

ICE HKA Discussion Forum

What should be our new flood prevention strategy in response to the climate crisis?

10 December 2022

Background

The world is in a climate crisis of global warming. While the world leaders have reached a consensus in the 26th United Nations Climate Change Conference of the Parties to continue to reduce carbon emissions, the increasing frequency of more extreme weather is affecting people across the globe on a scale never seen before. Hong Kong is by no means an exception.

As a coastal city with over 1,000km of shoreline, we are inevitably facing a daunting new challenge of flood prevention against the combined effects of sea level rise and extreme rainfall due to climate change.

To rise to this new challenge, the Drainage Services Department (DSD) commenced the Strategic Planning Study on Flood Management against Sea Level Rise and Extreme Rainfall in March 2022. In connection with the coastal flooding problem, the Civil Engineering and Development Department (CEDD) has also commissioned the Study on Shoreline Management Plan, following its earlier Study of Coastal Hazards under Climate Change and Extreme Weather and Formulation of Improvement Measures.

Under such a background, the Institution of Civil Engineers Hong Kong Association (ICE HKA) held a breakfast discussion forum on 23 July 2022 to raise the awareness of the participants on the importance of climate resilience and to gather their views/suggestions on the development of a comprehensive flood prevention strategy for Hong Kong to address the increase in flood risk brought by climate change.

We were honoured to have Mr Louie Lau, Deputy Head of Civil Engineering Office (Port & Land) of CEDD and Mr Edwin Lau, Assistant Director (Operations & Maintenance) of DSD to share with us their relevant studies as well as their proposals/ideas for Hong Kong's future flood prevention strategy in response to the climate crisis. An in-depth group and floor discussion session then followed. Highlights of Mr Louie Lau and Mr Edwin Lau's speeches and the discussion outcome are presented below.





Speeches by the distinguished speakers

Mr Louie Lau introduced the work of the Climate Change Working Group on Infrastructure (CCWGI), the findings of the coastal hazards study, and the formulation of the Shoreline Management Plan, led by CEDD. He explained CCWGI was tasked to align the design parameters for updating the relevant manuals, enhance government infrastructure's resilience, carry out climate change studies and assess the impacts of climate change on infrastructure to facilitate the relevant bureaux and departments to devise enhancement strategies, and share the experience with various stakeholders. After studying the coastal risks under climate change and extreme weather, CEDD would adopt a progressive adaptive approach by using a risk-management approach to formulate the enhancement measures at 26 identified coastal low-lying and windy residential areas including both improvement works and management measures, such as constructing/raising wave walls, installing fixed/demountable flood barriers and establishing action plans based on triggering level of the early alert system. He also highlighted that the Shoreline Management Plan being studied would provide guidelines for planning and land use of coastal development and long-term coastal defence strategies.

After that, Mr Edwin Lau presented the recent extreme weather events and the past major flooding incidents in Hong Kong. He explained that with the implementation of major drainage infrastructure works, including drainage tunnels, stormwater storage schemes and river training works, there had been a significant reduction of flooding blackspots. However, in view of the adverse impact due to climate change, the Drainage Master Plan 2.0 was being studied by DSD, which aimed at tackling climate change related flooding problem in Hong Kong, including more extreme rainfall, more serious storm surge and increase of sea level. He pointed out that an Integrated Flood Management Approach with "Adaptation, Resilience and Management" would be the major approach to be adopted. He also highlighted the use of blue-green drainage infrastructure and other possible adaptation measures, as well as the use of innovative technologies such as the Hydrometric Information System for monitoring/management of the drainage system on a real-time basis.

Outcome of group and floor discussions

Four discussion groups were formed to deliberate on the following four major aspects relevant to the formulation of a new flood prevention strategy in response to the climate crisis. A floor discussion on these then followed.

<p>Topic 1 – Land use planning</p> 	<p>Topic 2 – Engineering</p> 
<p>Topic 3 - Cost effectiveness</p> 	<p>Topic 4 - Sustainability / Environment</p> 

Topic 1 – Land use planning

- It was acknowledged that land use could influence all elements of flood risk and therefore land use planning had a key role in alleviating flood damage which would be exacerbated by climate change impacts.
- Planning for compatible land use in flood prone areas at coastal strips and along river corridors.
- Applying floodable design concept and agreeing demarcation of management and maintenance responsibilities among relevant government departments early.
- Striking an optimum balance on the provision of public and private flood management schemes and solutions.
- Further tightening the drainage impact assessment process for new developments, and imposing additional requirements for developers to provide extra mitigation against climate risks.
- Raising public awareness of the local flood risks by making the regional flood risk maps available to the public.

Topic 2 – Engineering

- The proposed approach by CEDD and DSD to handle flood risk was considered pragmatic and acceptable.
- Taking into account the accuracy of mathematical modelling and change of site characteristics in introducing flood risk map.
- Addressing the hydraulic, visual and environmental problems of existing measures such as flap valves, flood pumping schemes and land reclamation for coastal protection.
- Considering cost effectiveness, environment and land availability for district-based measures. Also, considering cross-catchment solution as appropriate.
- Adopting innovative technologies for real-time monitoring and early warning.

Topic 3 - Cost effectiveness

- Addressing the fundamental issues of whether to mitigate climate change or adapt to it, and how much more resources to be deployed to prepare for the uncertainty.
- Conducting further study on the forecast methodology for enhancing the understanding of the potential damages.
- Considering the cost effectiveness of the proposed measures in terms of social and financial impacts and corresponding areas such as:
 1. Identifying the area that is most susceptible to flooding through a hydrological model; and
 2. Combining this with social and financial impact assessments (consider combining with Hong Kong Monetary Authority's proposed assessment of property devaluation and commercial disruption to businesses).
 3. Comparing different options/schemes to offer the highest value for each dollar of public money spent.
- Determining the payer for the proposed measures (could be the affected land user/the public).

Topic 4 - Sustainability / Environment

- Needing more well-designed public education campaigns to enhance the awareness of the hazards and risks associated with climate change, and the corresponding concepts of adaptation and resilience.
- Establishing a proper risk assessment framework (ideally covering both fatality and economic risks) for sustainability analysis as well as environmental impact assessment.
- Needing more engineering input to the modelling and projection of scenarios, (taking due account of the likelihood of concurrent occurrence of different hazards and their interactions) for the sake of stress testing of the emergency response system to identify bottlenecks and areas that would warrant improvement or streamlining.
- Undertaking a more realistic assessment of the likely performance of nature-based solutions under the impact of extreme weather events in order to better manage expectations.
- Requiring further reviews of the likely effectiveness of blue-green infrastructure (including SUDS) and sponge city concept under extreme rainfall events, taking cognizance of the lessons learnt from recent relevant case studies round the globe.

Conclusion

This discussion forum is considered fruitful. Mr Louie Lau and Mr Edwin Lau's speeches and subsequent discussions have enhanced the participants' awareness towards climate risks and flooding prevention strategy. The participants also made some constructive comments/suggestions on the formulation of a comprehensive flood prevention strategy from land use planning, engineering, cost effectiveness and sustainability/environment perspectives. It is hoped that these views would be useful for formulating a new flood prevention strategy for Hong Kong that would rise to the climate change challenge.