Integrated, resilience-based planning for mitigation and adaptation in Asia

Ayyoob Sharifi, National Institute for Environmental Studies, Japan
Interconnected Risk Landscape

Climate Change, The Biggest Risk
Resilience and adaptation

Incremental adaptation
- Dominant type
- Small-scale disruptions

Transformational
- Highly vulnerable system
- Severe/more frequent stresses
- Thresholds are crossed

Source: Sharifi (forthcoming)
Major elements of the framework for analysis

- Comprehensiveness
- Cross-scale relationships
- Temporal dynamism
- Uncertainties
- Participatory approaches
- Action plans
Shortcomings and Challenges, gaps in knowledge

General enough/flexible enough
Spatial and temporal dynamics
Modelling, simulation and scenario making
Dominance of vulnerability (not resilience) measures
Interlinkages and complex interactions
Can resilience assessment shed more light on the uncertain future?
Data availability for conducting assessment
Cost of assessment
A major challenge would be reducing information to an understandable and manageable level (optimization)
Developing integrated tools for assessing both sustainability and resilience
Energy System

IT networks and equipment for system monitoring and control

- Real-time communication of operating conditions with utility managers
- Optimizing response time to reduce potential loss of system function
- Better sharing of information between system
- Interactive feedback with residents (smart-metering/in-home displays)

Shift from centralized grid to decentralized systems (e.g. microgrid)

- Distributed generation
- Less exposure to extreme events
- Prevent cascading effects
- Energy efficiency enhancement
- Improved diversity, and reliability, clean energy, etc.

Source: Sharifi and Yamagata (2016); Arup, RPA and Siemens (2013)
Buildings

Passive design (orientation, natural lighting, high albedo, PCM, green roof/facade, etc.)

Automated systems to take advantage of local climate

Solar energy panels

High-tech/IT infrastructure for failure detection (smoke, air quality, …)

Indoor human behavior simulation

Source: solaripedia.com

Source: Raven et al. (2015)

Source: Sharifi (2016)
Future challenges and opportunities

Adaptive mitigation

Life cycle costs
  - Massive urbanization provides opportunities for eco-design

Nexus issues
  - E.g. water-energy nexus

Trade offs

Consider context
  - (climate, technical feasibility, site suitability)
Thanks for your attention

Ayyoob Sharifi, PhD.

Executive director, GCP
Research Associate, NIES

sharifi.ayyoob@nies.go.jp
sharifigeomatic@gmail.com

http://www.cger.nies.go.jp/gcp/