

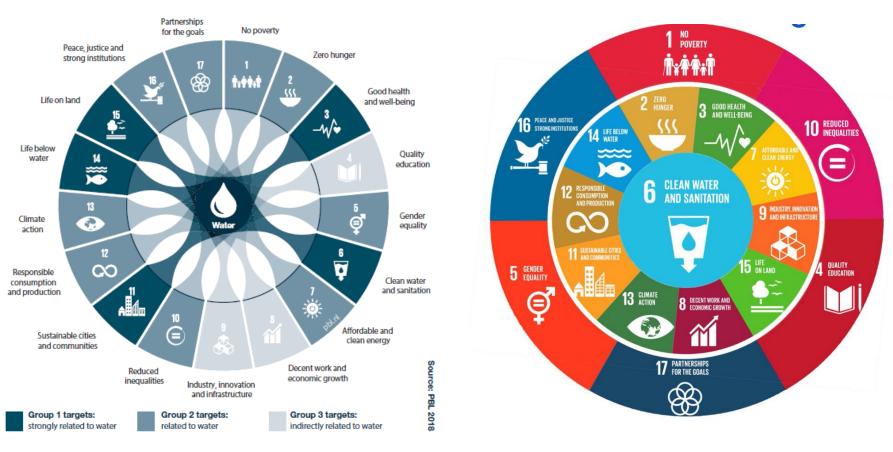
Improving City Resilience through a Design with Water Approach



10/22/2018



Why? A common currency across the SDGs







Why? Rising up the agenda

Top 5 Global Risks in Terms of Impact

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
1st	Asset price collapse	Asset price collapse	Asset price collapse	Fiscal crises	Major systemic financial failure	Major systemic financial failure	Fiscal crises	Water crises	Failure of climate- change mitigation and adaptation	Weapons of mass destruction	Weapons of mass destruction	
2nd	Retrenchment from globalization (developed)	Retrenchment from globalization (developed)	Retrenchment from globalization (developed)	Climate change	Water supply crises	Water supply crises	Climate change	Rapid and massive spread of infectious diseases	Weapons of mass destruction	Extreme weather events	Extreme weather events	
3rd	Slowing Chinese economy (<6%)	Oil and gas price spike	Oil price spikes	Geopolitical conflict	Food shortage crises	Chronic fiscal imbalances	Water crises	Weapons of mass destruction	Water crises	Water crises	Natural disasters	
4th	Oil and gas price spike	Chronic disease	Chronic disease	Asset price collapse	Chronic fiscal imbalances	Diffusion of weapons of mass destruction	Unemployment and underemployment	Interstate conflict with regional consequences	Large-scale involuntary migration	Major natural disasters	Failure of climate- change mitigation and adaptation	
5th	Pandemics	Fiscal crises	Fiscal crises	Extreme energy price volatility	Extreme volatility in energy and agriculture prices	Failure of climate- change mitigation and adaptation	Critical information infrastructure breakdown	Failure of climate- change mitigation and adaptation	Severe energy price shock	Failure of climate- change mitigation and adaptation	Water crises	
	📕 Economic 📕 Environmental 📕 Geopolitical 📕 Societal 📕 Technological											



Why? Miami shocks and stresses



10/22/2018



Why? Manila shocks and stresses





Why? Chicago .. The opportunity





What? Leeds, UK





What? Hunters Point, New York





What? GI Retrofit, New York

NYC Resiliency Green Infrastructure



10/22/2018



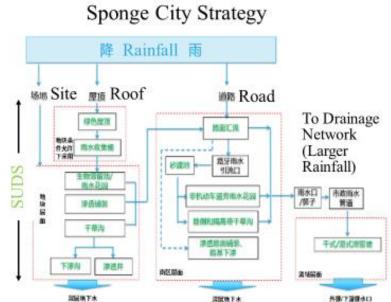
City Masterplanning, Beijing

Yongding River New Ecological Cultural Zone, Beijing

sustainable water master planning



- Location: Fengtai District, Beijing
- Site area: 156.4 ha
- Very asymmetrical annual rainfall distribution: 80% of rainfall in June, July and August



Retain on site or Infiltrate to Ground (Rainfall < 2 year return period)



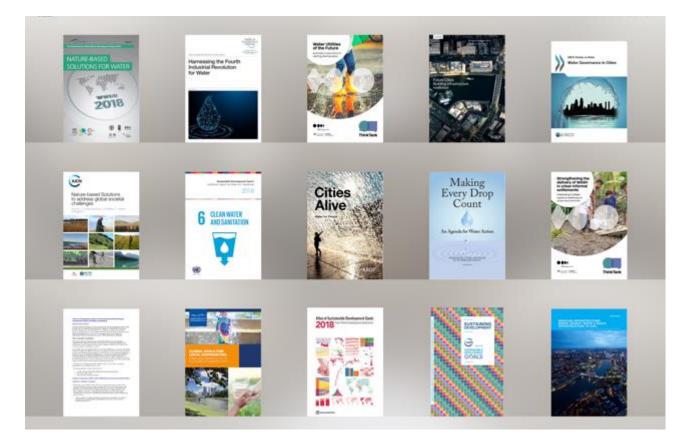
Lake District Masterplan, Singapore



10/22/2018



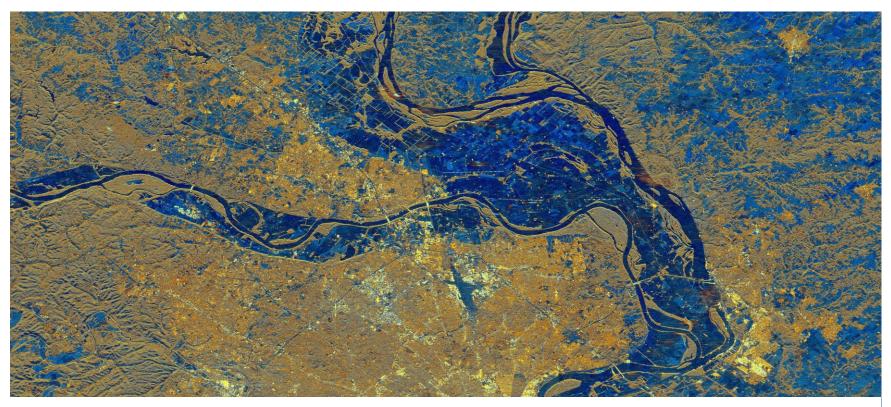
How? No lack of guidance



10/22/2018



Data and Technology



Natural flood management with machine learning

Arup, NVIDIA and DigitalGlobe explored machine learning potential to evaluate the performance of natural flood management schemes. We have successfully developed multiple deep learning based systems that provide map data on land use and object identification at a higher resolution than other datasets that are currently available.



Data and Technology



10/22/2018





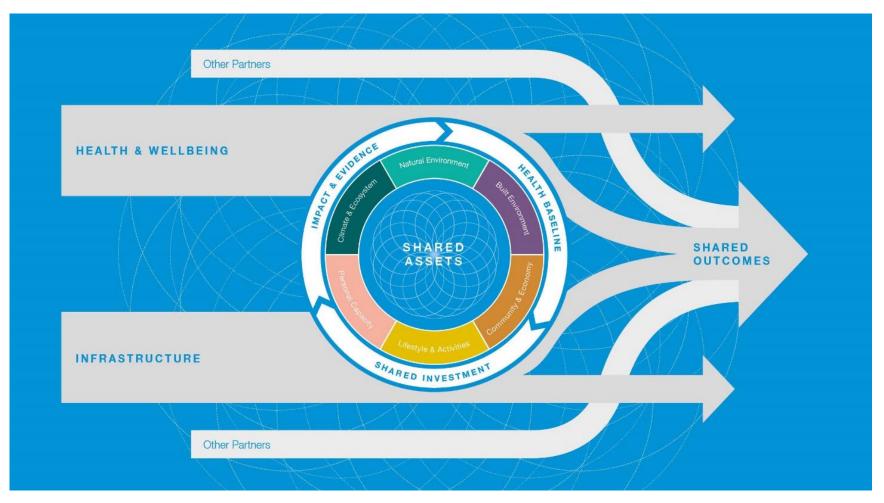
Value



10/22/2018



Value





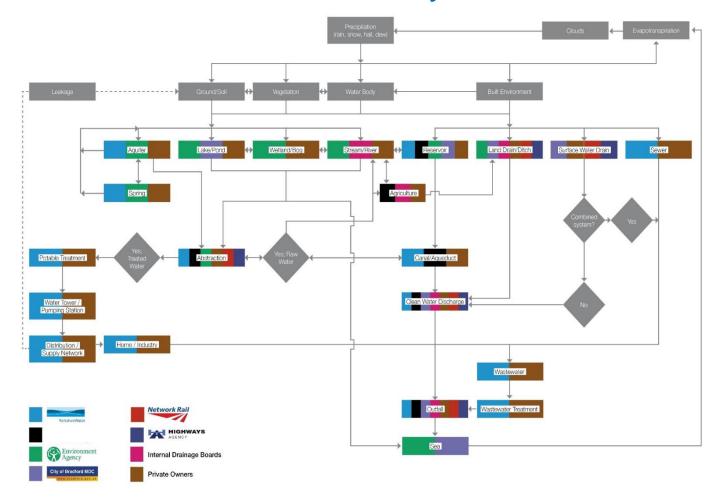
Basin Sensitive

Water is fundamental to all urban systems, a shared vision across the river basin.





Governance across the water cycle





City Water Resilience Framework

SISTHE RESILIENCE SHIFT

Urban Resilience

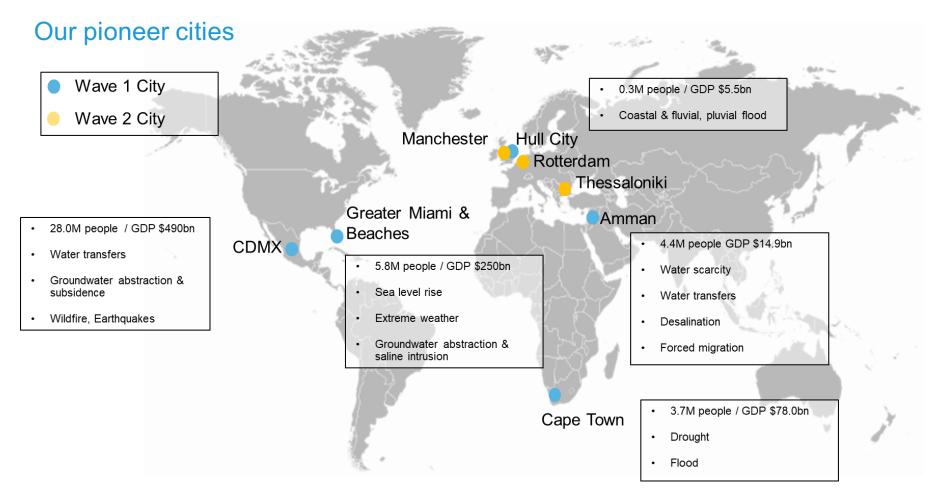
"City resilience describes the capacity of cities to function, so that the people living and working in cities – particularly the poor and vulnerable – survive and thrive no matter what stresses or shocks they encounter"

(CRI, 2014)





CWRF Pilot



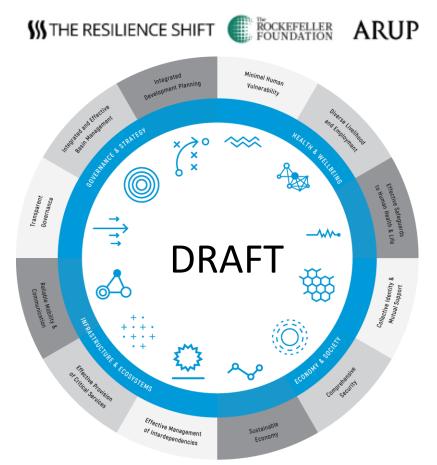


CWRF Draft Framework

The value of urban water resilience Water through an urban resilience lens

Creating opportunities

- Realising the 2030 Agenda for the Sustainable Development Goals
- Attract investors: water risk is increasingly a key consideration in business decisions
- Robust decision making that properly accounts for water risk
- Improve water governance structures with clearly defined roles and responsibilities
- · Reduce the risk of cascading failure





Conclusions

Cities Alive: Water for People

Five themes for implementing sustainable water management



Putting People First



Basin Sensitive Cities

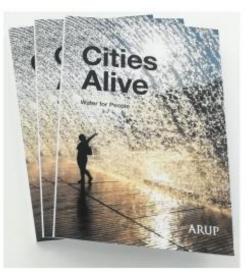


Integrated Design

City Regeneration



Transcending Barriers



ARUP

10/22/2018



Thank you



10/22/2018