

BUILDING RESILIENCE IN URBAN CONTEXTS:

Challenges and Progress in Evidence
of What Matters

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CONCEPTUALIZING URBAN RESILIENCE

Urbanization

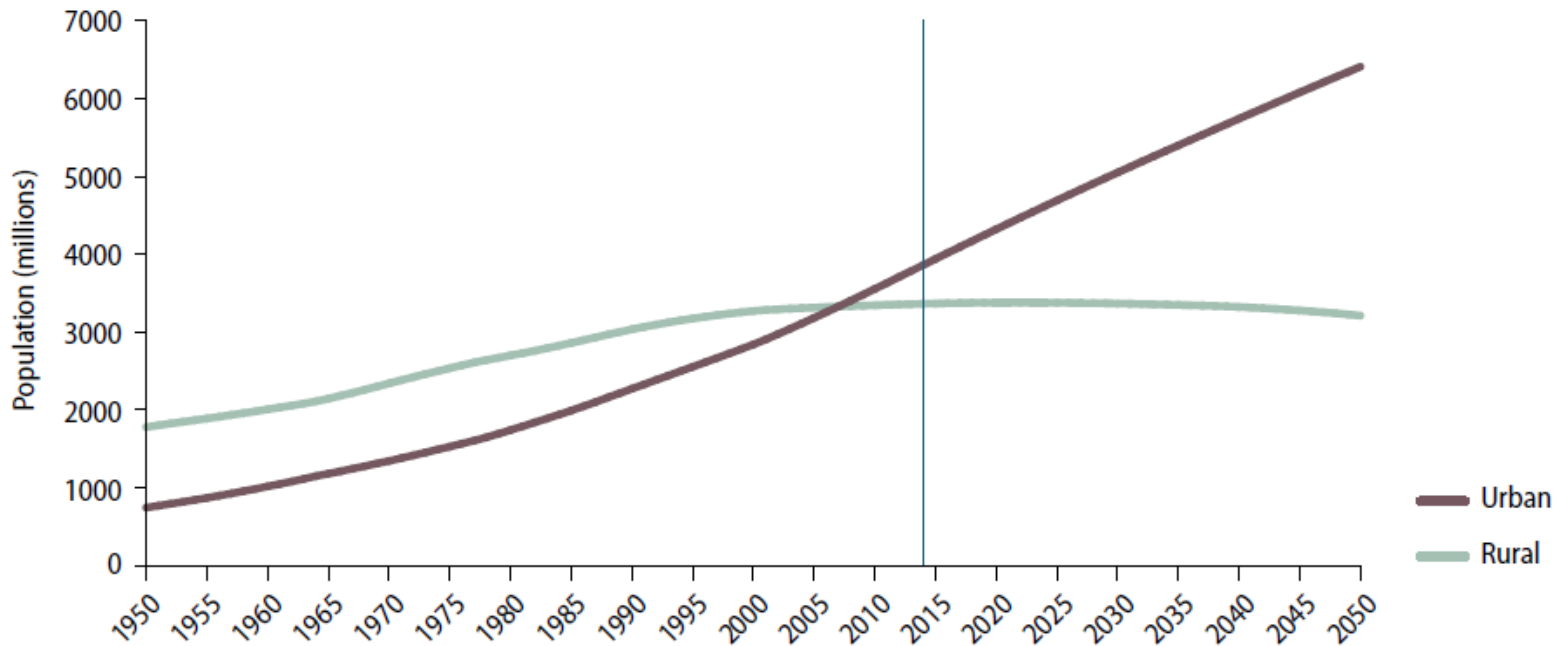
- 54% to 70% by 2050
- 2.5 billion people in urban areas
- 90% in Africa and Asia



Urbanization

Figure 2.
Urban and rural population of the world, 1950–2050

A majority of the world's population lives in urban areas



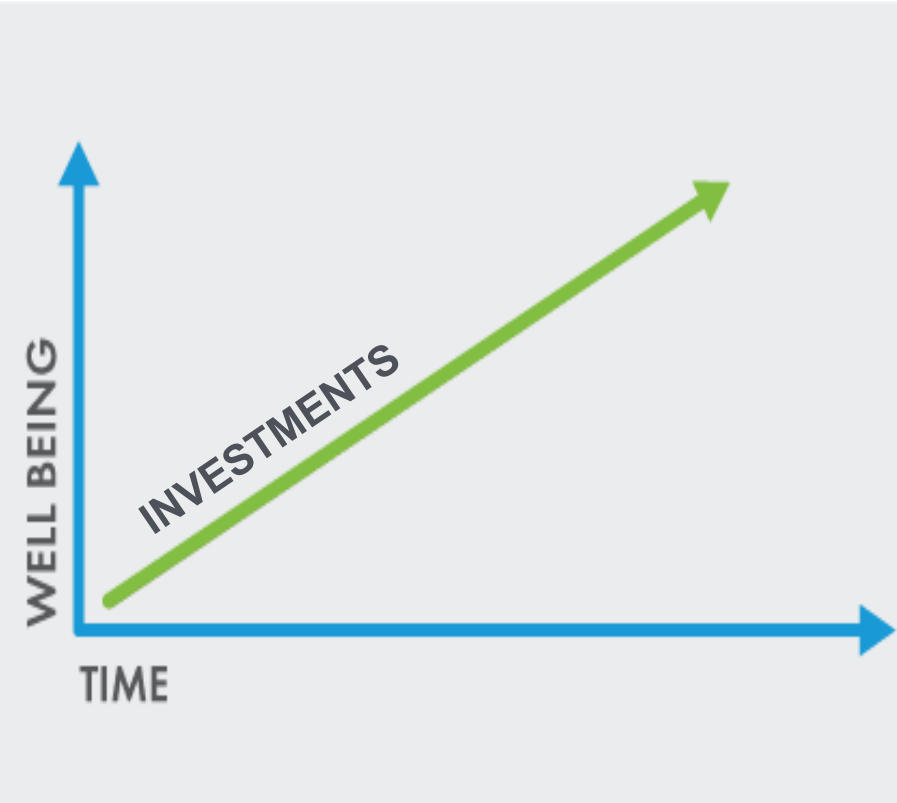
Source: United Nations, World Urbanization Prospects, 2014

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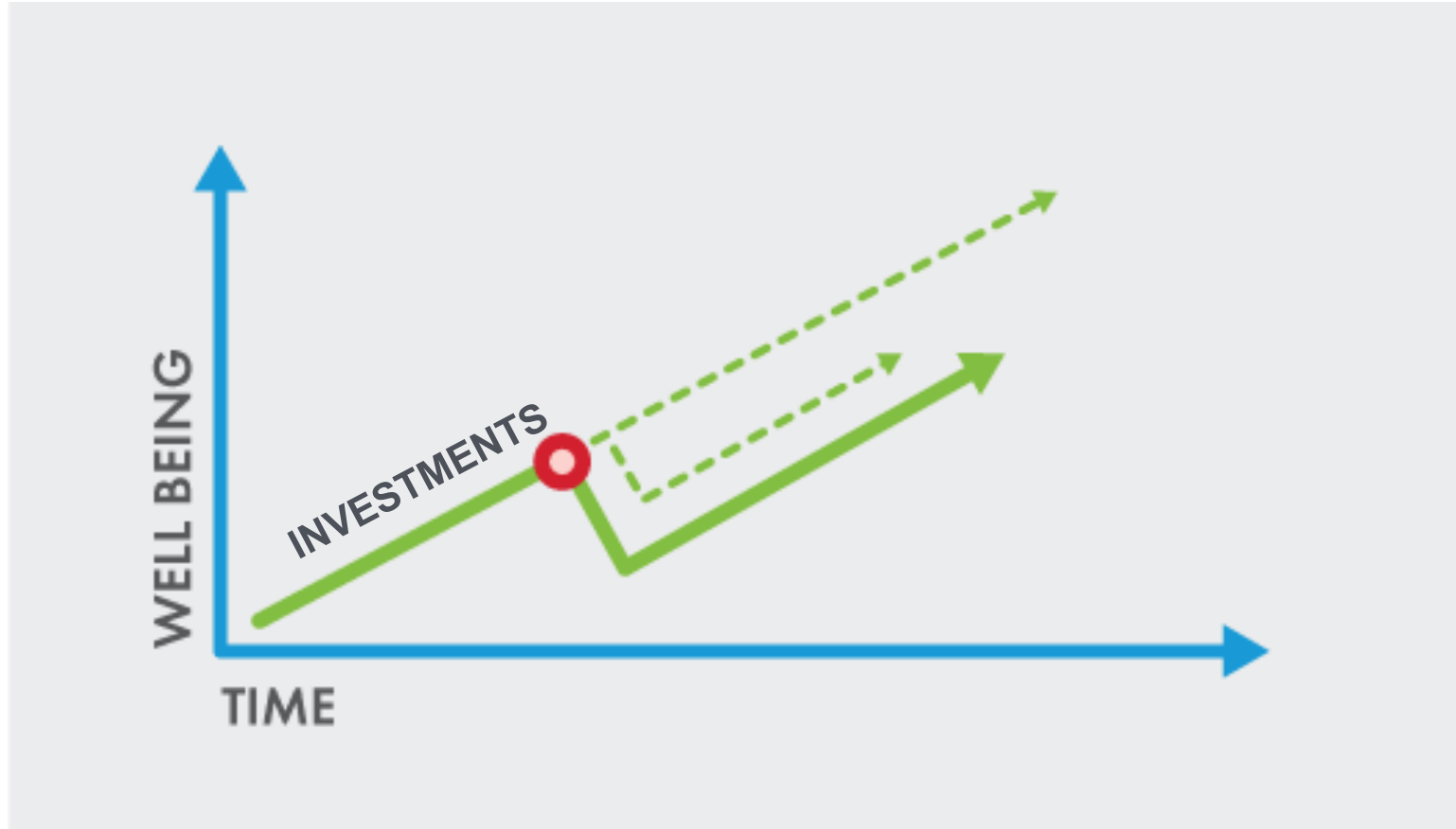
Mumbai Floods...



Conceptualizing Resilience



Conceptualizing Resilience



Resilience Definitions....

USAID	ROCKEFELLER	RESILIENCE MEASUREMENT - TWG
<p>The ability of people, households, communities, countries, and systems to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth</p>	<p>Urban resilience is the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience</p>	<p>The capacity that ensures adverse stressors and shocks do not have long-lasting adverse development consequences</p>

Where do we start?



PEOPLE



SYSTEMS



**SHOCKS/
STRESSES**



CAPACITIES



RESILIENCE OF WHAT?

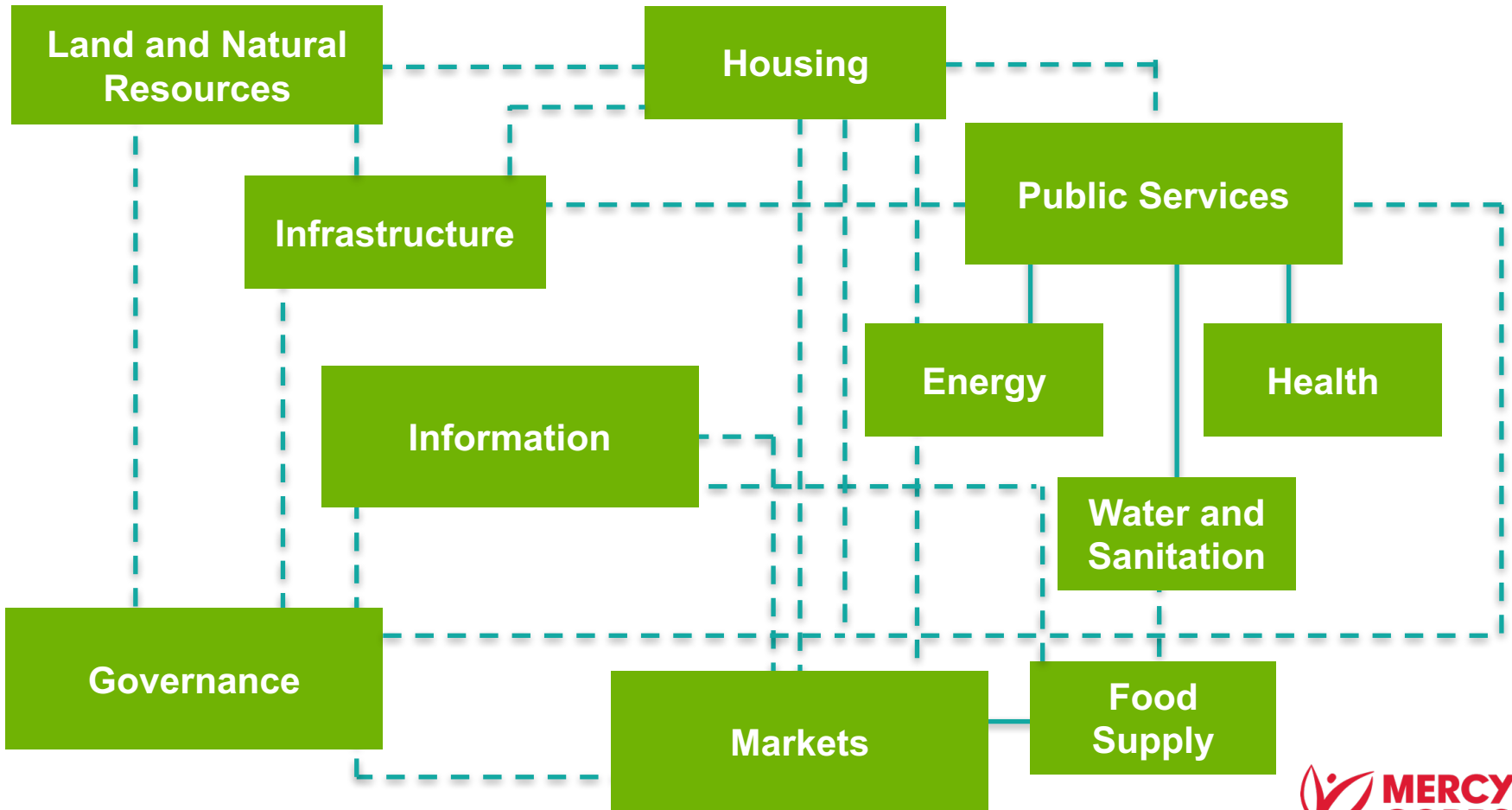
Urban Systems

How can we assess and measure whether urban systems retain functionality in the face of shocks and stresses....?



RESILIENCE OF WHAT?

Urban Systems



BUILDING RESILIENCE IN URBAN CONTEXTS

CUTTER (2008)	WEF (2013)	GALL (2013)
Social systems covering education, health, age, etc	Social sub-system covering human capital, health, the community and the individual.	Social systems covering community network, trust, civic engagement, norms, poverty levels.
Economic systems namely employment, income and equality, business, etc	Economic sub-system including such aspects as the macroeconomic environment, goods and services market, financial market, labor market, sustainability and productivity.	Economical systems, such as income and productivity.
Infrastructure systems, includes housing, shelter, medical capacity, etc	Infrastructure sub-system, also known as critical infrastructure, namely communications, energy, transport, water and health.	Physical systems covering critical infrastructure and communication systems.
Institutional/organizational systems covering experience, mitigation, political fragmentation, etc	Governance sub-system covering institutions, government, leadership, policies and the rule of law.	Political systems including aspects such as disaster risk reduction plan.
		Institutional systems includes first responders, response system.
		Technical systems includes early warning systems and emergency plans.
Ecological systems includes area of wetlands, dunnes, etc	Environmental sub-system including aspects such as natural resources, urbanization and the ecological system.	Food and nutrition systems also known as food security.
		Environmental systems includes fresh water and arable land.
		Ecological systems includes pollination and carbon sinks.
Community systems includes social capital, innovation, political engagement, etc		Human systems including such aspects as the skills, knowledge, health, education.



RESILIENCE TO WHAT?

Shocks and Stresses

Estimates suggest that by 2050, urban population exposed to cyclones will increase from 310 million to 680 million while exposure to major earthquake will increase from 370 million to 870 million (World Bank, 2013b)



RESILIENCE FOR WHOM?

Impact Groups





RESILIENCE THROUGH WHAT?

Resilience Capacities

ABSORB

ADAPT

TRANSFORM

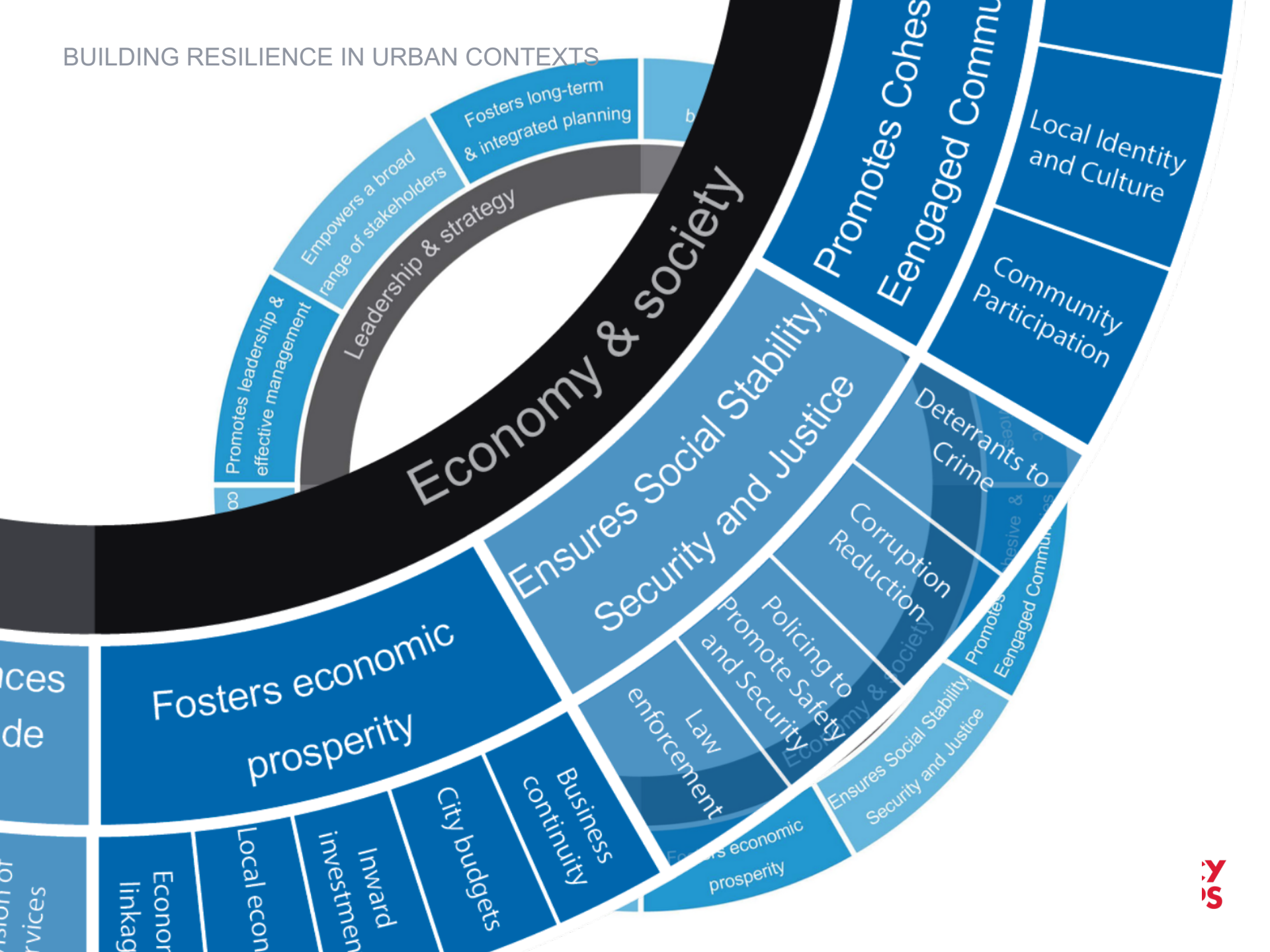


RESILIENCE THROUGH WHAT?

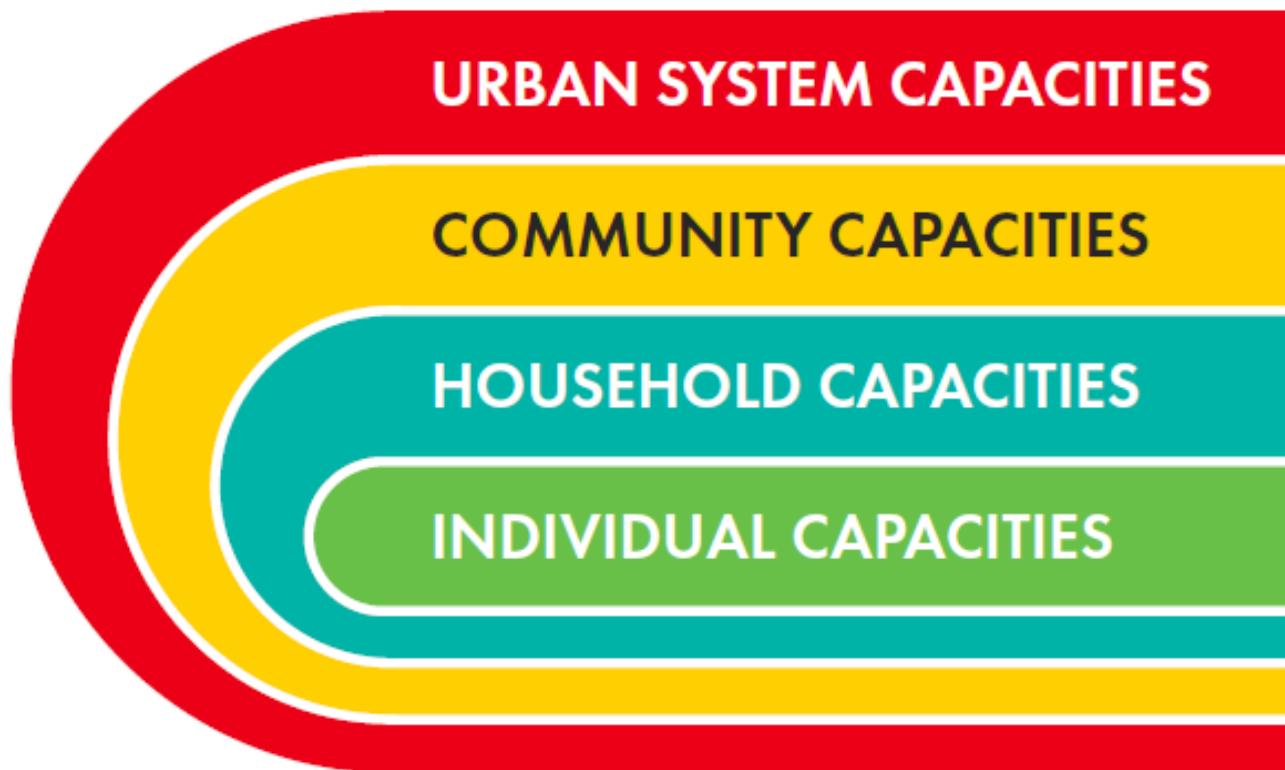
Resilience Capacities



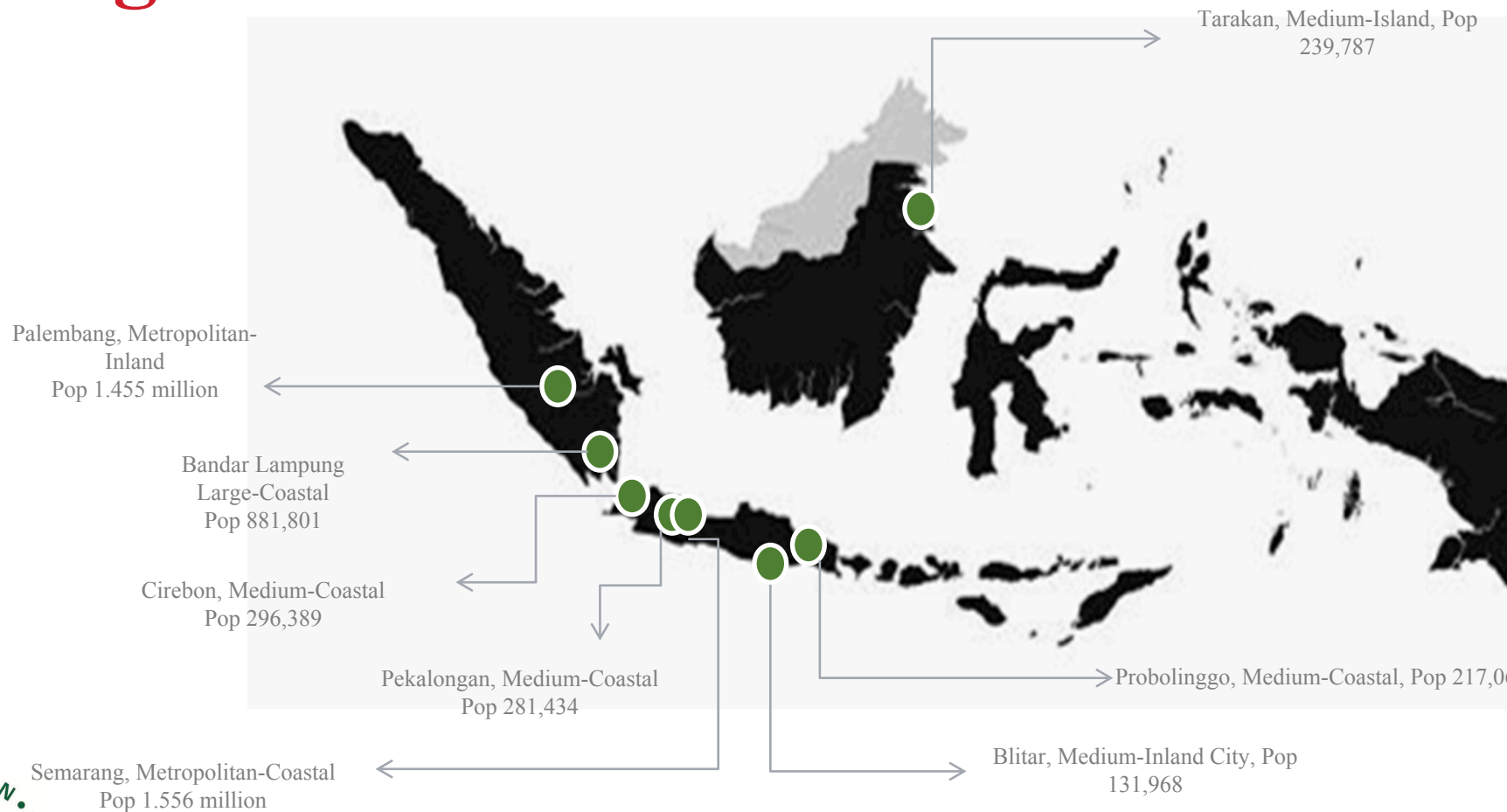
BUILDING RESILIENCE IN URBAN CONTEXTS



WHERE DO WE FOCUS?



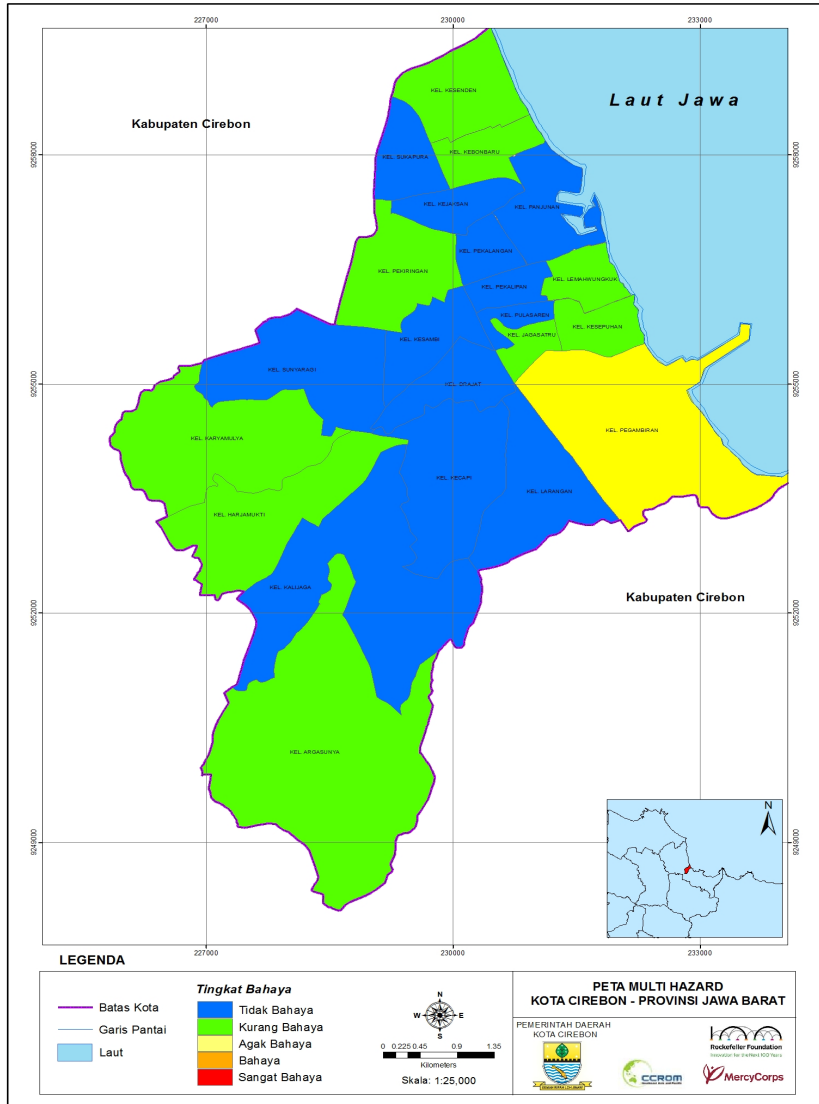
CASE 1: Asian Cities Climate Change Resilience Network



ACCCRN Program Approach



CIREBON: City Resilience Review



SHOCK & STRESS ES	PHYSICAL IMPACT TO URBAN SYSTEM	NON-PHYSICAL IMPACT TO URBAN SYSTEM
Diarrhea, Dengue, ARD		<ul style="list-style-type: none"> - Disturbing learning activity for student - Decreasing work productivity - Increased expenses for medical
Typhoon	<ul style="list-style-type: none"> - Infrastructures damage - Falling trees - Electricity disruption - Traffic disruption 	<ul style="list-style-type: none"> - Material losses - Increased expenses for medical
Drought	<ul style="list-style-type: none"> - Lack of clean water 	<ul style="list-style-type: none"> - Expenses for waterways construction - Declining of farmer income - Increasing operational expenses - Increasing epidemic of diseases
Flood	<ul style="list-style-type: none"> - Infrastructures damage - Environment degradation - Traffic disruption 	<ul style="list-style-type: none"> - Increasing epidemic of diseases - Psychological aspect - Material losses
Tidal Flood	<ul style="list-style-type: none"> - Sedimentation - Sea water intrusion - Infrastructures damage 	<ul style="list-style-type: none"> - Material losses - Repair expenses for house - Declining of groundwater resources
Abrasion	<ul style="list-style-type: none"> - Change of shoreline - Reduction of mainland - Land rise phenomenon as an impact of sedimentation 	<ul style="list-style-type: none"> - Declining of pond farmers income
Landslide	<ul style="list-style-type: none"> - Environment degradation 	<ul style="list-style-type: none"> - Psychological aspect

City Resilience Review:



INSTITUTIONAL RESILIENCE



**HUMAN
RESILIENCE**



**SOCIAL
RESILIENCE**



**ECONOMIC
RESILIENCE**



**PHYSICAL
RESILIENCE**

ECOLOGICAL RESILIENCE



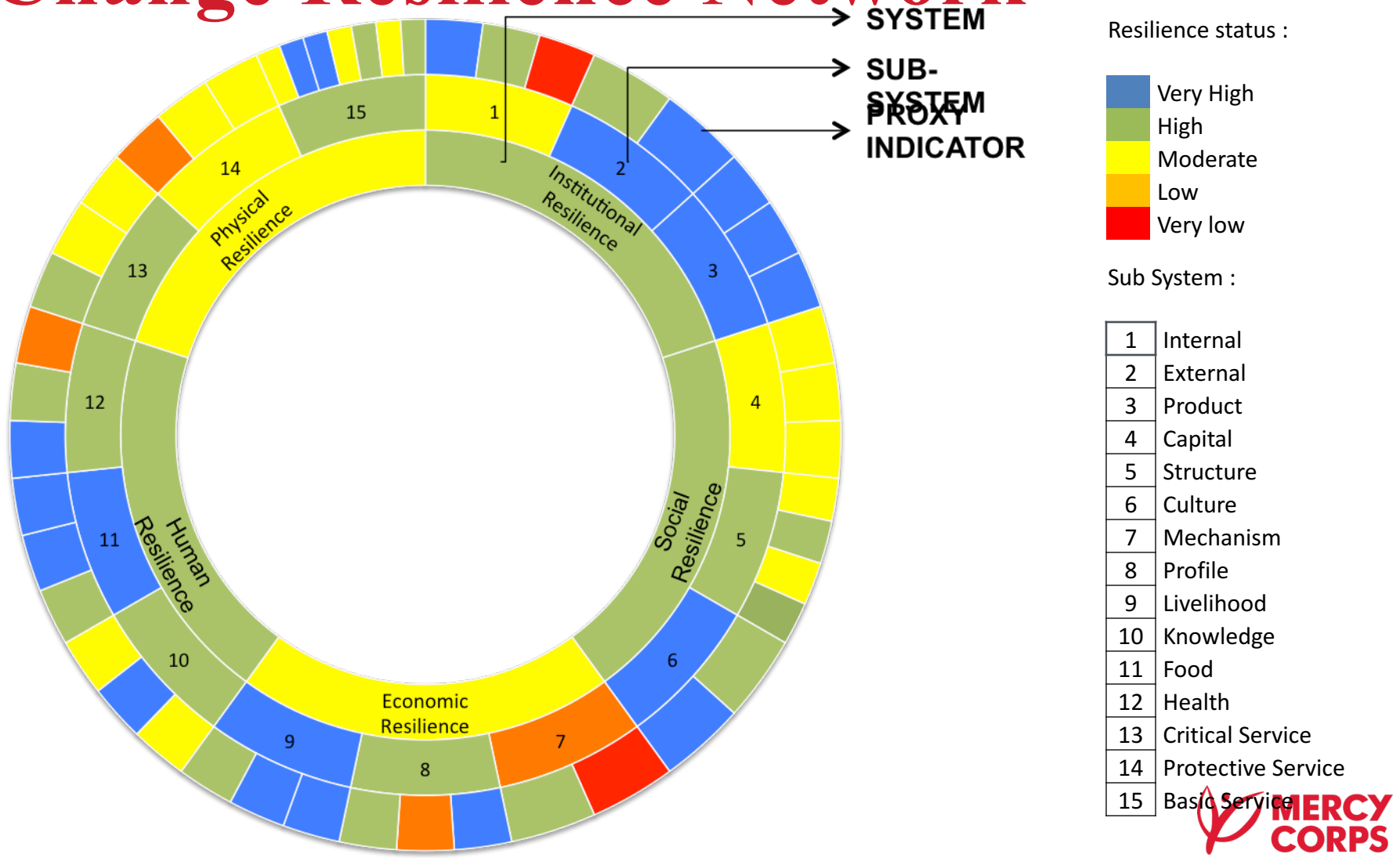
Resilience Dashboard-Institutional

System	Sub-System	Proxy Indicator
Physical/ Infrastructure	Critical	Emergency Response
		Evacuation Route
		Shelter
	Protective	Adequacy
		Minimum Standard
		Maintenance
	Clean Water	Water Reserve
		Distribution
		Quality
	Housing	Liveable
		Location
	Transportation	Reliability
	Utility	Accessibility
		Reliability
	Waste	Management
	Waste Water	Distribution
	Drainage	Availability
		Quality
Management		

Resilience Dashboard-Institutional

system	Status	Sub-system	Status	Proxy indicator	Status	Indicator	2015	Status
1 Institutional Resilience	0.77	1.1 Internal	0.51	1.1.1 Knowledge	0.87	INS01 Participation of Local Government Institution in "urban climate resilience" workshop	5	1.00
						INS02 Capacity building of local government institution in "urban climate resilience"	4	0.80
						INS03 Knowledge saring mechanism of "urban climate resilience"	4	0.80
				1.1.2 Structure	0.67	INS04 Multistakeholder Structure of government institution	2	0.67
						1.1.3 Cross-sector	0.00	INS05 Contribution and task of every stakeholder
		1.2 External	0.81	1.2.1 Multi-stakeholder	0.78	INS06 Participation of non government organization in resilience actions	1	1.00
						INS07 Participation of private actor sector in resilience actions	1	1.00
						INS08 Participation of education institution sector in resilience actions	1	0.33
				1.2.2 Cross-boundary	0.83	INS09 Good cooperation pattern	1	1.00
						INS10 Policy advocation	2	0.67
		1.3 Product	1.00	1.3.1 Commitment	1.00	INS11 Local policy related to urban climate resilience	1	1.00
						INS12 Local financing of urban climate resilience action	1	1.00
				1.3.2 Assessment	1.00	INS13 Climate Risk Assessment	1	1.00
						INS14 City Resilience Strategy	1	1.00
				1.3.3 Inclusivity	1.00	INS15 Mainstreaming climate risk assessment and climate resilience strategy into spatial plan	1	1.00
INS15 Mainstreaming climate risk assessment and climate resilience strategy into development plan	1	1.00						

CASE 1: Asian Cities Climate Change Resilience Network



Case 2: Understanding Urban Resilience through Post-Event Analysis



TRANSFORMING CHENNAI

Building Micro, Small, and Medium Enterprise Resilience to Water-Related Environmental Change

NOVEMBER 2016

Context

Chennai and its environs received a record-breaking 272 mm of rainfall in just 12 hours on December 1, 2015. This was 50% more than the city typically receives in the entire month of December, and came after more than a month of monsoon rains that had already saturated the ground. Floods inundated the city, including the airport, major train stations, and roads in and out of the metro area.¹ The floods, reported to be the worst in a 100 years, resulted in the displacement of over 1.8 million people in the city, with economic losses estimated at \$7.43 billion – \$14.67 billion, making it the eighth most expensive natural disaster in the world in 2015.² Both the flooding and its impacts were exacerbated by recent development patterns, in which urban expansion has taken place in hydrologically vulnerable areas.³

¹ Petrus, S. (2015). Chennai floods a climate change wake-up call for world. CNN.
² Manoharan, S., & Coughlin, V. (2016). The Chennai floods of 2015: urgent need for ethical disaster management guidelines. Indian Journal Of Medical Ethics, 1(2) (NS), 91
³ Narasimhan, B., Shaligramani, S.M., Mondal, A., Chak, S., and Mujumdar, P. (2016). Chennai floods 2015: A rapid assessment. ICWER, IISc-Bangalore.

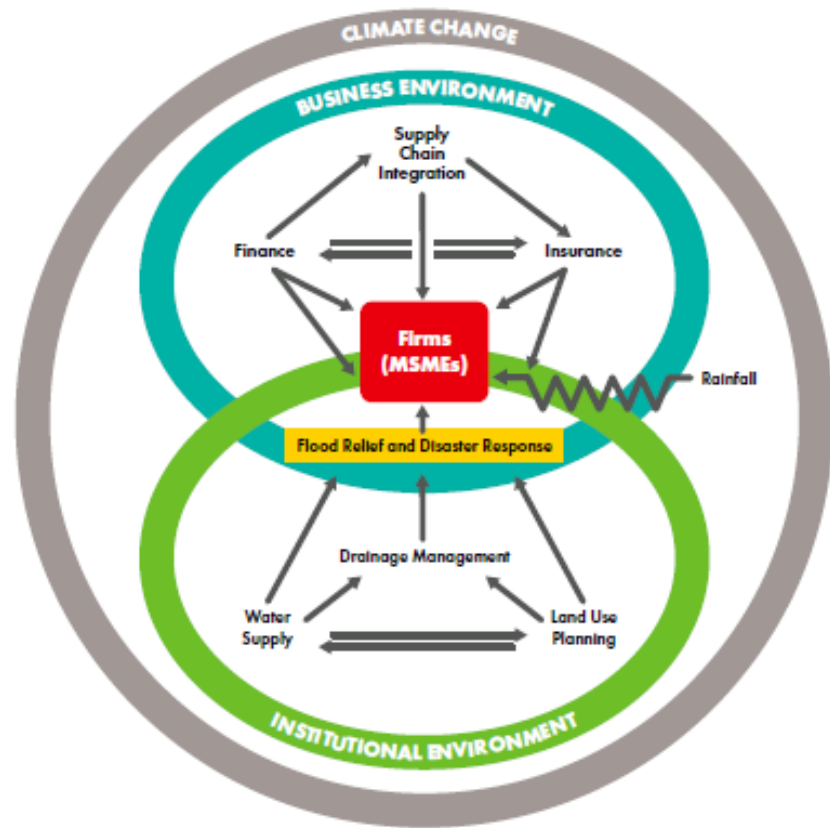
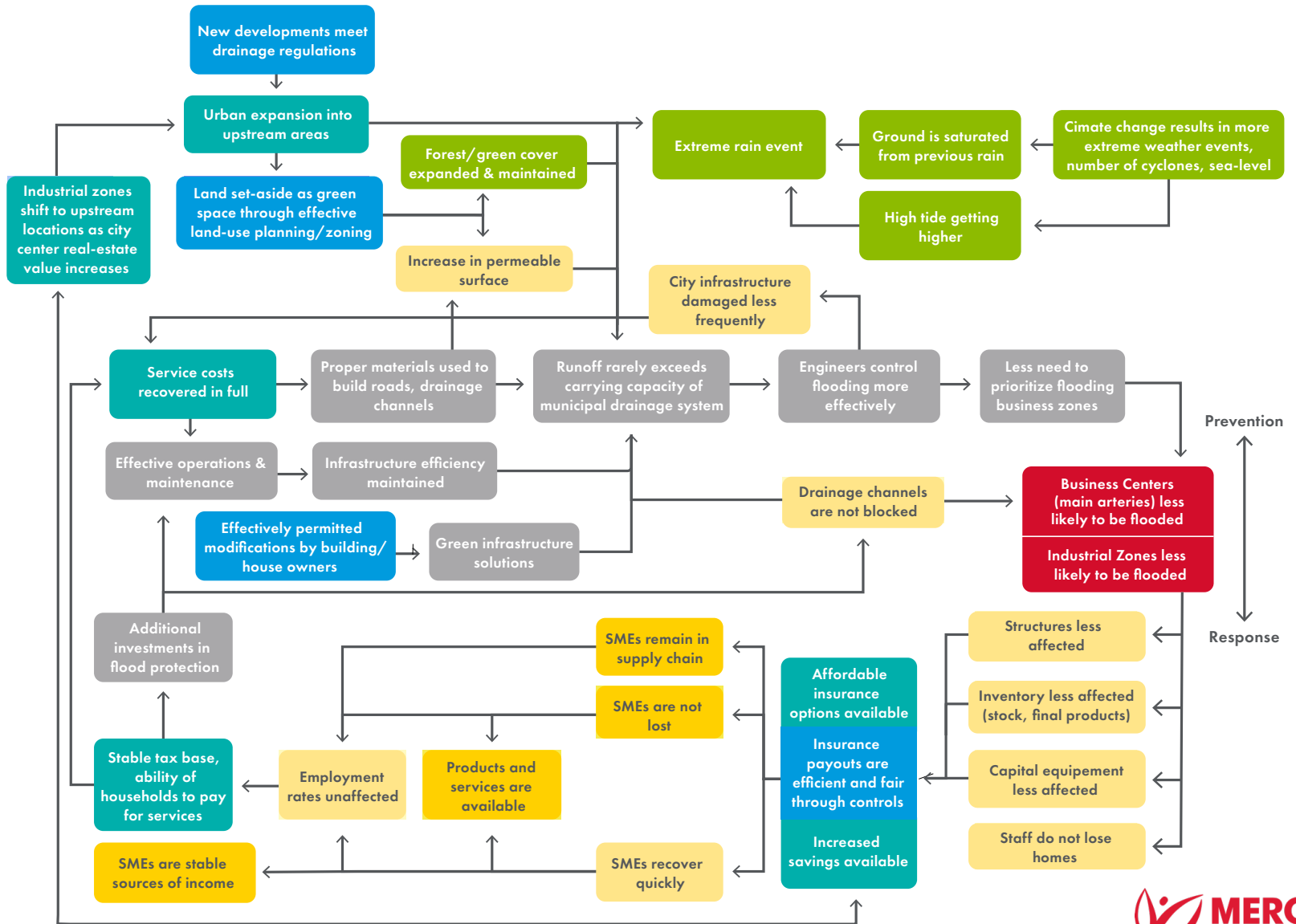


Figure 1: Systems Analysis Framework of MSME Resilience in Chennai




Capacities Systems Map: Chennai



Case 2: Transforming Chennai

Key Findings

- Fragmented institutions and infrastructure create challenges for balancing economic growth with environmental safeguards
- The impact of the flood disaster on MSME has as much to do with the business and institutional environment, as on the severity of the event.
- Slow or inaccessible formal financing increases the economic impact of natural hazards on firms




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1. Patena, S. (2016). Chennai floods: climate change wake-up call for coastal cities.
2. International, S., & Corporation, P. (2016). The Chennai floods of 2015: a report card for urban disaster management guidelines. Indian Journal of Medical Ethics, 11 (P46), 91.
3. Desai, S., Sankaranarayanan, S., Marudai, A., Chinn, S., and Majumdar, P. (2016). Chennai floods 2015: A rapid assessment. ICWE, ECo Bangalore.

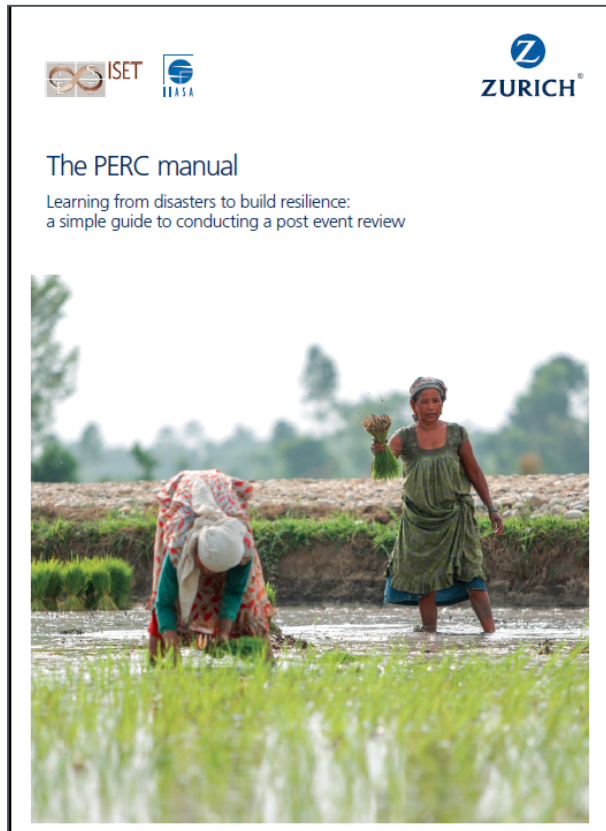


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Case 2: Understanding Urban Resilience through Post-Event Analysis



Methodology being adopted by Zurich Alliance 2.0

Focus on Five Capital Framework (Social, Physical, Financial, Human, Natural)

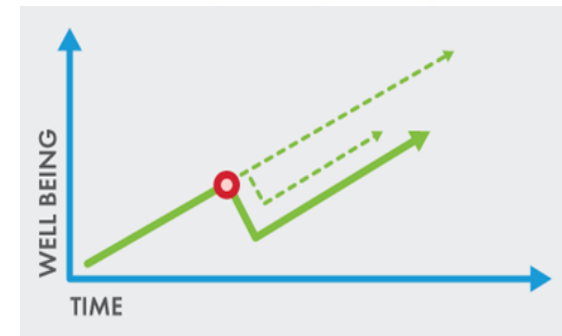
Post-Event Studies conducted in Colombia South Carolina (2014), Germany (2016), Central European Floods (2013), Balkans (2014)

Case 3: Outcome-based Urban Resilience Measurement?

A set of capacities

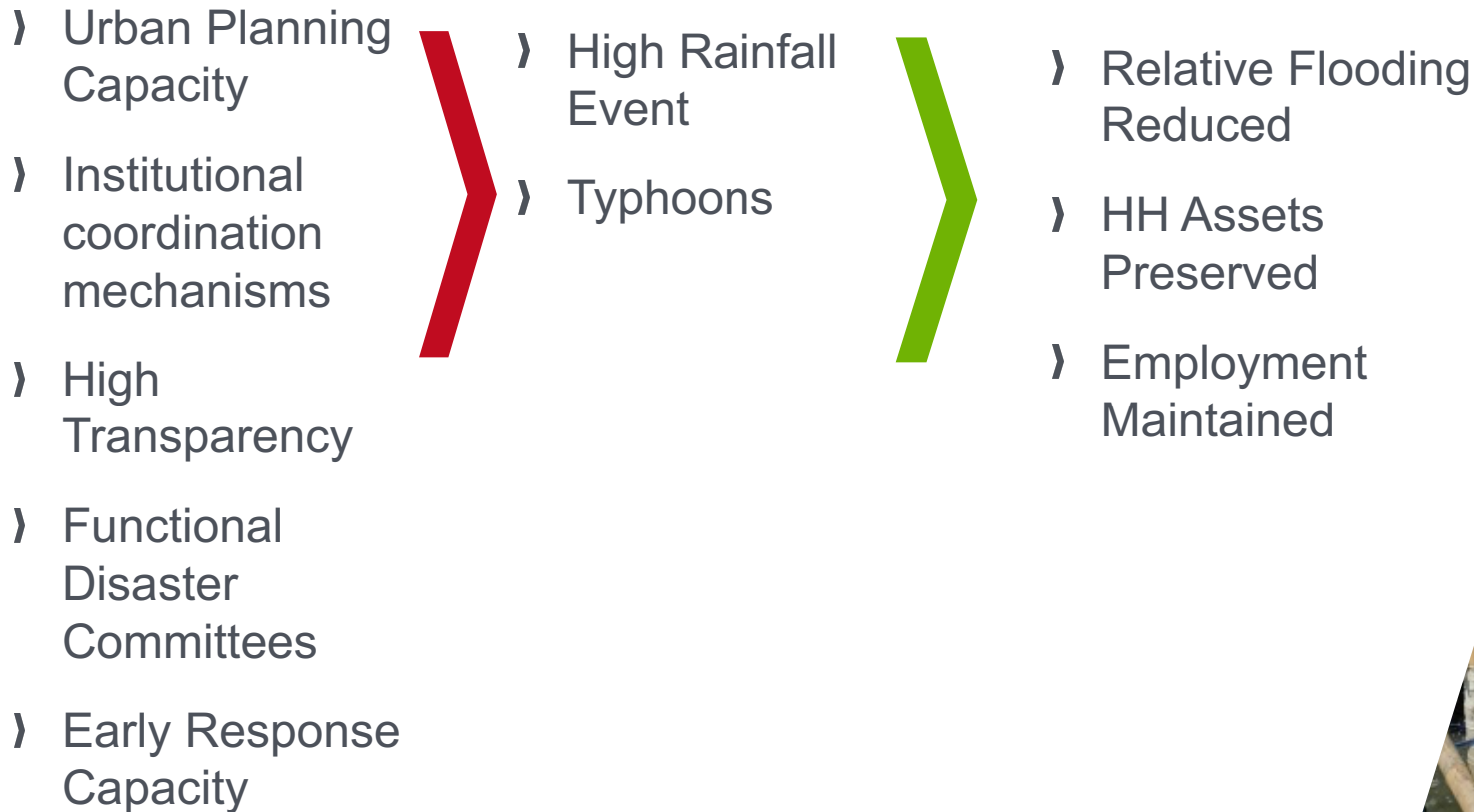
Realized in connection with some disturbance

Indexed to a well-being outcome



MULTIPLE TIMES AND SCALES

Case 3: Outcome-based Measurement?



Case 3: Outcome-based Measurement?



Photo Credit: C. Corbin/2008

URBAN RESILIENCE MEASUREMENT

An Approach Guide and Training Curriculum



DISCUSSION GROUPS

Making Evidence Matter For Urban Resilience

Discuss the unique considerations to assessment and measurement in urban areas:

- **What do you see as the major challenges to urban resilience measurement?**
- **What type of evidence do policy-makers need to advance urban resilience?**
- **What types of practical methods and tools can we pull from?**





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