Disaster Resilience

Dale Sands
RES/CON Conference –New Orleans
March 1-3, 2016

Agenda

- Climate Adaptation and Resilience Driving Forces
- Resilience Defined
- The “Ten Essentials” for Disaster Risk Reduction
- The Origin of the Disaster Resilience Scorecard
- Applications of the Scorecard in Asia, Europe, USA
- Small & Mid Size Business Scorecard Development
- Summary

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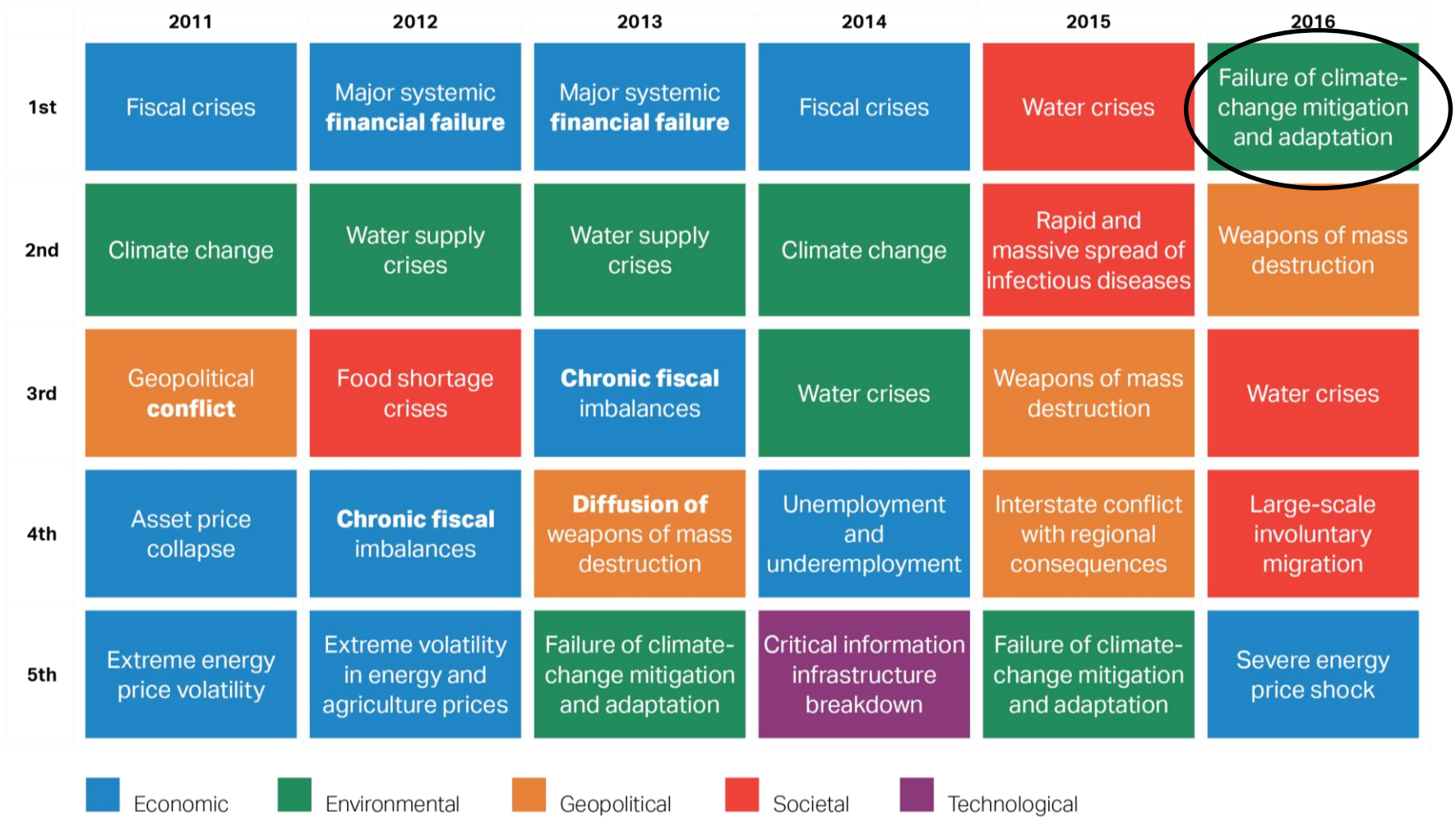
Five Global Risks in Terms of Impact



Source: World Economic Forum 2007-2016, *Global Risks Reports.*

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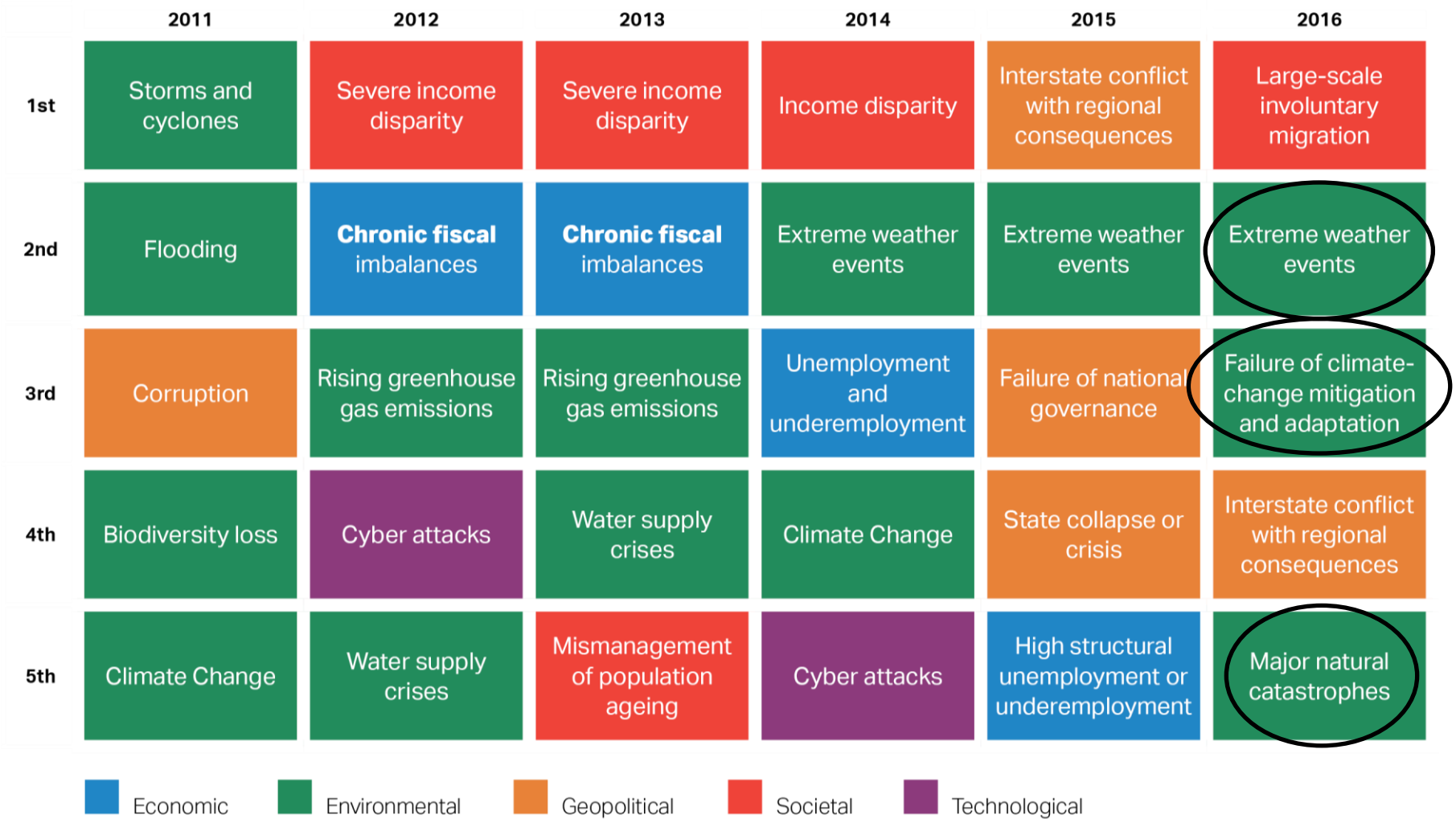
The Five Global Risks in Terms of Likelihood



Source: World Economic Forum 2007-2016, *Global Risks Reports.*

Disasters Affect People and Assets Globally

There were $1.4T damages 2005 -2014

1.7 B people were affected

700,000 people were killed

87% of losses were climate related in 2014

Average loss from earthquakes, cyclones tornadoes, are $180B+ per year

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Disasters 2005 to 2014

Top Ten Countries with Most Disasters 2005-14			
Country	# of Disasters	Damages ($B)	% of GDP
China	286	265	3.2%
USA	212	443	2.7%
Philippines	181	16	6.4%
India	167	47	2.5%
Indonesia	141	11	1.3%
Vietnam	73	7	4.5%
Afghanistan	72	72	351.0%
Mexico	64	16	1.4%
Japan	62	230	3.9%
Pakistan	59	25	11.1%

Driving Forces

- Urbanization increases exposure to capital losses
  - 50% of world population lives in metro areas
    - 70%+ projected to live in metros by 2050
- Frequency of extreme weather events increasing
  - 1,060 natural disasters in 2015, up 3X from 1985
- Annual $ losses from shock events skyrocketing
  - Capital losses $250B+ per year
  - 70% of losses are uninsured
  - Major private sector investment in Metros

Resilience Defined

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Resilience Definition

Resilient

"**Rebounding**"…Webster's New Dictionary

"**Springing back to a former shape or position…Capable of recoiling from pressure or shock unchanged or undamaged …Elastic"…** Readers Digest Great Encyclopedia Dictionary

"The power or ability to return to the original form, position, etc., after being bent, compressed, or stretched; elasticity … Random House Dictionary, © Random House, Inc. 2016.

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Resilience Definition

Resilience

The U.S. National Academies of Science (2012):

"***The ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events.***"

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Resilience Definition

Resilience

US Department of Defense Directive 4715.21 Climate Change Adaptation and Resilience (1/14/2016):

"Ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover from disruptions"

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Resilience Definition

Resilience

The Rockefeller Foundation define urban resilience as:

"*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*"

Acute Shocks: Earthquakes, floods, disease outbreaks, terrorist attacks

Chronic Stresses: High unemployment, chronic food & water shortages, endemic violence, inefficient public transportation systems

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Resilience Definition

Resilience

CO Resiliency Framework Definition:

"The ability of communities to rebound, positively adapt to, or thrive amidst changing conditions or challenges – including disasters and climate change – and maintain quality of life, healthy growth, durable systems, and conservation of resources for present and future generation"

Resilience Definition

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Resilience

UNISDR Definition:

"The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the affects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions"

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Resilience Definition

Resilience

- The ability of human settlements and organizations to withstand, recover quickly from and continue to prosper in the context of increasing impacts of natural and man made hazards or disasters.
- This includes chronic stresses such as those from climate change and acute shocks from natural and man made disasters.
- Resilience is an inescapable attribute of a smarter planet…Resilience requires planning and adaptation in advance of a peril.

The “Ten Essentials” For Disaster Risk Reduction

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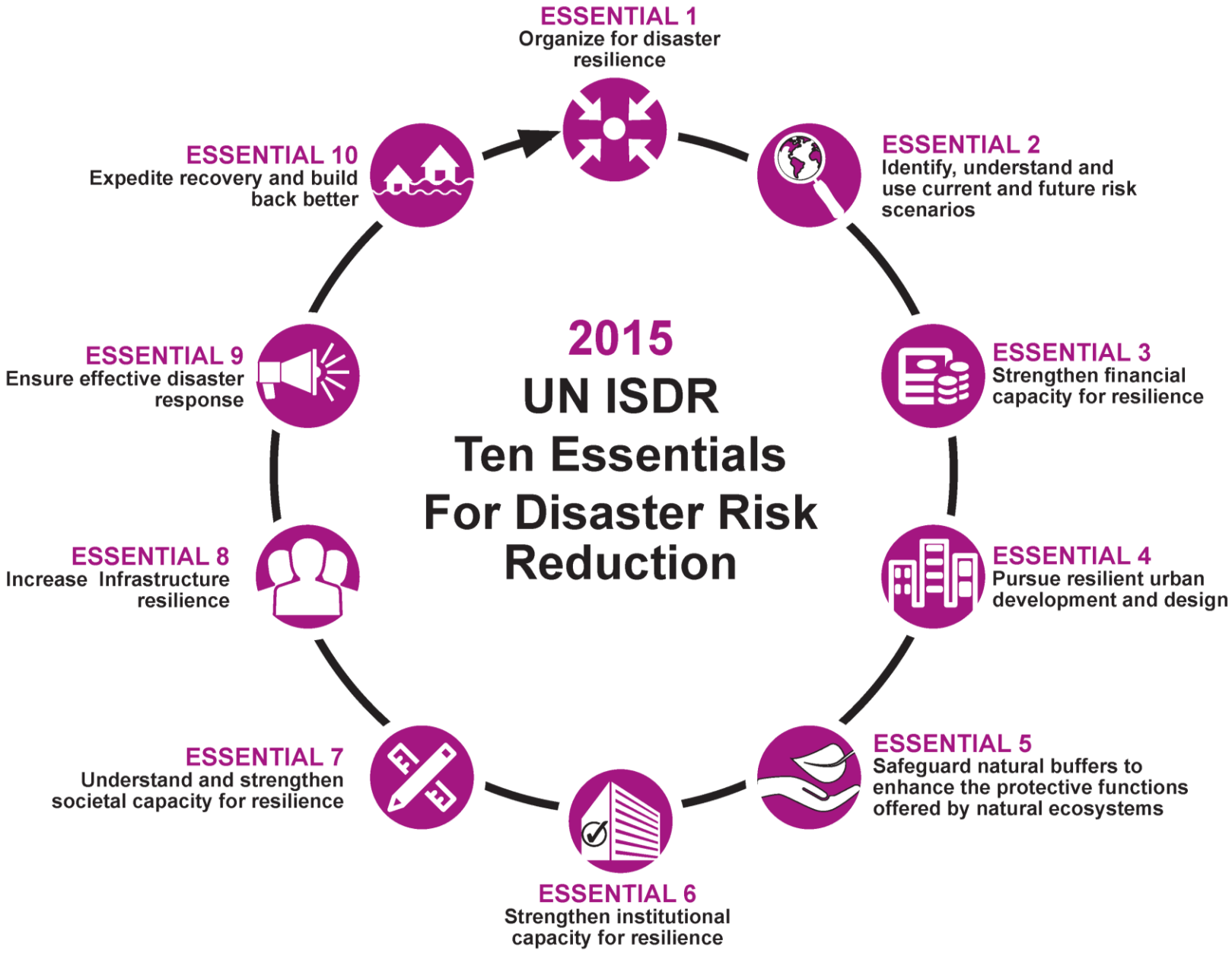
The UN's Ten Essentials



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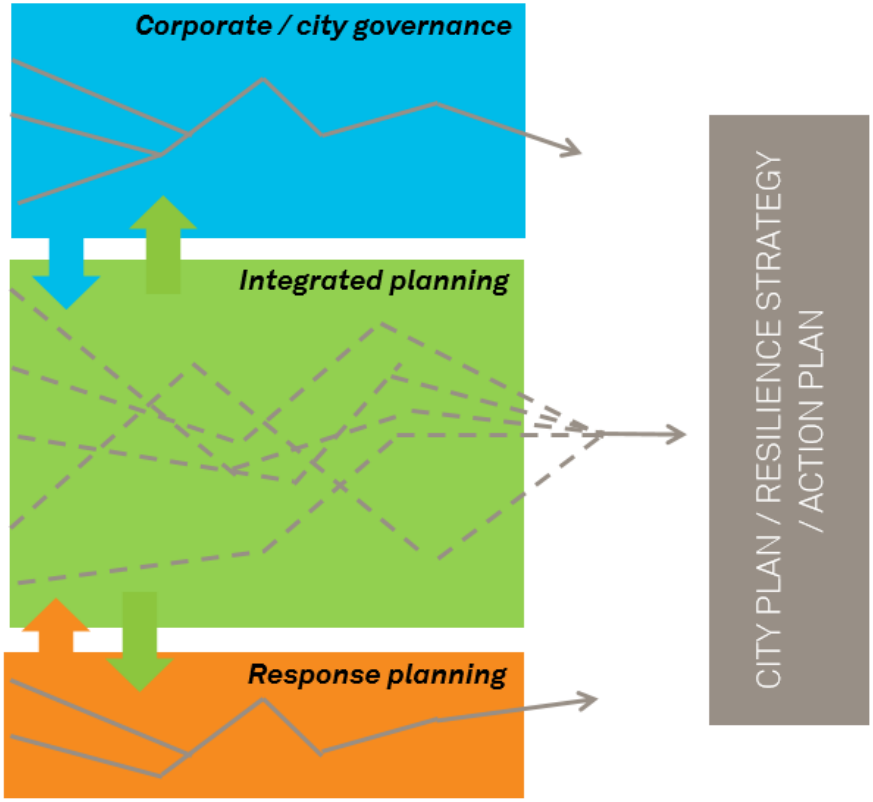
The UN's Ten Essentials For DRR

City Resilience Scorecard

The Ten Essentials

1	Organize for disaster resilience
2	Identify, understand and use current and future risk scenarios
3	Strengthen financial capacity for resilience
4	Pursue resilient urban development and design
5	Safeguard natural buffers to enhance the protective functions offered by natural ecosystems
6	Strengthen institutional capacity for resilience
7	Understand and strengthen societal capacity for resilience
8	Increase infrastructure resilience
9	Ensure effective disaster response
10	Expedite recovery and build back better



http://www.unisdr.org/campaign/resilientcities/toolkit/essentials

How The Ten Essentials Apply

1	**Organize for disaster resilience**	• Multi-disciplinary focus in City • Coordination with communities, other stakeholders. • 8 items measured
2	**Identify, understand & use current & future risk scenarios**	• 5 items measured
3	**Strengthen financial capacity for resilience**	• Financial risk analysis: monetize potential event impacts • Community funding • 10 Items measured
4	**Pursue resilient urban development & design**	• Lay-out and design of City • Application of building codes as required by risks in #2. • Incorporation of resiliency into master plans • Hazard exposure and vulnerability • Up to date review of data and acute & chronic threats/perils • 8 Items measured
5	**Safeguard natural buffers to enhance the protective functions offered by natural ecosystems**	• Preservation of natural features that may help protect the base & the region • 3 Items measured
6	**Strengthen institutional capacity for resilience**	• Skills, training for disaster response • Regional aspects • Data & metrics • 6 Items measured
7	**Understand & strengthen societal capacity for resilience**	• Awareness of all residents, organizations • Using training as a channel to the community • 7 Items measured
8	**Increase infrastructure resilience**	• Exposure & vulnerability of all key systems • Asset interdependencies – plan for failure chains • Response capabilities • Resilience upgrades • 32 Items measured
9	**Ensure effective disaster response**	• Disaster planning, rehearsals with community engagement • Response capabilities based on likely need. • Regional capabilities • 13 Items measured
10	**Expedite recovery & build back better**	• Enhanced capabilities for post event recovery – plans, triage strategies, post event organizations… • 2 Items measured

The Disaster Resilience Scorecard

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The Scorecard: Developed by AECOM, IBM

– Following a Public / Private Sector Workshop in San Francisco, we debated how to measure ‘resilience’…

– “Resilience” is a large – and growing – concept, variously including environmental, economic, social and other forms of resilience as well as disaster resilience. The Scorecard is focused on disaster resilience, and on those other forms of resilience to the extent that they affect disaster resilience.

– The Scorecard is intended to help cities understand all the elements of their disaster resilience positioning, frame a plan of action to prioritize investments, and track progress.

– The scorecard is free to use, for non-profit or for-profit purposes.

The Scorecard: Developed by AECOM, IBM

- As a baselining instrument, the scorecard is NOT intended for benchmarking between communities.
- The scorecard is deliberately pitched as a “counsel of perfection”… No community would get a perfect score.
- In the “raw” scorecard, all assessments are equal.
- Because the Scorecard is free to use, we are not aware of all implementations…however, we estimate that some 40+ cities, across every continent, will have used it in some fashion.

Applying the Scorecard

– The typical process

– Alternative approaches:
  - The ‘light touch’ – one-day workshop in the US
  - Two-day workshop, supported by initial questionnaire and interviews in Asia, Europe
  - Multi-week detailed assessment in Europe

The Typical Process

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Extract from the Scorecard – Essential 1

Subject/Issue	Item measured	Indicative Measurement	Indicative Measurement Scale	Comments
1.1 Organization and coordination	1.1.1 Co-ordination of all relevant **pre-event** planning and preparation activities exists for the city's area, with clarity of roles and accountability across all relevant organizations.	Presence of organizational chart documenting structure and role definitions at each relevant agency to achieve a single overall point of co-ordination. Structure agreed and preferably signed off by all participants via MOU or similar.	5 – Single point of coordination exists with agreed roles and responsibilities. 4 – Single point exists but with some minor exceptions. 3 – Single point exists in principle, but with some major omissions, or lack of agreement on some major areas. 2 – Initial steps taken to create a single point of coordination. 1 – No single point but plans exist to create one. 0 – No single point and no plans to create one.	The single point of co-ordination may be a person, or a group or committee (with sub-groups or committees as appropriate). It will coordinate the relevant (see below) activities of: - The city government and, if separate, highways, police, armed forces/civil defense, water, energy, or any other relevant city organizations); - Other tiers of government (eg state, ward-level) or neighboring municipalities); - Private sectors organizations with relevant roles – for example, utilities, phone companies, healthcare, logistics companies, fuel depots, property companies, and so on. Some cities may have different organizational arrangements for different types of disaster. However, these need at least to work through the same coordination point (person or committee) to ensure consistency in response arrangements; and also to enable management of simultaneous disasters as applicable. The test of relevance is whether the organization or activity must contribute in any way to preparing for the event scenarios covered below in Essential 2.
	1.1.2 Coordination of all relevant **event response** activities in the city's area, with clarity of roles and	Presence of organizational chart documenting structure and role definitions at each relevant	5 – Single point of coordination exists with agreed roles and responsibilities.	As above – the single point may be a person or a group.

The Disaster Resilience Scorecard Applications

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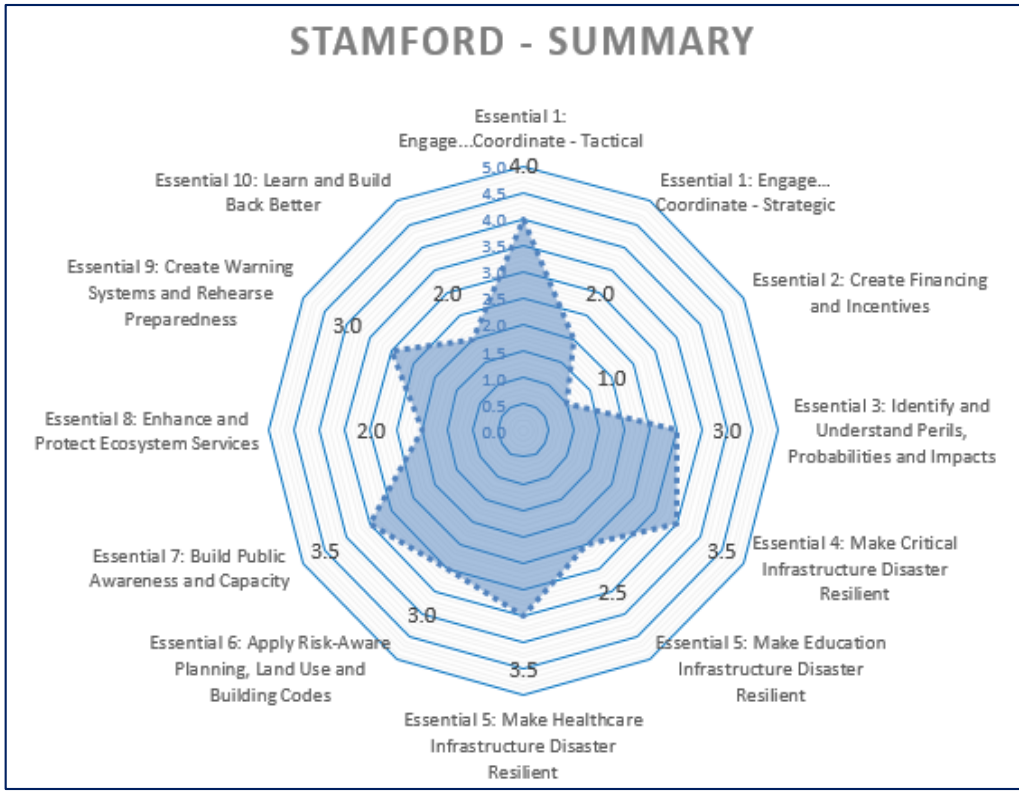
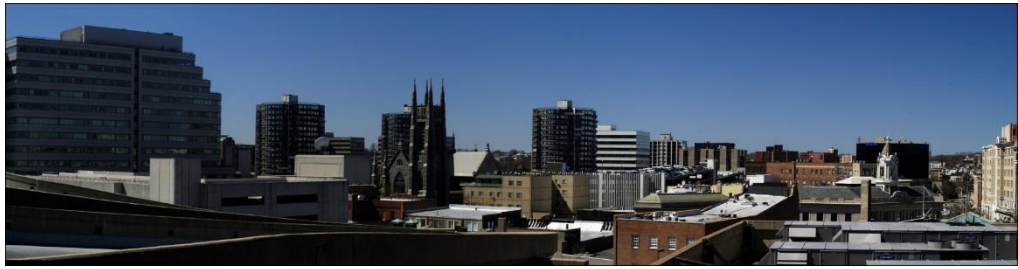
One Day Workshop: Stamford, CT

- Tool for Engaging Stakeholders:
  - One-day workshop – initiated by the Mayor at the request of Stamford 2030 - a local business/civic group.
    - Supported facilitated discussions among range of stakeholders, using detailed assessments in the Scorecard as discussion prompts.
    - Scores developed for each of the Ten Essentials, based on group consensus.
    - Identified priority areas needing further investigation, coordination.
    - Scorecard was a flexible tool that provided a great agenda for bringing together key stakeholders in a very useful, low cost way





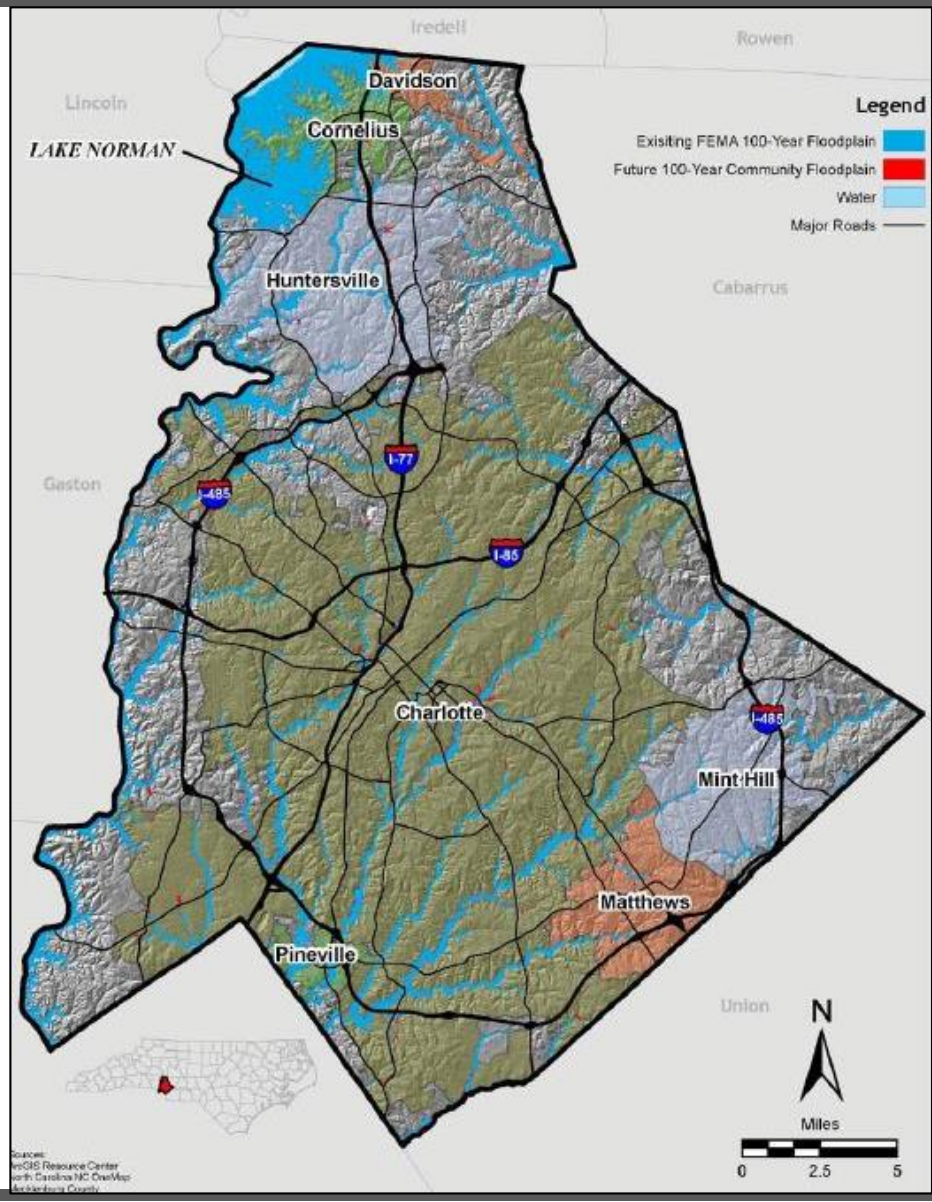
Stamford Scorecard Application

"We're excited to be the first city in the U.S. to use the UN Scorecard to measure the resilience of our City. Stamford is uniquely located on the Long Island Sound, where the need to address infrastructure resiliency and adapt to extreme weather events is imperative…The workshop helped us to identify strategically where we need to put our focus in order to move forward with the right projects to make our City better prepared."

Mayor David Martin, City of Stamford

Integration with Hazard Mitigation Planning

- City of Charlotte / Mecklenburg County, NC
- Integration of HMP update and Scorecard
- Focus on all indicators for seven communities
- Identification of areas warranting further investigation
- Communicating value in aligning the processes



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Hazard Mitigation Planning

UNISDR 10 Essentials	Component in HMP		
Essential 1: Engage, Share Understanding and Coordinate	• Capability assessment • Public involvement	• Mitigation action plan	• Plan review, approval, adoption
Essential 2: Create Financing and Incentives	• Capability assessment • Mitigation strategy	• Mitigation action plan	
Essential 3: Identify and Understand Perils, Probabilities and Impacts	• Community profile • Risk assessment	• Public engagement • Planning process	• Mitigation strategy • Mitigation action plan
Essential 4: Make Critical Infrastructure Disaster Resilient	• Capability assessment	• Mitigation action plan	• Mitigation strategy
Essential 5: Make Education and Healthcare Infrastructure Disaster Resilient	• Community profile	• Risk assessment	
Essential 6: Apply Risk-Aware Planning, Land-Use and Building Codes	• Planning process	• Community profile	• Mitigation strategy
Essential 7: Build Public Awareness and Capacity	• Community profile	• Public engagement	
Essential 8: Enhance and Protect Ecosystem Services	• Risk assessment • Planning	• Capability assessment • Mitigation strategy	• Mitigation action plan
Essential 9: Create Warning Systems and Rehearse Preparedness	• Capability assessment • Public engagement	• Mitigation strategy	• Mitigation action plan
Essential 10: Learn and Build Back Better	• Capability assessment • Public engagement	• Community profile	• Public education

Note: this work used an older version of the Essentials and Scorecard.

Two-day Workshop Format

- Two-day workshop with questionnaire and some interviews in advance
- Examples: Coimbatore (India); Da Nang (Vietnam), Makati (Philippines); Bandung (Indonesia)
  - Multiple stakeholders in attendance
  - Explore all indicators
  - Launching action with partners
  - Determining areas of relative strength & areas requiring greatest focus/improvement

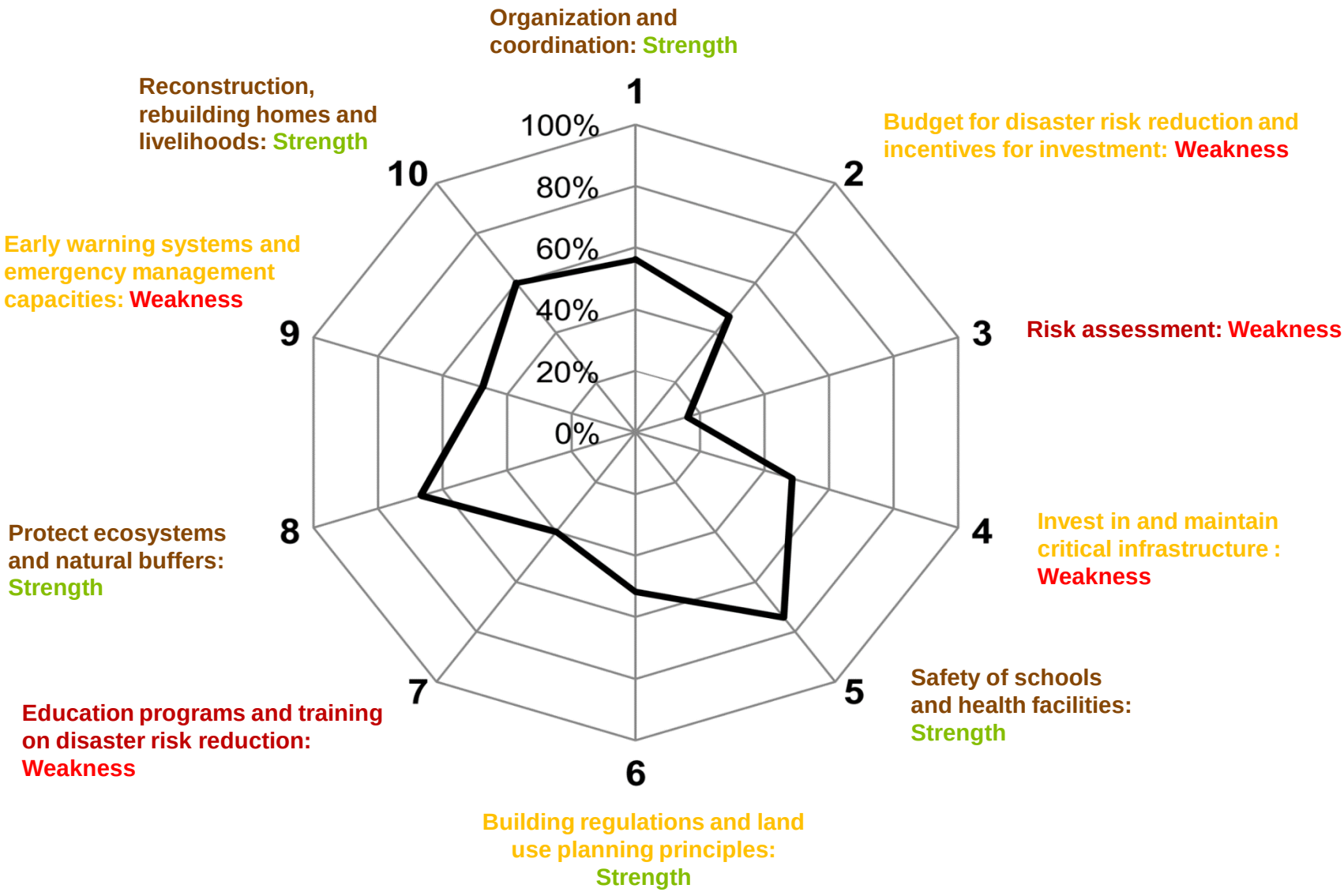
Asia Applications

1. Kickoff meeting to explain process, data requirements, work plan
2. Circulate the Ten Essentials to City Officials
3. Introductory meeting with Mayor, Commissioner, Heads of Departments, Technical managers, representatives of departments
4. Collect base maps and secondary data from various stakeholders
5. Rapid assessment of civic amenities identifying line departments, Key stakeholders, NGO's, academic institutions, private sector, chamber of commerce, religious organizations, financial organizations
6. Assessment of infrastructure status of water supply, underground wastewater systems, storm water drains, street lighting, etc.

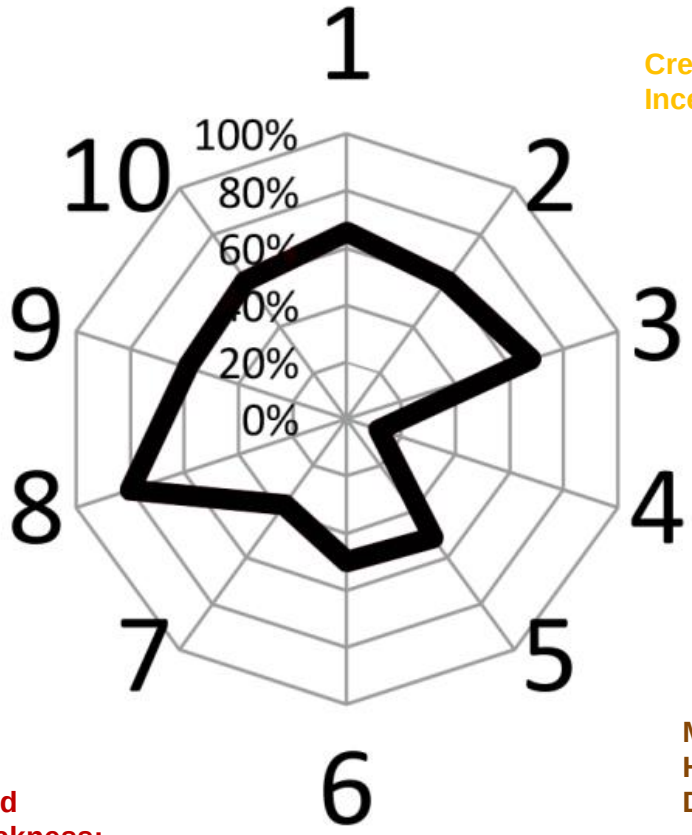
Asia Applications

- Scorecard measured resilience status of cities…it supports target setting, prioritizes actions & investments
- Was a learning tool to understand the elements of resilience aligned with regional/national strategies
- Benefits to participating Cities were:
  - Systematic assessment of resilience to risks faced
  - Basis on which to plan future investments & track progress
  - Basis to identify/engage many organizations
  - Increased economic investment potential from reduced exposure
  - Potential reduction in cost of insurance
  - Establishment/recognition as global leader for resilient city by adoption of good practices, contribution of learning

Bandung, Indonesia - Summary



Makati City – 3 Workshops



Engage, Share and Understanding and Coordinate

Create Financing and Incentives

Identify and Understand Perils, Probabilities and Impacts – Strength: Further Work to map hazards, validate risks,

Make Critical Infrastructure Resilient – Weakness: Floodiing

Make Education & Healthcare Infrastructure Disaster Resilient

Apply Risk-Aware Planning, Land Use and Building Codes

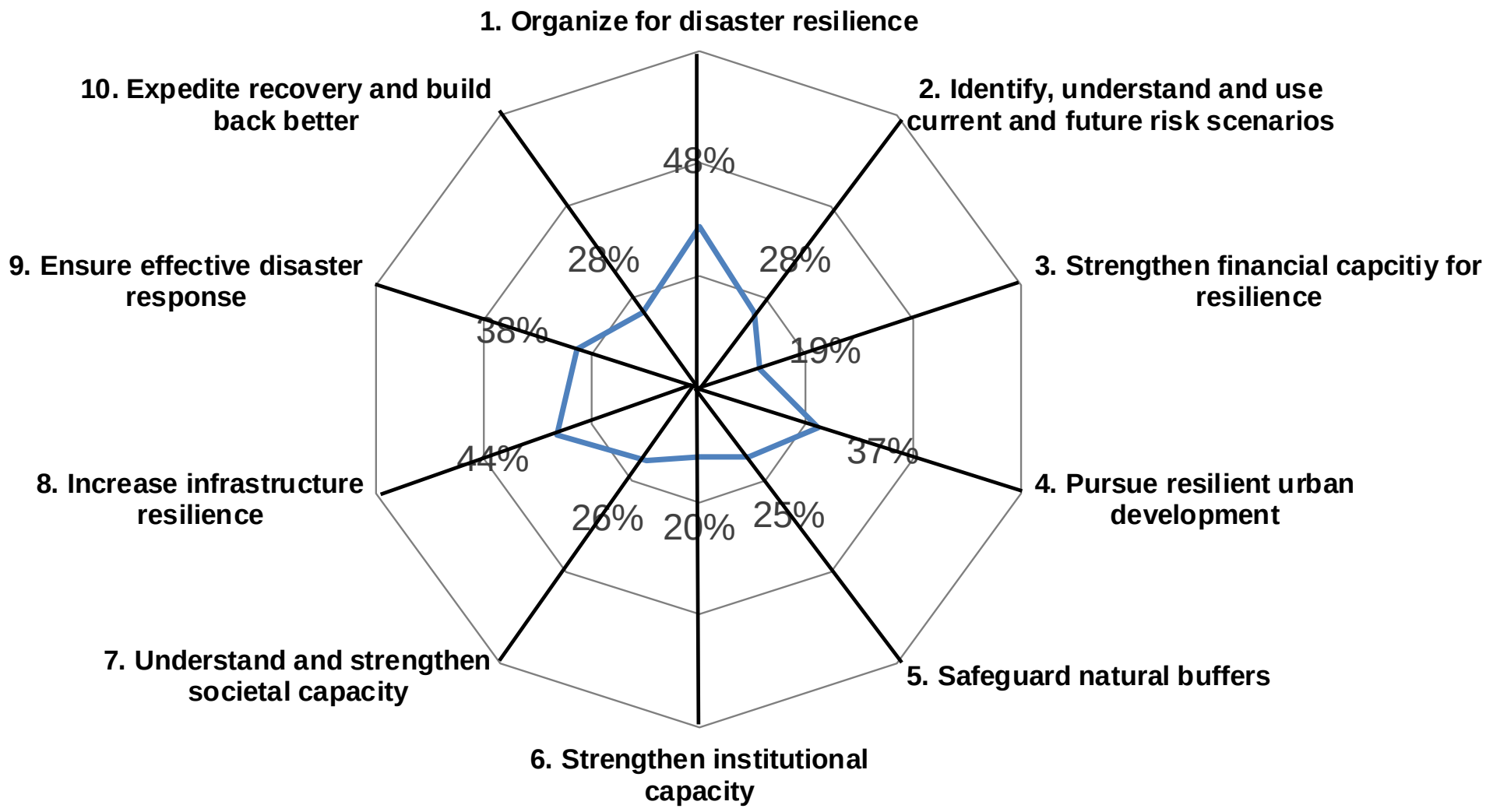
Build Public Awareness and Capacity –Weakness: Holistic program needed

Enhance and Protect Ecosystem Services: Strength

Create Warning Systems and Rehearse Preparedness

Learn and Build Back Better

Puerto Montt, Chile - Summary

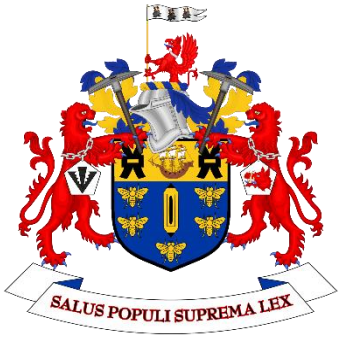


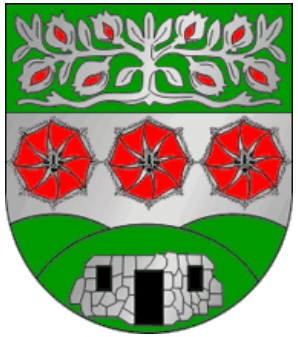
Puerto Montt, Chile - Summary

1. Create a resilience strategy linking regional and local activities
2. Create a post-event strategy
3. Learn from other countries and cities
4. Appoint a “Chief Resilience Officer”
5. Establish a Central Resilience Coordination Committee with responsibility for integrating resilience planning and disaster response efforts
6. Create community “cells” of volunteers
7. Define and agree specific risk scenarios
8. Create a financial strategy for resilience
9. Create a graduated alert system
10. Create a sustained, continuous awareness and “marketing” campaign
11. Test emergency response processes and organization relative to adopted scenarios
12. Encourage larger businesses to create continuity plans
13. Create a Disaster Resilience IT Strategy
14. Complete an engineering assessment of resilience of critical infrastructure

Detailed Assessment

- Scorecard application completed in five European Cities: Salford & Stoke-on-Trent (UK), Jonkoping & Arvika (Sweden), Amadora (Portugal).
- High profile: Salford project was run by full-time senior government officer, a local police Superintendent (UK police are designated first responders).
- Interviews, questionnaires, documentary review, some site visits: will take some weeks to execute.
- Result will be a detailed disaster resilience blueprint with scores that will allow process specifically to be tracked.
- Funded by the EU – results used for further grant applications..





Greater Manchester

- Developing 3-5 year resilience strategy
- Conducted multiple sessions with stakeholders
- Second Two focused on Essential 5 & 8
- Significant improvement in engagement ‘suggesting scorecard process had been beneficial in developing interest in the project and ownership of outcomes
- Challenges: Analyze large amounts of data, Verify quality, how deep to validate, reinforce ‘high impact – high probability scenario, get access to sensitive/secure data…much benefit derived from going through the process

Small- and Mid-Size Business Scorecard Development and application

- Survey Small- & Mid-Size Businesses in Six Corridors in New Orleans to gauge preparedness to natural disasters
- Objectives:
  - Define steps business may take to improve their resilience
  - Evaluate neighborhood / block opportunities to collaborate
  - Identify areas where City of New Orleans may support improvements
- Target 250 businesses for interview with newly developed "scorecard" …derivation of DRS with 26 focused metrics
- Status:
  - Pilot tested scorecard on 23 businesses
  - Roll out over next month with final report by June

Summary

- Disaster Risk Reduction is a global priority as capital asset losses have increased along with the number/intensity of natural disasters.
- Disaster Resilience Scorecard has been used as an effective tool to evaluate resilience in 40+ cities worldwide.
- Application of the Scorecard can be a very effective means of bringing multiple stakeholders together to evaluate community resilience, to define gaps and focus efforts on areas of highest priority.
- Improving resilience in a community is a journey over many years but most important actions can begin immediately with every capital investment.
- The process of bringing public and private sector members together to apply the scorecard to community can foster collaboration and cooperation to improve resilience across the community.
- Resilience plans must be technically possible, economically feasible, politically acceptable and emotionally motivational


Thank You!
Dale Sands