

# Context of Resilience

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# Defining Resilience

- *Resilience*: the capacity of a system to absorb disturbance and reorganize while undergoing change, so as to still retain essentially the same function, structure, identity, and feedbacks” (Walker et al. 2004; Folke et al. 2010).
- *Resilience is about neither persistence nor change but about balancing and integrating both in an adaptive cycle*
- *The key resilience question is the resilience of what to what?*



“Imagine you are on a boat docked in a calm harbor and you want to quickly carry a brim-full cup of water across a stateroom without spilling. Now imagine the same situation but with the boat in rough seas. In harbor, the solution is simple: just walk quickly, but not so quickly that the water spills. At sea, speed is a secondary concern; now the real challenge is to maintain balance on an abruptly pitching floor. The solution now is to find secure handholds and footholds and to flex your knees to absorb the roll of the boat. In harbor, the solution is a simple optimization problem (walk as fast as possible but not too fast); at sea the solution requires you to enhance your ability to absorb disturbance – that is, enhance your resilience against the waves.”

Walter V. Reid in the foreword to Brian Walker and David Salt,  
*Resilience thinking. Sustaining Ecosystems and People in a  
Changing World*

# Bug world vs. Cog world

*Resilience thinking and efficiency come into conflict with looking at the paradigm of Socio-Ecological Systems*

## Bug World



Examples:  
Ecosystems  
Economies  
Organisms

### A complex adaptive system

- ✓ Variety of interactions
- ✓ Self organizing system
- ✓ No single point of control
- ✓ Emergent behavior
- ✓ Non-linear
- ✓ Secondary feedback loops

## Cog World

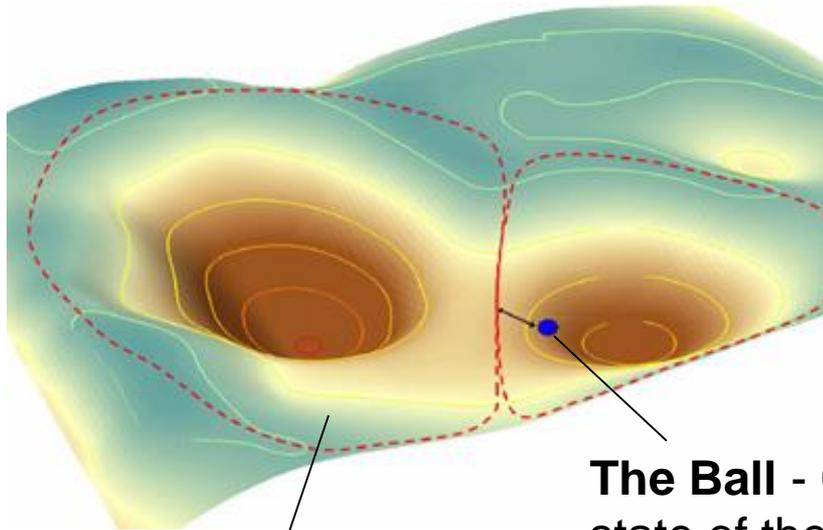


### A complicated system

- ✓ Interconnected
- ✓ Complicated but simple
- ✓ Predictable
- ✓ Linear
- ✓ Cannot adapt to change

# The Ball in the Basin

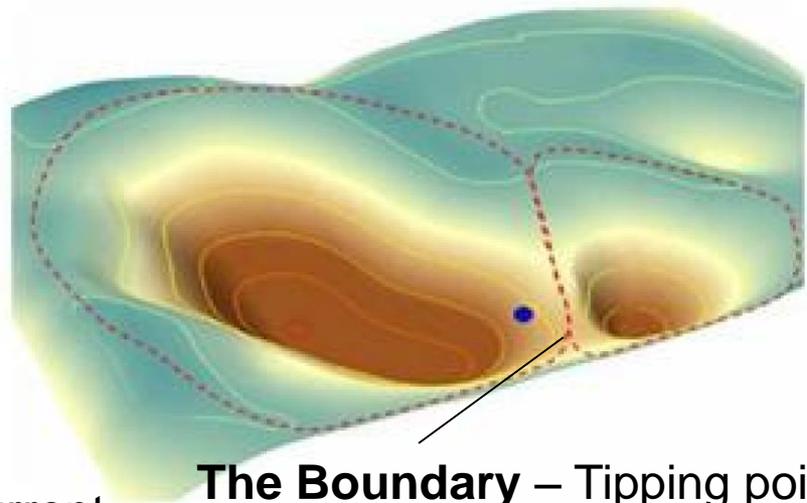
*Framework for understanding the state of stability in a socio-ecological system*



**The Ball** - Current state of the system

## **The Basin**

- ✓ Set of states with the same functions and feedback loops.
- ✓ Acts as a basin of attraction: the system is attracted to the bottom of the basin
- ✓ Shape of the basin is always changing. System is never in a “stable-perfect” equilibrium

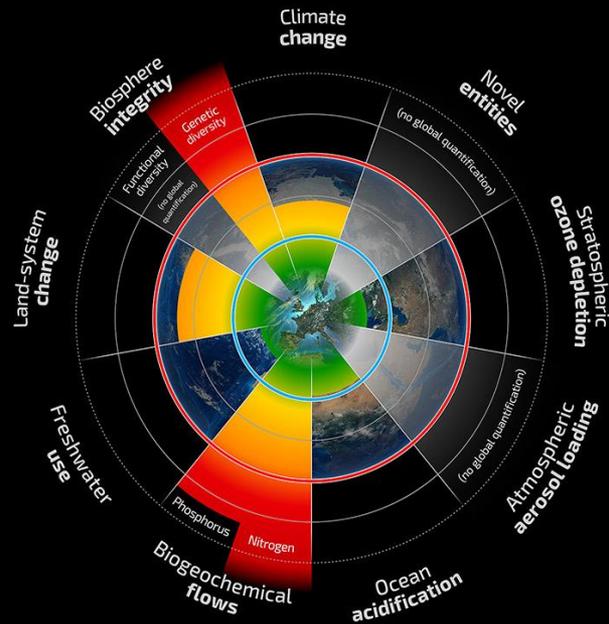


**The Boundary** – Tipping point – system moves towards a different equilibrium

# Basin of Attraction – Planetary Boundaries

## Planetary Boundaries

A safe operating space for humanity



- Beyond zone of uncertainty (high risk)
- In zone of uncertainty (increasing risk)
- Below boundary (safe)
- Boundary not yet quantified

Source: Steffen et al. Planetary Boundaries: Guiding human development on a changing planet. *Science*, 16 January 2015.  
Design: Globalia

# Revisiting the Definition of Resilience

- *Resilience: the capacity of a system to absorb disturbance and reorganize while undergoing change, so as to still retain essentially the same function, structure, identity, and feedbacks” (Walker et al. 2004; Folke et al. 2010).*
- ***Resilience is about neither persistence nor change but about balancing and integrating both in an adaptive cycle***
- *The key resilience question is the resilience of what to what?*

# Resilience through Adaptive Cycles

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→  
Much



CAPITAL STORED



←  
Little



← Weak

CONNECTEDNESS

Strong →

2. Reorganization or Exploitation

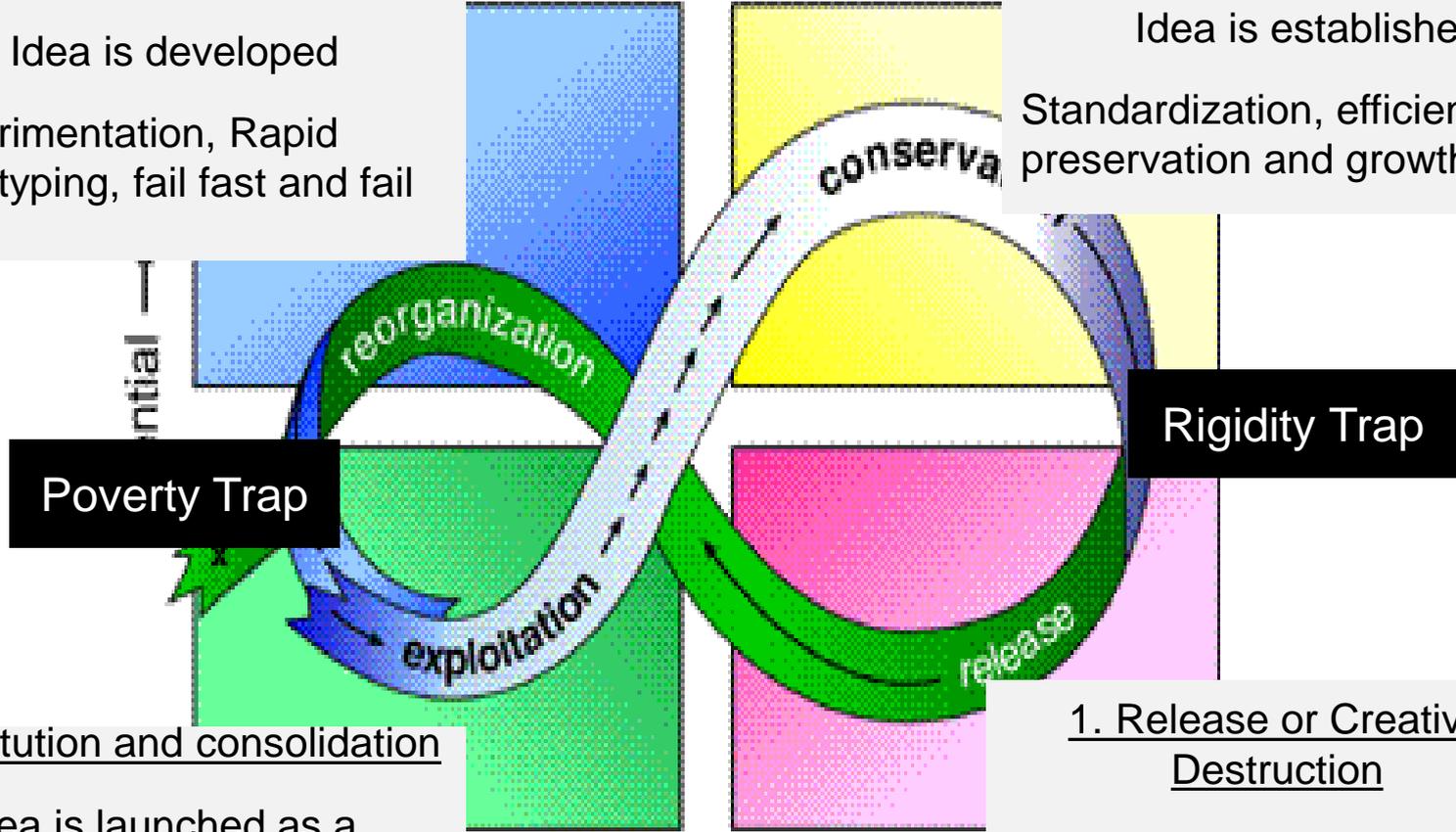
Idea is developed

Experimentation, Rapid prototyping, fail fast and fail often

3. Conservation and scale

Idea is established

Standardization, efficiency, preservation and growth



Poverty Trap

Rigidity Trap

3. Institution and consolidation

Idea is launched as a produce/process/organization

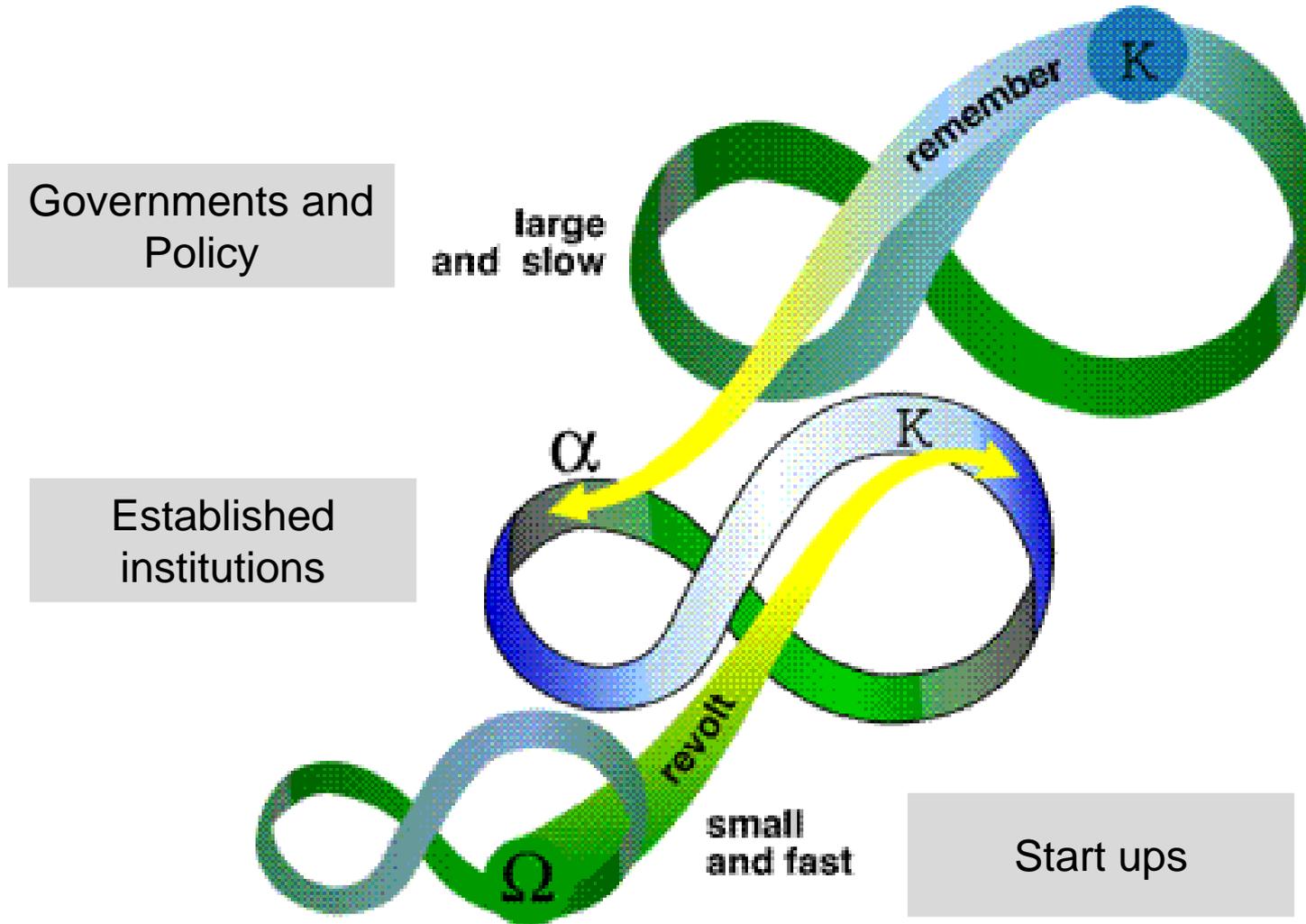
Dynamic start up, institutionalization and systems

1. Release or Creative Destruction

Ideas are born

Opportunity, Release of resources, paradigm changes

# Adaptive Cycles at Cross Scales



# Roles of Technology

*For our partnership – How does technology help navigate complex socio-ecological systems*

- ❑ Sensemaking for socio-ecological systems – aggregation of interdisciplinary variable; developing and testing new methodologies for measurement and analysis
- ❑ Rapid prototyping and real-time feedbacks
- ❑ Understanding states, patterns and trends within systems
- ❑ Creating perspectives across scales and sectors
- ❑ Visualizing context for policy, advocacy and crowding-in actors

*The key resilience question is the resilience of what to what?*

# Resilience in Asia

*For our region, key stresses and emergent crisis affecting the socio-ecological system*

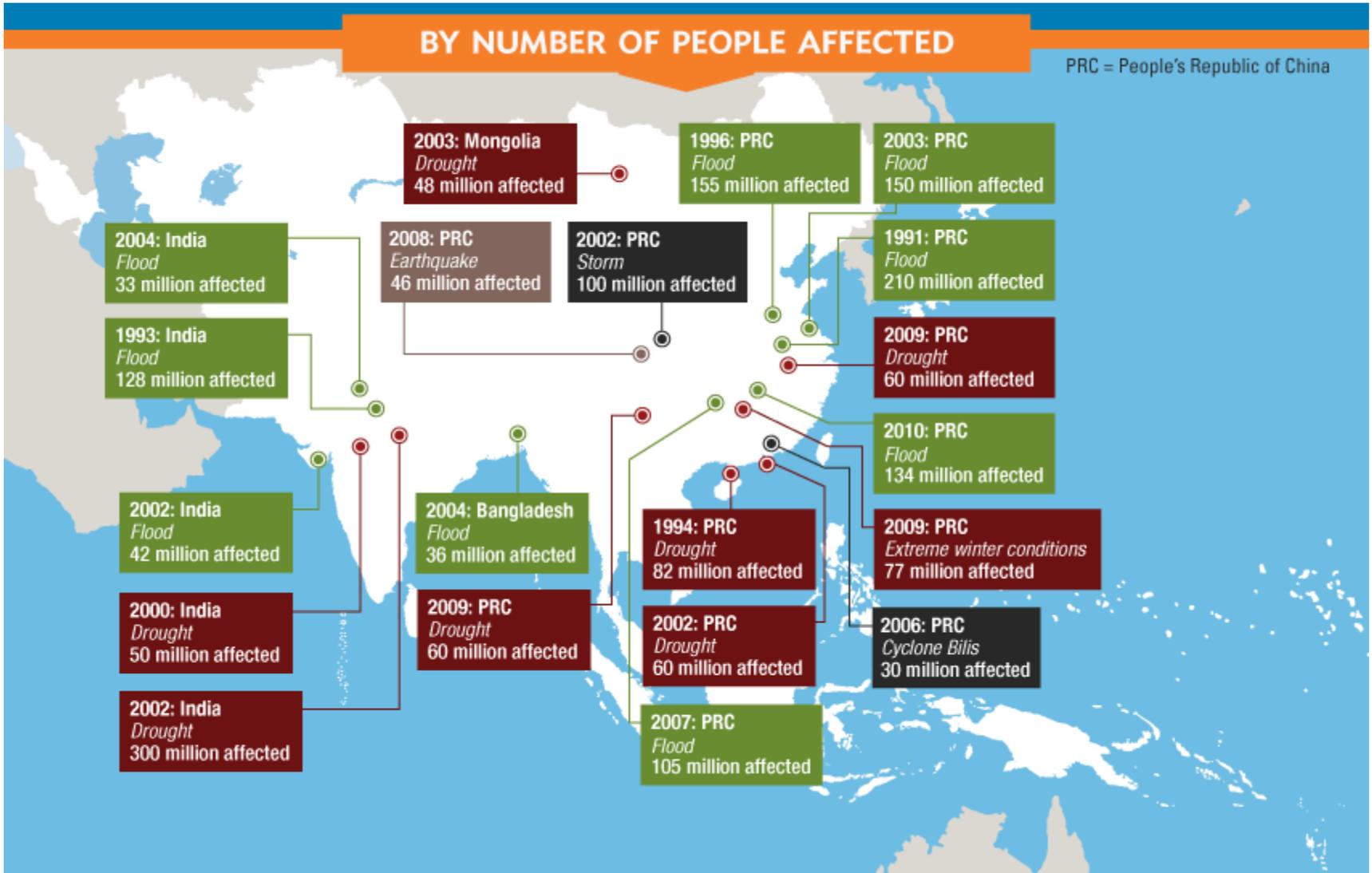
- Climate change and frequency of natural disasters
- Unplanned urbanization
- Population dynamics (Youth bulge, gender gap, ageing)
- Food security and production
- Management and access to water
- Labor markets and migration

*The key resilience question is the resilience of what to what?*

# Scale of Natural Disasters

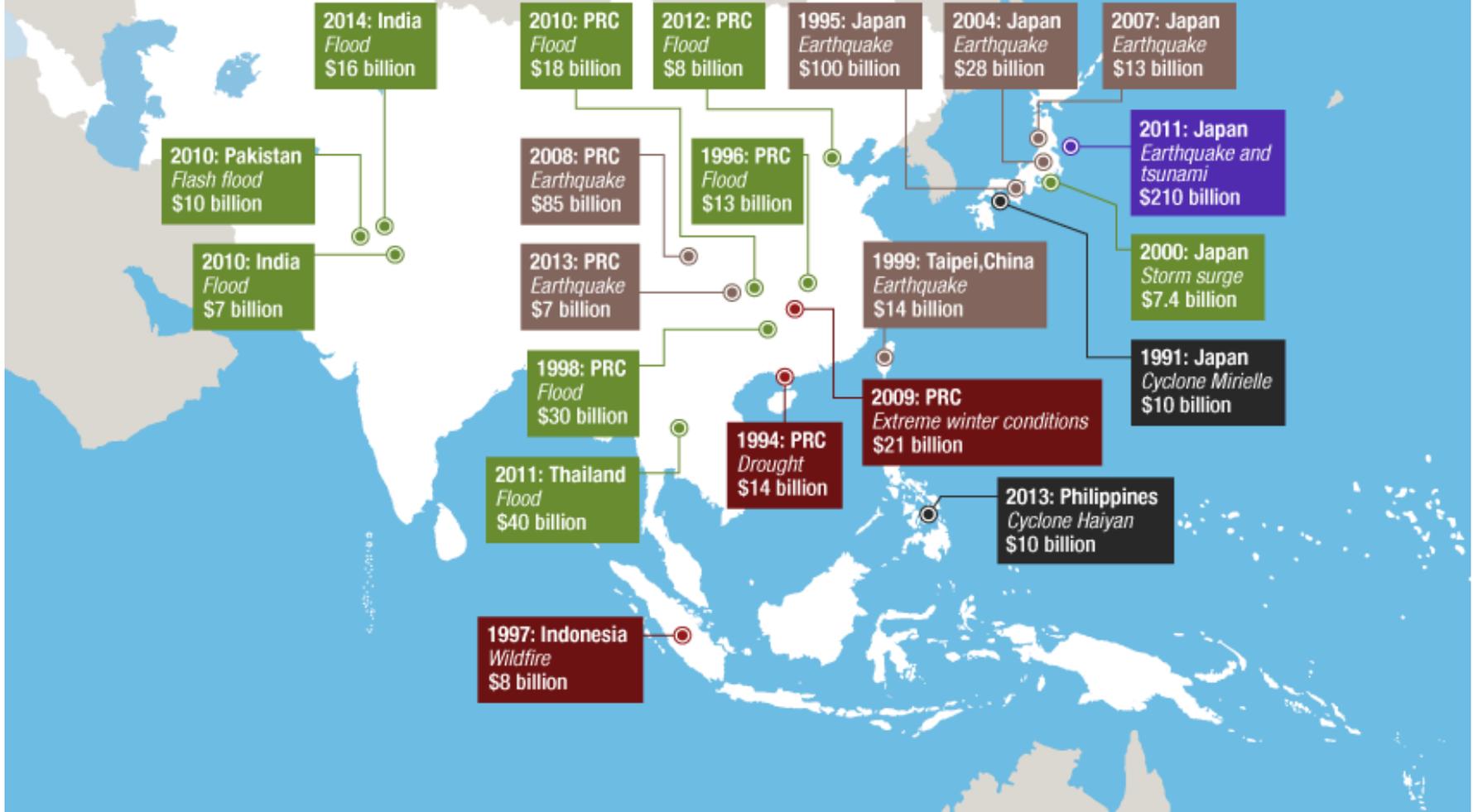
## BY NUMBER OF PEOPLE AFFECTED

PRC = People's Republic of China



## BY ESTIMATED DAMAGE

PRC = People's Republic of China



# Rapid Urbanization



## MEGACITIES ON THE RISE

More than half of the world's megacities - cities with 10 million or more people - are now in Asia. By 2025, Asia will likely have **21 out of a global total of 37 megacities**.



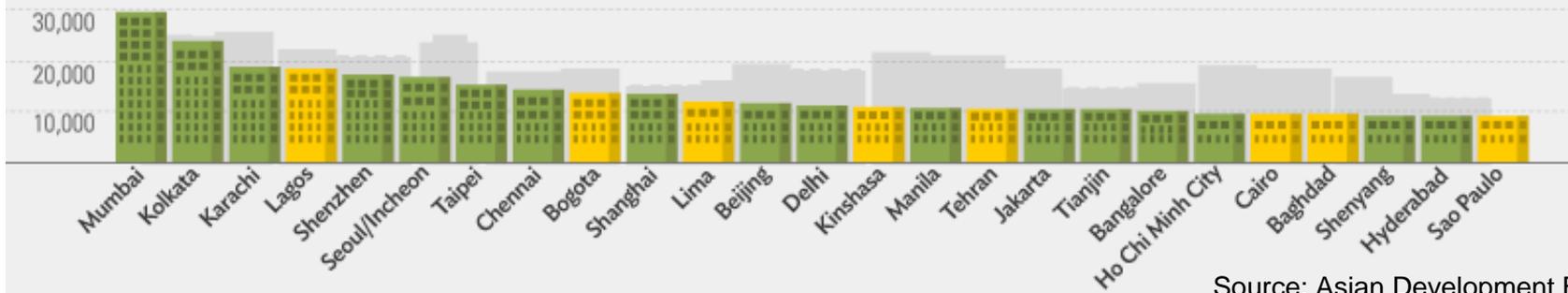
## ASIA'S MEGACITIES BY 2025

- |                    |                     |
|--------------------|---------------------|
| Bangalore, India   | Kolkata, India      |
| Bangkok, Thailand  | Lahore, Pakistan    |
| Beijing, PRC       | Manila, Philippines |
| Chennai, India     | Mumbai, India       |
| Chongqing, PRC     | Osaka-Kobe, Japan   |
| Delhi, India       | Shanghai, PRC       |
| Dhaka, Bangladesh  | Shenzen, PRC        |
| Guangzhou, PRC     | Tianjin, PRC        |
| Hyderabad, India   | Tokyo, Japan        |
| Jakarta, Indonesia | Wuhan, PRC          |
| Karachi, Pakistan  |                     |

\* PRC = People's Republic of China



## TOP 25 CITIES BY POPULATION DENSITY IN 2007 (person/square kilometers)



Source: Asian Development Bank

# Tremendous Opportunity



Data: ITU Measuring the Information Society (2014)  
Pic credit: Paul Butler, visualizing friendship

# Thank You