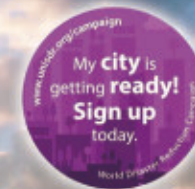




THE HONG KONG
POLYTECHNIC UNIVERSITY
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MAKING HONG KONG A RESILIENT CITY: PRELIMINARY ASSESSMENT

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Opening Minds • Shaping the Future • 啟迪思維 • 成就未來

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Foreword

This preliminary assessment report on making Hong Kong a resilient city is an outcome of the “Disaster Risk Reduction Collaboration Programme” established by the United Nations Office for Disaster Risk Reduction and the Faculty of Health and Social Sciences of The Hong Kong Polytechnic University. It is a worthwhile endeavour to assess Hong Kong’s resilience capacity based on the Ten Essentials suggested by the United Nations International Strategy for Disaster Reduction.

The findings and suggestions in the report, highlighting the importance of resilience building even in a peaceful, prosperous city such as Hong Kong, are worth society’s attention and further exploration.

For this project, our University’s researchers worked closely with the Kwai Tsing District, the Kwai Tsing Safe Community and Healthy City Association, and various other stakeholders. Collaboration between academia and the local community is important and meaningful as it facilitates the exchange of expertise and experience, which in turn helps bring benefits to the development of society.

PolyU attaches great value to University Social Responsibility. I sincerely hope that this report can raise the awareness of disaster risk reduction within the government and the community-at-large. Our University will continue to join hands with our partners to support far-reaching research studies in this area, with a view to making Hong Kong a resilient city and contributing to the sustainable development of the region.



Timothy W. Tong, Ph.D.

President

The Hong Kong Polytechnic University

May 2017





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We would like to give a special note of thanks to the Hong Kong Observatory for their in-depth and insightful input.

Finally, we would personally like to thank the Hong Kong Polytechnic University team that has diligently worked on this report.



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Abbreviations

AFCD	A griculture, F isheries and C onservation D epartment
BD	B uildings D epartment
CEDD	C ivil E ngineering and D evelopment D epartment
CEO	C ivil E ngineering O ffice
CISCC	C ritical I nfrastructure S ecurity C oordination C entre
DEVB	D evelopment B ureau
DH	D epartment of H ealth
DRR	D isaster R isk R eduction
DSD	D rainage S ervices D epartment
EDB	E ducation B ureau
EMSD	E lectrical and M echanical S ervices D epartment
EPD	E nvironmental P rotection D epartment
FEHD	F ood and E nvironmental H ygiene D epartment
FSD	F ire S ervices D epartment
GEO	G eotechnical E ngineering O ffice
HA	H ospital A uthority
HAD	H ome A ffairs D epartment
HD	H ousing D epartment
HKMA	H ong K ong M onetary A uthority
HKO	H ong K ong O bservatory
HKPF	H ong K ong P olice F orce
ISD	I nformation S ervices D epartment
LandsD	L ands D epartment
LegCo	L egislative C ouncil
OFCA	O ffice of the C ommunications A uthority
PD	P lanning D epartment
SAR	S pecial A dministrative R egion
SB	S ecurity B ureau
SWD	S ocial W elfare D epartment
UNISDR	U nited N ations Office for D isaster R isk Reduction





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Executive Summary

A top-down approach is commonly applied to resilient city making around the world. The Hong Kong Special Administrative Region (SAR) has creatively used a bottom-up approach to make the financial centre a resilient city. This approach is connected to its unique political structure and status as an SAR of the People's Republic of China, and to government officials' broad understanding of the concept of disaster risk reduction (DRR).

This bottom-up framework for making Hong Kong a resilient city integrates the upgraded toolkit of the United Nations Office for Disaster Risk Reduction (UNISDR) and the academic achievements of resilient cities research. A taskforce comprising academics from the Hong Kong Polytechnic University and frontline practitioners from Kwai Tsing District Safe Community and Healthy City Association facilitated the initiative. A mixed method combining documentary review, focus groups and individual interviews with key informants was used to collect data for the resilience assessment.

The preliminary results of the resilience assessment reveal that the integrated disaster resilience of Hong Kong is satisfactory. The evident strengths of Hong Kong are proactive protection of natural ecosystems (Essential 5) and solid society capacity for resilience (Essential 7). The most obvious shortcomings preventing Hong Kong from qualifying as a resilient city are its inadequate identification, understanding and leveraging of current and future risk scenarios (Essential 2) and weaker institutional capacity for resilience (Essential 6), such as the lack of an effective mechanism to strengthen the sharing of knowledge and skills among stakeholders involved in disaster resilience building.

Limitations of this initiative are inevitable. They include limitations of the UNISDR toolkit (e.g., the lack of scoring details for some Layer 3 indicators); insufficient detailed information on disaster risk reduction from some government documents (e.g., no access to the budget breakdown of some departments); and inadequate engagement of government departments in the resilience assessment (e.g., the Security Bureau).



1

Background

The Hong Kong SAR government faces various challenges in disaster risk reduction (DRR). Every year diverse hazards threaten Hong Kong. Typical hazards that can result in natural disasters include exceptionally heavy rain, storm surges, thunderstorms and tropical cyclones. These events can cause floods, landslides and other incidents that lead to serious casualties and damage to transport and other critical infrastructure. Fortunately, there have been few high-impact natural disasters in Hong Kong in recent decades. However, this has inadvertently led to a more complacent outlook, which has decreased the preparedness of Hong Kong people. The Hong Kong government has conscientiously undertaken several important and effective DRR projects in the past three decades, including a comprehensive flood prevention strategy and a landslide prevention and mitigation (LPMit) programme.¹ Nevertheless, a lack of consolidation and dissemination of important platforms has obscured the good DRR practices of Hong Kong in the international community.

Since the Hyogo Framework for Action 2005–2015 (HFA), increasing international attention has been paid to making cities resilient to disasters. In 2010, the United Nations Office for Disaster Risk Reduction (UNISDR) launched a worldwide campaign, ‘Making Cities Resilient: My City is Getting Ready!’, to promote resilient and sustainable urban communities through actions taken by local governments to reduce disaster risk. This campaign actively encouraged urban local governments to assess and improve their cities’ resilience by using UNISDR’s toolkit, which includes ‘Ten Essentials’ for making cities resilient, a Local Government Self-Assessment toolkit and a Resilience Scorecard. After the introduction of the Sendai Framework for Disaster Risk Reduction 2015–2030 (SFDRR), UNISDR’s Resilient City Team in Geneva upgraded the toolkit to bring it in line with the new framework. Recently, 12 major international cities (including Geneva in Switzerland, Florence in Italy and Lisbon in Portugal) have been piloting the revised toolkit in view of climate change and sustainable development.



The UNISDR and the Hong Kong Polytechnic University established a ‘Disaster Risk Reduction Collaboration Programme’ (CoPe) between February 2015 and March 2016. One of the overarching goals of CoPe is to make Hong Kong a resilient city in collaboration with important stakeholders, including but not limited to the public and private sectors, academic institutions, non-governmental organisations and the community. Among the stakeholders, the district-level local governments are closest to Hong Kong people and their communities, and assume the vital responsibility for the immediate response to crises and emergencies. Therefore, it is essential to carry out a preliminary assessment at the district level to make Hong Kong a resilient city.

CoPe and the Kwai Tsing Safe Community and Healthy City Association (KTSCHCA) jointly agreed in April 2016 to roll out the ‘Making Hong Kong a Resilient City’ programme (the Pilot Programme), using Kwai Tsing as a focal point.

This report presents the interim outcomes of the preliminary assessment.

¹ Cheung, E. (2015) ‘Hong Kong People Not Ready to Deal with Natural Disasters, Experts Say’. South China Morning Post, 30 March 2015. Available at <http://www.scmp.com/news/hong-kong/article/1745613/hong-kong-people-not-ready-deal-disaster-experts-say> (Accessed 30 May 2016).

2

Methodology



2.0 Uniqueness of the Method

A 'bottom-up' approach was used for the Pilot Programme. This is in contrast to current international practices, such as those of the UNISDR's Making Cities Resilient Programme and the Rockefeller Foundation's 100 Resilient Cities programme, for which a 'top-down' approach is the norm. In addition, the crucial distinction between the 'resilient city' initiative and other types of city initiative (e.g., healthy city, smart city, global age-friendly city) is that both development (e.g., improved urban planning, more efficient maintenance of critical infrastructure) and challenges (e.g., ageing population, traffic congestion) in normal conditions and rebound capacity in emergency situations (i.e., emergency response and post-event recovery) are emphasised in resilient cities making, whereas the other initiatives emphasise specific aspects of urban development, with little consideration of emergency situations.



2.1 Instrument

The initiative used the ‘Local Urban Indicators’ tool based on the ‘Ten Essentials for Making Cities Resilient’ framework with reference to the Sendai Framework for Disaster Risk Reduction (2015–2030)² (see Table 1). These indicators were developed to enable cities to assess the extent to which they have prepared to cope with any disaster and the urgent tasks required to improve the resilience capacity in local cities.

Key indicator questions for each essential area enable local governments and other stakeholders to measure their level of resilience and make policy decisions to develop resilience by conducting resilience assessments based on the tool.

Table 1: UNISDR’s Ten Essentials for Making Cities Resilient (Sendai Framework)

Essential Area	Description
1 Governance for Disaster Resilience	Put in place an organisational structure and identify the necessary processes to understand and act on reducing exposure to, the effect of and vulnerability to disaster.
2 Identify, Understand and Use Current and Future Risk Scenarios	City governments should identify and understand their risk, including hazards, exposure and vulnerabilities, and use this knowledge to inform decision making.
3 Strengthen Financial Capacity for Resilience	Understand the economic effect of disasters and the need for investment in resilience. Identify and develop financial mechanisms that can support resilience activities.

4 Pursue Resilient Urban Development and Design	Assess and make resilient the built environment, informed by risks identified in Essential 2.
5 Safeguard Natural Buffers to Enhance Ecosystems’ Protective Functions	Identify, protect and monitor critical ecosystems that confer a disaster resilience benefit.
6 Strengthen Institutional Capacity for Resilience	Ensure that all institutions relevant to a city’s resilience have the capabilities they need to discharge their roles.
7 Understand and Strengthen Society Capacity for Resilience	Cultivate an environment for social connectedness that promotes a culture of mutual help through recognition of the role of cultural heritage and education in disaster risk reduction.
8 Increase Infrastructure Resilience	Assess the capacity and adequacy of, and linkages between, critical infrastructure systems and upgrade these as necessary according to risks identified in Essential 2.
9 Ensure Effective Preparedness and Disaster Response	Ensure the creation and updating of disaster response plans informed by risks identified in Essential 2 and communicate them to all stakeholders through organisational structures as per Essential 1.
10 Expedite Recovery and Build Back Better	Ensure sufficient pre-disaster plans according to risks identified and that after any disaster, the needs of the affected are at the centre of recovery and reconstruction, with their support to design and implement rebuilding.

Source: <http://www.unisdr.org/campaign/resilientcities/home>

Three options are recommended to implement the resilience assessment at city level (see Figure 1). More comprehensive and detailed data are needed when an option with a higher number is taken. Option 1 is to use 6 indicators of Layer 0 and 31 indicators of Layer 1. Option 2 is to add 77 indicators of Layer 2 to Option 1, and Option 3 is to add another 122 indicators of Layer 3 to Option 2; 31 indicators of Layer 1 are decomposed into 77 indicators of Layer 2, which are further decomposed into 122 indicators of Layer 3. The indicators of Layers 0 and 1 are independent, and the 6 indicators of Layer 0 are designed to fulfil national reporting, not specifically to reflect the implementation of the 4 priorities in DRR under the Sendai Framework.

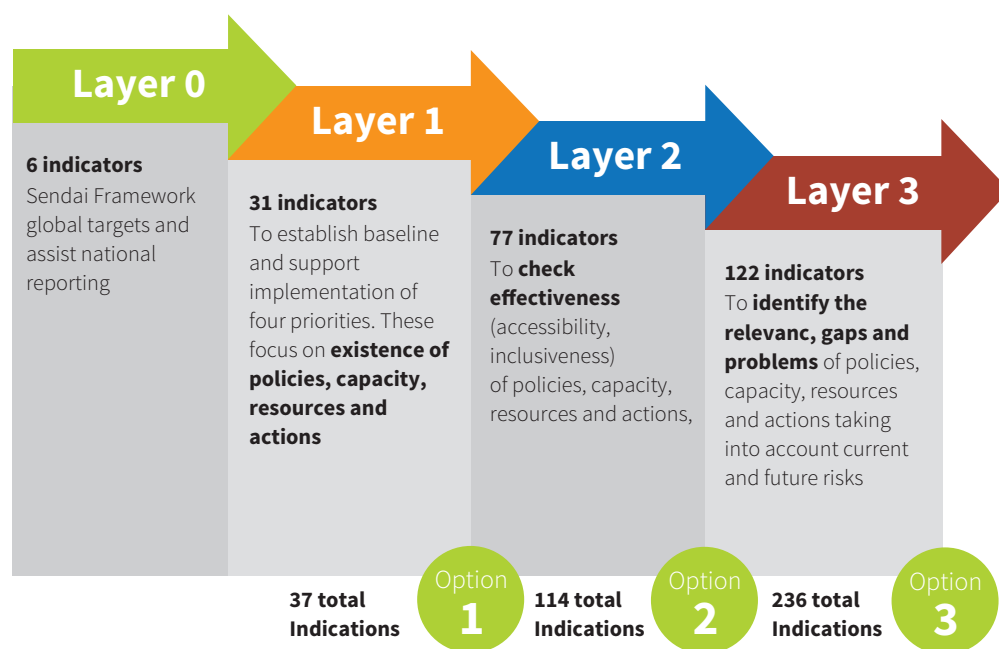


Figure 1: Three Options for Resilience Assessment

Source:³ UNISDR. Draft – ‘New’ Local-Urban Indicators DRR and Resilience, available at https://www.unisdr.org/campaign/resilientcities/assets/documents/privatepages/02_Local%20Indicators_Handout.pdf

For the initiative, we chose Option 1, without the six indicators of Layer 0, and made some adjustments to the scoring method of the UNISDR’s tool. We decided not to qualitatively assess the achievements of relevant DRR work for each indicator of Layer 1 (31 in total). Instead of using the recommended three-point scale (‘strongly agree’, ‘partly agree’ and ‘disagree’), we picked up at least one specific assessment question (indicator) from Layer 3 to help us assess the indicators of Layer 1, according to the detailed scoring criteria, where available. For example, for Indicator 1.1, ‘Disaster risk reduction is a key consideration of the City Vision and/or Strategic Plan for safeguarding the city’, the key words are ‘disaster risk reduction’, ‘key consideration’ and ‘City Vision’. For Indicator 1.1, we picked up Question 1.1.1.1: ‘To what extent are risk factors considered in the City Vision and/or Strategic Plan?’ and gave an indicative score.⁴ Using a documentary review method, we scored each indicator of Layer 1 as the same as the corresponding indicator of Layer 3, from 0 to 5. Specifically, when answering the indicator questions, we followed the assessment process proposed by the UNISDR. First, we conducted a comprehensive documentary review by consulting relevant official documents and government bodies. Next, a comprehensive report was generated and we undertook a consultation to assess the related measures for DRR. Five stakeholders were invited to a workshop to give feedback and comment on the responses to the existing measures. They included a district counsellor (equivalent to a mayor), a community leader with medical training, a manager of a local non-government organisation and two academics. After the responses from the workshop were incorporated and consolidated, the outcome was sent to all other relevant stakeholders for review. The report was also presented at four conferences over a period of twelve months, including a High Level Forum organised by the United Nations in Florence on 16 June 2016, for further critique and discussion.

³ Necessary revisions have been made to the numbers of indicators in the figure to correct calculations of the sum of indicators at each layer.

⁴ 5 – Present and future risks are fully considered in the City Vision (CV)/Strategic Plan (SP) with scientific data and multi-stakeholder hazard information supporting strategic decisions.

4 – Risk factors are identified and included in some detail in the CV/SP.

3 – Risk factors are in the process of being identified for the CV/SP.

2 – Risk factors are on the agenda for discussion.

1 – Risk factors are not considered in the CV/SP.

0 – No risk factors identified.

A nighttime photograph of the Hong Kong skyline, featuring the Victoria Harbour and the International Finance Centre (IFC) Tower. The city lights are reflected in the water, and the sky is dark with some clouds. The number 3 and the word Results are overlaid on the left side of the image.

3 Results

3.0 Overview of the ‘Ten Essentials’

The aggregated resilience performance of Hong Kong according to the UNISDR's 10 specific aspects for building disaster resilience (the ‘Ten Essentials’) is shown in Figure 2. The preliminary results reveal that the most evident strengths of Hong Kong lie in the proactive protection of natural ecosystems (score 5.0) and solid society capacity for resilience (score 5.0). In contrast, the most obvious shortcomings are the inadequate identification, understanding and leveraging of current and future risk scenarios to improve resilience (score 3.0), and scarce institutional capacity building (score 3.0).

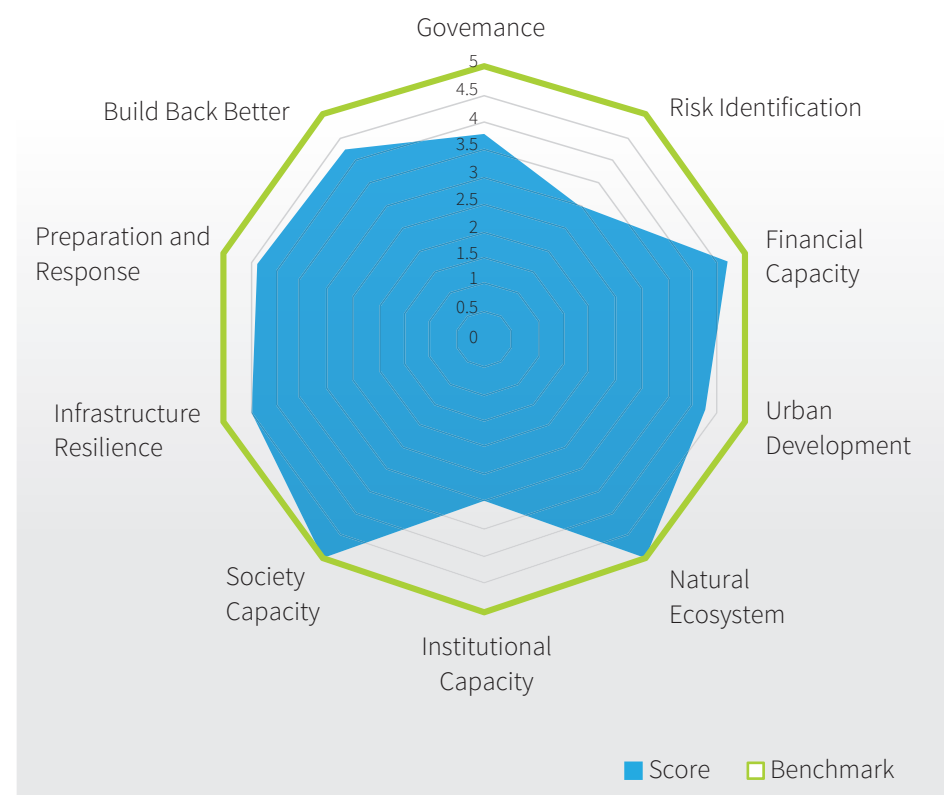


Figure 2: Resilience-building Performance of Hong Kong

3.1 Essential 1: Governance for Disaster Resilience

Essential 1 includes four indicators of Layer 1, which scored 2, 4, 4 and 3, respectively, giving an average score of 3.25.

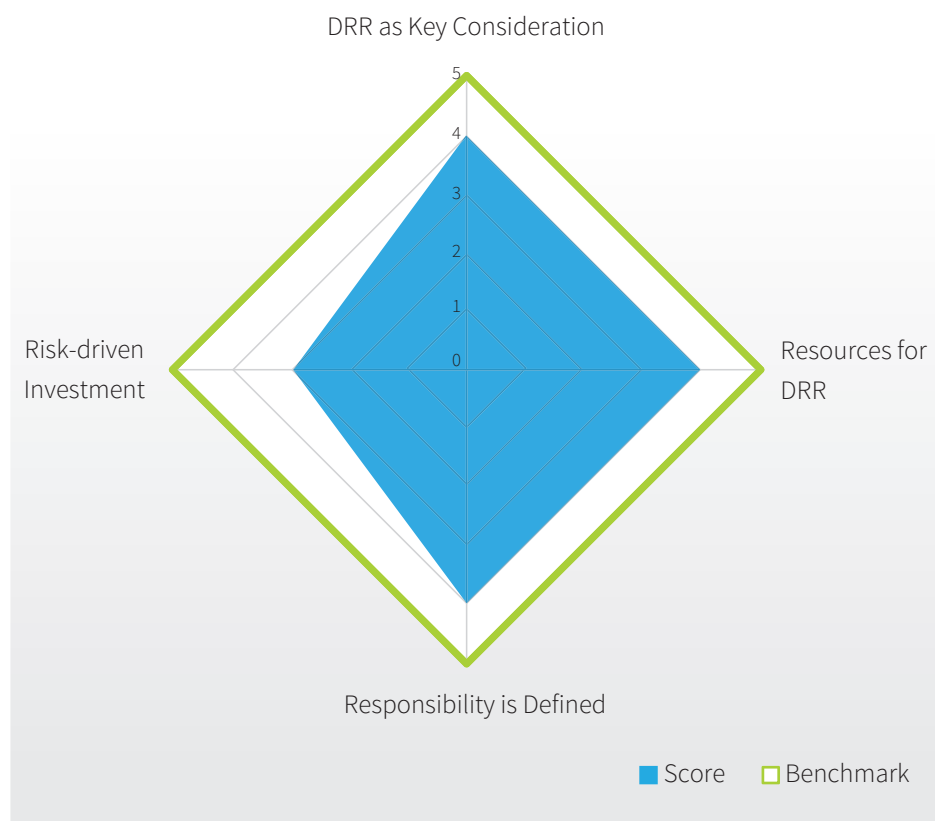


Figure 3: Performance of 'Governance for Disaster Resilience'

Indicator 1.1. DRR is a key consideration throughout the City Vision (CV) and/or Strategic Plan (SP) safeguarding the city to achieve its goals.

The supporting question selected from Layer 3 is 'To what extent are risk factors considered in the City Vision/Strategic Plan?', scored according to the following indicative measures:

- 5 – Present and future risks are fully considered in the CV/SP with scientific data and multi-stakeholder hazard information supporting strategic decisions.
- 4 – Risk factors are identified and included in some detail in the CV/SP.
- 3 – Risk factors are in the process of being identified for the CV/SP.
- 2 – Risk factors are on the agenda for discussion.
- 1 – Risk factors are not considered in the CV/SP.
- 0 – No risk factors are identified.

Two marks are scored for Indicator 1.1.

To date, DRR has not been a key consideration in the City Vision of Hong Kong. Essential assessment of various disaster risks is inadequate, and the capacity building of prospective risk management institutions is faltering. For example, a 'seismic-resistant' building standard has not yet been established, even though it has been discussed for a long time.

Nevertheless, DRR is becoming an important consideration in the City Vision. For instance, the Port Works Manual of the CEDD and the Drainage Master Plans of the DSD have taken the risks of storm surge and heavy rain into consideration. The Hong Kong government proactively advanced measures for climate change mitigation after the Paris Climate Conference. The Chief Secretary for Administration established and personally chairs an interdepartmental committee to steer and coordinate the implementation of these measures. The first meeting of the Steering Committee on Climate Change was held on 7 April 2016 and the Hong Kong SAR Climate Change Report 2015 was published in November 2015.⁵

Indicator 1.2. The city has the necessary authority and resources to satisfy local DRR requirements.

The supporting question selected from Layer 3 is 'What kind of authority do the lead departments or agencies have?', scored according to the following indicative measures:

- 5 – The lead departments or agencies have the relevant authority and resources to coordinate all necessary pre-event, event response and post-event planning and preparation activities.
- 4 – The lead departments or agencies have the relevant authority and resources to coordinate only pre-event and event response activities.
- 3 – The lead departments or agencies have the relevant authority and resources to coordinate only pre- and post-event activities.
- 2 – The lead departments or agencies have the relevant authority and resources to coordinate only event response and post-event activities.
- 1 – The lead departments or agencies have the relevant authority and resources to coordinate only single-stage activities.
- 0 – The lead departments or agencies have no authority or resources to coordinate pre-event, event response or post-event activities.

Four marks are scored for Indicator 1.2.

The lead departments or agencies have the relevant authority and resources to coordinate all necessary pre-event, event response and post-event planning and preparation activities. For example, the Hong Kong Police Force is responsible for ensuring preparedness for the rescue phase of major incidents and disasters by conducting regular multi-agency exercises to test and improve contingency plans and enhance restoration-phase capability to ensure the timely release of affected areas.⁵

Indicator 1.3. Responsibility (lead department) is defined for various aspects of disaster resilience within the city.

The supporting question selected from Layer 3 is 'Is there a diagram in place that indicates relevant departments' responsibilities, capacities and competencies, essential to strengthening urban resilience in the city either pre-event, in response or post-event?', scored according to the following indicative measures:

- 5 – A diagram exists and is being periodically monitored and reviewed, prioritising different types of stakeholder.
- 4 – A diagram exists that covers some but not all types of stakeholder.
- 3 – A diagram is under development.
- 2 – The city is considering developing a stakeholder diagram to map out responsibilities, capacities and competencies.
- 1 – A diagram that indicates responsibilities, capacities and competencies does not exist.
- 0 – There is no plan to have a diagram of this sort in the near future.

Four marks are scored for Indicator 1.3.

The Hong Kong Government's Emergency Response System has a diagram in place that indicates relevant departmental responsibilities, capacities and competencies, and it is being periodically monitored and reviewed, prioritising different types of stakeholder.⁷ A three-tier system of emergency response operates through the three principal phases of emergency response (rescue, recovery and restoration). Table 2 outlines the rescue and relief responsibilities of relevant departments. However, there is no established diagram illustrating the allocation and coordination of different departments' responsibilities at the pre-event stage.

⁵ <http://www.policyaddress.gov.hk/2016/eng/p201.html>

⁶ <http://www.police.gov.hk>

⁷ <http://www.sb.gov.hk/eng/emergency/ers/pdf/ERSc4.pdf> (Accessed 2 June 2016). Similar diagrams exist at the department/office level, such as 'The Design of a Workflow Management System to Support Nuclear Emergency Responses at the Hong Kong Observatory', which is available at <http://www.hko.gov.hk/publica/tnl/tnl085.pdf> (Accessed 2 June 2016).

Table 2: The Rescue and Relief Responsibilities of Different Departments

Department	Responsibility
Civil Aviation Department	Coordination of search and rescue operations for aircraft in distress within Hong Kong airspace.
Fire Services Department	Direction of all rescue activities and coordination of all rescue parties involved within the inner-cordoned zone of a disaster site on land or within Hong Kong waters. The attending Senior Fire Officer will be the Rescue Commander.
Hong Kong Police Force	Establishing a Police Command Post at the scene, co-located with the Fire Services Incident Command Post and will be provided with a FSD liaison officer.
Home Affairs Department	Establishment of a District Emergency Coordination Centre. The District Officer is responsible for coordinating relief measures by the Social Welfare Department, the Housing Department and other agencies at the scene.
Information Services Department	Overseeing press activities and arranging for on-site briefings to be given to the media by the District Officer or the on-scene commanders.
Marine Department	Conducting maritime search and rescue operations in Hong Kong waters and within the Hong Kong Maritime SAR, through the Maritime Rescue Coordination Centre/Marine Emergency Centre.
Hospital Authority	The provision of hospital services for casualties.



Source: Security Bureau

Indicator 1.4. The city has in place a mechanism that prioritises resources towards effectively lowering risks that local assessments have identified as significant.

The supporting question selected from Layer 3 is 'To what extent are city investments influenced by the results of risk analysis?', scored according to the following indicative measures:

- 5 – The results of risk analysis are shared within city government and effectively influence spending on areas such as risk preparedness and mitigation (e.g., flood defences are sufficiently funded).
- 4 – The results of risk analysis are shared within city government and influence spending, but this could be improved.
- 3 – Risk analysis is shared and influences investment to some extent, but both this and subsequent action could be improved.
- 2 – Risk analysis only sometimes influences government spending.
- 1 – Risk analysis does not influence investment.
- 0 – Risk assessment is absent.

Three marks are scored for Indicator 1.4.

Allocation of resources has not been realised in proportion to the severity of various disaster risks. Risk analysis plays a modest role in influencing government investment because of inadequate risk assessment and the incomparability between the risk assessment results of different government departments. Generally, the allocation of resources is driven by hazardous events in Hong Kong, which means resources are allocated to areas according to the severity of damage caused by disasters or incidents. For instance, in the early 1990s, serious floods occurred in Northern New Territories (including one on 27 September 1993 and another on 22 July 1994) that pushed the government to invest more in reducing the effects of flooding. Although the government had carried out some projects pertaining to flood risk before these serious events, most of the flood prevention investment was made after the floods occurred. The Drainage Services Department commissioned studies for drainage master plans between 1996 and 2004, and implemented drainage improvement works in phases from 1996 to 1998, at a cost of about HK\$3.402 billion.⁸



⁸ <http://www.legco.gov.hk/yr97-98/english/panels/plw/minutes/pl131097.htm> (Accessed 2 June 2016). For details, please see the report at [http://library.legco.gov.hk:1080/search~S10?/Xm%3A%28No.+CB%281%29366%29+and+m%3A%28Drainage%29+and+m%3A%28Flood%29&searchscope=10&l=&m=&Da=1996&Db=1998&SORT=D/Xm%3A%28No.+CB%281%29366%29+and+m%3A%28Drainage%29+and+m%3A%28Flood%29&searchscope=10&l=&m=&Da=1996&Db=1998&SORT=D&SUBKEY=m%3A\(No.+CB\(1\)366\)+and+m%3A\(Drainage\)+and+m%3A\(Flood\)/1%2C2%2C2%2CB/frameset&FF=Xm%3A%28No.+CB%281%29366%29+and+m%3A%28Drainage%29+and+m%3A%28Flood%29&SORT=D&2%2C2%2C](http://library.legco.gov.hk:1080/search~S10?/Xm%3A%28No.+CB%281%29366%29+and+m%3A%28Drainage%29+and+m%3A%28Flood%29&searchscope=10&l=&m=&Da=1996&Db=1998&SORT=D/Xm%3A%28No.+CB%281%29366%29+and+m%3A%28Drainage%29+and+m%3A%28Flood%29&searchscope=10&l=&m=&Da=1996&Db=1998&SORT=D&SUBKEY=m%3A(No.+CB(1)366)+and+m%3A(Drainage)+and+m%3A(Flood)/1%2C2%2C2%2CB/frameset&FF=Xm%3A%28No.+CB%281%29366%29+and+m%3A%28Drainage%29+and+m%3A%28Flood%29&SORT=D&2%2C2%2C) (Accessed 2 June 2016).

3.2 Essential 2: Identify, Understand and Use Current and Future Risk Scenarios

This Essential includes three indicators of Layer 1, which scored 3, 2 and 4, respectively, giving an average score of 3. This is one of the weaker aspects of resilience capacity in Hong Kong SAR.

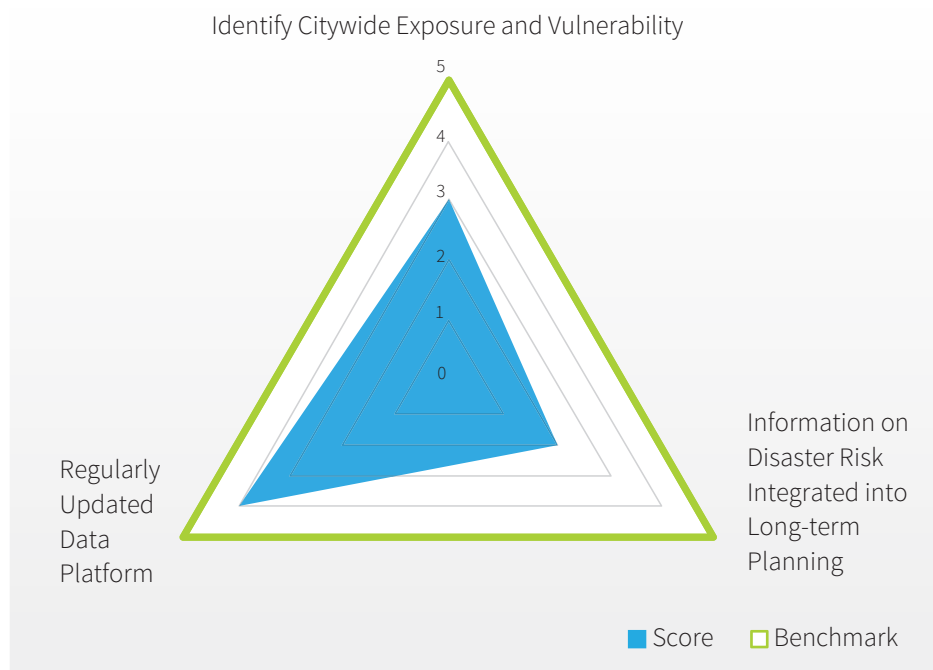


Figure 4: Performance of 'Identify, Understand and Use Current and Future Risk Scenarios'



Indicator 2.1. The city undertakes technical and multi-stakeholder analysis of current and future threats and hazards to identify citywide exposure and vulnerability.

The supporting question selected from Layer 3 is 'Does a series of citywide disaster risk maps exist, and to what extent of so?', scored according to the following indicative measures:

- 5 – Fully comprehensive, detailed and up-to-date risk maps exist for the entire city, covering various hazards, assets and populations at risk, and they are known to be accurate.
- 4 – Risk maps exist for the entire city, but with some minor omissions of content or detail, perhaps because an update is due.
- 3 – Risk maps exist, but with more significant omissions or known inaccuracies.
- 2 – Risk maps are partial in coverage and fragmented; exposure and vulnerability data for key assets or areas may be entirely lacking.
- 1 – Risk maps are old, incomplete and known to be unsound as a basis for decision making.
- 0 – No maps exist.

Three marks are scored for Indicator 2.1.

Some maps on seismic hazards,⁹ storm surges and landslides in Hong Kong SAR exist. However, they cannot be regarded as comprehensive risk maps because data on vulnerability were not taken into account in their development. Fully comprehensive, detailed and up-to-date risk maps for the entire city based on exposure and vulnerability data, hazards, assets and populations at risk are not available. For instance, maps of areas potentially affected by storm surges and landslides are shown on pages 60 and 63 of Hong Kong Climate Change Report 2015, but they do not reflect the information on vulnerability and exposure, such as assets and populations at risk.¹⁰

Indicator 2.2. Information on disaster risks is integrated into the city's long-term planning.

The supporting question selected from Layer 2 is 'Are there clear mechanisms to leverage information on risks and their effects as a decision-making tool across all city departments and into their planning/strategy processes?' (No detailed scoring is required in the UNISDR's tool.)

Two marks are scored for Indicator 2.2.

As mentioned previously, disaster risks are only partially assessed in Hong Kong. The information on disaster risks that can be integrated into the city's long-term planning is scarce. Furthermore, there is no effective mechanism to guarantee that available information must be used in the course of the city's long-term planning.

For instance, due to the gradually rising sea level in Hong Kong and its adjacent waters, the HKO has been investing in research in climate science (particularly regarding the uncertainty in projecting global sea level rises); land stability and subsidence; and better protection of coastal areas with a history of flooding (e.g., a map illustrating the areas of Hong Kong vulnerable to storm surge¹¹). More effort can be leveraged for better land-use planning and preparation efforts by the relevant departments (e.g., the CEDD has reviewed the Port Works Manual based on the latest projection of sea level rise).

⁹ Please see GEO Report No. 311 at http://www.cedd.gov.hk/eng/publications/geo_reports/geo_rpt311.html.

¹⁰ For examples of good practice in disaster risk mapping, please see Shi, P (Ed). 2011. *Atlas of Natural Disaster Risk of China*. Beijing: Science Press.

¹¹ Environment Bureau (2015) Hong Kong Climate Change Report 2015, p. 60. <http://www.enb.gov.hk/sites/default/files/pdf/ClimateChangeEng.pdf>



Photo Credit: Jackson Lee

Indicator 2.3. The city has a regularly updated data platform that enables stakeholders and the wider population to access and exchange risk-related information.

The supporting question selected from Layer 2 is 'Is information on hazard and risk publicly available and easy to access?' (No detailed scoring is required in the UNISDR's tool.)

Four marks are scored for Indicator 2.3.

The information on weather-related hazard and risk is publicly available and easy to access via official government websites.¹² For example, information about typhoons, rainfall, temperature, relative humidity, wind and visibility can be found easily on the HKO's website. In addition, social media apps such as YouTube, Twitter, Weibo, WeChat and Tudou can be used to exchange risk-related information. It is noteworthy that the 'My Observatory' mobile app administered by Hong Kong Observatory, which provides real-time weather and related hazard information to the public, has extremely high reach and popularity (more than 6 million downloads and around 232 million page views per day).

3.3 Essential 3: Strengthen Financial Capacity for Resilience

This Essential includes three indicators of Layer 1, which scored 4, 5 and 5, respectively, giving an average score of 4.67.

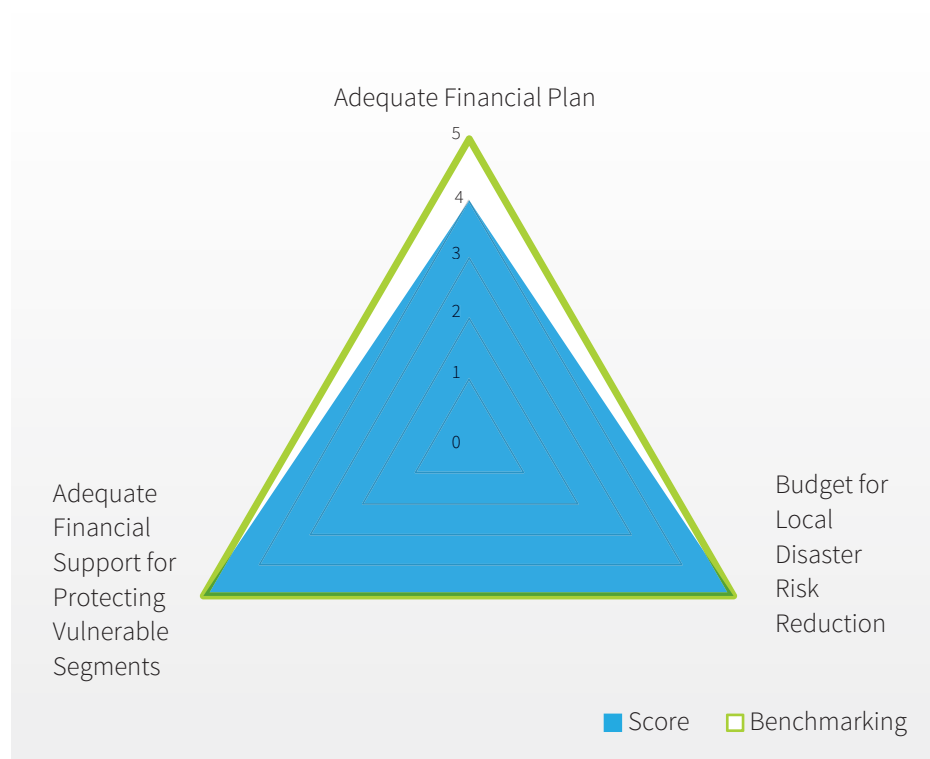


Figure 5: Performance of ‘Strengthen Financial Capacity for Resilience’



Indicator 3.1. The city has in place an adequate financial plan (or procedures) and sufficient resources to allow resilience-building activities to be realised, including long-term climate adaptation.

The supporting question selected from Layer 2 is ‘Does the city have a forward-looking agenda with financial plans to address the risks posed by climate change scenarios?’, scored according to the following indicative measures:

- 5 – Yes, and clear funding arrangements are secured for identified actions.
- 4 – Yes, and some funding is available, but this changes year to year.
- 3 – Yes, and some funds are available, but they are insufficient.
- 2 – Yes, but only limited funds are available.
- 1 – Climate change is mentioned, but no funds are available.
- 0 – There is no plan and no funding.

Four marks are scored for Indicator 3.1.

The Hong Kong government has in place an adequate financial plan to allow resilience-building activities including long-term climate adaptation. For example, the government is committed to protecting the environment and making Hong Kong a green and more pleasant place to live. The current government allocated over HK\$30 billion to building environmentally friendly facilities, funding green projects, improving air quality, combating climate change and improving waste management in the 2015–2016 budget. In addition, the Hong Kong government has implemented new measures and introduced new legislation to combat climate change, save energy and reduce emissions. The Mandatory Energy Efficiency Labelling Scheme, launched in 2009, now covers products whose electricity consumption accounts for 70% of that in the residential sector.¹³

The current government has injected HK\$1.5 billion into the Environment and Conservation Fund. It subsidises projects that promote energy saving, waste reduction and recycling, greening, conservation and scientific research into environmental protection. Between 2008 and the end of 2011, the Fund approved more than 2,000 projects and provided subsidies of over HK\$1 billion.¹⁴

Indicator 3.2. The city has in place a specific budget, the necessary resources and contingency fund arrangements for local DRR.

The supporting question selected from Layer 2 is ‘Is an annual budget assigned to prevention measures?’ (No detailed scoring is required in the UNISDR’s tool.)

Five marks are scored for Indicator 3.2.

In the 2016–2017 Budget of the Hong Kong government, annual budgets are assigned to disaster prevention and preparedness actions in DRR-related departments (see Table 3). For instance, HK\$1,280,640,000 was allocated to the CEDD from the Civil Engineering Fund to enhance landslip prevention measures. In view of the landslip risk, a special budget of HK\$1,045,636,000 (programme code No. 5001BX)¹⁵ was allocated in the 2015–2016 Budget to the Geotechnical Engineering Office (GEO) to launch a Landslip Prevention and Mitigation Programme (LPMitP) to systematically deal with the landslip risk associated with both manmade and natural slopes. Under the LPMitP, the most deserving manmade slopes and natural hillside catchments are selected for study each year in accordance with a risk-based priority ranking system. The necessary landslip prevention and mitigation works, as identified by the studies, are carried out for manmade slopes and natural hillside catchments under government maintenance.¹⁶ This is an example of providing necessary resources for local DRR.

¹³ <http://www.budget.gov.hk/2012/eng/budget36.html>

¹⁴ <http://www.budget.gov.hk/2015/eng/pdf/disast.pdf>

¹⁵ <http://www.budget.gov.hk/2015/chi/pdf/c-705.pdf>

¹⁶ http://www.cedd.gov.hk/eng/projects/landslip/land_lpm.html

Table 3: Budget Items and Amounts for Departments Involved in Disaster Prevention and Preparedness

Department	Item	Budget 16–17 (HK\$)	Source
HKO	Promoting public awareness of, and community preparedness for, natural disasters	240,562,000	Budget for HKO ¹⁷
CEDD	Landslip preventive measures	1,280,640,000	Civil Engineering Fund ¹⁸
LandsD	Maintaining manmade slopes on unallocated and unleased government land	546,837,000	Budget for LandsD ¹⁹
AFCD	Nature Conservation and Country Parks	669,100,000	Budget for AFCD ²⁰
DSD	Drainage and erosion protection	341,841,000	Drainage Fund ²¹
EDB	Repairs to slopes of aided schools served with Dangerous Hillside Orders	200,000	Capital Subventions and Major Systems and Equipment Fund ²²

Indicator 3.3. There are means in place to ensure adequate financial support for protecting vulnerable segments of the city's population.

The supporting question selected from Layer 3 is 'Are there social protection and financial assistance plans and mechanisms, such as microfinance, in place to address the specific needs of the city's vulnerable population?', scored according to the following indicative measures:

- 5 – Financing exists, to address all known issues, for all segments of the city's vulnerable population.
- 4 – Financing exists for most groups of the vulnerable population, with minor gaps in coverage.
- 3 – Financing exists for most groups of the vulnerable population, but there are large gaps in coverage.
- 2 – Financing exists for some issues, but gaps exist for some vulnerable groups of the population.
- 1 – There is significant weakness in coverage of the city's vulnerable groups, coverage of issues or in level of adequacy.
- 0 – No financing exists.

Five marks are scored for Indicator 3.3.

The Hong Kong government is committed to assisting individuals and families in need (see Table 4 for details of related schemes). The scope and extent of Hong Kong's welfare services have steadily evolved over the years. Emergency relief in the form of meals or cash in lieu of meals and other necessities is given to victims of natural or other disasters. Grants from the Emergency Relief Fund are paid to eligible victims or, in the case of death, to their dependants.²³

¹⁷ <http://www.budget.gov.hk/2016/eng/pdf/head168.pdf>. Note that the budget is for the whole department's operation, not just for disaster prevention and preparedness. No detailed breakdowns of the budget can be accessed.

¹⁸ <http://www.budget.gov.hk/2016/chi/pdf/c-705.pdf>

¹⁹ <http://www.budget.gov.hk/2016/eng/pdf/head091.pdf>

²⁰ <http://www.budget.gov.hk/2016/eng/pdf/head022.pdf>

²¹ <http://www.budget.gov.hk/2016/chi/pdf/c-704.pdf>

²² <http://www.budget.gov.hk/2016/chi/pdf/c-708.pdf>

²³ Information Services Department (2015) Hong Kong 2014. pp. 165–168

Table 4: Overview of Financial Assistance Schemes for Various Vulnerable Groups in Hong Kong

Programme	Target Group	Actual 2014-15	Revised 2015-16	Estimated 2016-17
Comprehensive Social Security Assistance (CSSA)	Individuals who cannot support themselves financially	19,547,872,000	20,103,000,000	31,361,000,000
Support for Self-reliance (SFS)	CSSA recipients	N/A	N/A	N/A
Portable Comprehensive Social Security Assistance (PCSSA)	Elderly CSSA recipients who meet the prescribed criteria to continue to receive cash assistance under the CSSA Scheme if they choose to retire permanently in Guangdong or Fujian	N/A	N/A	N/A
Social Security Allowance	Hong Kong residents who are severely disabled or who are 65 years of age or above	17,179,487,000	18,680,000,000	20,653,000,000
Criminal and Law Enforcement Injuries Compensation	Persons (or their dependants in cases of death) who are injured as a result of a crime of violence, or by a law enforcement officer using a weapon in the exercise of his or her duty	5,599,000	5,950,000	5,950,000
Traffic Accident Victims Assistance	Road traffic accident victims (or their dependants in cases of death)	32,761,000	37,094,000	44,707,000
Emergency Relief	Victims of natural or other disasters such as fire, typhoon, flood, rainstorm, landslide and house collapse and evacuees of buildings and premises considered to be dangerous under Closure Orders	525,000	1,000,000	1,000,000

Sources: <http://www.swd.gov.hk/tc/index/>; <http://www.budget.gov.hk/2016/chi/pdf/chead170.pdf>.

3.4 Essential 4: Pursue Resilient Urban Development and Design

This Essential includes four indicators of Layer 1, scored 4, 5, 4 and 4, respectively, with an average score of 4.25.

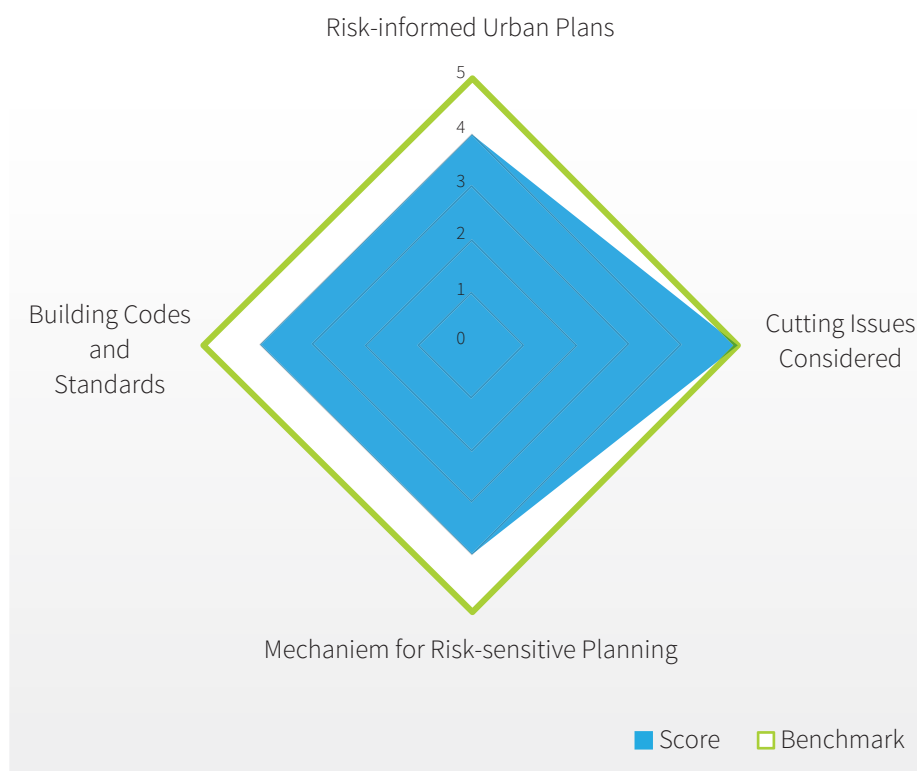


Figure 6: Performance of 'Pursue Resilient Urban Development and Design'.

Indicator 4.1. Urban plans are informed and influenced by up-to-date risk information.

The supporting question selected from Layer 3 is 'Do up-to-date datasets exist that will inform risk-sensitive urban planning and development?', scored according to the following indicative measures:

- 5 – Multiple datasets created through collaborative approaches (such as on population and social statistics, urban economics, housing and land, critical infrastructure and facilities, and environmental sustainability) inform risk-sensitive urban plans and are updated on a regular basis.
- 4 – All datasets exist, but they have not been updated within the last 5 years.
- 3 – Some datasets are available and updated.
- 2 – There are plans to develop non-existent datasets and update old ones.
- 1 – There are no plans to develop non-existent datasets, but there are plans to update old ones.
- 0 – There are no plans to develop non-existent datasets or to update old ones.

Four marks are scored for Indicator 4.1.

All datasets exist, but the update cycles of different datasets vary. The majority of datasets are maintained by the Census and Statistics Department,²⁴ and are updated every 5 or 10 years. However, some datasets that are developed and maintained by technical departments are updated more efficiently. For instance, the Hong Kong Geological Survey is responsible for maintaining the most comprehensive archive of geological information in Hong Kong and providing authoritative advice on Hong Kong's geology to the government, the engineering profession and the public. It also produces geological maps and relevant publications, and compiles a geological and natural terrain database for use by the government and the private sector. Many of the datasets are stored in a geographical information system, which is frequently updated.

²⁴ <http://www.censtatd.gov.hk>

Indicator 4.2. Urban plans consider cross-cutting issues of urban resilience.

The supporting question selected from Layer 3 is 'Are innovative planning practices and urban design solutions used to improve resilience? (e.g., by maximising the extent and benefit of ecosystem services within the city)', scored according to the following indicative measures:

- 5 – Systematic use of innovative planning practices and design solutions to improve resilience throughout the city, enforced by codes, is assumed to be the norm.
- 4 – Widespread use of urban design features, but some missed opportunities. Proposals to use urban design solutions are likely to be favourably received, but are not mandated.
- 3 – Some use of urban design features (in some areas or concentrating on one or two solutions). Their use is not assured, but the argument for using them can be made depending on each case.
- 2 – Scattered use of urban design solutions, but interested in expanding this.
- 1 – Little use of urban design solutions and little interest in them.
- 0 – No use of design solutions and no interest in them.

**Five marks are scored for Indicator 4.2.**

Cross-cutting issues are commonly defined as topics that, by their very nature, have a significant influence on all operations in a given field and must therefore receive special attention. In the field of urban resilience, innovative scientific planning is one of the most important cross-cutting issues.

Hong Kong has a tradition of emphasising innovative planning practices and design solutions to increase urban resilience. To maximise the extent and benefit of ecosystems, 24 country parks have been designated for the purposes of nature conservation,²⁵ countryside recreation and outdoor education. In addition, a further 22 Special Areas have been created for the main purpose of nature conservation. The designation and protection of these parks and Special Areas are enforced by Country Parks Ordinance (CAP 208), Country Parks and Special Areas Regulations (CAP 208A), Country Parks (Designation) (Consolidation) Order (CAP 208B), Designation of Special Areas within Country Parks (Consolidation) Order (CAP 208C) and Special Areas (Designation) (Consolidation) Order (CAP 208D).

In Hong Kong, in accordance with the Hong Kong Planning Standards and Guidelines (HKPSG), practising good urban design at the local level is highly recommended to realise a liveable high-density environment. The HKPSG provide design guidelines on aspects such as massing, height profile, street orientation and breezeways to promote better urban air ventilation, and thereby help tackle the urban heat island effect and improve the microclimate of the urban environment.²⁶

One of the most impressive examples of using a design solution to improve urban resilience in Hong Kong is the design of steel structures. Codes for the design of steel structures in Hong Kong were initially derived from London byelaws and the specification for the use of structural steel in building, BS 449. In 1987, Hong Kong published its own code. After the return to Chinese sovereignty, the Hong Kong government revised the code to the Code of Practice for the Structural Use of Steel 2005 to encourage the use of structural steel to benefit stakeholders, the environment and the society. This is in line with the vision to develop a technology-driven and knowledge-based society. After a three-year review and consideration of the latest

²⁵ Information Services Department (2016) Hong Kong: The Facts – Country Parks and Conservation, available at http://www.gov.hk/en/about/abouthk/factsheets/docs/country_parks.pdf

²⁶ Environment Bureau (2015) Hong Kong Climate Change Report 2015, p. 55. <http://www.enb.gov.hk/sites/default/files/pdf/ClimateChangeEng.pdf>, <http://www.enb.gov.hk/publica/tnl/tnl085.pdf> (Accessed 2 June 2016).

design and technology related to steel construction, the Code of Practice for the Structural Use of Steel 2011 was issued to capture the latest best practice. The Code not only provides full guidance on how to comply with the requirements of the Buildings Ordinance, but also provides a more up-to-date reference for practising engineers and members of the construction industry.²⁷

Hong Kong has been chosen as an Asia-Pacific base by some global architecture and planning firms. HOK, a global design, architecture, engineering and planning firm,

earned a contract to create the masterplan and conceptual design for the new international passenger terminal in Hong Kong in June 1990. In the process of implementing the design contract, HOK discovered substantial business opportunities for innovative planning and design in Hong Kong. The firm then decided to expand its project office to a permanent practice in Hong Kong. HOK's practice has blossomed into a sophisticated network of full-service offices that delivers innovative planning and design solutions to clients throughout the Asia-Pacific region.²⁸



²⁷ <http://www.bd.gov.hk/english/documents/code/SUOS2011.pdf>

²⁸ Hellmuth, Obata & Kassabaum (2009) HOK Asia. The Images Publishing Group Ltd. pp. 6–10.

Indicator 4.3. There is a mechanism/process to implement risk-sensitive urban planning.

The supporting instruction selected from Layer 3 is 'Indicate the level and type of stakeholder engagement with indicative measurement', scored according to the following indicative measures:

- 5 – There is multi-stakeholder engagement with all relevant groups (civil society, NGOs, academic and research organisations and the private sector) and collaboration where necessary with national/regional governments at different stages of planning (information generation, design, implementation, monitoring).
- 4 – There is engagement with main stakeholder groups during planning and implementation.
- 3 – There is engagement with some stakeholder groups in implementation only (as legally required).
- 2 – There is currently no stakeholder engagement or consultation during planning but the city is identifying engagement mechanisms.
- 1 – The city is currently discussing how to identify mechanisms.
- 0 – There is no current stakeholder engagement and consultation process and no plan to identify engagement mechanisms.

Four marks are scored for Indicator 4.3.

In accordance with the Town Planning (Amendment) Ordinance 2004, stakeholder engagement is integral to plan making and implementation. The Ordinance provides for the opening up of all meetings of the Town Planning Board and its committees to the public, except for the deliberation part and in some special circumstances. In addition, the Ordinance contains provisions to further enhance the transparency of plan making and the planning application processes, and to achieve greater public participation while maintaining the efficiency of the planning application system.²⁹

Apart from public participation, another indispensable requirement for implementing risk-sensitive planning is to take the potential effects of natural hazards into account when planning new developments. In Hong Kong, the GEO is the landslide technical office that assumes the responsibility of providing the PD and LandsD with geotechnical input at the early stages of land development, identifying any geotechnical constraints and advising on the suitability of land for specific purposes.³⁰



²⁹ Planning Department's pamphlet about *Town Planning (Amendment) Ordinance 2004*, available at http://www.pland.gov.hk/pland_en/tech_doc/tp_bill/pamphlet2004/index.html

³⁰ The Geotechnical Engineering Office (2015) *Geotechnical Services*, p. 2. Available at http://www.cedd.gov.hk/eng/publications/fact_sheet/doc/gc.pdf

Indicator 4.4. The city develops, updates and enforces the use of building codes and standards, according to relevant hazards and the effects of climate change.

The supporting question selected from Layer 3 is 'Do statutory codes conform to latest standards in building practices and perils faced by the city?', scored according to the following indicative measures:

- 5 – Codes are or will be reviewed for suitability for worst-case scenarios or reasonable worst-case scenarios and are updated at least every 5 years. They embody the latest international standards and good practice in building.
- 4 – Codes are or will be reviewed for suitability for the 'most probable' scenario every 10 years. They may not embody the very latest standards in building practice.
- 3 – Codes are or will be reviewed for suitability for the 'most probable' scenario every 10 years. They probably do not embody the very latest standards in building practice.
- 2 – Codes are or will be reviewed for suitability for the 'most probable' scenario every 15 years or more. They are known to be obsolete in significant respects.
- 1 – Codes exist, but are not reviewed at all, and there are no plans to do so. They are totally obsolete.
- 0 – No codes exist.

Four marks are scored for Indicator 4.4.

A set of building standards has been developed and reviewed at varying periods. These include the *Code of Practice on Wind Effects*, *Code of Practice for the Structural Use of Steel* and *Code of Practice for Fire Safety in Buildings*.

Substantial research has revealed that two dominant factors shape the extreme wind loading in Hong Kong. The first is the exposure to severe typhoons, and the second is the protection afforded by one of the most sheltered natural harbours in the world.³¹ In view of the extreme wind loading, the *Code of Practice on Wind Effects* in Hong Kong was established in 1983 and revised in 2004.³²

As mentioned under Indicator 4.2, the code for the design of steel structures in Hong Kong was initially derived from London byelaws and then BS 449. In 1987, Hong Kong published its own code based on the permissible stress design for the structural use of steel. Further revisions were made in 2005, 2008 and 2011.

Furthermore, in 2011, the Code of Practice for Fire Safety in Buildings was issued to replace the *Code of Practice for the Provision of Means of Escape in Case of Fire 1996*, the *Code of Practice for Fire Resisting Construction 1996* and the *Code of Practice for Means of Access for Firefighting and Rescue 2004*, and to provide guidance on compliance with the requirements laid down in the *Building (Construction) Regulation 90* and the *Building (Planning) Regulations 41, 41A, 41B, 41C and 41D*, which include the requirements for fire-resisting construction, means of escape and means of access to buildings for firefighting and rescue. The new Code also provides guidelines on the testing standards for the fire properties of building elements and components, fire safety management of buildings and the alternative approach to fire safety design (i.e., the fire engineering approach).³³

The Legislative Council and Building Department have discussed and researched the necessity and feasibility of establishing Hong Kong standards for 'seismic-resistant' or other specific hazard-resistant building codes or importing standards from the USA or mainland China,³⁴ but this is still subject to deliberation.

³¹ Buildings Department (2004) *Explanatory Materials to the Code of Practice on Wind Effects in Hong Kong 2004*, available at <http://www.bd.gov.hk/english/documents/code/EMwindcode2004.pdf>

³² Buildings Department (2004) *Code of Practice on Wind Effects in Hong Kong 2004*, available at <http://www.bd.gov.hk/english/documents/code/windcode2004.pdf>

³³ http://www.bd.gov.hk/english/documents/code/fs_code2011.pdf

³⁴ Legislative Council Panel on Development, Consultation on Introduction of Seismic-resistant Building Design Standards in Hong Kong, available at <http://www.legco.gov.hk/yr13-14/english/panels/dev/papers/devcb1-1110-1-e.pdf>

3.5 Essential 5: Safeguard Natural Buffers to Enhance the Protective Functions Offered by Natural Ecosystems

This Essential includes two indicators of Layer 1, both of which scored 5.³⁵

Indicator 5.1. There are solutions in place to address current and future environmental risks (e.g., green and blue infrastructure).³⁶

The supporting instruction selected from Layer 3 is 'Specify the level of awareness and actions undertaken', scored according to the following indicative measures:

- 5 – The city is aware of the roles of blue and green infrastructure projects in increasing resilience, and they are integrated into city implementation plans. A number of projects have been undertaken.
- 4 – The city is aware of the roles of blue and green infrastructure projects in increasing resilience, and there is a process to integrate them into city implementation plans (such as in conjunction with urban design projects or advocating for energy efficiency measures such as green roofs).
- 3 – The city is learning about the roles of blue and green infrastructure projects in increasing resilience and is considering partnering with a third party to learn how to integrate such projects in city plans.
- 2 – The city is starting to consider learning about the benefits of blue and green infrastructure and using them in relevant city projects to increase resilience.
- 1 – The city does not know how to use blue and green infrastructure to increase resilience, but would like to learn from other cities' experiences.
- 0 – The city is not considering blue and green infrastructure to increase resilience.

Five marks are scored for Indicator 5.1.

A set of legislation on environmental protection has been established in Hong Kong. Ten ordinances are in place to address various environmental risks: the Waste Disposal Ordinance, the Water Pollution Control Ordinance, the Air Pollution Control Ordinance, the Noise Control Ordinance, the Ozone Layer Protection Ordinance, the Dumping at Sea Ordinance, the Environmental Impact Assessment Ordinance, the Hazardous Chemicals Control Ordinance, the Product Eco-responsibility Ordinance and the Motor Vehicle Idling (Fixed Penalty) Ordinance.³⁷

A greening policy has been adopted to enhance urban resilience and is comprehensively explained on the Hong Kong government's official website.³⁸ The important role of blue and green infrastructure projects is fully understood, and a number of projects have been undertaken. The main initiatives include active planning of the greening programme; enhancing opportunities for quality greening, community support and private sector involvement; and tree preservation. To better guide the planning, design and implementation of greening works, the Hong Kong government has developed Greening Master Plans (GMPs) since 2004. The GMPs aim to define an overall greening framework by identifying suitable locations for planting with desirable themes and species, thus paving the way for continuous and consistent results in greening the environment. In addition, the Greening, Landscape and Tree Management Section was established under the Works Branch of the Development Bureau in March 2010 to champion a new strategic policy on greening, landscaping and tree management for the sustainable development of a greener environment for Hong Kong.

³⁵ A Radar figure cannot be produced because there are fewer than three indicators.

³⁶ Also called nature-based solutions or protection of ecosystems. Green infrastructure in cities includes greening streets, squares and roadsides; greening roofs and facades; developing urban agriculture; creating urban green corridors; replacing impermeable surfaces; natural water filtration; phyto-purification; daylighting urban rivers and restoring embankments; etc. Blue infrastructure in cities includes river corridors, wetlands and other waterways.

³⁷ <http://www.yearbook.gov.hk/2012/en/pdf/E14.pdf>

³⁸ Greening Hong Kong, available at : <http://www.gov.hk/en/residents/environment/sustainable/greening.htm>

Indicator 5.2. The city protects and restores ecosystems to the extent that they offer sufficient adaptation to and mitigation of current and future risks.

The supporting question selected from Layer 3 is 'Are there any specific projects to preserve and restore land (including coastline) to support biodiversity and critical ecosystems?', scored according to the following indicative measures:

- 5 – There are a number of preservation/restoration projects currently at the implementation stage.
- 4 – A number of preservation/restoration projects are currently in development.
- 3 – Projects are at the decision-making stage waiting for final approval.
- 2 – The city is currently considering developing projects to preserve and restore land.
- 1 – The city is currently partnering with third parties to learn about the benefits of ecosystems preservation to make informed decisions on whether projects to preserve and restore land are necessary.
- 0 – There are no planned projects to preserve and restore land.

Five marks are scored for Indicator 5.2.

A number of preservation/restoration projects are currently at the implementation stage. The Protection of the Harbour Ordinance (CAP 531) is an example of Hong Kong legislation that aims to limit land reclamation in the surviving waters of Victoria Harbour.³⁹ Environmental issues brought about by reclamation include the release of contaminants from dredging, disruption of the marine environment and ecosystem, pollution of the surrounding water and air and irreversible damage to the coastline and harbour.⁴⁰ The Harbour Ordinance established a statutory principle recognising the harbour as a public asset and natural heritage of Hong Kong. No one can reclaim the harbour unless under exceptional circumstances.

As mentioned previously, to maximise the extent of and benefit to ecosystems, 24 country parks have been designated for the purposes of nature conservation, countryside recreation and outdoor education, and a further 22 Special Areas have been created for the main purpose of nature conservation.



³⁹ https://en.wikipedia.org/wiki/Protection_of_the_Harbour_Ordinance

⁴⁰ Ma K.W. (2014) *A Study of Hong Kong Reclamation Policy and Its Environmental Impact*. Dissertation of Hong Kong University. Available at <http://hub.hku.hk/bitstream/10722/207670/1/FullText.pdf?accept=1>

3.6 Essential 6: Strengthen Institutional Capacity for Resilience

This Essential includes four indicators of Layer 1, which scored 3, 2, 3 and 4, respectively, with an overall score of 3, making this a weaker area in Hong Kong.

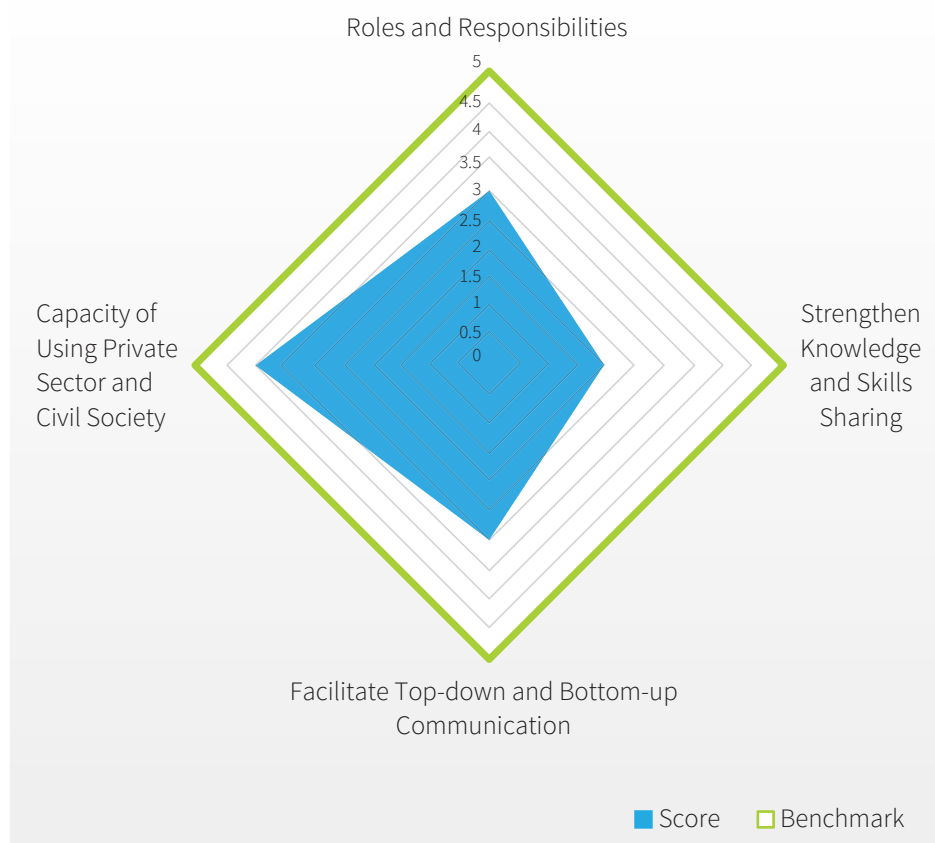


Figure 7: Performance of 'Strengthen Institutional Capacity for Resilience'

Indicator 6.1. The roles and responsibilities of disaster resilience (See Essential 1.3) are legitimised in DRR legislation.

The supporting instruction selected from Layer 3 is 'Evaluate existing DRR-related legislation relevant to the city', scored according to the following indicative measures:

- 5 – Comprehensive DRR-related legislation sets out the national and local roles and responsibilities of all relevant stakeholders. It also outlines DRR objectives, criteria/threshold for an emergency/major incident and related key terms. Legislation is clear, well publicised and understood by relevant parties.
- 4 – DRR-related legislation effectively explains major roles and responsibilities and defines incident levels. It could be presented more clearly and disseminated more widely.
- 3 – DRR-related legislation explains roles, responsibilities and event thresholds to some degree, but it could be clearer and more detailed.
- 2 – Basic legislation exists, but more detail is required.
- 1 – No legislation exists and the roles, responsibilities and objectives for DRR are not legally defined.

Three marks are scored for Indicator 6.1.

Although the majority of DRR actions have been observed in Hong Kong, and there is clear allocation of roles and responsibilities among different government departments in accordance with related ordinances (see Table 5), the current legislation is inadequate to secure sustained action. In other words, the legislation is grossly lagging behind the development of DRR practice. Clearer and more detailed statutory requirements to enhance resilience capacity are needed.

Table 5: An Overview of Legislation Related to DRR

DRR	Ordinances
Environmental Risk Reduction	<i>Waste Disposal Ordinance (CAP 354)</i> <i>Water Pollution Control Ordinance (CAP 358)</i> <i>Air Pollution Control Ordinance (CAP 311)</i> <i>Noise Control Ordinance (CAP 400)</i> <i>Ozone Layer Protection Ordinance (CAP 403)</i> <i>Dumping at Sea Ordinance (CAP 466)</i> <i>Environmental Impact Assessment Ordinance (CAP 499)</i> <i>Hazardous Chemicals Control Ordinance (CAP 595)</i> <i>Product Eco-Responsibility Ordinance (CAP 603)</i> <i>Motor Vehicle Idling (Fixed Penalty) Ordinance (CAP 611)</i>
Landslide Risk Reduction	<i>Building Management Ordinance (CAP 344)</i> <i>Buildings Ordinance (CAP 123)</i>
Urban Planning	<i>Town Planning Ordinance (CAP 131)</i>
Response and Relief	<i>Emergency Relief Fund Ordinance (CAP 1103)</i>
Flooding	<i>Sewage Services Ordinance (CAP463)</i>

In accordance with the government's Contingency Plan for Natural Disasters (Contingency Plan), in the event of a damaging earthquake or other unspecified serious scenario affecting Hong Kong, the Emergency Monitoring and Support Centre of the Security Bureau will be activated to coordinate the necessary response actions to be taken by various government departments. Although it has been playing an important role in emergencies, a drawback of the Contingency Plan is the lack of a legal basis for its creation and operation.

Some codes have been issued to make up for the lack of legal basis for some measures proposed in the Contingency Plan. For example, the Code of Practice in Times of Typhoons and Rainstorms provides advice and practical guidelines on work arrangements for employers.⁴¹

⁴¹ Labour Department (2015) Code of Practice in Times of Typhoons and Rainstorms, available at <http://www.labour.gov.hk/eng/public/wcp/Rainstorm.pdf>

Indicator 6.2. Processes are in place that strengthen and share the knowledge and skills of stakeholders involved in disaster resilience.

The supporting question selected from Layer 3 is ‘Are skills and experience in disaster resilience (risk identification, mitigation, planning and post-event response) present across institutions?’, scored according to the following indicative measures:

- 5 – A skills inventory has been carried out in the last year and all key skills and experience are available in required quantities in all organisations relevant to city disaster resilience, or there exists the ability to partner between organisations to address skills gaps.
- 4 – A skills inventory has revealed minor gaps in quantity or skill type in some organisations.
- 3 – A skills inventory has been carried out, but each organisation has at least one skill or experience type in short supply.
- 2 – A skills inventory may not have complete coverage, but there is a known widespread lack of multiple skills or experience types in many organisations.
- 1 – A rudimentary and partial skills inventory has been carried out, and there is suspicion of a complete or almost complete lack of skills available across the city.
- 0 – No skills inventory has been carried out.

Two marks are scored for Indicator 6.2.

Current processes to strengthen knowledge and skills for different stakeholders involved in disaster resilience are uneven. Generally, the public sector has more opportunities to strengthen the sharing of knowledge and skills than does civil society. However, there are few effective processes to share knowledge and skills between government and civil society. Although institutionalised information sharing between different offices of the Hong Kong government exists in emergency situations,⁴² few mechanisms are in place to enhance knowledge and skills sharing between the government and stakeholders involved in disaster resilience, apart from some pamphlets, videos and websites provided by the HKO and GEO for public education about weather warnings, hazards, landslip risks and tsunami risks.

Indicator 6.3. Processes are in place to facilitate top-down and bottom-up communication, strengthening the knowledge and awareness of the general public.

The supporting question selected from Layer 3 is ‘Are appropriate “systems of engagement” that enable citizens to participate in data collection and to receive and give updates before and after a disaster known of throughout the population and used?’, scored according to the following indicative measures:

- 5 – All information before, during and after an event is available on mobile devices. This is supported by alerts on social media and used to enable an inbound ‘citizen to government’ flow allowing crowdsourcing of data on events and issues, and the majority of citizens are aware of/subscribed to this.
- 4 – Extensive use is made of systems of engagement, with a few minor omissions.
- 3 – Some use is made of systems of engagement, but there are larger gaps in the information available by this means and the inbound flow works only via direct communication rather than mining of data.
- 2 – As for 3 but with no inbound flow.
- 1 – There is only rudimentary use of systems of engagement – perhaps only via mobile access to the existing website, which may not be optimised for smartphones – but interest in this is expanding.
- 0 – Systems of engagement are not used.

Three marks are scored for Indicator 6.3.

Top-down communication is in place to strengthen the knowledge and awareness of the general public in Hong Kong by various approaches, including SMS, mobile apps and public exhibitions. For example, the Community Weather Information Network (Co-WIN; <http://co-win.org>), established jointly by the HKO, the Hong Kong Polytechnic University and the Hong Kong Joint-school Meteorological Association in 2007, aims to help schools and other organisations to set up automatic weather stations to promote weather education, and to provide the public with comprehensive weather information covering a wide area. As of 16 June 2015, there were 148 members (see Figure 8).

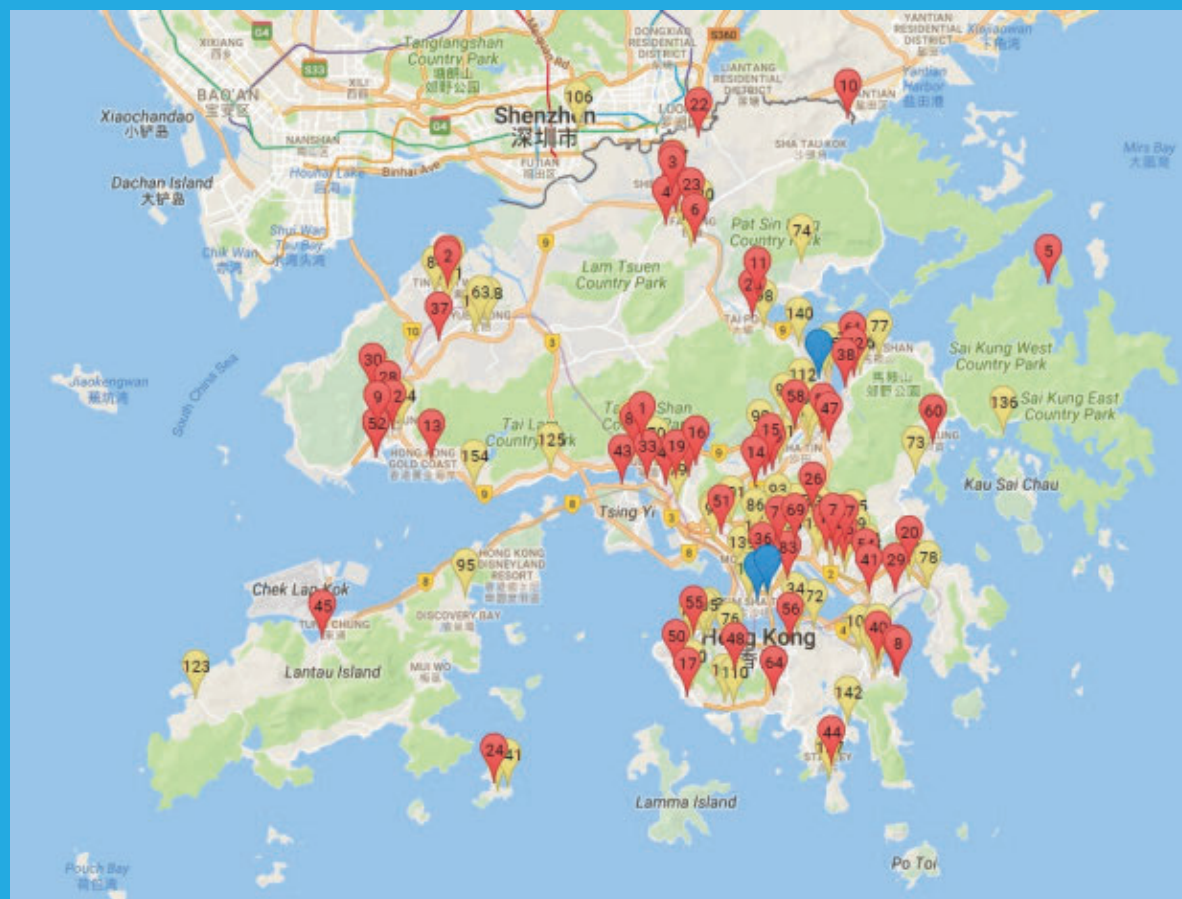


Figure 8: Distribution of Members of the ‘Community Weather Information Network’⁴³

Bottom-up communication is at a preliminary stage. A pioneer initiative of Co-WIN, the Community Weather Observing Scheme, led by the HKO, was launched in 2011. The initiative aims to encourage members of the public to carry out first-hand weather observations to broaden their knowledge of weather and climate by offering various on-line platforms to which anyone can upload weather photos and observation reports to share with others.

⁴³ Source: Hong Kong Observatory http://www.hko.gov.hk/whatsnew/r3/wn20150616_e.htm

Indicator 6.4. The city uses the capacity of the private sector and civil society for DRR.

The supporting question selected from Layer 3 is 'To what extent does the city utilise and engage civil society organisations?', scored according to the following indicative measures:

- 5 – City DRR stakeholders have in place comprehensive MOU agreements with various NGOs, and the NGO role in providing support in response, relief and meeting resource demands is defined. Volunteer capacity is sufficiently high. Regular planning and coordination meetings are held.
- 4 – The city works with NGOs in various DRR capacities, but this could be expanded further.
- 3 – The city works with NGOs in some DRR capacities, but this could improve. Volunteer capacity is modest relative to the city's needs.
- 2 – Some agreements exist, but these are not formal or coordinated. There is a need for greater volunteer capacity.
- 1 – City DRR stakeholders have started to engage NGOs, but this is at an early stage.
- 0 – No agreements or arrangements are in place.

Four marks are scored for Indicator 6.4.

The private sector is extensively engaged in DRR actions in Hong Kong, particularly in consultation for DRR policy making, civil engineering services to address landslide risk and provision of insurance for fire risks. For instance, Ove Arup & Partners (Hong Kong) Limited has provided a consultancy service to the government to assess the seismic effects on buildings in Hong Kong and introduce seismic provision in building design for Hong Kong since 2002,⁴⁴ and is currently drafting the first seismic design standard for Hong Kong.

Many government departments have partnered with NGOs for various DRR actions, particularly to increase the resilience capacities of various vulnerable groups, but this could be promoted further. To promote bottom-up communication in terms of strengthening the resilience knowledge and disaster risk awareness of the general public, civil society could play an essential role in plugging the existing gaps while the government pays more attention to the shortcomings of existing institutions and the strengths of NGOs in enabling community engagement in disaster resilience building.⁴⁵



⁴⁴ Buildings Department (2002) *Assessment Scheme to Determine Green Status of Buildings*, available at <http://www.bd.gov.hk/english/documents/news/20020826ae.htm> (Accessed May 31 2016).

⁴⁵ Newnham E., Patrick K., Balsari, S. & J. Leaning (2015) *Community Engagement in Disaster Planning and Response: Recommendations for Hong Kong*. Available at <https://cdn2.sph.harvard.edu/wp-content/uploads/sites/5/2015/11/Community-Preparedness-Policy-Brief-10.28.15.pdf> (Accessed 31 May 2016).

3.7 Essential 7: Understand and Strengthen Society Capacity for Resilience

This Essential includes three indicators of Layer 1, which all scored 5, making this one of the clear strengths of Hong Kong's DRR.

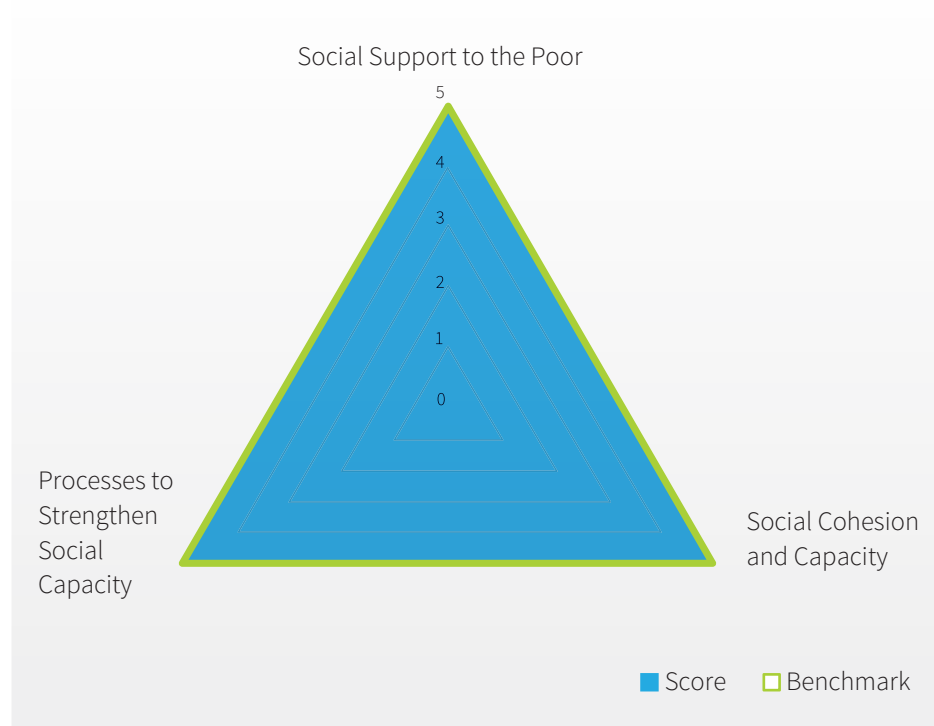


Figure 9: Performance of 'Understand and Strengthen Society Capacity for Resilience'



Indicator 7.1. The city provides social support to the poorest parts of the city, increasing their capacity and lowering their vulnerability to disaster.

The supporting question selected from Layer 3 is 'Are social assistance programmes available and adequate to the needs of the city's vulnerable population?', scored according to the following indicative measures:

- 5 – Support is available to most people and is adequate.
- 4 – Support is available to many people and is adequate.
- 3 – Support is available to many people but is inadequate.
- 2 – Support is available to some people but is inadequate.
- 1 – Support is available only to a few people and is inadequate.
- 0 – Support is not available to most people.

Five marks are scored for Indicator 7.1.

The Hong Kong government and society both provide social support to the poorest groups of the city, increasing their capacity and lowering their vulnerability to disasters. The government is committed to assisting individuals and families in need, and the scope and extent of Hong Kong's welfare services have steadily evolved over the years. A variety of assistance or welfare programmes exists for vulnerable groups such as the poor, the disabled, new immigrants and the elderly, to protect them from being trapped in difficult circumstances and to help them positively engage in the Hong Kong social mainstream.⁴⁶

A comprehensive report was prepared by Alison Gordon on the social assistance provided to the vulnerable population by various charitable organisations (such as The Hong Kong Jockey Club Charities Trust and Hong Kong Community Chest).⁴⁷

Indicator 7.2. Current social cohesion and social capacity in the city are understood.

The supporting question selected from Layer 3 is 'Are there active grassroots/community-based organisations that deal with resilience building within the city?', scored according to the following indicative measures:

- 5 – Grassroots organisations addressing the full spectrum of disaster resilience issues arising from the risk assessment exist for every neighbourhood, irrespective of wealth and demographics.
- 4 – >75% of neighbourhoods are covered by grassroots organisations addressing the full spectrum of disaster resilience issues.
- 3 – >50–75% of neighbourhoods are covered by grassroots organisations addressing the full spectrum of disaster resilience issues.
- 2 – >25–50% of neighbourhoods are covered by grassroots organisations addressing the full spectrum of disaster resilience issues.
- 1 – There are plans to engage neighbourhood organisations and maybe one or two initial cases.
- 0 – There is no engagement with neighbourhood organisations.

Five marks are scored for Indicator 7.2.

In the face of disasters, whether in Hong Kong or other countries or territories around Hong Kong, voluntary donations from the community to help victims have strongly demonstrated the social cohesion in Hong Kong, and the size of public donations made to disaster-stricken areas has revealed its strong social capacity.

Taking the vessel collision accident that happened in the waters off the northwest of Lamma Island in 2012 as an example, when the incident occurred, many charitable organisations and trusts promptly provided emergency financial assistance to address the victims' urgent needs. The Hong Kong Electric Company Limited (HEC) and the Li Ka Shing Foundation provided relief funds of HK\$200,000 and HK\$750,000,

⁴⁶ Information Services Department (2015) *Hong Kong: The Facts – Social Welfare*. Available at http://www.gov.hk/en/about/abouthk/factsheets/docs/social_welfare.pdf; *Legislative Council Panel on Welfare Services 2016 Policy Address: Policy Initiatives of the Labour and Welfare Bureau* (LC Paper No. CB (2)624/15-16(01)). Available at <http://www.legco.gov.hk/yr15-16/english/panels/ws/papers/ws20160125cb2-624-1-e.pdf>

⁴⁷ Gordon, A. (2013) *Hong Kong Government Social Funds: Fit for Purpose or Time for a Re-think?* Available at http://www.admcf.org/wordpress/wp-content/uploads/2013/10/HKGovtSocialFunds_OCT2013.pdf

respectively, to families of the deceased (including HEC and non-HEC staff). The government and various charitable funds and organisations also provided financial assistance to affected persons and their families. The Hong Kong Jockey Club Charities Trust offered financial assistance of HK\$100,000 to each of the 32 families of the deceased (a total of 39 victims) through the Social Welfare Department. The General Chinese Charities Fund offered emergency financial assistance of HK\$8,000 to each of the 25 eligible families with deceased members (a total of 29 victims), as well as HK\$3,000 to one family with an injured member through the Home Affairs Department.⁴⁸

A variety of grassroots organisations is ready to provide various services to different vulnerable groups among Hong Kong residents. The general public or specific groups in the community may turn to a number of charitable trusts in Hong Kong for relief and assistance. Many of the trust funds are statutory funds with a variety of charitable, educational and welfare purposes.

The level of social cohesion and social capacity is as high, if not higher, for natural disasters outside Hong Kong, such as the 2008 Wenchuan earthquake and the 2010 Yushu earthquake in mainland China, the 2011 Great East Japan Earthquake and the 2013 Typhoon Haiyan in the Philippines. For instance, after the Yushu earthquake in 2010, the Hong Kong government provided HK\$130 million, and the Hong Kong public raised about HK\$135 million in donations for relief measures and reconstruction.⁴⁹

Society capacity for disaster resilience is also reflected in the engagement of academic institutions, such as the Collaborating Centre for Oxford University and The Chinese University of Hong Kong for Disaster and Medical Humanitarian Response (CCOUC) (located in The Chinese University of Hong Kong), the Hong Kong Disaster Medicine Association, the Hong Kong Polytechnic University, the University of Hong Kong and the Hong Kong Jockey Club Disaster Preparedness and Response Institute. These institutes have active on-going DRR initiatives in mainland China and other nearby territories.

Indicator 7.3. The city has in place sufficient processes to strengthen social capacity.

The supporting question selected from Layer 3 is 'What is the percentage of primary schools in the city that teach emergency preparedness within their curriculum?' (No detailed scoring is required in the UNISDR's tool.)

Five marks are scored for Indicator 7.3.

In addition to social assistance and civil society development, it is crucial to provide school-based disaster preparedness education and related public education services.

According to the General Studies for Primary Schools Curriculum Guide (Primary 1 – Primary 6) prepared by the Curriculum Development Council, core elements of learning in the Health and Living strand for Key Stage 2 primary school students include the skills for dealing with unfamiliar situations and challenges, simple first aid and safety in daily life situations, minimising risks in daily life situations (e.g., safety, health, relationships) and understanding people and agencies that can assist with injury prevention, emergency care and violence prevention.⁵⁰

⁴⁸ http://www.hab.gov.hk/en/policy_responsibilities/District_Community_and_Public_Relations/trustfnd.htm

⁴⁹ Wolong, S. 'Carrie Lam opens Sichuan highway'. China Daily Asia, 12 May 2016. Available at http://www.chinadailyasia.com/hknews/2016-05/12/content_15431390_2.html (Accessed 27 May 2016).

⁵⁰ The Curriculum Development Council (2011) *General Studies for Primary Schools Curriculum Guide (Primary 1 – Primary 6)*, p. 18; available at http://www.edb.gov.hk/attachment/en/curriculum-development/kla/general-studies-for-primary/gs_p_guide-eng_300dpi-final%20version.pdf (Accessed 31 May 2016).

3.8 Essential 8: Increase Infrastructure Resilience

This Essential includes two indicators of Layer 1, which scored 5 and 4, respectively, giving an average score of 4.5.

Indicator 8.1. The city owns and implements a critical infrastructure plan or strategy to protect its critical infrastructure, utilities and services.

The supporting question selected from Layer 3 is 'Is there a multi-agency forum that assesses issues of infrastructure and operational resilience?', scored according to the following indicative measures:

- 5 – There is an established multi-agency/department/utility company forum that meets regularly, specifically to address issues of infrastructure resilience at the city scale.
- 4 – Some, but not all, key infrastructure/utility companies meet on a regular basis specifically to address issues of infrastructure resilience.
- 3 – Some, but not all, key infrastructure/utility companies meet on a regular basis, but the forum is not centred on resilience.
- 2 – Some, but not all, key infrastructure/utility companies meet on a semi-regular basis and occasionally address issues of resilience.
- 1 – There is an informal/ad-hoc network and relationships across various infrastructure/utility operators.
- 0 – There is little or no sharing of intelligence between infrastructure/utility providers.

Five marks are scored for Indicator 8.1.

According to the Marine Department,⁵¹ Hong Kong owns and implements a critical infrastructure plan or strategy to protect its critical infrastructure, utilities and services. The Critical Infrastructure Security Coordination Centre (CISCC), established in 2011, aims to enhance the protection of critical infrastructure and reduce vulnerability to terrorist attacks through effective coordination with all stakeholders. The CISCC follows processes and consults relevant government bureaux and departments before classifying any premises as a critical infrastructure. For example, the CISCC consults the Transport and Housing Bureau and the Transport Department before classifying premises under the Transportation Sector. The CISCC has grouped the critical infrastructures in Hong Kong into various sectors, and a 24-hour hotline has been set up to receive reports.

Indicator 8.2. Protective/risk-mitigating infrastructure (e.g., flood defences, seismic design) is in place where needed and is appropriately maintained.

The supporting question selected from Layer 3 is 'Is existing protective infrastructure well-designed and well-built based on risk information?', scored according to the following indicative measures:

- 5 – Protective infrastructure is fully in place and designed to deal with the 'most severe' scenario with minimal economic or humanitarian impact.
- 4 – Protective infrastructure has some deficiencies relative to the 'most severe' scenario, but is designed to deal with the 'most probable' scenario.
- 3 – Protective infrastructure will mitigate most of the 'most likely' scenarios, but some effects will be felt. Deficiencies relative to the 'most severe' scenario are more serious.
- 2 – Protective infrastructure will allow significant damage/effects from the 'most possible' scenarios and potentially catastrophic damage from the 'most severe' scenario.
- 1 – Protective infrastructure will mitigate some effects, but will still allow potentially catastrophic damage from the 'most probable' scenarios.
- 0 – No protection is in place.

Four marks are given to Indicator 8.2.

Protective/risk-mitigating infrastructure is sufficient in Hong Kong. The most significant risk-mitigating infrastructure in Hong Kong is the slope safety project, which is based on landslide risk information.

In view of flooding risks, a comprehensive flood prevention strategy has been progressively developed since 1990.⁵² The strategy's primary component is a set of flood protection standards for the planning and design of storm water drainage systems. There are various structural measures for long-term improvements, non-structural measures as short-term provisions and planned preventive maintenance. Other non-structural components include management and administrative measures such as land-use planning and control, legislation, warning systems and hazard management plans. Apart from typical river training and on-line capacity improvement, dedicated options including flood pumping schemes to protect buildings located on rural floodplains and storm water diversion and retention to minimise excavation works in densely populated urban areas have also been developed to suit specific local conditions.

⁵² Chui, S.K., Leung, J.K & Chu, C.K. (2006) *The development of a comprehensive flood prevention strategy for Hong Kong*, International Journal of River Basin Management, 4:1, 5–15, DOI: 10.1080/15715124.2006.9635270

3.9 Essential 9: Ensure Effective Preparedness and Disaster Response

This Essential includes three indicators of Layer 1, which scored 4, 4 and 5, respectively, giving rise to an average score of 4.3.

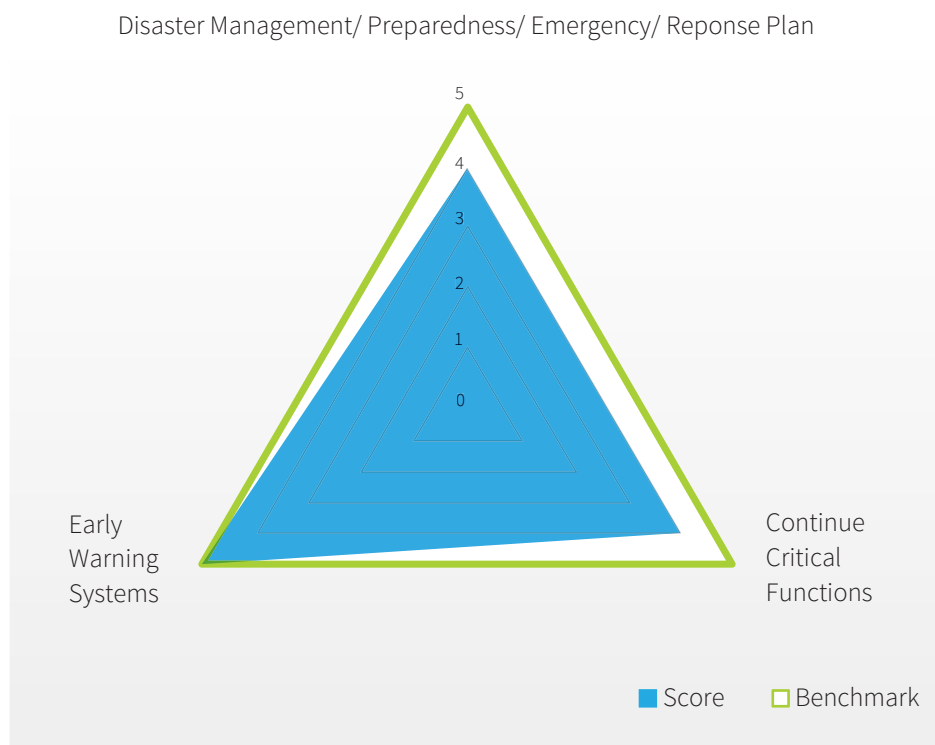


Figure 10: Performance of 'Ensure Effective Preparedness and Disaster Response'

Indicator 9.1. There is a disaster management/preparedness/emergency response plan outlining city mitigation, preparedness and response to local emergencies.

The supporting question selected from Layer 3 is 'Is the responsible disaster management authority able to reach surge capacity to support first responder duties?', scored according to the following indicative measures:

- 5 – Surge capacity exists and is tested via either actual events or practice drills for disaster and risk scenarios in Essential 2; coverage of all neighbourhoods will be possible within 4 hours.
- 4 – Adequate surge capacity nominally exists but is untested.
- 3 – Surge capacity exists but is known or suspected to have minor inadequacies, perhaps in location or numbers; coverage of all neighbourhoods will be possible within 4–12 hours.
- 2 – Coverage of all neighbourhoods will be possible within 12–48 hours.
- 1 – Coverage of all neighbourhoods will be possible within 48–72 hours.
- 0 – No surge capacity is identified.

Four marks are scored for Indicator 9.1.

The Hong Kong government has established a set of contingency plans, such as Contingency Plan for Natural Disasters (2015),⁵³ The Government of the Hong Kong SAR Preparedness Plan for Influenza Pandemic (2014)⁵⁴ and the Daya Bay (Nuclear Plant) Contingency Plan. These plans play a crucial role in coordinating different authority departments to collaboratively deal with various emergencies. Manpower and funds are available to guarantee the efficient implementation of the contingency plans. For instance, an emergency relief fund has been established to provide financial assistance to persons who need urgent relief as a result of fire, flood, tempest, landslide, typhoon or other natural disaster.

Adequate surge capacity nominally exists but is untested. Taking health service as an example, surge capacity is designed to effectively cope with any epidemics that occur. According to the Hospital Authority, 91 general acute beds and around 500 excess temporary medical, paediatric and convalescent beds were planned to open in the 2012–2013 influenza surge to augment hospital capacity. The distribution and opening of temporary beds among the public hospitals depend on the actual demand in an influenza surge.⁵⁶



⁵³ <http://www.sb.gov.hk/eng/emergency/ndisaster/CPND%20with%20Tamar%20Address.pdf>

⁵⁴ http://www.chp.gov.hk/files/pdf/erib_preparedness_plan_for_influenza_pandemic_2014_eng.pdf

⁵⁵ <http://www.dbcp.gov.hk/eng/dbcp/>

⁵⁶ <http://www.legco.gov.hk/yr14-15/english/panels/hs/papers/hs20150216cb2-818-4-e.pdf>

Indicator 9.2. The city has made arrangements to continue critical functions even in an emergency situation.

The supporting questions selected from Layer 3 is 'Is a comprehensive and up-to-date city-level plan in place outlining how government and other key services will remain in operation in an emergency? How many years has it been since the plan was updated and since the plan was tested/exercised?' (No detailed scoring is required in the UNISDR's tool.)

Four marks are scored for Indicator 9.2.

The Hong Kong government has made arrangements to continue critical functions even in an emergency situation, and there are comprehensive and up-to-date city-level plans in place that outline how government and other key services will remain operational in an emergency, such as Mass Transit Railway (MTR) Contingency Plans and Response Measures for Railway Incidents.⁵⁷

Given that Hong Kong is a financial centre, it is vital to maintain uninterrupted operations of key financial services in any emergency. Since 2002, the Hong Kong Monetary Authority (HKMA) has periodically reviewed and improved the business continuity plans of all authorised institutions (AIs) in Hong Kong in light of the events of 11 September 2001 (9/11).⁵⁸ 'Business Continuity Planning (TM-G-2)', a crucial module of the Supervisory Policy Manual of HKMA was issued in 2002, setting out the HKMA's supervisory approach to business continuity planning and the sound practices the HKMA expects AIs to consider in this regard.⁵⁹ On 29 September 2014, during the 'Occupy Central' event, in view of the public order situation in Central and other areas, the HKMA and affected banks activated their business continuity plans to maintain normal operations of the core functions of the banking system. However, little information is available about updates to relevant policies and manuals.

Indicator 9.3. The city is connected to relevant early warning systems.

The supporting question selected from Layer 3 is 'Are adequate resources and tools in place and used for the dissemination of warnings through various means (social media, radio, SMS, sirens etc.)?' (No detailed scoring is required in the UNISDR's tool.)

Five marks are scored for Indicator 9.3.

Hong Kong is connected to relevant early warning systems and has adequate resources and tools in place for the dissemination of warnings through various means, such as social media, radio, SMS, TV, websites, e-mail, apps and so on. In view of the risk of heavy rain or typhoon, every employer assumes responsibility for informing employees about any warnings (via e-mail and other internal communication tools).

For the most vulnerable areas of Hong Kong, such as the five low-lying areas susceptible to flooding during typhoons (Luen On San Tsuen, Kar Wo Leu, Sham Tseng San Tsuen, Lei Yue Mun Praya Road and Nam Wai), the DSD, HKO, HAD and other relevant departments have established a mechanism to alleviate the effects of flooding on local residents. An early alert system for serious flooding in Tai O, a fishing town on Lantau Island in Hong Kong, has also been established to alert its residents and relevant departments to mobilise their resources for evacuation and relief efforts.

⁵⁷ Legislative Council Paper 2012, available at http://www.legco.gov.hk/yr03-04/english/panels/tp/tp_rdp/papers/tp_rdp0305cb1-1168-2e.pdf

⁵⁸ <http://www.hkma.gov.hk/eng/key-information/guidelines-and-circulars/circulars/2002/20020131a.shtml>

⁵⁹ <http://www.hkma.gov.hk/media/eng/doc/key-functions/banking-stability/supervisory-policy-manual/TM-G-2.pdf>

3.10 Essential 10: Expedite Recovery and ‘Build Back Better’

This Essential includes three indicators of Layer 1, which scored 3, 5 and 5, respectively, giving an average score of 4.3.

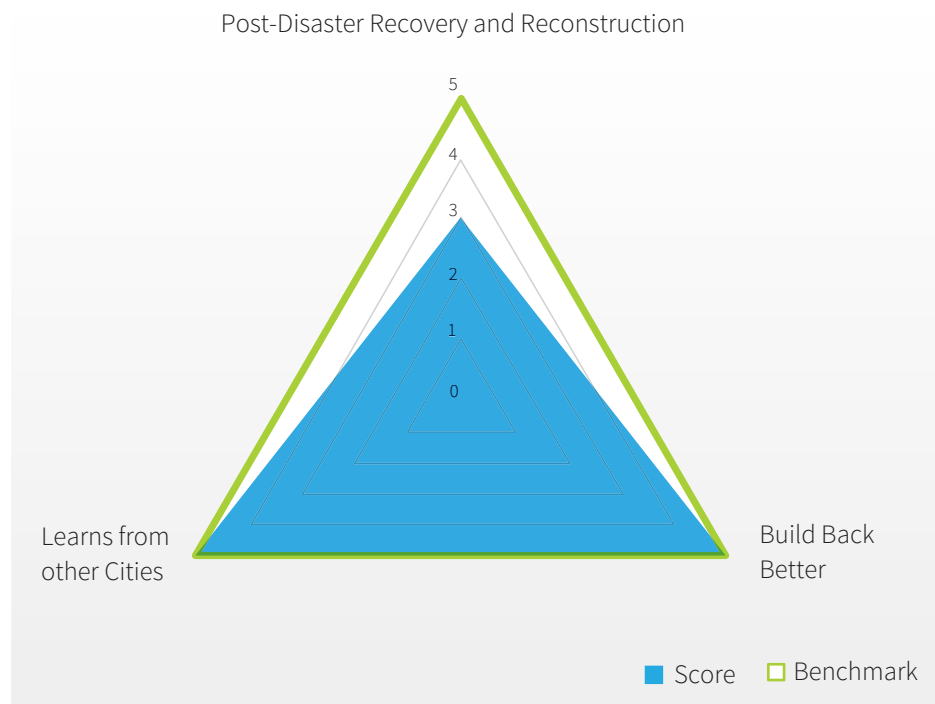
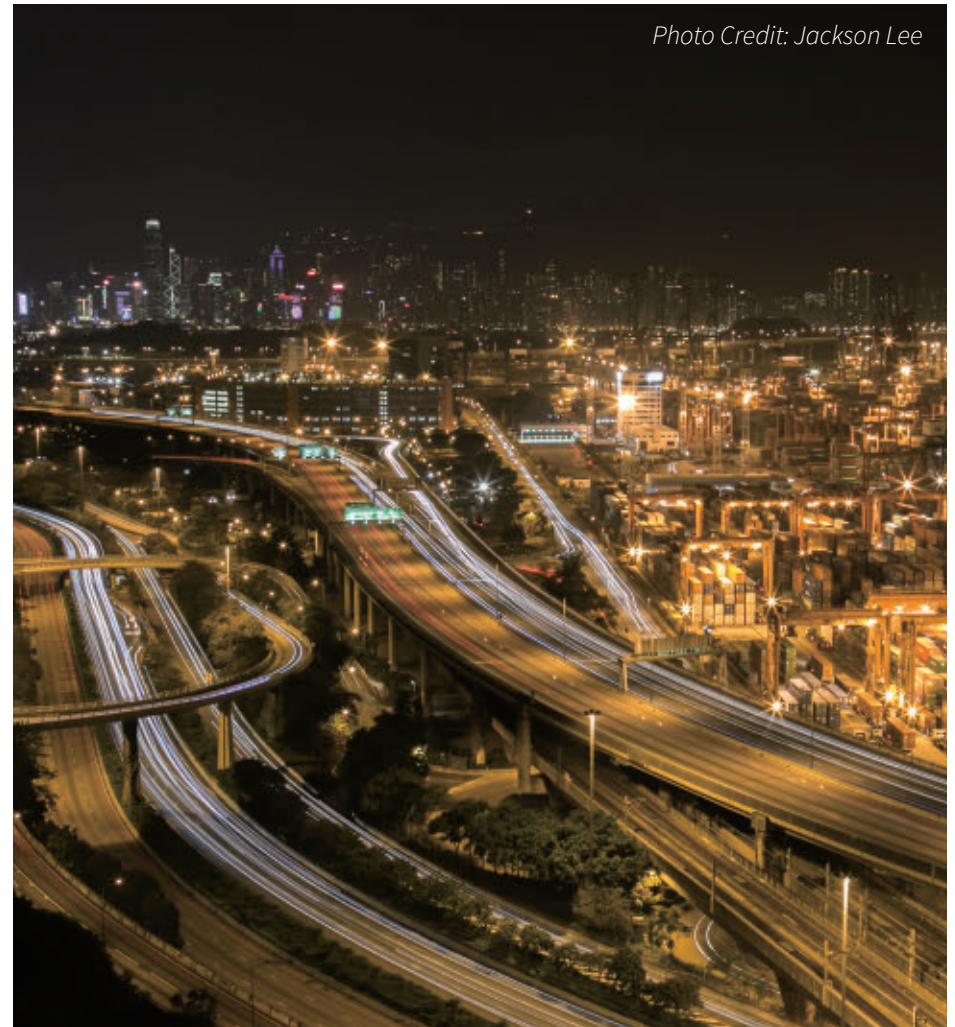


Figure 11: Performance of ‘Expedite Recovery and Build Back Better’



Indicator 10.1. There is a strategy or process in place for post-disaster recovery and reconstruction, including economic and societal aspects.

The supporting question selected from Layer 3 is ‘Does the city have plans for post-event recovery and economic rebooting?’, scored according to the following indicative measures:

- 5 – Fully comprehensive plans addressing economic, infrastructure and community needs after ‘most probable’ and ‘most severe’ scenarios are in place.
- 4 – Fully comprehensive plans addressing economic, infrastructure and community needs after ‘most probable’ scenarios are in place.
- 3 – Plans are in place for ‘most probable’ scenarios, but there are some shortfalls.
- 2 – Plans are in place for ‘most probable’ scenarios, but they have more significant shortfalls.
- 1 – Plans are in place for ‘most probable’ scenarios, but they have generalised inadequacies.
- 0 – There are no plans in place for disaster recovery and reconstruction.

Three marks are scored for Indicator 10.1.

Plans are in place for recovery after ‘most probable’ scenarios but there are some shortfalls. Financial risk is the biggest threat to the stability of Hong Kong society. Learning from the experience of the 1997 Asian financial crisis, the Hong Kong government has established a set of supervisory policies and practices in the Supervisory Policy Manual, illustrating the minimum standards Als are expected to attain to satisfy the requirements of the Banking Ordinance and recommendations on best practices that Als should aim to achieve.⁶⁰ Comprehensively considering the potential risks and probable consequences, ‘Recovery Planning (RE-1)’, an integral module of the Supervisory Policy Manual, provides guidance to Als on the key elements of effective recovery planning, and sets out the HKMA’s expectations and approach to reviewing Als’ recovery plans.⁶¹

The SARS epidemic in 2003 seriously shocked the economy of Hong Kong. In facing the adverse consequences of SARS, the Hong Kong Legislative Council efficiently passed a plan to promote economic rebooting once the epidemic was under control.⁶² Unfortunately, a generic plan for post-crisis economic rebooting has not been made.



⁶⁰ <http://www.hkma.gov.hk/eng/key-functions/banking-stability/supervisory-policy-manual.shtml>

⁶¹ Hong Kong Monetary Authority (2014) Supervisory Policy Manual – Recovery Planning, available at <http://www.hkma.gov.hk/media/eng/doc/key-functions/banking-stability/supervisory-policy-manual/RE-1.pdf>

⁶² <http://www.legco.gov.hk/yr12-13/english/counmtg/hansard/cm1114-translate-e.pdf>

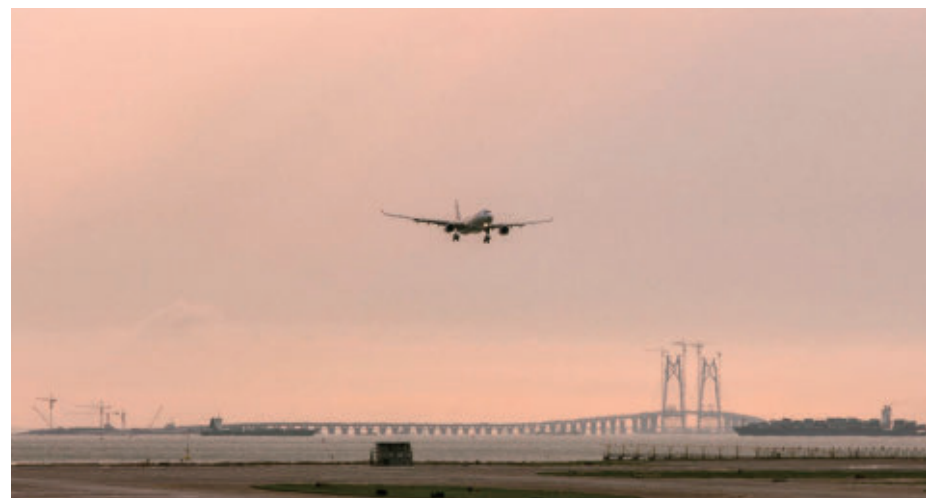
Indicator 10.2. If required, the city would effectively implement the concept of 'Build Back Better'.

The supporting question selected from Layer 3 is 'As part of the recovery process, is the city able to consider new risk and other key information in reviews and updates of urban development plans and processes?', scored according to the following indicative measures:

- 5 – Updating key plans based on new risk information is a requirement embedded in policy, and the city has the capacity to realise this.
- 4 – There is capacity and some level of requirement for updating key plans based on new risk information, but it could be better defined in policy.
- 3 – There is capacity to update key plans based on new risk information, but the requirement is not mandatory.
- 2 – It is mandatory to update key plans based on new risk information, but the capacity to fully realise this requirement does not exist.
- 1 – Updating key plans based on new risk information is desired, but the capacity to realise this does not exist.
- 0 – Updating key plans based on new risk information has not been considered.

Five marks are scored for Indicator 10.2.

The updating of key plans based on new risk information is a requirement embedded in policy, and the city has the capacity to realise this. Although there has been no large-scale post-disaster reconstruction and recovery in Hong Kong in the past 10 years, the city's capacity to effectively implement the concept of 'Build Back Better' is guaranteed by its tradition of political accountability. As an example, after the landslides that occurred in 1993, some necessary improvements were made immediately to avoid another similar incident.⁶³



Indicator 10.3. The city learns from other cities with a similar risk profile.

The supporting question selected from Layer 3 is 'Has the city taken specific learning from disasters in other cities over the past ten years, to increase its own resilience?' (No detailed scoring is required or provided in the UNISDR's tool.)

Five marks are scored for Indicator 10.3.

Hong Kong has learned from disasters in other cities to increase its own resilience. Taking advantage of the opportunities to provide emergency relief to victims of Haiyan Typhoon in the Philippines and to support funding for post-disaster recovery and reconstruction after the 2008 Wenchuan earthquake in Sichuan province and the 2011 Fukushima Daiichi nuclear disaster, the Hong Kong government and society have learned lessons about disaster consequences and emergency disposal. In addition, to reduce the chance of an epidemic entering Hong Kong from outside, reference has been made to the measures currently adopted by other countries to block the entry of diseases.

⁶³ http://www.legco.gov.hk/yr93-94/english/lc_sitg/hansard/h940119.pdf



4

Overall Findings

Some preliminary conclusions can be drawn based on this assessment.

In general, the resilience capacity of Hong Kong SAR is solid and reliable.

The strengths of Hong Kong SAR's resilience building are as follows:

- Prospective and effective protection of natural ecosystems, which makes Hong Kong an environmentally friendly city generally; and
- The parallel operations of an efficient government (e.g., scientific urban planning and adequate financial capacity in DRR) and a strong society (e.g., generous social assistance to vulnerable groups).

The shortcomings of Hong Kong SAR's resilience building are as follows:

- The lack of a framework to integrate DRR actions within the government, which decreases the feasibility of systematically improving the efficiency and effectiveness of investment in DRR actions via scientific evaluation;
- The lack of effective mechanisms to enable bottom-up public participation and community engagement in DRR (i.e., building a disaster-resistant community);
- The lack of a unified risk assessment methodology and effective tools to assess hazard-specific risks (such as from earthquake, typhoon, drought, and so on),⁶⁴ limiting the comparability of different disaster risks; and
- The lack of a mechanism to promote mutual communication on resilience building between the government and society.

The following urgent work is needed to further improve Hong Kong SAR's resilience capacity:

- Promote further cooperation between different stakeholders involved in disaster resilience by establishing a dialogue or knowledge-sharing mechanism between the government and society in terms of resilience building;
- Study and produce hazard-specific and integrated risk maps that can be used in deciding priority actions and investment, by using a unified method and the same basic data (to ensure the risk assessment results can be compared with each other); and

- enhance the understanding of the concept of DRR within different stakeholders in Hong Kong, particularly within government, and design and provide more prospective risk management frameworks (rather than out-of-date remedy management) by embedding DRR's essentials into the processes of public service provision.

Limitations of this study include the following:

- The limitations of the 'Local Urban Indicators' tool. For instance, the lack of scoring details for some Layer 3 indicators/questions, which we have noted in the report (i.e., no detailed scoring is required in the UNISDR's tool), and ambiguity in the scoring details for some of the Layer 3 indicators/questions.⁶⁵
- Unavailability of some detailed information on disaster risk reduction from government. For instance, we did not have access to the detailed budget breakdowns of some government departments for 2016–2017 and information on internal capacity building of relevant government departments and relevant NGOs in Hong Kong was inadequate.
- Inadequate engagement of relevant government departments/offices in the course of resilience assessment.

⁶⁴ For some examples, please see: Pelling M. *Visions of Risk: A Review of International Indicators of Disaster Risk and Its Management*, available at http://www.managingforimpact.org/sites/default/files/resource/a_review_of_international_indicators_of_disaster_risk_and_its_management.pdf (2 June 2016).

⁶⁵ For an example, see Indicator 9.1.



5 Action Plan

5.1 Hong Kong's Long-Term Resilience Goals

Resilience is an important indicator of a city's capacity to cope with and rebound from any shock triggered by economic, social or cultural emergencies. This preliminary action plan highlights the importance of incorporating DRR into long-term strategic planning and embracing the relevant values using a community-based approach. Echoing the global trend for sustainable development, we also emphasise sustainability when implementing this disaster resilience plan, to make Hong Kong a resilient city.

By 2020:

First, we plan to implement a pilot project to make Kwai Tsing (one of the 18 districts in Hong Kong) a disaster-resilient district via capacity building and social cohesion. We would like to

- Build a socially resilient environment in Kwai Tsing (i.e., resilient homes/schools/hospitals/community centres);
- Strengthen resilience capacity and social cohesion, especially among the elderly and ethnic minorities;
- Establish a risk mapping system in Kwai Tsing;
- Increase leadership training for first responders; and
- Establish a localised/customised online platform regarding DRR information for easy access.

By 2030:

To make Hong Kong 'Asia's resilient and sustainable city', we suggest to

- Replicate the achievements in Kwai Tsing in the other districts of Hong Kong; and
- Build a resilient city model for other Asian cities.

By 2047:

In the long term, we suggest making Hong Kong a resilient and sustainable city in the face of climate change. We want to showcase our city to other countries in the world via the United Nations and China's Belt and Road Initiative.



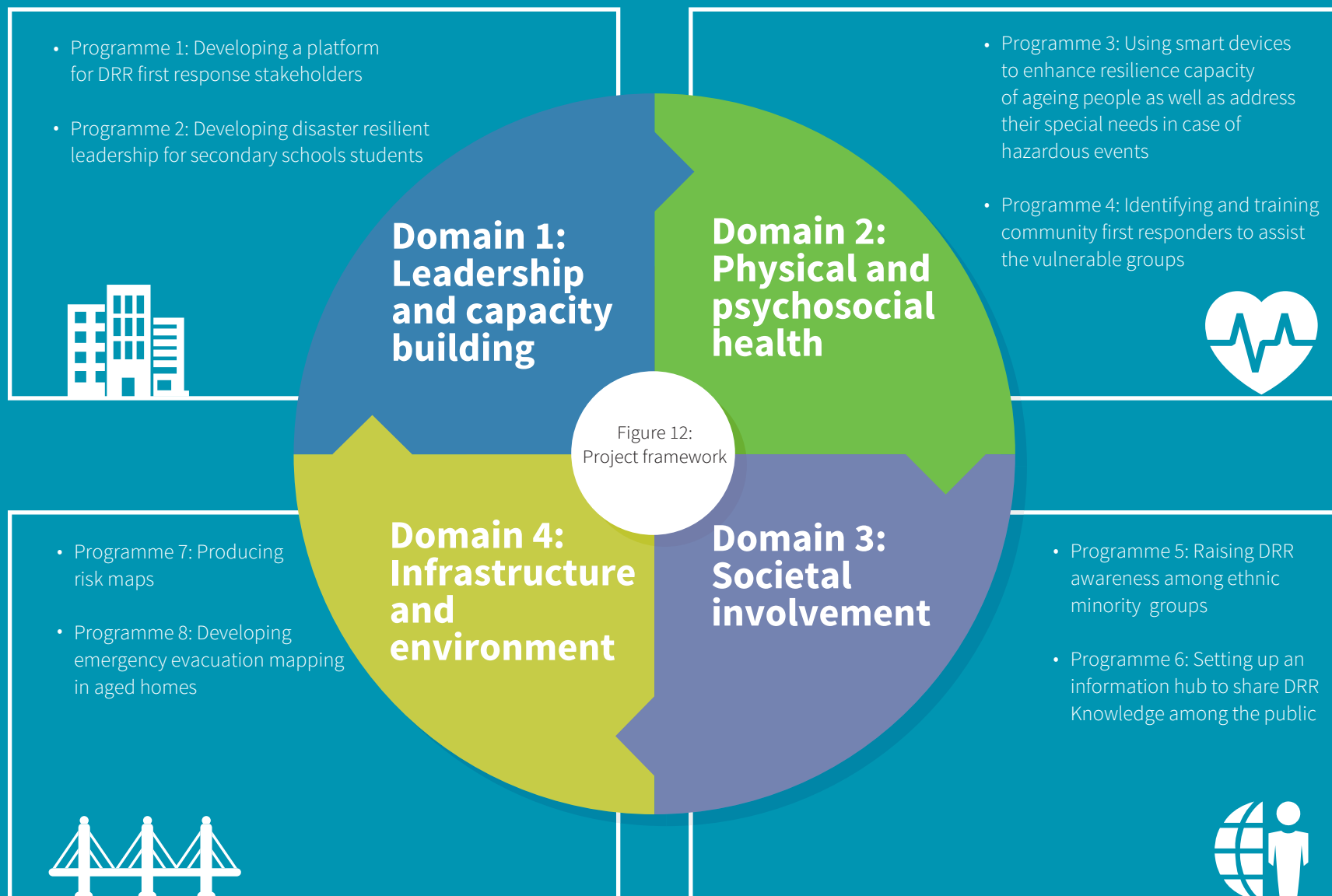
Photo Credit: Jackson Lee

5.2 Suggested Programmes to Make Hong Kong a Resilient City by 2020

Due to the shortcomings mentioned in the previous section, a series of programmes may be initiated to fill in the gaps to reduce risks and build resilience in the current situation and, most importantly, to strengthen Hong Kong's disaster resilience capacity in the long term. To begin with, a pilot study is being initiated in Kwai Tsing to strengthen its first response system through building community capacity and fostering social cohesion.

Seven programmes will build upon a 4-domain framework (See Figure 12) that encompasses (i) leadership and capacity building; (ii) physical and psychosocial health; (iii) societal involvement and (iv) infrastructure and environment. A trans-disciplinary approach is incorporated into the framework, which is characterised by top-down, bottom-up and interdisciplinary collaboration to engage the community in resolving real-world problems. Specifically, various areas of expertise (civil engineering, social sciences, nursing, information technology, etc.) and social sectors (district councils, NGOs, community centres, etc.) are essential to resilience building and we would like to initiate the concept of DRR through local community collaboration.





5.3 Summary of the Forthcoming DRR Programmes



Photo Credit: Jackson Lee

With the support of the Kwai Tsing District Councillor, Mr Chow Yick-hay, The Hong Kong Polytechnic University is now planning a series of DRR programmes to enhance local people's first response training and their awareness of disaster risks.

Eight specific programmes have been developed based on a four-domain framework that covers a wide range of social aspects (see Figure 12). Each programme is linked to the others to facilitate easy access of information and enhance disaster risk management/coordination. For example, Programmes 1 (developing a collaborative DRR district platform) and 7 (risk maps) share the same nature, with a focus on mapping resources, organisational structures and geographical features. The outcomes from these programmes can be references for the others.

Programmes 2 (community first responders training), 3 (smart home devices) and 8 (evacuation plan) emphasise building the DRR capacity of the residents in Kwai Tsing. In addition to information sharing, the interrelated nature of these programmes means that one may help fill in the gaps or shortcomings of another, resulting in better coordination and effective resource allocation.

Finally, Programmes 5 (catering to ethnic minority groups) and 6 (information hub) will work together as both involve technological techniques. An app about DRR knowledge and its corresponding community information will be developed for ethnic minority groups. Another major benefit of such collaboration is that it will reduce the cost of Programme 5, especially the future maintenance, update and development of the app. Programme 6 will be able to provide support for all related technological issues.

The integration of all programmes instead of isolating each programme highlights the bottom-up feature of the project, which will require a great deal of community-based effort and guidance to take the action plans forward. As it is the first time Kwai Tsing is carrying out such a large-scale DRR project, systemic coordination of the programmes will better ensure its effectiveness.

Please see Table 6 for a description of each programme.

Table 6: Overview of forthcoming DDR programmes in Kwai Tsing

	Action	Programme leader
Programme 1: Developing a platform for DRR first response stakeholders	Strengthening the associations between government and non-government organisations in disaster first response via the development of a collaboration platform that can also serve as an advisory body for Programmes 2–8.	Department of Applied Social Sciences, PolyU
Programme 2: Developing disaster resilient leadership for secondary schools students	Enhancing students' disaster first response capacity and leadership skills especially in times of fires.	Department of Applied Social Sciences and School of Nursing, PolyU and other stakeholders (i.e. Hong Kong Fire Services Department)
Programme 3: Using smart devices to enhance resilience capacity of ageing people as well as address their special needs in case of hazardous events	Developing the practical use of smart devices to enhance the resilience of ageing people.	Department of Building and Real Estate, PolyU
Programme 4: Identifying and training community first responders to assist the vulnerable groups	Identifying and training first responders to help the vulnerable population in the estate during public health emergencies.	School of Nursing, PolyU
Programme 5: Raising DRR awareness among ethnic minority groups	Organising and providing comprehensive DRR training and education for the ethnic minority population, enabling them to share information within their own communities.	Department of Building and Real Estate, PolyU
Programme 6: Setting up an information hub to share DRR Knowledge among the public	Developing an information hub through which community members can obtain and exchange knowledge about safety and health hazard resilience in a concise format and apply the knowledge to their local region.	Faculty of Health and Social Sciences, PolyU
Programme 7: Producing risk maps	Generating health disaster risk maps for Kwai Tsing using remote sensing data, 3D models and the results of health disaster spatial analyses.	Department of Building and Real Estate, PolyU
Programme 8: Developing emergency evacuation mapping in aged homes	Studying the fire safety aspects of aged homes and developing emergency evacuation designs for the aged homes in Kwai Tsing.	Department of Rehabilitation Sciences and Department of Building Services Engineering, PolyU



6

Glossary

This report uses a set of terms and definitions in accordance with the Global Assessment Report on Disaster Risk Reduction 2015.⁶⁶

Disaster risk reduction (DRR) describes the policy objective of anticipating future disaster risk; reducing existing exposure, vulnerability or hazard; and strengthening resilience. Some related definitions include ‘disaster risk management’, ‘disaster management’ and ‘emergency management’. **Disaster risk management (DRM)** describes the actions that aim to achieve this objective, including prospective risk management, such as planning designed to avoid the construction of new risks; corrective risk management, designed to address pre-existing risks; and compensatory risk management, such as insurance that shares and spreads risks. **Disaster (or emergency) management** refers to a cluster of measures, including preparedness and contingency planning, business continuity planning, early warning, response and immediate recovery to deal with disasters once they are imminent or have occurred.

Governance refers to the different ways in which governments, the private sector and all individuals and institutions in a society organise themselves to manage their common affairs. Within this broad concept of governance, **disaster risk governance** refers to the specific arrangements that societies put in place to manage their disaster risk.

Resilience refers to the capacity of systems (from national, local or household economies to businesses and their supply chains) to anticipate, absorb or buffer losses and to recover. Thus, the **disaster resilience of a city** indicates the capacity of a city (as an entity) to anticipate, absorb or buffer losses due to disasters, and to recover from shocks and devastation caused by disasters.



Photo Credit: Jackson Lee

⁶⁶ United Nations. (2015) *Global Assessment Report on Disaster Risk Reduction 2015*, available at <https://www.unisdr.org/we/inform/publications/42809> (Accessed 31 May 2016).





Photo Credit: Jackson Lee



MAKING HONG KONG A RESILIENT CITY: PRELIMINARY ASSESSMENT



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