Three Principles to improve the strategy for Disaster Risk Management

- Taking two Mega-Disasters in 2011 for instance-

3 April 2012

Japan International Cooperation Agency (JICA)

Yusuke AMANO

Outline

- Disasters strike somewhere in the world every year.
- In 2011, the Great East Japan Earthquake and the subsequent Tsunami hit Japan, while the heavy flood occurred in Thailand.

- "Trinciples (Tri + principles) Approach", consists of

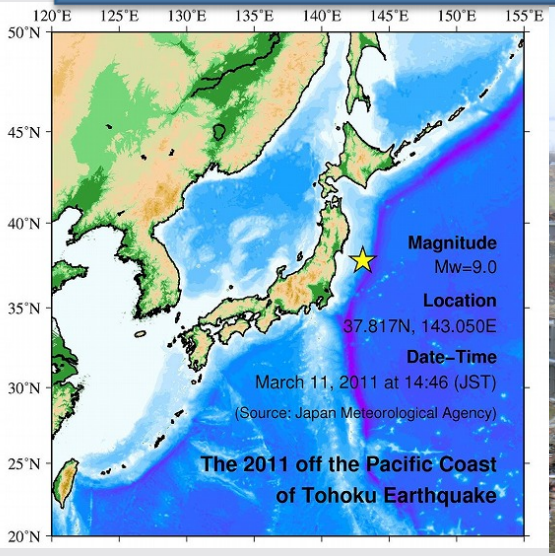
  (1) Risk Literacy,

  (2) Redundancy, and

  (3) Kaizen (Continuous Improvement),

  are effective to fill the gaps on the foundation of an integrated risk reduction strategy.

The Great East Japan Earthquake



	Great East Japan Eq.	Hanshin-Awaji Eq.
Date (Magnitude)	2011.3.11 (Mw = 9.0)	1995.1.17 (Mw= 7.3)
Dead/Missing	15,854/3,143	6,434/3
Feature of damage	1) Tsunami damage 2) Damage to Nuclear power plant	1) Collapse of civil structures 2) Fire of wooden houses
Damage cost (bil. USD)	200-313	124

- **There was the strategy for disaster risk management, which partially worked, but not so much against the unexpected scale of disaster.**

The heavy Flood in Thailand in 2011

- **Statistics**

(Source DDPM Jan 23rd: Department of Disaster Prevention and Mitigation)

- Death 815
- Affected House Holds 4,086,138
- Affected People 13,595,192
- 65 Provinces, 684 Districts, 4,920 Sub-Districts, 43,636 Villages
- Area: 18,000 km2 (Source: PDNA), 14,241 km2 (Source: GISTDA)
- Damages: 20.5 billion USD (Source: PDNA)
- Losses: 26.0 billion USD (Source: PDNA)
- Affected Business (Source: Prime Minister Press Conference, Jan 20th):
  7 industrial estates, 28,679 enterprises, 993,944 workers

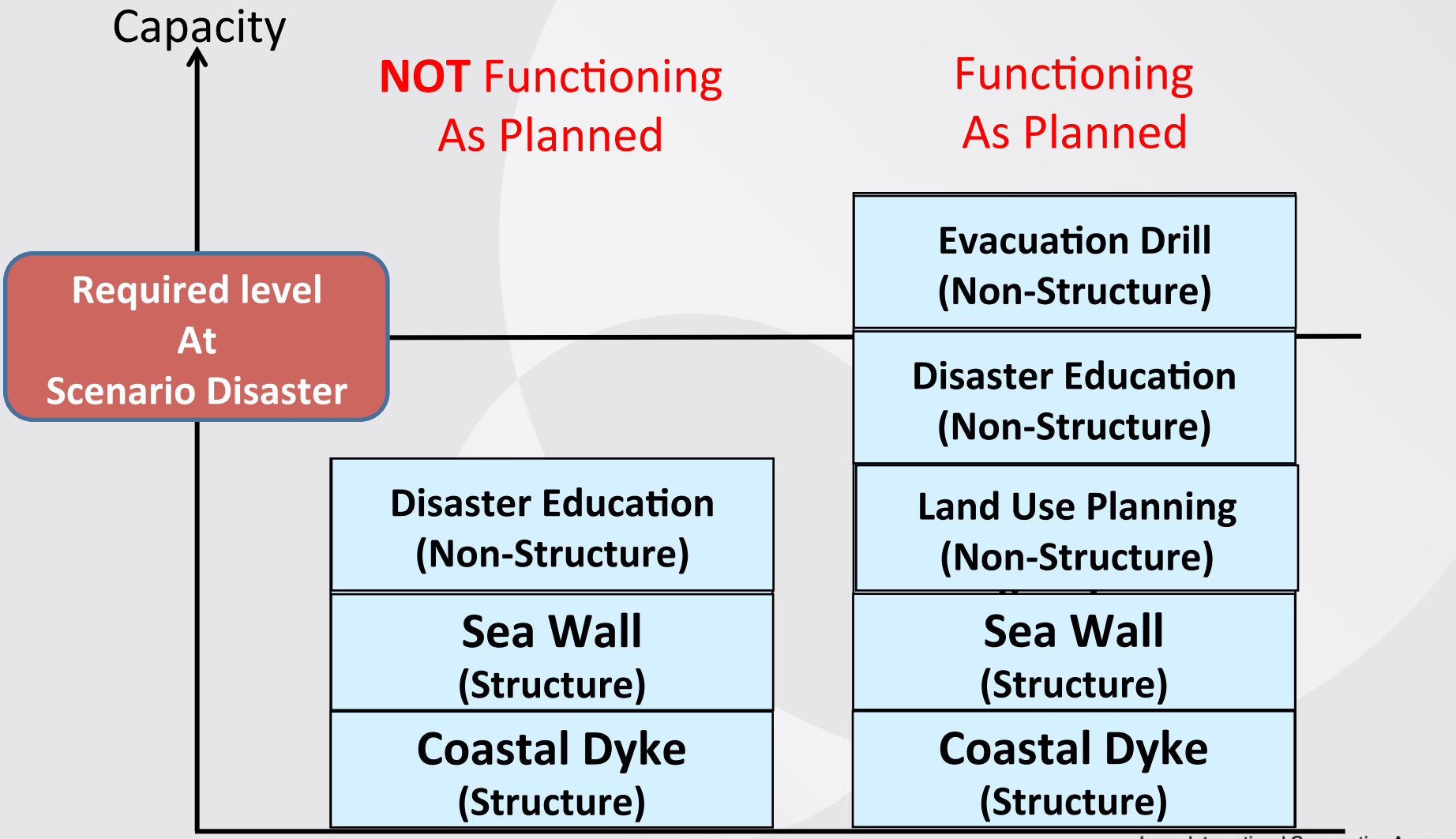
- **The strategy for disaster risk management did not seem to exist.**

Disaster Risk Management (DRM)

To minimize the damage by disasters, the strategy is definitely needed.

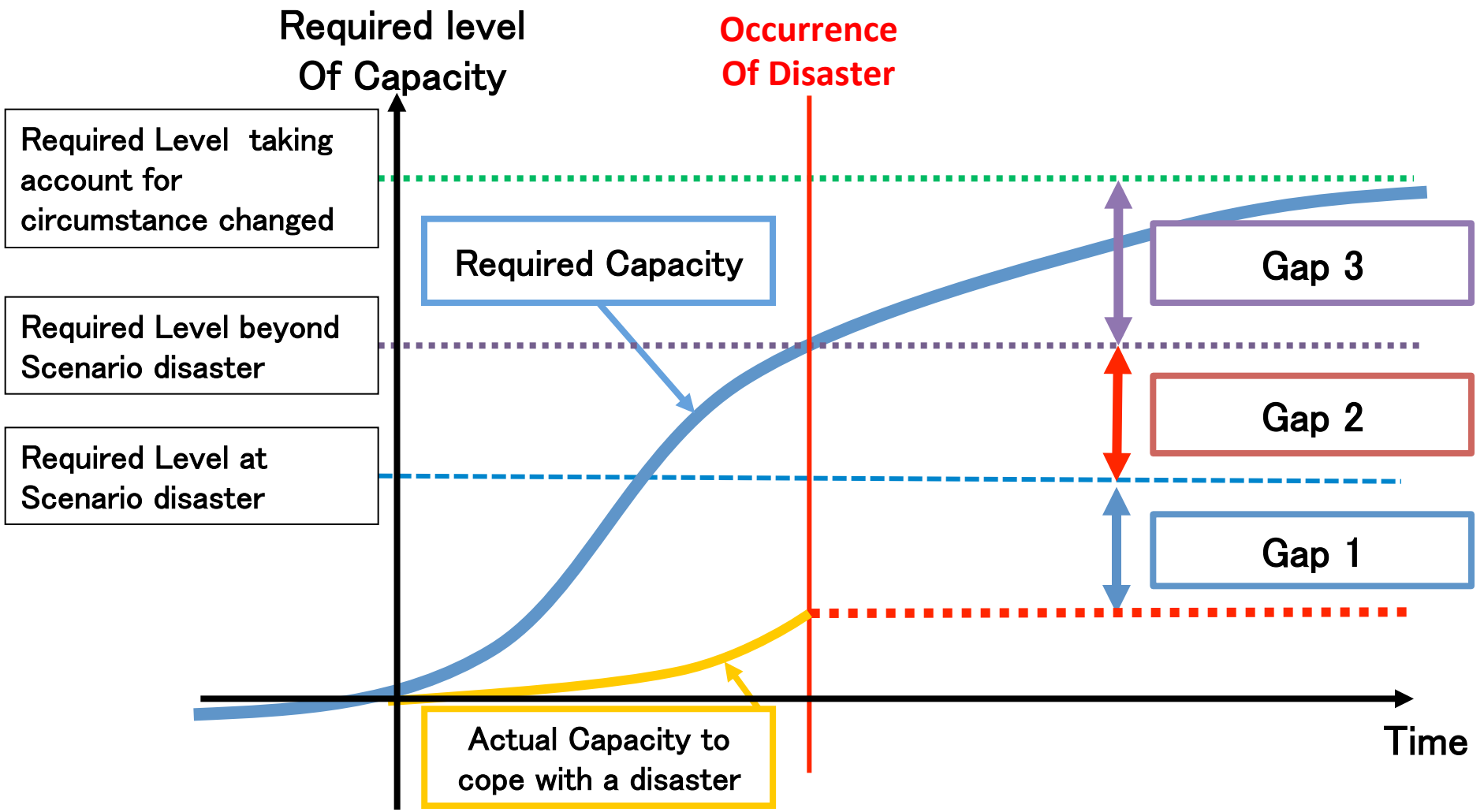
- **How can the strategy be improved?**
- **What are the gaps?**

Disaster Risk Management (DRM)
- Scenario disaster and anticipated risk -



Three (3) types of Gaps emerged from Mega-Disasters' experiences

Gap="Required Level" and "Actual Capacity"



The Great East Japan Earthquake

Gap 3
Circum-stance Changed

- New development for residence and tourism after the completion.
- Rapid aging in the area

Gap 2
Beyond Scenario

- Malfunction of dykes
- Limited evacuation route and Evacuation centers

Gap 1
Scenario Disaster

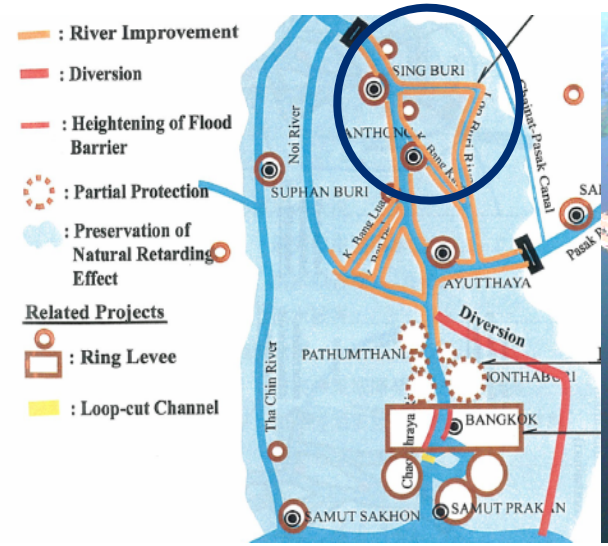
- Lack of understanding in limits on functions of measures designed by scenario disaster

The 2011 Thai Flood

Gap1
scenario disaster

Gap2
beyond scenario

Gap3
Circumstance Changed



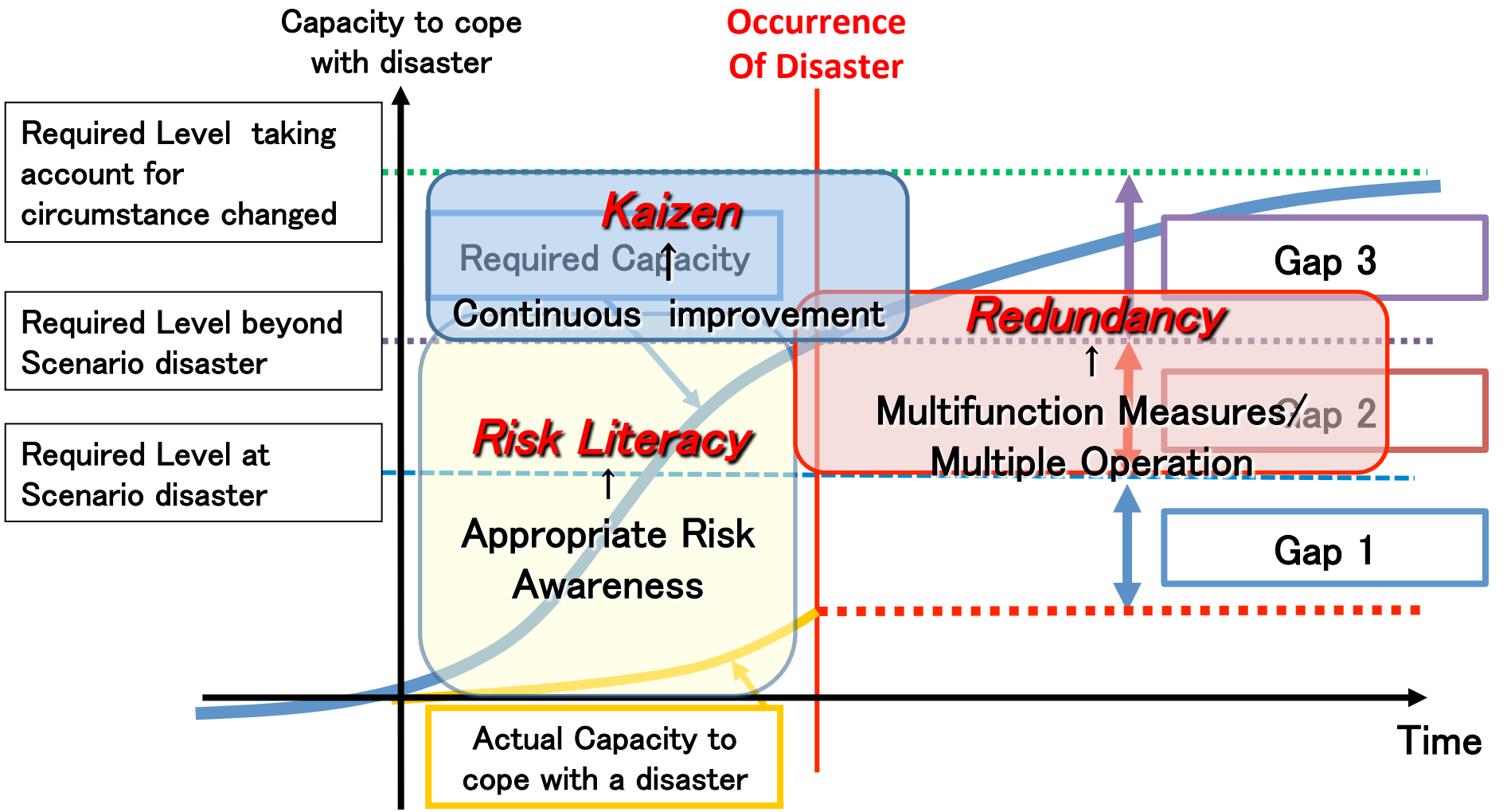
- Miscommunication of disaster potential
- Lack of information and early warning
- Insufficient investment in DRM

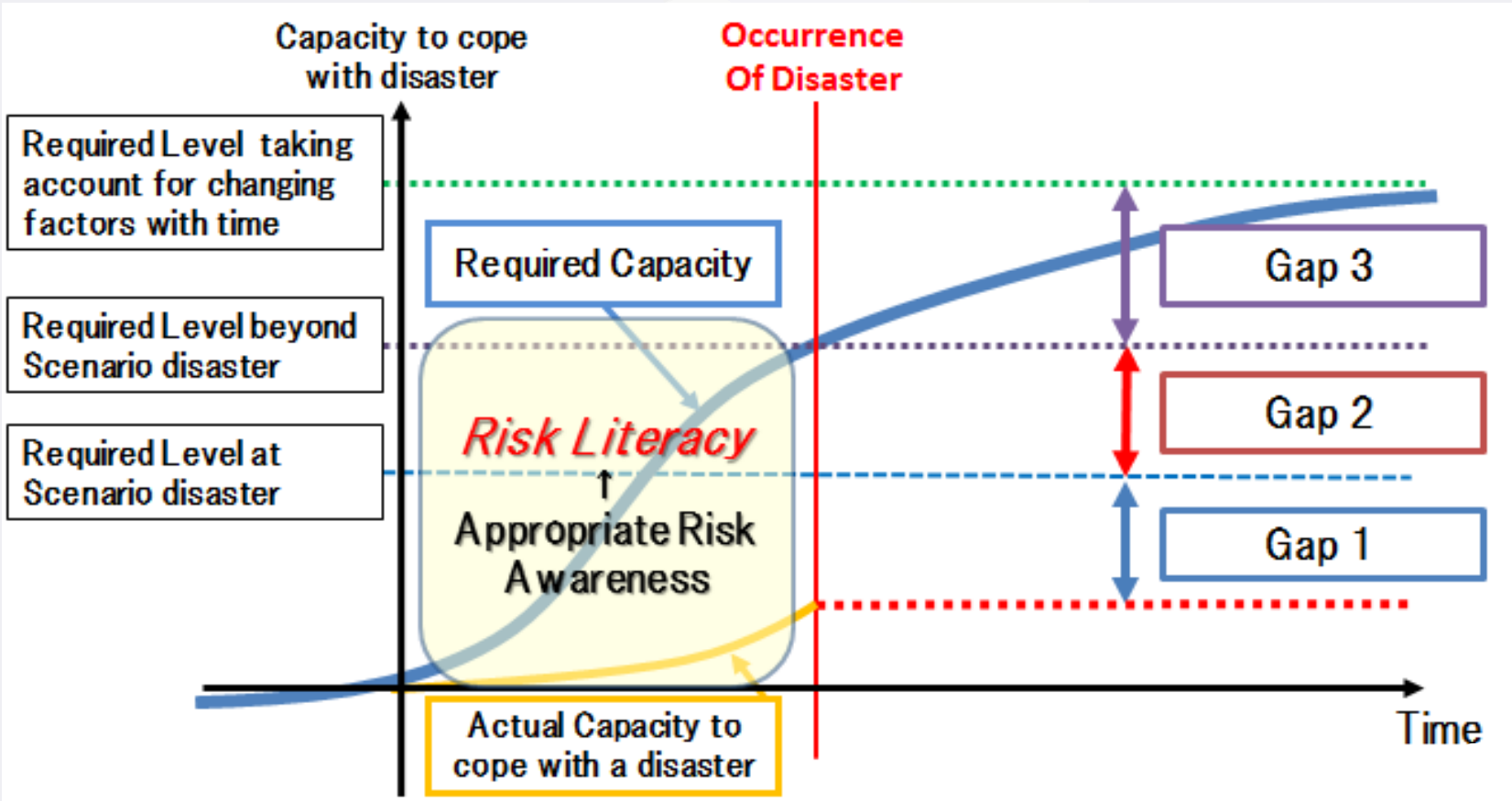
- Inundation beyond estimation (Hazard Map) due to Extraordinary Precipitation

- Expansion of urban area
- Lowed retention effect due to urbanization

Three Gaps emerged from Mega-Disasters' experiences

Gap="Required Level" and "Actual Capacity"



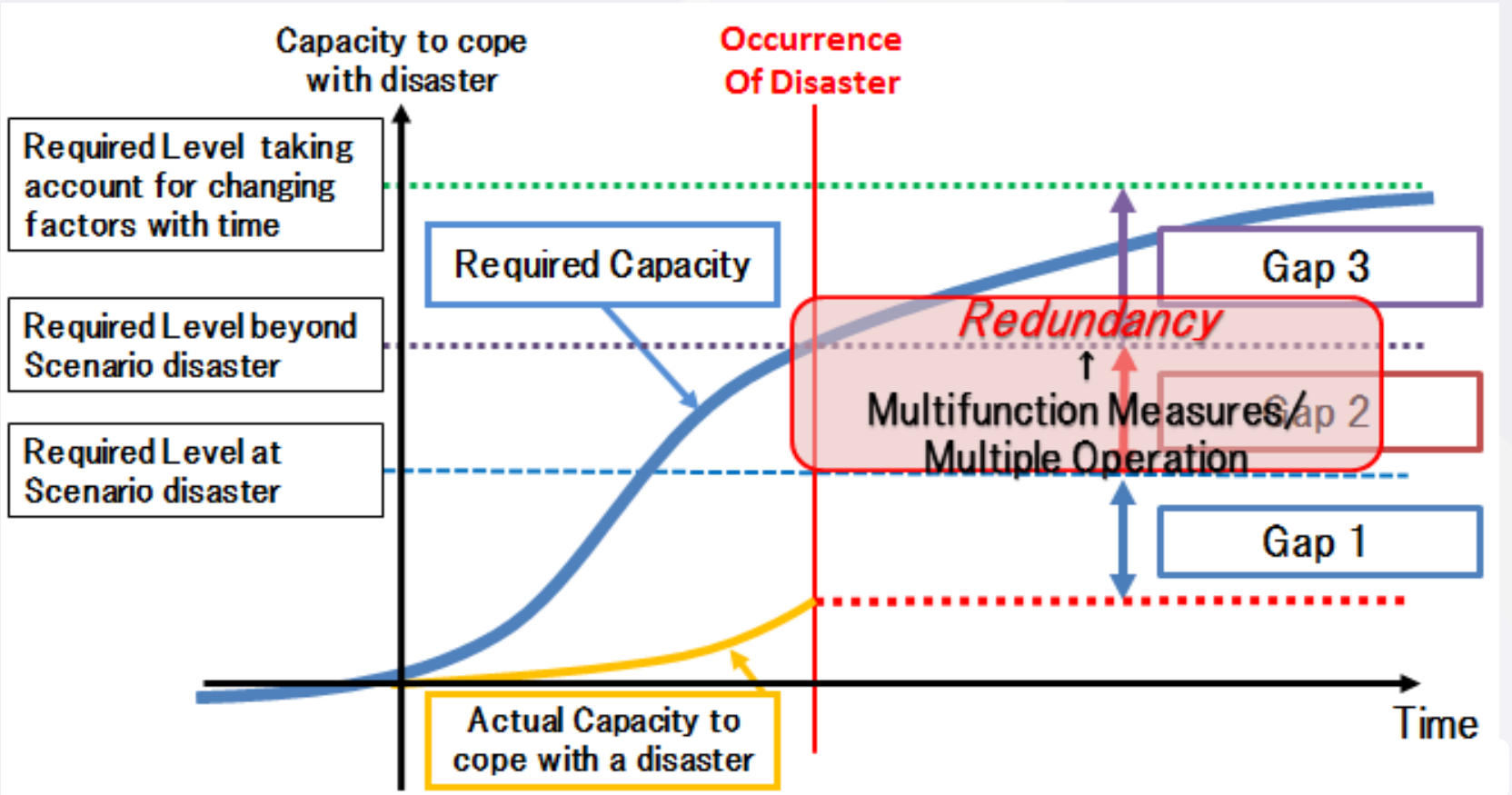


Risk Literacy

Exchange and/or sharing of risk information

(1) Limitations of structure and non-structure measures

(2) Promotion of Communication among various stakeholders

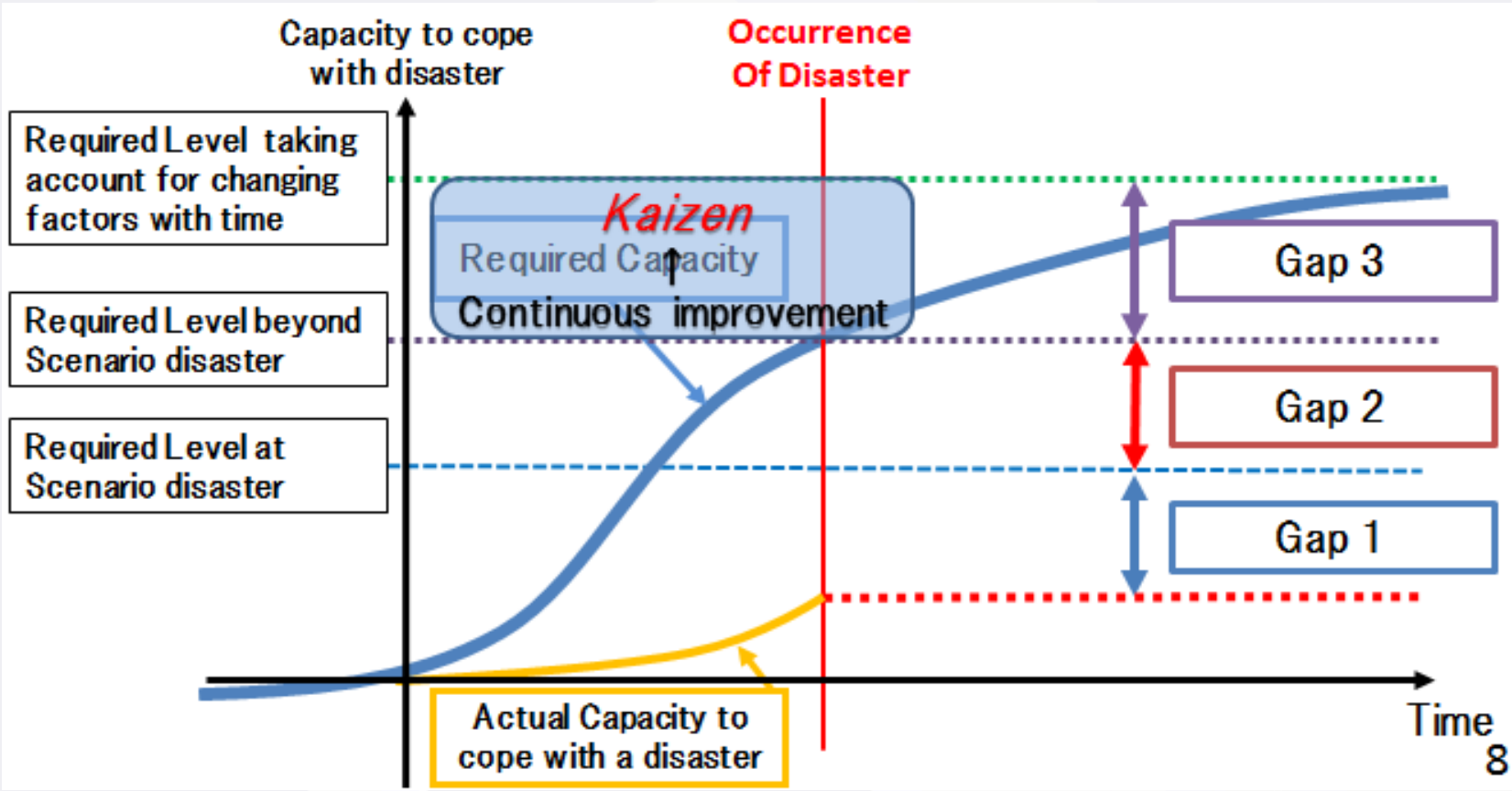


Redun-dancy

Inclusion of extra components to original functions in preparation for uncertainty

(1)Redundant operations and measures

(2)DRM into other sectors (Multi-sector)



Kaizen
(Continuous Improvement)

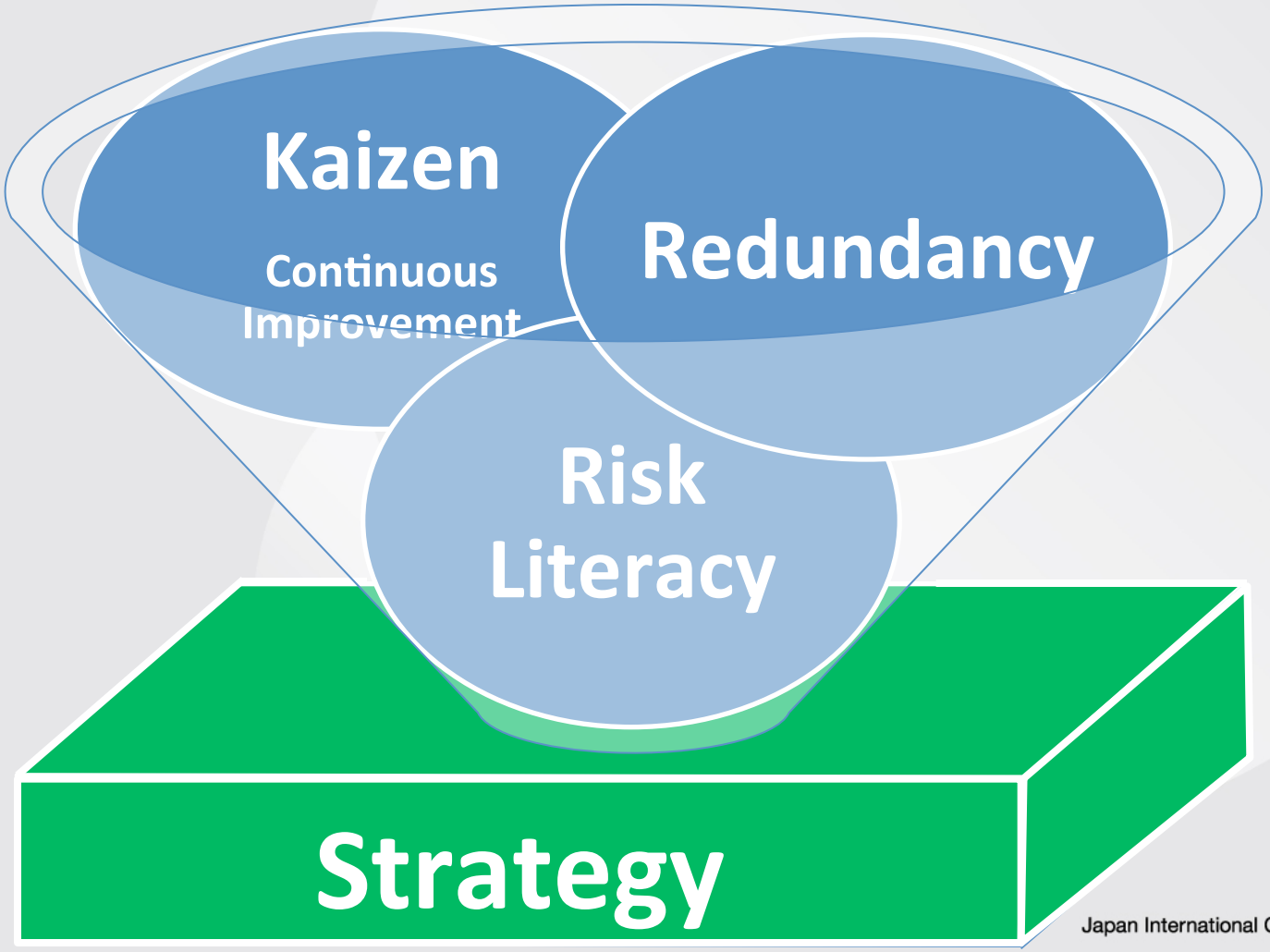
Continuous improvement and review

(1)Scientific aspects (The latest research results, advancement in technology, etc.)

(2)Social aspects (population growth, urbanization, aging society, etc.)

JICA's Trinciples Approach

* Trinciples : Coined Word created form "Tri (Triple) " and "Principles"



Trinciples Approach for the Great East Japan Earthquake

Gap 3
Circum-stance Changed

- New development for residential and hotel area after the completion.
- Rapid aging in the area

→ Preparation of disaster management plan taking account for social change (Kaizen)

Gap 2
Beyond Scenario

- Malfunction of the dyke
- Limited evacuation route and Evacuation centers

→ Increase of evacuation routes (Redundancy)

Gap 1
Scenario Disaster

- Lack of understanding in limits on functions of measures designed by scenario disaster.

→Advocacy planning such as limitations of various measures (Risk Literacy)

Trinciples Approach for the 2011 Thai Flood

Gap1
scenario disaster

Gap2
worst scenario

Gap3
Circumstance Changed

RISK LITERACY

- Discussion on validity of a scenario flood
- Clear indication of limitation of each measures

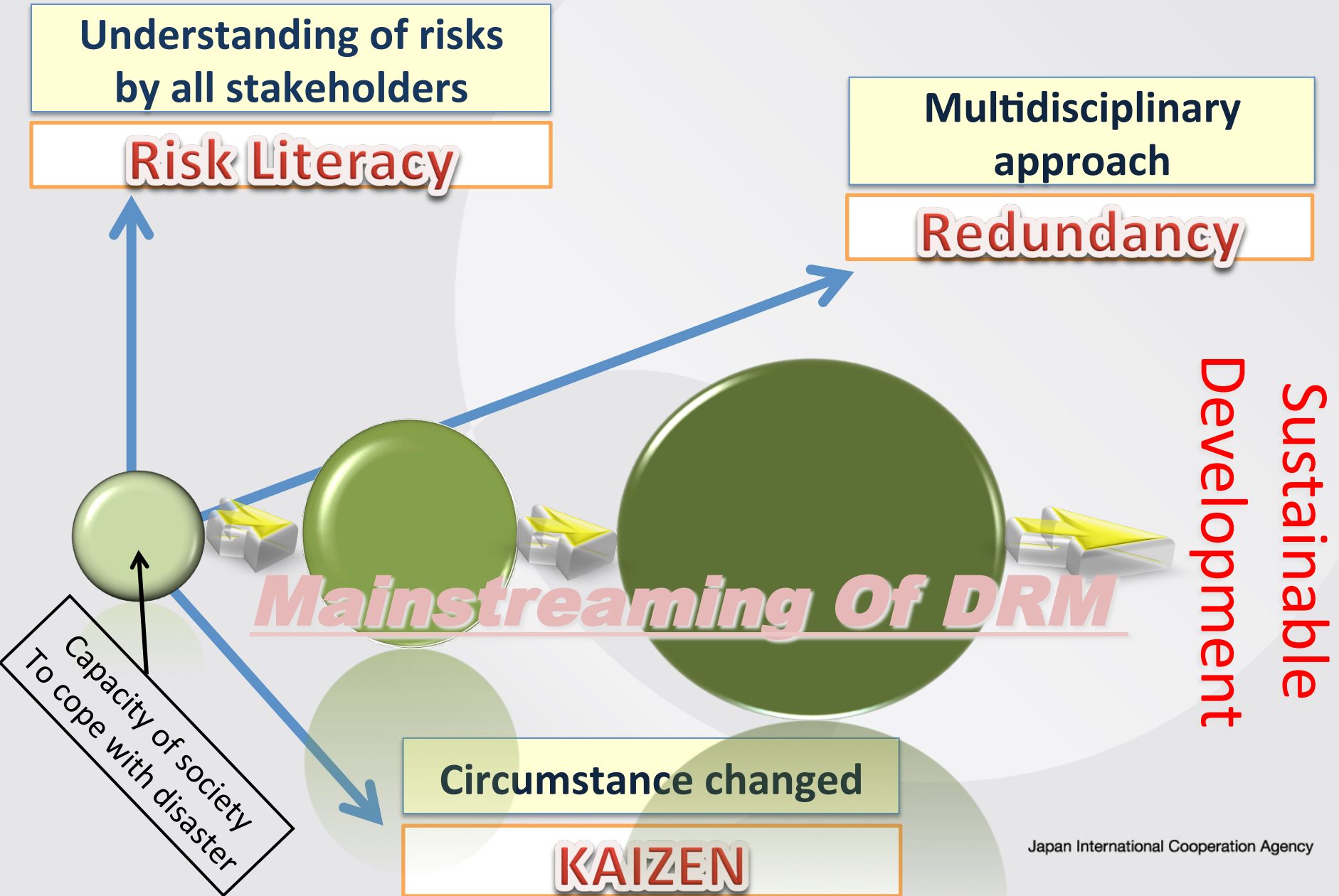
REDUNDANCY

- Leveling of road connected with industrial estates
- Preparation of MP taking account for agriculture sector

KAIZEN

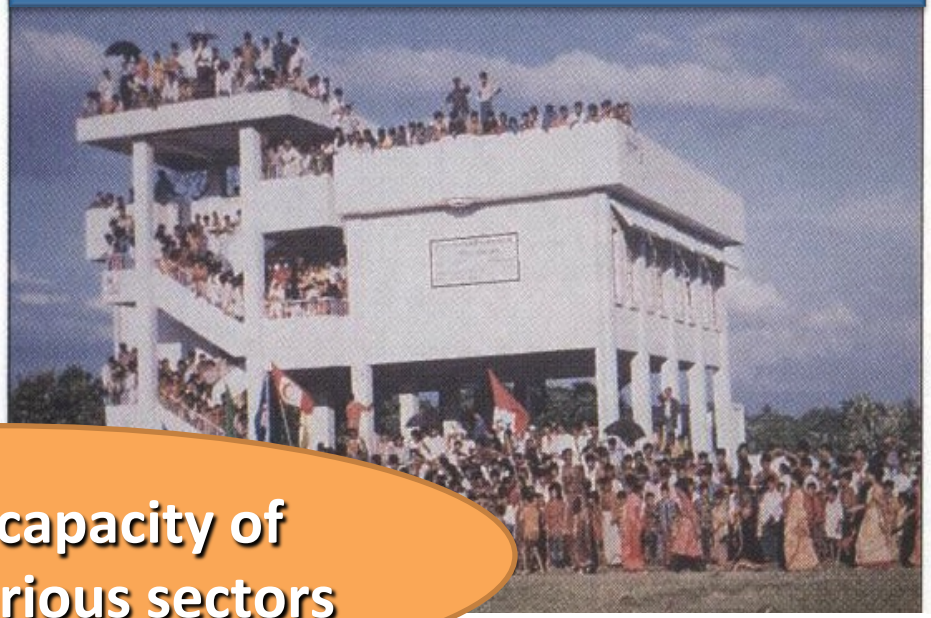
- Preparation of MP taking account for climate variation, population growth and urbanization etc.

Toward the mainstreaming of DRM

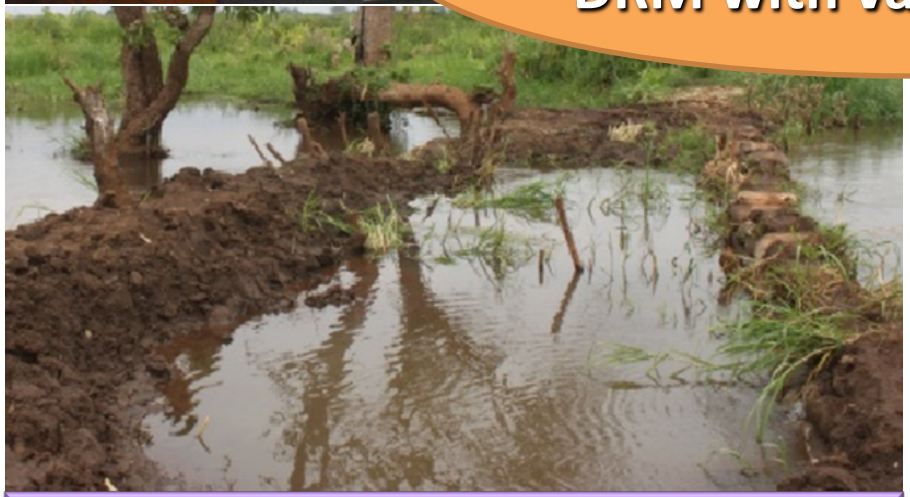


Leveling of subway entrance (Thailand)

A School with function of shelter (Bangladesh)



Enhancing capacity of DRM with various sectors



Multipurpose agricultural facility (Kenya)

Others

(1) Ring dyke for Industrial estates
(2) Preparation of Business continuity plan(BCP)（ex: Port, Medical facility, Educational Facility etc.)
(3) Disaster education in official curriculum
(4) Urban development + DRM
(5) Community/gender development +DRM

Application to JICA project

Pupils discussing risks in and around their school

Youth of a community discussing risks and countermeasures

Risk Literacy	Redundancy	Continuous improvement (Kaizen)
☐ Linkage between communities, municipalities and national agencies ☐ Risk mapping by communities	☐ Involvement of school education and community development	☐ Capacity development for preparing and revising risk maps and disaster management plans

STRATEGY	Central American Policy for Integral Disaster Management (PCGIR)

Input to International DRM Strategy

2012	2013	2014	2015
International conferences on DRM	4th Global Platform for Disaster Risk Reduction (UNISDR)		3rd World Conference on Disaster Reduction (UN/ISDR)

Discussion on new strategy on DRM and new framework after HFA (Hyogo Framework for Action 2005-2015)

Post-HFA

Total amount of Damage

Unit: Billion US $, 1USD=80JPY

	東日本大震災 Great East Japan Eq. (Cabinet Office)	Great East Japan Eq. (Cabinet Office) ケース１	Great East Japan Eq. (Cabinet Office) ケース２	Hanshin-Awaji Eq. (National Land Agency)
建築物等（住宅・宅地、店舗・事務所・工場、機械等） Houses/Building	約１０兆４千億円 130	約１１兆円 140	約２０兆円 250	約６兆３千億円 79
ライフライン施設 Lifeline utilities	約１兆３千億円 16	約１兆円 13	約１兆円 13	約６千億円 7.5
社会基盤施設 Infrastructure	約２兆２千億円 28	約２兆円 25	約２兆円 25	約２兆２千億円 28
その他 Other — Agri.	約１兆９千億円 24	約２兆円 25	約２兆円 25	約５千億円 6.3
その他 Other — Other	約１兆１千億円 14			
Total Amount	約１６兆９千億円 212	約１６兆円 203	約２５兆円 313	約９兆６千億円 121

注：ストックの区分は内閣府（防災担当）の推計で用いたものによるものであり、推計により若干異なる。

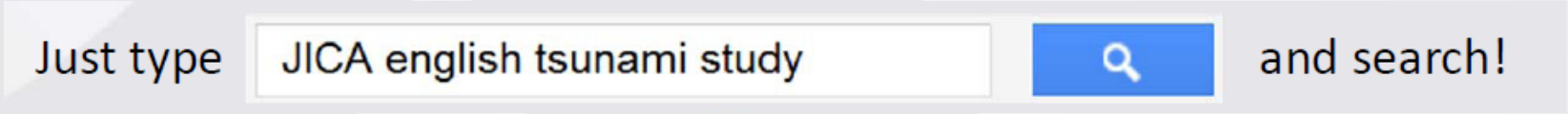
Government Budget Bill for DRM (FY 2011)

Ministry / Agency	Research	Mitigation	National Land Conservation	Recovery	Total (Mil JPY)
Cabinet Office	7	3,801		609	4,417
National Police Agency		3,484			3,484
Min. of Internal Affairs and communications	495	30			525
Fire and Disaster Management Agency	439	10,439			10,878
Min. of Justice		14,021			14,021
Min. of Foreign Affairs		268			268
Min. of Finance		9,284		78,346	87,630
Min. of Education, Culture, Sport, Science and Technology	4,277	8,606		602	13,485
Agency for Cultural Affairs		89			89
Min. of Health, Labor and welfare		14,821		720	15,541
Min. of Agriculture, Forestry and Fisheries		1,173	95,145	129,147	225,465
Min. of Economy, Trade and Industry		3,388	2,483		5,871
Min. of Land, Infrastructure and Tourism	1,657	44,210	577,208	44,958	668,033
Japan Meteorological Agency	1,048	21,957			23,005
Japan Coast Guard	116	72,002			72,118
Min. of the Environment			14	200	214
Min. of Defense		1,113		118	1,231
	8,039	208,686	674,850	254,700	1,146,275

Thank you very much for your kind attention.

For further information, please visit our website.

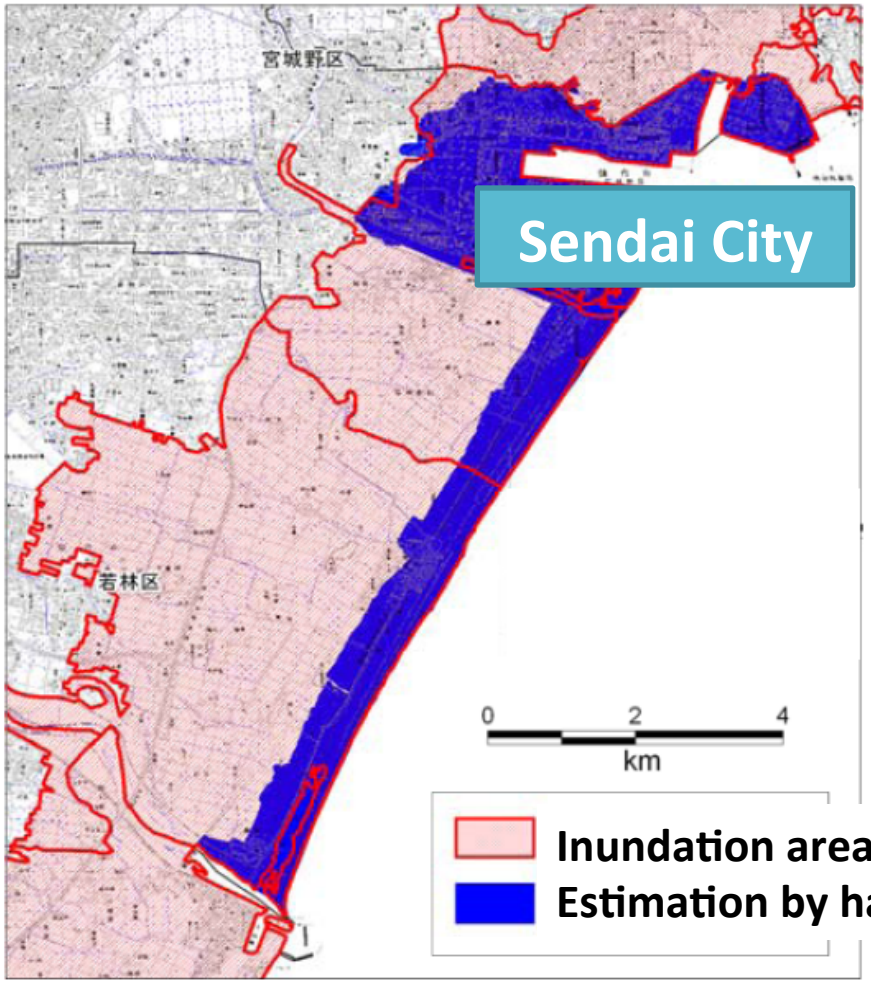
http://www.jica.go.jp/english/operations/thematic_issues/water/earthquake/index.html

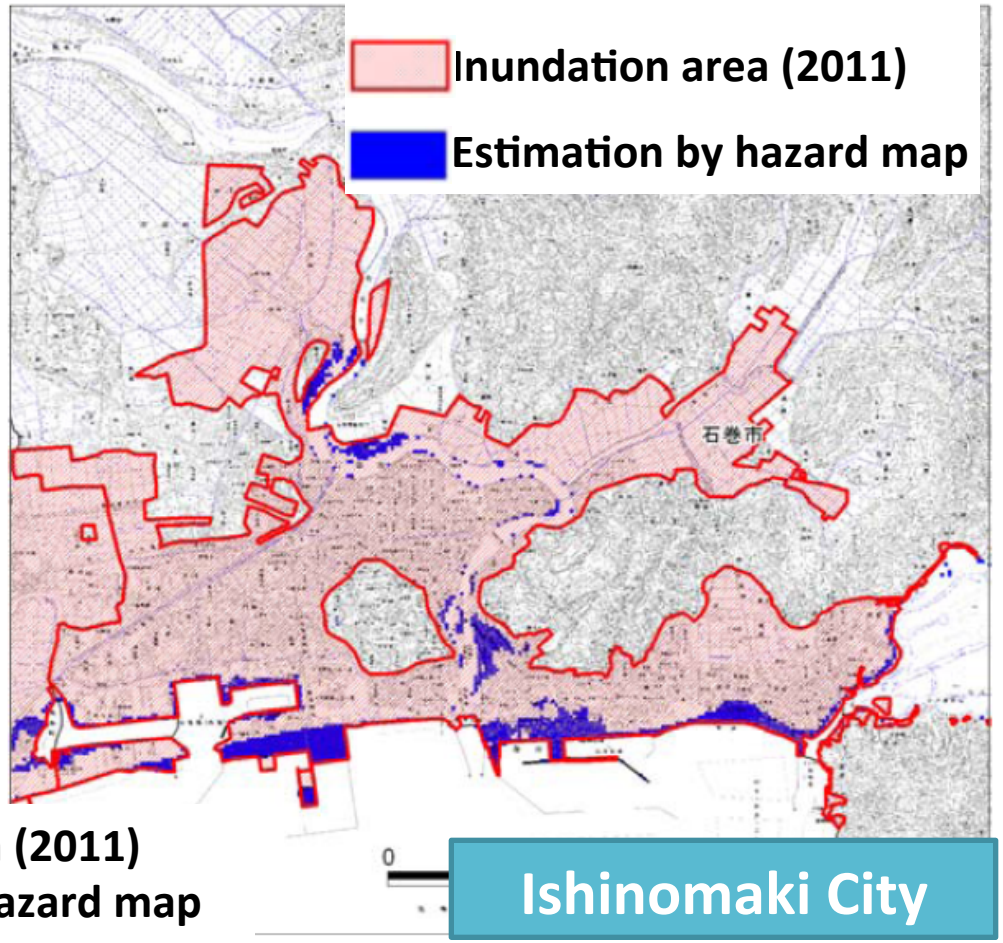


Contact: Global Environment Department, JICA
jicage-water@jica.go.jp

(Gap 1)
"Required capacity to a scenario disaster" and "Actual capacity"

Disaster information needs to be carefully distributed

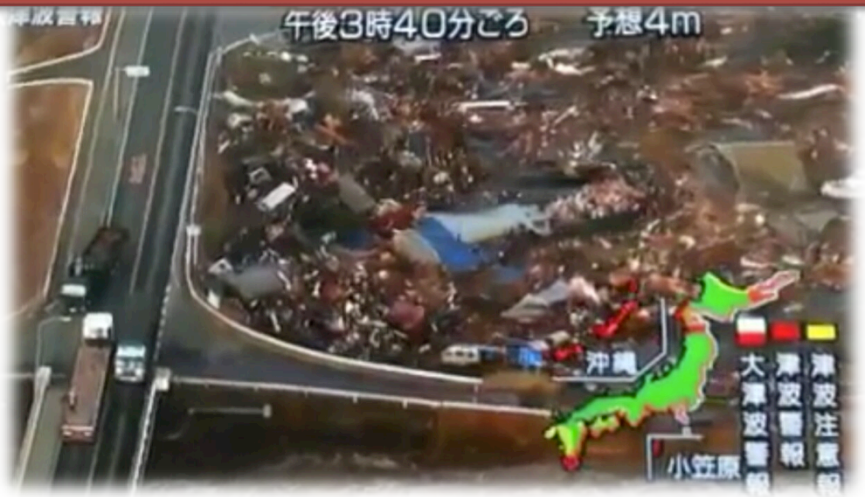




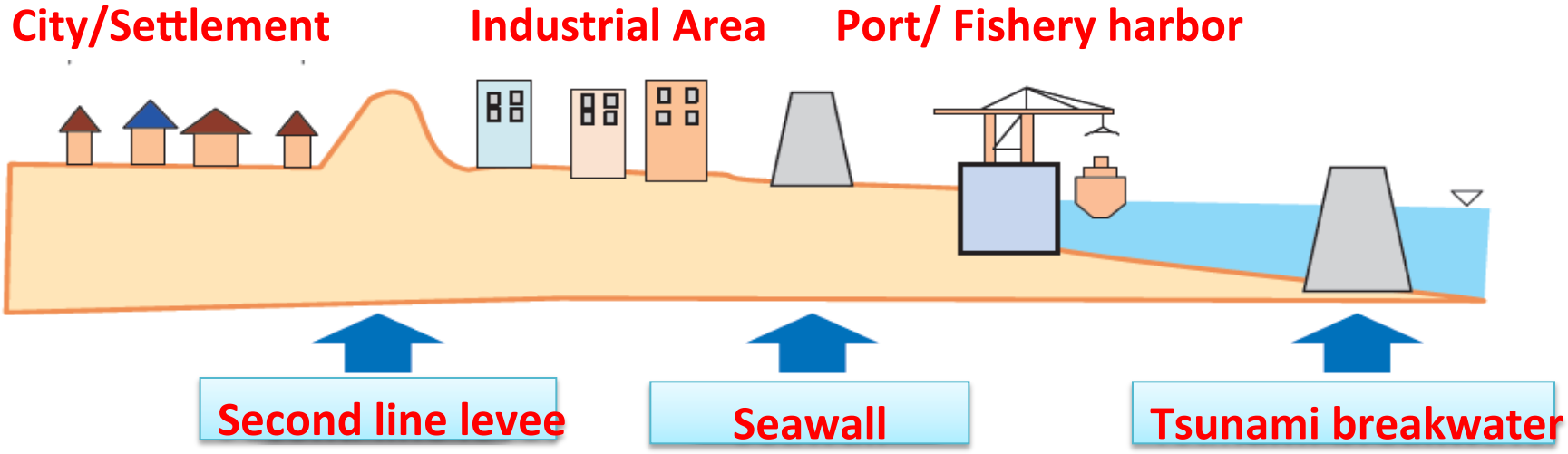
Source: Central Disaster Prevention Council

(Gap 2) “Required capacity to a scenario disaster” and “Required capacity to a worst scenario”

Elevated highway blocked tsunami and reduced damage



Land use considering multilayered measures



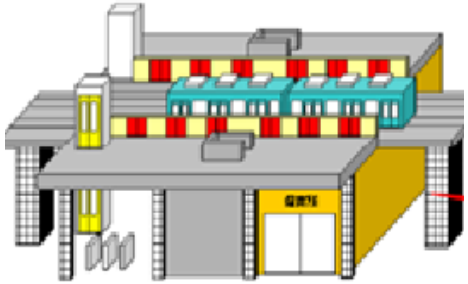
(Gap 3) “Required capacity to a worst scenario” and “Required capacity to risk increasing over time”

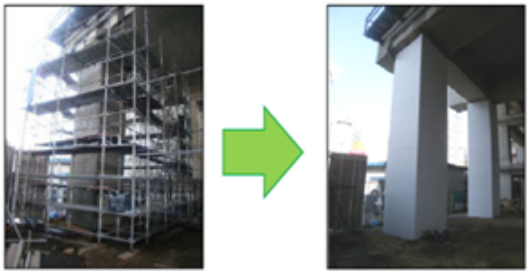
Latest scientific knowledge need to be considered

Changes of society like aging need to be paid attention

Project on aseismic retrofit of rail stations

(Purpose)
To do seismic retrofitting for major raised stations which are located in high-risk areas

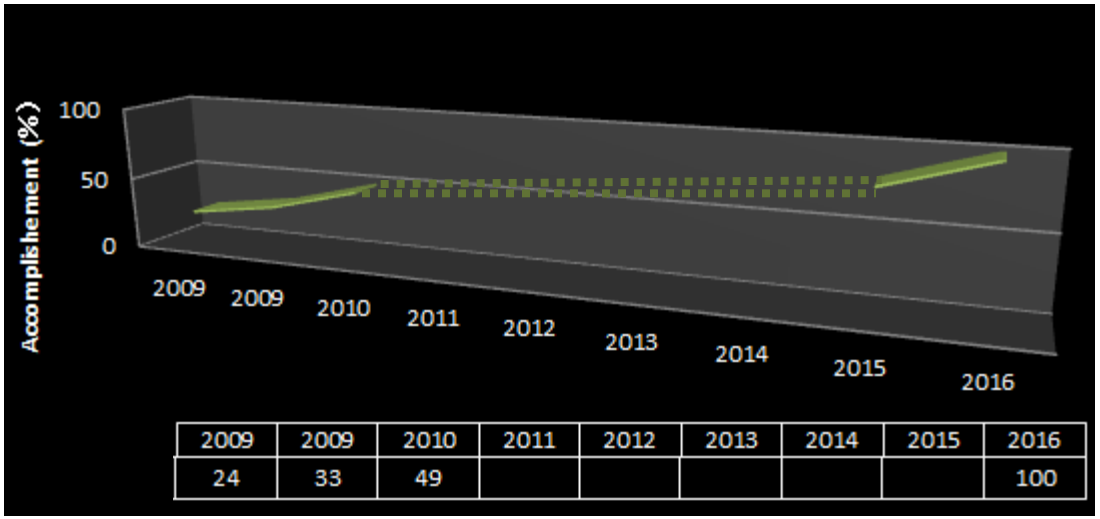




- ✓ The central Government and local governments subsidize the expense of retrofitting.

Subsidies coverage

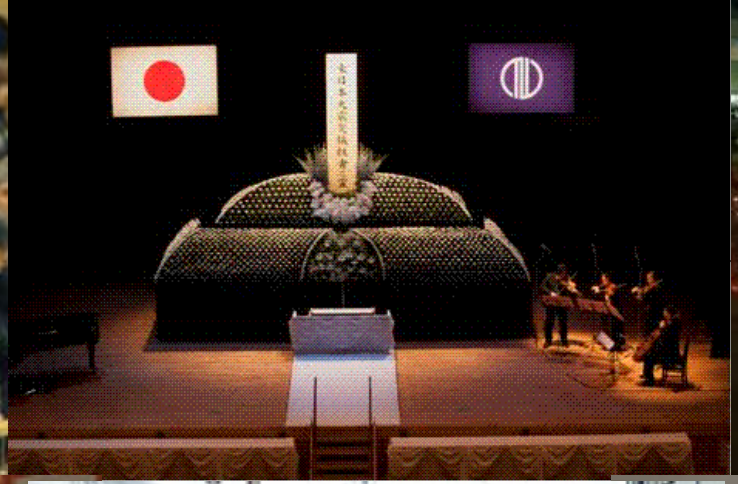
Central Government : 1/3 of entire cost
Local Government : 1/3 of entire cost



2009	2009	2010	2011	2012	2013	2014	2015	2016
24	33	49						100

Budgetary Situation		
Fiscal year	2011	2012
General Accounts	812	1610

(UNIT: million JPY)




JICA


2010


July 2011 JICA's World 16


受付


JAPAN
WE ARE
WITH YOU!!
JAPAN
WE SHARE YOUR
GRIEF


がんばれ！日本
Тримайся, Японіє!


PRAY
FOR
JAPAN

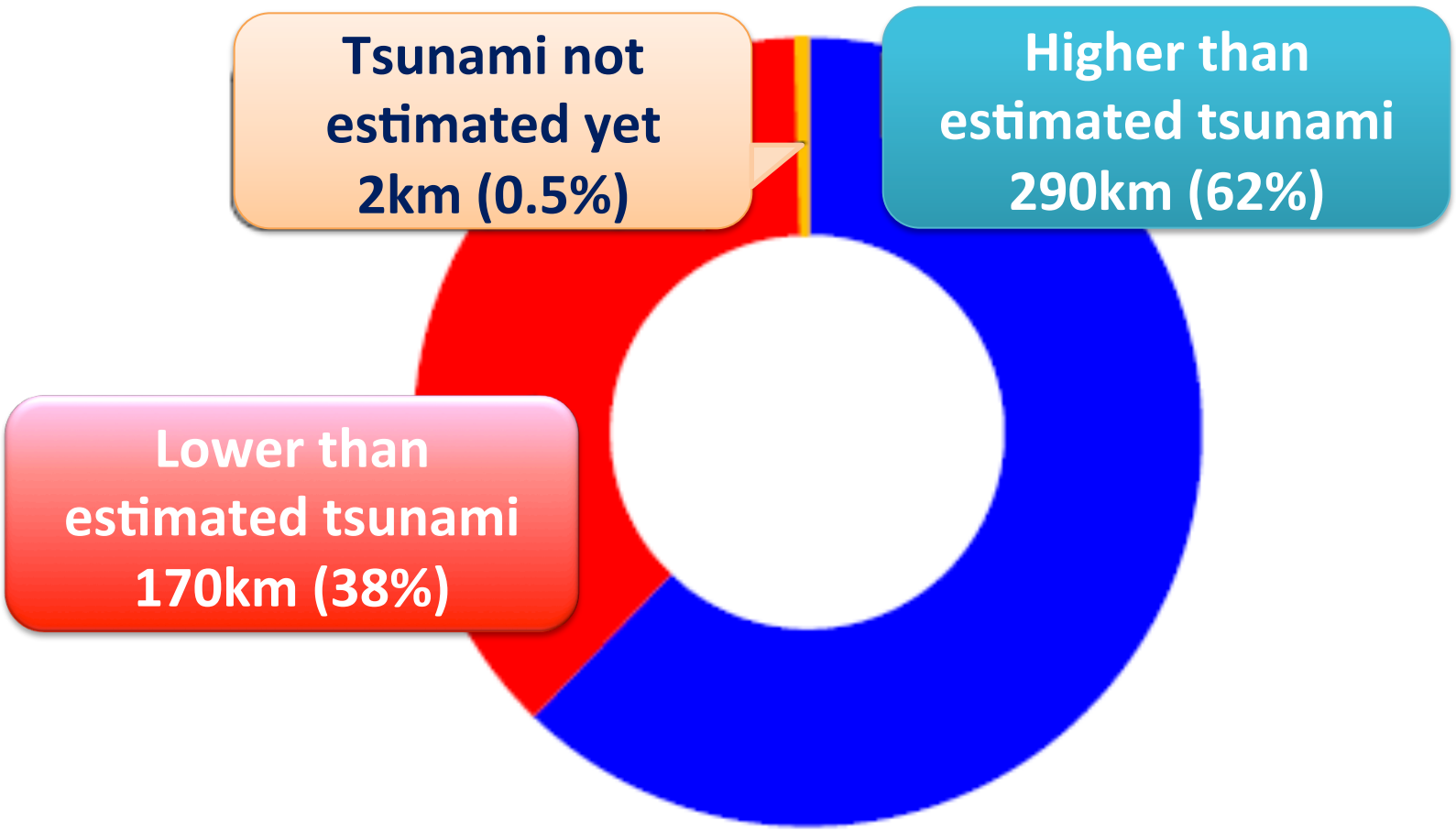

Hageruga


THOUGHTS
TO JAPAN
SONHOS
REALIZAR
JAPÃO
FORÇA
JAPÃO!


ACEH PRAY FOR JAP
You are not alone, We love you !


WALK FOR THE
RISING SUN
PJCA

Mismatch of standards for construction of coastal levee



Coast of Tohoku Region 460km

Application to JICA project

Emergency road network

Demonstration by community volunteers

KAIZEN	Risk Communication	Redundancy
• Revise emergency road network • Revise master plan for community-based disaster management	• Disaster management museum • Large-scale practical evacuation drill	• Redundancy plan of emergency road network • Backup communication line

STRATEGY

Comprehensive Master Plan on Urban Seismic Disaster Prevention and Management for Tehran

Application to JICA project

A pupil preparing emergency goods such as drinking water

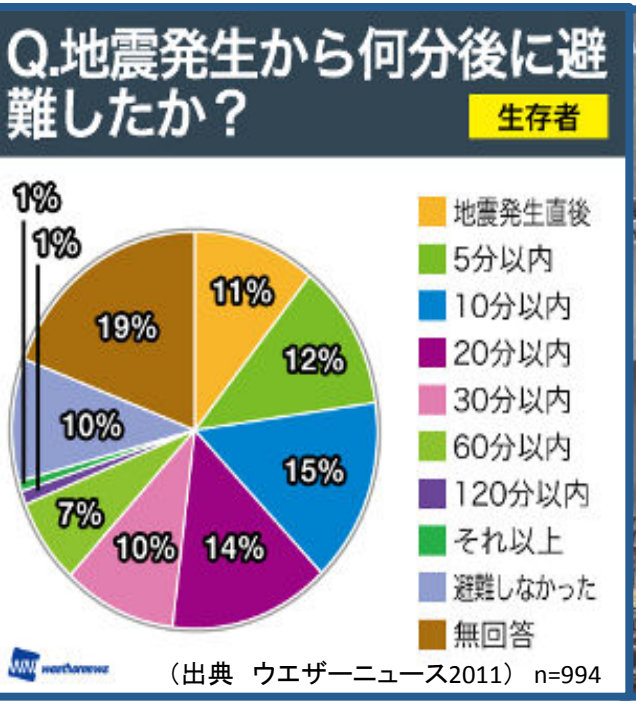
Teacher demonstrating quake resistant house using paper model

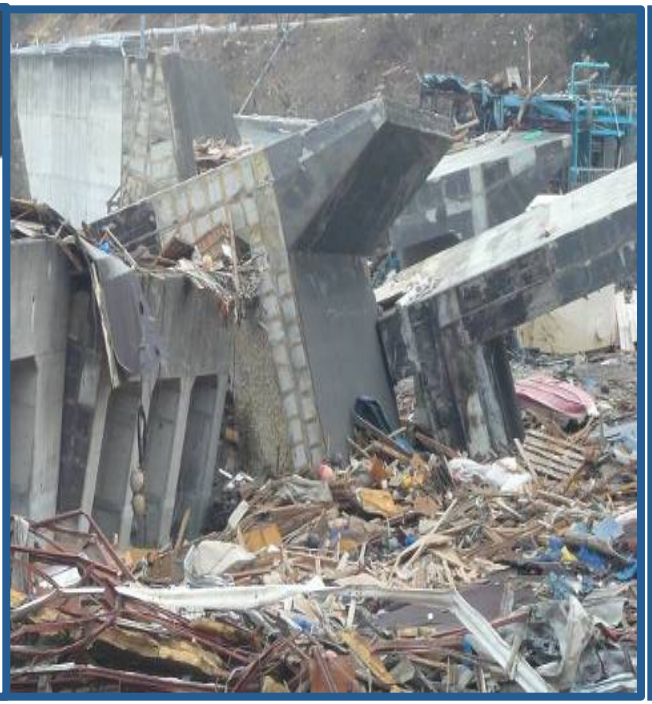
KAIZEN	Risk Communication	Redundancy
● Considering implementing body to revise and review curricula and materials	● Understanding of difference between desk plans and practices in evacuation response	● Both education and quake resistant building ● Inclusion of DRM into various subjects and club activities

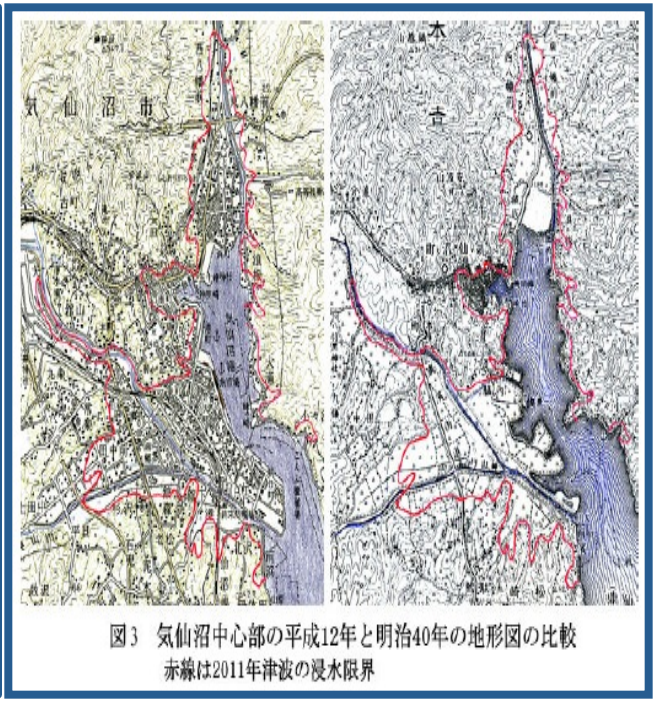
STRATEGY	National Earthquake Strategy and Action Plan

3 types of the Gap found from the Great East Japan Earthquake

Gap1	Gap2	Gap3







-「計画どおり」に地震発生直後に避難した生存者はわずか11%のみ。	-不確実性の高い自然災害（計画で想定していた地震以上の規模の地震）に対する構造物の機能不全	-都市部の拡大 -高齢化社会の進行 （今後の新たなリスクも示唆）