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United Nations
Educational, Scientific and
Cultural Organization

Disaster Risk Reduction, Resilience and Sustainability

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Contents

- Conceptual shift in Disaster Risk Reduction
- Sustainability, Resilience & DRR
- Building resilient society

Sendai Framework for Disaster Risk Reduction 2015-2030

3rd World Conference on DRR, 18 Mar 2015 (A/CONF.224/CRP.1)

Priorities for Action

- **Understanding disaster risk**.
- **Strengthening governance and institutions** to manage disaster risk.
- **Investing** in economic, social, cultural, and environmental **resilience**.
- Enhancing **preparedness** for effective response, and **building back better** in recovery and reconstruction.

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Hyogo Framework for Action 2005-2015

World Conference on Disaster Reduction (A/CONF.206/6)
Kobe, Hyogo 2005 adopted by 168 nations

Priorities for Action

1. Ensure that disaster risk reduction is a national and a local priority with a **strong institutional basis** for implementation.
2. Identify, assess and **monitor disaster risks** and enhance **early warning**.
3. Use knowledge, innovation and **education** to build a culture of safety and resilience at all levels.
4. Reduce the **underlying risk** factors.
5. Strengthen **disaster preparedness** for effective response at all levels.

Some changes in emphasis

	HFA	SFDRR
New emphasis		S&T, Governance, **Investing, BBB**
Pages	25	25
Vulnerable/-bility	40	14
Resilient/-ce	20	38

Disasters in SDGs

Open Working Group's 17 Goals and 169 targets

- **Goal 1. End poverty in all its forms everywhere**
- 1.5 by 2030 build **resilience** of the poor and reduce their exposure to **disasters**

- **Goal 2. End hunger, achieve food security**
- 2.4 by 2030 ensure sustainable food production that strengthen capacity for climate change, **extreme weather, drought, flooding and other disasters**

- **Goal 11. Make cities resilient and sustainable**
- 11.5 by 2030 **significantly reduce the number of deaths and the number of affected people** and **decrease by y% the economic losses** relative to GDP caused by disasters, including water-related disasters, with the focus on protecting the poor and people in vulnerable situations
- 11.b by 2020, **increase by x% the number of cities and human settlements adopting and implementing integrated policies and plans** towards inclusion, resource efficiency, mitigation and adaptation to climate change, **resilience to disasters**, develop and implement in line with **the forthcoming Hyogo Framework holistic disaster risk management at all levels**

- **Goal 13. Combat climate change and its impacts ***
- 13.1 strengthen resilience and adaptive capacity to climate related hazards and **natural disasters** in all countries

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Sustainability, Resilience and Disaster Risk Reduction

Sustainability

- The capacity to create and maintain conditions where **human** and **nature** can exist in productive harmony fulfilling **social**, **economic** and **environmental** needs of present and future generations. (modified from EPA)

⇕

human security & bio-diversity

- Sustainability ⇔ Global sustainability ⇔ Human sustainability
  - Social sustainability
  - Economic sustainability
  - Environmental sustainability

⇔ Sustainable Development

⇔ Development to achieve sustainability

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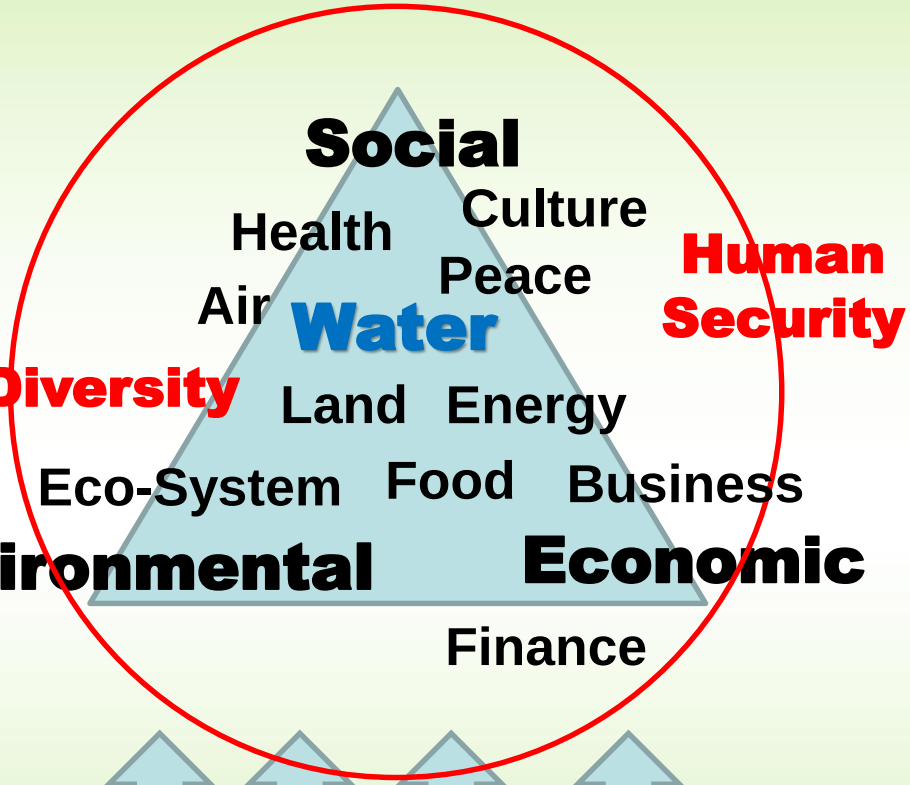
Global Sustainability



Human well-being
Freedom of choice
Health
Safety
Material needs
Social relation
Almerty Sen & Ogata

Human Security

Attributes

Bio-Diversity

Security is a product of risk reduction & vice versa

Controllers

Risk Reduction & Resilience

Science & Technology **Governance**

Human Empowerment

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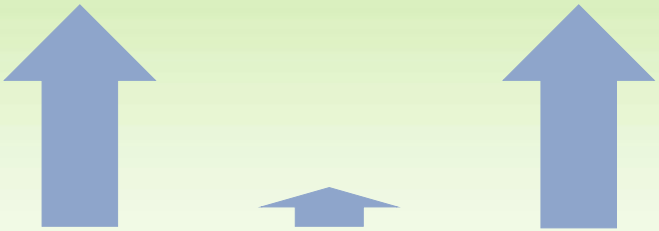
What is disaster risk?



R = H x V

R: disaster risk

H: hazard

V: vulnerability

The potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period.

A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation..

The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

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Vulnerability

- The characteristics and circumstances of a community, system or asset that **make it susceptible** to the damaging effects of a hazard. (UNISDR, 2009)

$$R = H \times \underbrace{E \times V_B / C}_{V}$$

R: disaster risk

H: hazard

E: exposure at risk area

V_B: basic vulnerability

C: coping capacity

Population growth & urbanization
Economic growth & globalization

Income, governance, education

Structural/nonstructural
Infrastructure development
EW, Shelter, Social capital,
Land use management

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Mind broadening exercise

$$R = H \times \underbrace{E \times V_B \times (1-C/C_{Max})}_{V}$$

R: disaster risk

H: hazard

E: exposure at risk area

V_B: basic vulnerability

C: coping capacity

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Resilience

- Capacity of a system to **maintain** its core function under serious disturbances and, if the core function is disrupted, quickly **recover** it under the changed circumstances.

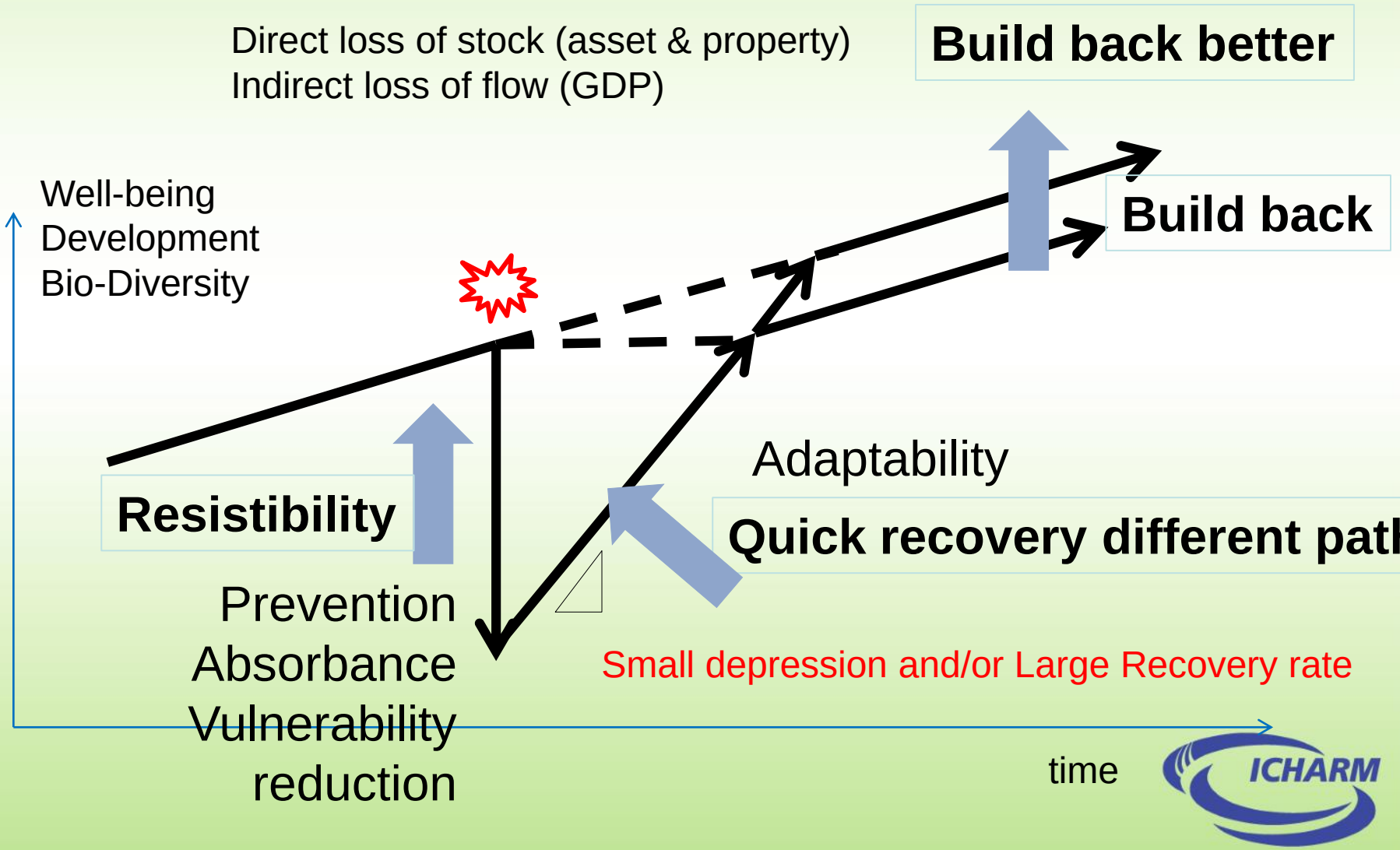
Resistibility and quick recovery

Resilience

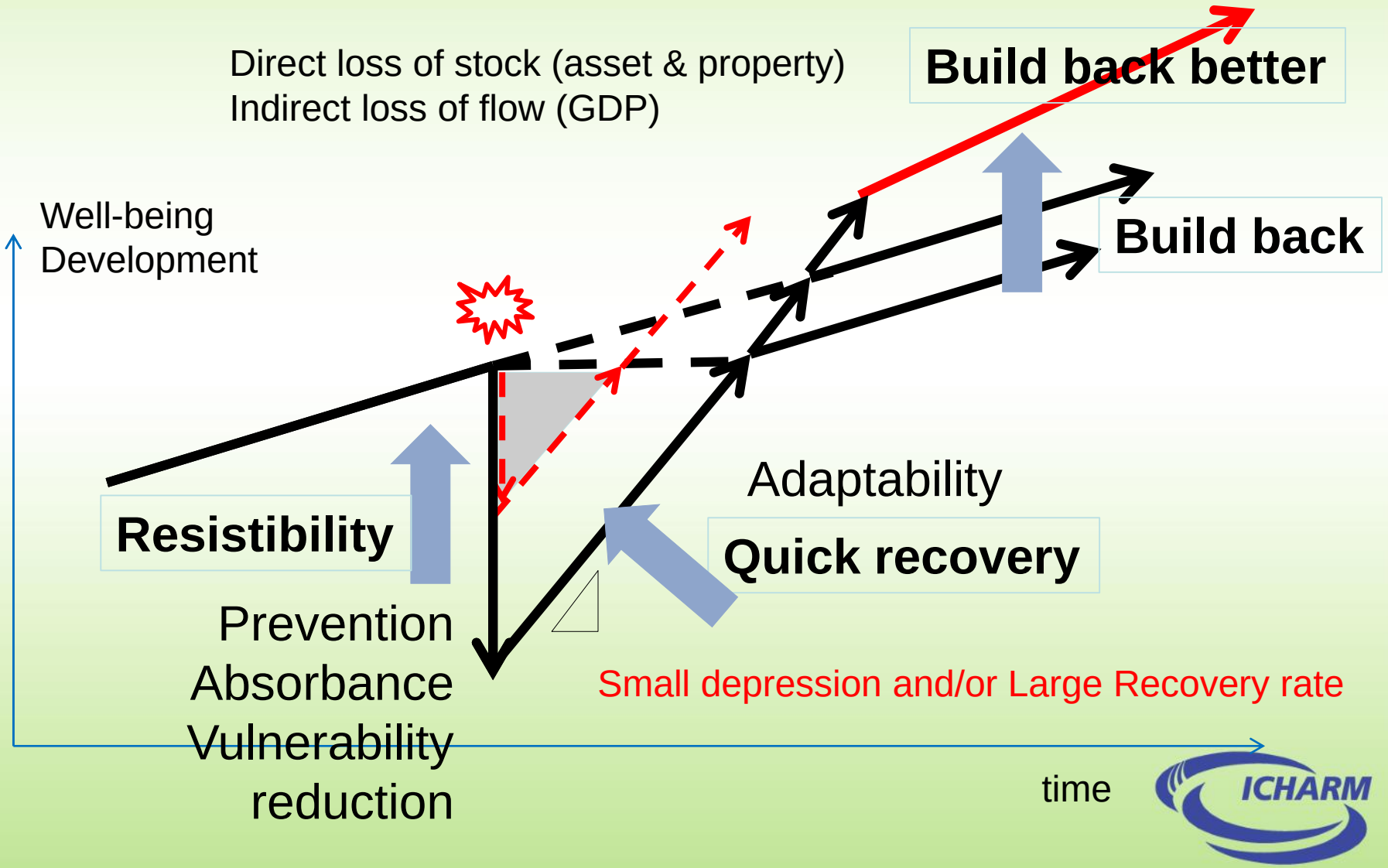
2009 UNISDR Terminology on Disaster Risk Reduction

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

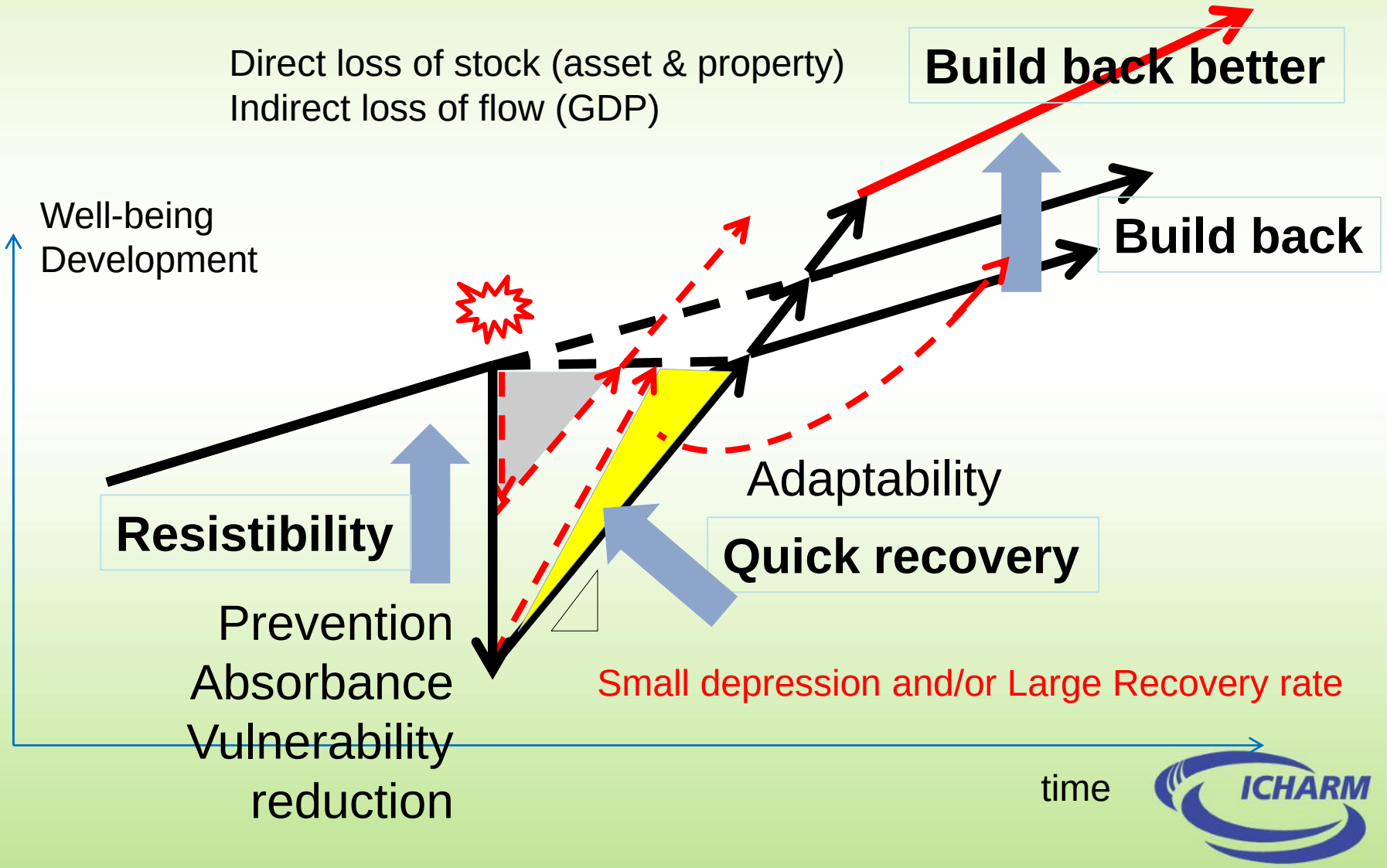
Resilience to Hazards & Disasters



Resilience to Hazards & Disasters



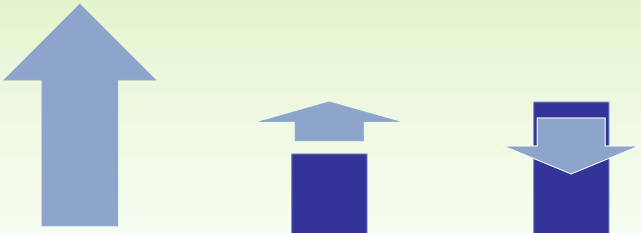
Resilience to Hazards & Disasters



How do we measure resilience?

Risk: Potential Disaster Impact

Mind broadening exercise



$$R_I = H / Re$$

R_I: potential disaster impact

H: hazard

Re: resilience

Capacity of a system to maintain its core function and if disrupted **quickly recover.**

Disaster impacts may include loss of life, injury, disease and other negative effects on human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation. (UNISDR, 2009)

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Mind broadening exercise

Disaster impact risk

$$R_I = H / Re$$

$$= H / ((R_{esist} + A_{bsorv}) x R_{ecov})$$

$$= ½ D_{direct\ loss} \times T_{recovery\ time}$$

$$= ½ R \times T$$ (disaster risk x recovery time)

Building resilient society


Banda Aceh, Nov 11, 2009


Banda Aceh, Nov 11, 2009


Kamaishi, Jan 13, 2013


Yuriage, May 13, 2014

http://yamada-cmjv.jp/

Master Plan for the Rehabilitation and Reconstruction

of the Regions and Communities of the Province of Nanggroe Aceh Darussalam and the Islands of Nias, Province of North Sumatera (Republic of Indonesia, April 2005)

- Section 5.2 (16) "**Reconstruction of disaster affected cities by restoring them into their initial state of order**" and "The cities stricken by earthquake and tsunami are to **be reconstructed by immediate empowerment of the affected people, restoring the initial physical order, social order and economic system**, …, self-restructuring of settlements by the communities concerned, …"

Basic Act on Reconstruction

in response to the Great East Japan Earthquake

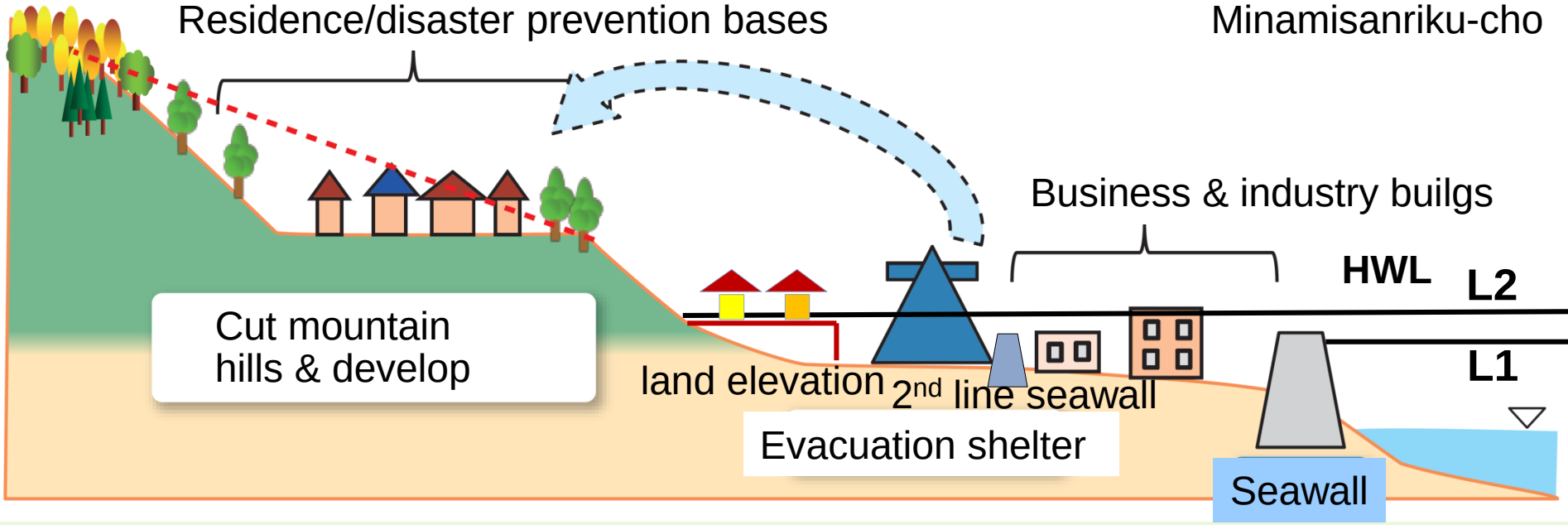
(Heisei 23 Law 76, 2011) 24 June 2011

- Article 2 “2) … communities will be **restored with the vision of Japan appropriate for mid-twenty-first century**. Such will be accomplished by promoting dramatic measures with the perspective of revitalizing vibrant Japan which **does not limit itself to recovery from disaster which simply restores affected facilities to its original state**, as well are construction measures which aim to facilitate each individual to overcome the disaster and lead prosperous lives.”

Reconstruction principles
(28 Sept 2011)

Two levels Approach

Level 1 Tsunami (Frequent scale: 50-150 years)
Life, prop & livelihood
- Sea walls, highways:



Level 2 Tsunami (Maximum scale: 1000 yr) Life
- Move to higher lands
- Tall buildings to evacuate
- Landuse (park, factories, farmland; commercial/business, residential areas)

Mind broadening exercise

Question

- What are the basic principles and conditions that justify the reconstruction approaches of Banda Aceh and Tohoku?

Conclusions

- **Disaster triggered by natural hazards are the major threat to sustainability.**
- **Sustainability** needs risk reduction and resilience building
- Resilience is a capacity of **resistibility** against hazards and **quick recovery** from disasters.
- Both resistibility and quick recovery are the key to **build back better**.
- In order to break the disaster risk-poverty nexus and take off economic development, **prevention** against frequent small to medium scale hazards and **build back better** are indispensable.

居安思危 Be aware of risk while we are safe

思則有備 Awareness leads us preparedness

有備無患 Preparedness leaves us no regret

「春秋」左氏伝
Source: Zuo Qiuming "Zuoshi Commentary"
in Confucius ed. "Spring and Autumn", 480BC

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ICHARM preparedness for floods