster Risk Transfer Solutions in Viet Nam

**SOCIALIST REPUBLIC OF VIETNAM
Independence – Freedom – Happiness**

Can Tho, December 24, 2021

To:

- The InsuResilience Solutions Fund (ISF);
- The Insurance Development Forum (IDF).

On the basis of the Open Letter dated November 24, 2021, of the InsuResilience Solutions Fund (ISF), confirming the selection of Can Tho to pilot the Feasibility Study for the development of the project City-Level Disaster Risk Transfer Solutions in Viet Nam,

Upon consideration of the primary objective of the project, which is to develop a disaster insurance product covering floods and typhoons to protect high-value, high-risk public assets in accordance with the Law on Management and Use of Public Assets. The project will focus on leveraging synergies amongst development partners and the private sector. This will be accomplished through transferring the financial risk of disasters to the domestic insurance and international re-insurance markets. Insurance solutions can provide additional valuable measures to strengthen Can Tho’s resilience against climate change-related impacts in the future.

The People’s Committee of Can Tho is highly interested in and supportive of the selection of Can Tho to participate in piloting the Feasibility Study for the development of the project City-Level Disaster Risk Transfer Solutions in Viet Nam.

The People’s Committee of Can Tho assigns the Department of Natural Resources and Environment of Can Tho as the focal point in all communications with the Project Management Board from the ISF on matters related to the study. At the same time, the Department of Natural Resources and Environment of Can Tho shall coordinate with the relevant agencies to provide recommendations and proposals to ensure the feasibility and effectiveness of the study.

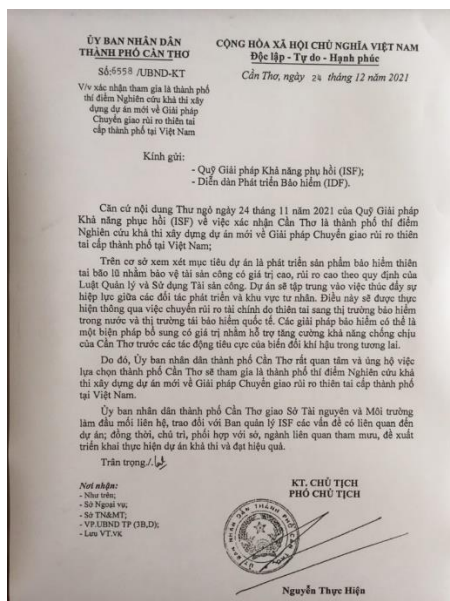
Respectfully Yours./.

**PP. CHAIRMAN
VICE-CHAIRMAN**

Recipients:

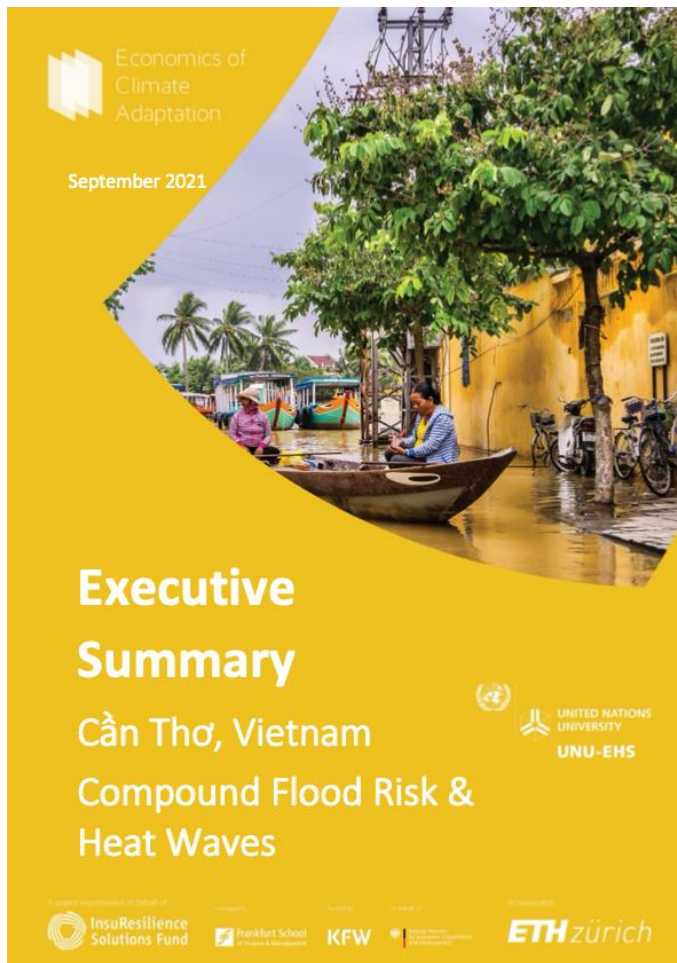
- Above-mentioned.
- The Department of Foreign Affairs of Can Tho;
- The Department of Natural Resources and Environment of Can Tho;
- The Office of the People’s Committee of Can Tho (3B, D).
- Archived

Nguyen Thuc Hien



Appendix 2 - Can Tho City Report (Executive Summary)

- PDF file



Appendix 3 - Viet Nam Insurance Industry – Registered companies, as at July 2021

 Source: Viet Nam, Ministry of Finance Website: <https://vst.mof.gov.vn>

No.	Insurance company (as at 19/07/2021)	Year of
Non Life Companies: 32		
1	Bao Viet Insurance Corporation	1964
2	Bao Minh Insurance Corporation	1994
3	Petrolimex Insurance Corporation	1995
4	Bao Long Insurance Corporation	1995
5	PVI Insurance Corporation	1996
6	Tokio Marine Insurance Viet Nam Company Limited	1996
7	United Insurance Company of Viet Nam	1997
8	Post - Telecommunication Joint Stock Insurance	1998
9	Groupama Viet Nam General Insurance Company Limited	2001
10	Vietinbank Insurance Joint Stock Corporation	2002
11	Samsung Vina Insurance Company Limited	2002
12	Vien Dong Joint Stock Assurance Company Ltd	2003
13	BIDV Insurance Corporation	2005
14	AAA Assurance Corporation	2005
15	AIG Viet Nam Insurance Company Limited	2005
16	QBE Insurance (Viet Nam) Co.,Ltd	2005
17	Agriculture Bank Insurance Joint-Stock Corporation	2006
18	Global Insurance Corporation	2006
19	Phu Hung Joint Stock Insurance Company	2006
20	Liberty Insurance Limited	2006
21	Chubb Insurance Company Limited	2006
22	Military Insurance Corporation	2007
23	Viet Nam National Aviation Insurance Corporation	2008
24	Sai Gon - Ha Noi Insurance Corporation	2008
25	Hung Vuong Assurance Corporation	2008
26	MSIG Insurance (Viet Nam) Company Limited)	2008
27	Fubon Insurance Viet Nam Co., Ltd	2008
28	XuanThanh Insurance Joint Stock Corporation	2009
29	Cathay Insurance (Viet Nam) Co., Ltd	2010
30	OPES Insurance Joint Stock company	2018
31	HD Insurance Company Limited	2020
32	Seoul Guarantee Insurance Company - Ha Noi Branch	2014
Professional Reinsurers: 2		
1	Viet Nam National Reinsurance Corporation	1994
2	PVI Reinsurance Joint Stock Corporation	2011
Insurance Brokers: 21		
1	Aon Viet Nam Limited	1993
2	Viet Quoc Insurance Broker Joint Stock Company	2001
3	A Dong Joint Stock Insurance Broker	2003
4	Dai Viet Insurance Broker Joint Stock Company (*)	2003
5	Willis Towers Watson Viet Nam Insurance Broker	2003
6	Marsh Viet Nam Insurance Broking Company LTD	2004
7	Pacific Insurance Broker Joint Stock Company	2005
8	Cimeco Insurance Broker Joint Stock Company	2006

9	SPE Viet Nam Insurance Broker Joint Stock Company	2008
10	Jardine Lloyd Thompson Limited	2008
11	Nam A Joint stock Insurance Broker Company	2010
12	Toyota-Tsusho Insurance Broker (Viet Nam) Corporation	2011
13	Legacy Insurance Broker Joint Stock Company	2016
14	Ginet Insurance Broker	2019
15	Aegis Insurance Brokers Company Limited	2019
16	Integer Insurance Broker Joint Stock Company	2020
17	LK Viet Nam Insurance Broker Co.Ltd	2020
18	Pan Asia Viet Nam Insurance Broker Co. Ltd	2020
19	BEE VN Insurance Broker Jointstock Company	2020
20	Hung Nghiep Insurance Broker Joint Stock Company	2021
21	DIB Insurance Broker Joint Stock Company	2021

Appendix 4 – Sample Proposal Form including flood and typhoon cover in Viet Nam

Head Office Address:
HCM City, Vietnam
Tel:
Fax:

**PROPOSAL OF COMPULSORY FIRE AND EXPLOSION INSURANCE
EXTEND TO NAMED PERILS INSURANCE**

Currency	VND	Policy Version	<input type="checkbox"/> ENG <input type="checkbox"/> VN
Policy Number		Original:	Copies of Statement
Renewal Policy Number		Duplicate:	Original:
		Copy:	Duplicate:
		Reference	
INSURED'S INFORMATION			
The Insured			
Reg. No			
Contact Address of Insured			
INSURANCE INFORMATION			
Period of Insurance	From	To	
Type of Construction			
Loss Record	<input type="checkbox"/> No <input type="checkbox"/> Yes _____		
Occupancy			
COVERAGE, LOCATION AND SUM INSURED			
Coverage			
COMPULSORY FIRE AND EXPLOSION INSURANCE			
NAMED PERILS INSURANCE			
- LIGHTNING (A) - LIMIT 50% OF SUM INSURED			
- AIRCRAFT AND OTHER AERIAL DEVICES AND/OR ARTICLES DROPPED THEREFROM (C) - LIMIT: 50% OF SUM INSURED			
- RIOT, STRIKERS, LOCKED-OUT WORKERS (D) - LIMIT: 50% OF TOTAL SUM INSURED OR MAX VND 105,000,000,000 WHICHEVER IS LOWER			
- MALICIOUS DAMAGE (E) - LIMIT: 50% OF TOTAL SUM INSURED OR MAX VND 105,000,000,000 WHICHEVER IS LOWER			
- EARTHQUAKE OR VOLCANIC ERUPTION (F) - LIMIT: 50% OF SUM INSURED			
- STORM, TEMPEST AND FLOOD (H) - LIMIT: 50% OF SUM INSURED			
- IMPACT BY ANY ROAD VEHICLE OR ANIMAL (J)			
Address of Premises			
Location :			
On Building (Book Value)			
On Machinery And Equipment (Book Value)			
On Stock (Indemnity Value)			
Total Sum Insured			
TOTAL PREMIUM			
Premium rate			
- COMPULSORY FIRE AND EXPLOSION INSURANCE			
- NAMED PERILS INSURANCE			
+ LIGHTNING (A) - LIMIT 50% OF SUM INSURED			
+ AIRCRAFT AND OTHER AERIAL DEVICES AND/OR ARTICLES DROPPED THEREFROM (C) - LIMIT: 50% OF SUM INSURED			
+ RIOT, STRIKERS, LOCKED OUT WORKERS, MALICIOUS DAMAGE (D & E) - LIMIT: 50% OF TOTAL SUM INSURED OR MAX VND 105,000,000,000 WHICHEVER IS LOWER			
+ EARTHQUAKE OR VOLCANIC ERUPTION (F) - LIMIT: 50% OF SUM INSURED			
+ STORM, TEMPEST AND FLOOD (H) - LIMIT: 50% OF SUM INSURED			
+ IMPACT BY ANY ROAD VEHICLE OR ANIMAL (J)			
Premium			
VAT			
Total Premium			
DEDUCTIBLE			
COMPULSORY FIRE AND EXPLOSION INSURANCE			
- For Any One Accident			

Sample Proposal of fire and explosion insurance with flood and typhoon (storm/tempest) cover, page 1

DEDUCTIBLE									
NAMED PERILS INSURANCE									
- For Riot, Strikers, Locked-out workers, Malicious Damage: 10% of Loss & Min / A.O.A									
- For Other Risks / A.O.A									
TERMS AND CONDITION, ADDITIONAL CLAUSES									
As per attached Quotation									
Signature of Insured:					Signature of Broker/ Agent:				
Date of Application:					Date of Application:				
General Director	Director	Manager	Underwriter	FAC	Check	Key In	Handler	Broker/Agent Commission	

Sample Proposal of fire and explosion insurance with flood and typhoon (storm/tempest) cover, page 2

Appendix 5 - List of entities involved in disaster risk management in Viet Nam

S. No.	Name of the Organisation	Type	Role
1	Can Tho Climate Change Coordination Office	Administrative body in Can Tho City	http://biendoikhihau.cantho.gov.vn
2	Insurance Association of Viet Nam (IAV)	Association	Association of insurers in Viet Nam Assistance through 3 pillars: Promoting job creation and competitiveness, increasing the inclusiveness of infrastructure and service delivery, improving environmental sustainability and climate change response
3	Asian Development Bank (ADB)	Development Bank	3 aid objectives: Enabling and engaging the private sector for development; Assisting the development and employment of a highly skilled workforce; promoting women's economic empowerment, including ethnic minorities
4	Australian Government - Dept. of Foreign Affairs and Trade	Foreign Government Entity	
5	Japanese International Cooperation Agency (JICA)	Foreign Government Entity	
6	United States Agency for International Development (USAID)	Foreign Government Entity	
7	Central Committee for Natural Disaster Prevention and Control (CCNDPC)	Government Agency	Coordinates Disaster Management and Humanitarian Response (DMHR) and with the National Committee for Incident, Disaster Response, Search and Rescue (VINASARCOM)
8	Viet Nam National Disaster Management Authority (VNDMA)	Government Agency	Acting as the Office of the Central Steering Committee
9	National Committee for Incident, Disaster Response, Search and Rescue (VINASARCOM)	Government Agency	Responsible for the conduct of Search and Rescue (SAR); also the go-to Military Unit in Viet Nam for Incident Command in the event that the disaster requires military support
10	Disaster Management Policy and Technology Center (DMPTC)	Government Agency	Roles: Organization and Administration, Division Planning and Finance Division, Technology Application and Database Management Division, Policy and Training Division and Disaster Management and Dike Technical Division
11	National Center for Hydro-meteorological Forecasting (NCHMF)	Government Agency	Hazard monitoring and forecasting for flood and storms; belongs to Viet Nam Meteorological Hydrological Administration (VMHA)
12	Commanding Committees for Disaster Prevention and Control, Search and Rescue	Local Government Agencies	Responsible for disaster response in provinces, cities, districts and communes
13	Ministry of Agriculture and Rural Development (MARD)	Ministry	Lead disaster management agency in Viet Nam
14	Ministry of Defence	Ministry	Use resources such as the Viet Nam's People Army and the Viet Nam People's Air Force to support VINASARCOM during a disaster

15	Ministry of Health	Ministry	Initiatives for health promotion and disease prevention
16	Ministry of Natural Resources and Environment (MoNRE)	Ministry	https://monre.gov.vn/english/Pages/Home.aspx
17	Food and Agriculture Organisation (FAO)	Multi-lateral Agency	Collaborates with different humanitarian agencies and governments
18	International Organisation for Migration (IOM)	Multi-lateral Agency	
19	World Bank Group	Multi-lateral Agency	
20	UNICEF	Multi-lateral Agency	
21	UNDP	Multi-lateral Agency	
22	UN-Habitat	Multi-lateral Agency	
23	UNFPA	Multi-lateral Agency	
24	American Red Cross	NGO	
25	Catholic Relief Services (CRS)	NGO	Disaster recovery and risk reduction Helps aging people to live dignified, healthy, and secure lives
26	HelpAge International	NGO	
27	CARE International	NGO	
28	OXFAM	NGO	
29	Plan International	NGO	
30	Save the Children	NGO	
31	Asia Foundation	NGO	
32	World Vision	NGO	Relief, development, and advocacy programs Conducts humanitarian activities and plays an auxiliary role to the government in humanitarian work
33	Viet Nam Red Cross Society (VNRC)	NGO	
34	Insurance Supervisory Authority (ISA)	Regulatory Authority	Insurance industry Supervisor and Regulator
35	Pacific Disaster Center (PDC)	Research Agency	Supporting the VinAWARE EWS in Viet Nam
36	VinaRe	State Owned Enterprise	National reinsurance corporation

Appendix 6 - Concise Concept Note

- Developed jointly by UNDP, ADB, KfW and IDF industry members AXA Climate, WTW and Guy Carpenter on 21 October 2021 – PDF File

Appendix 7 - Hue City project Summary by ADB and WTW – PDF File

Appendix 8 – Letter of No Objection issued by ISA/MoF

- PDF File

Appendix 9 – Letter of Support issues by Da Nang Commanding Committee for Natural Disaster Prevention and Control, Search and Rescue and Civil Protection (the CCNDPC/SR)

- PDF File

Appendix 10 - UNDP (2022). Development of Inclusive Insurance and Risk Financing in Viet Nam: A Country Diagnostic. UNDP

- PDF File

Appendix 11 - Data requirements per key project task and corresponding data sources

Task	Purpose	Data Requirements	Data Sources	Additional Details
Building a Public Asset Database	To assist in assessing the flood risk more accurately	Location, Replacement Value , Occupancy Type, Construction	<p>Exposure data on schools, hospitals, road networks, and other public assets collected for the ISF-funded Can Tho climate risk analysis based on the Economics of Climate Adaptation (ECA) is a good starting point for this public asset database.</p> <p>The central/national government is another source of data on universities and special schools for the gifted, while the provincial government would cover upper secondary and technical schools. District governments would cover other schools.</p>	<p>Location and details of the assets will be available from various government agencies. The valuation of the assets would be based upon government rebuilding costs, inflated for current values. Additional attributes may need to be added for insurance modelling purposes.</p>

			Per the WHO, public hospitals in Viet Nam are divided into three levels: central level (47 hospitals); provincial level (419 hospitals) and district level (684 hospitals). Besides the public hospitals, the country also has 182 private hospitals	
Developing Probabilistic Flood model	To estimate the average annual losses and probable maximum losses (PMLs) which will be used to structure the appropriate indemnity cover	Digital elevation model, soil roughness, precipitation and discharge data		Guy Carpenter has developed a basic flood hazard which includes pluvial and fluvial flooding from both typhoon and non-typhoon events, and vulnerability model. The model will be tailored and built upon for the purpose of this project.
Parametric Flood	To develop an appropriate flood parametric trigger supported by appropriate data for risk assessment and premium setting	Data requirements will depend upon trigger form, which will depend upon data availability and homogeneity. The data sources identified for the probabilistic flood model will be augmented by a mixture of rainfall data, satellite and ground-measured and flood extent maps/satellite imagery as available. Estimates of loss will for historical events will be required, together with a better	National and provincial hydro-met stations* (rainfall, river and tidal gauges), satellite data (e.g. CHIRPS), flood hazard maps for different flood scenarios (e.g. JBA Global Hazard Maps and Stochastic Event Set) and satellite imagery providers (e.g. ICEYE for real-time monitoring of the floods to trigger the payouts).	1) The pricing of the policy will be based on data gathered from two methods: Observations (e.g. on-site gauges) and physical modelling (e.g. flood hazard models). Several candidate indexes will be calibrated and the correlation of the indexes with the historical losses assessed. 2) The selected index will be monitored in real-time by using ground observation devices (e.g. gauges) or remote sensing techniques (e.g. SAR technology), or a combination of them. 3) The index selection will

		understanding of historical and possible shortfalls of funds for disaster response, reconstruction and economic impact		depend on the data availability, flood perils to cover (pluvial, fluvial and/or coastal flooding) and the assessment of the basis risk, among other factors.
Parametric Wind	To develop an appropriate wind parametric trigger supported by appropriate data for risk assessment and premium setting	Data requirements will depend upon trigger form, which will depend upon data availability and homogeneity. Likely the data sources identified for the probabilistic wind model will be augmented by tropical cyclone track and strength data wind from the Japan Meteorological Agency or JMA (the WMO regional tropical cyclone centre), other central sources and local ground measured wind data. Estimates of loss for historical events will be required, together with a better understanding of historical and possible shortfalls of funds for disaster response, reconstruction and economic impact.	Japan Meteorological Agency and national, provincial and possibly private weather station networks.*	Although wind is likely to be a secondary peril to flood, it will be important to understand correlation for flood events and the compounding of losses.

**There is a national network of hydromet weather stations, some provincial ones, and a number of private data suppliers. However, based on WTW's experience working on other projects in Vietnam, some provincial governments were concerned that the Central Government would not sanction insurance that used data other than those from national networks. The team could consider using satellite data instead.*

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