

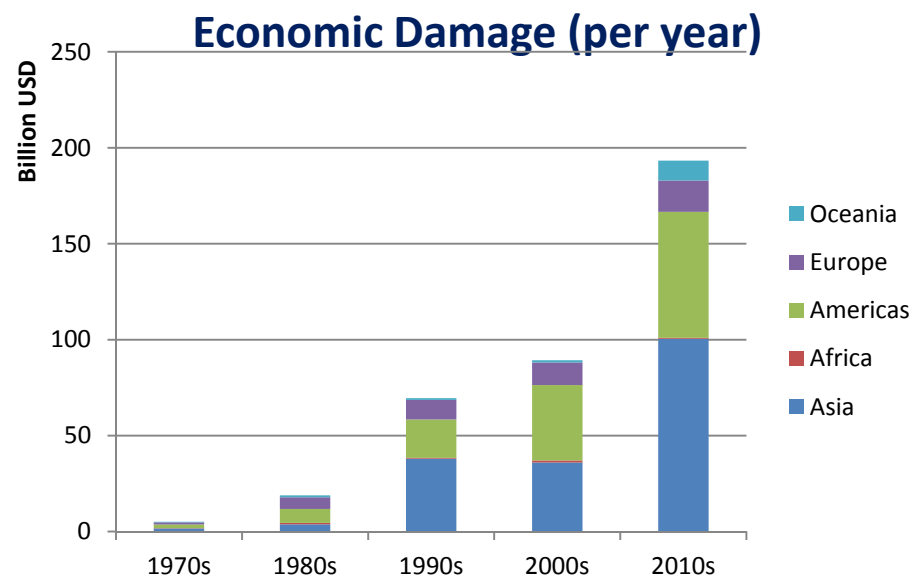
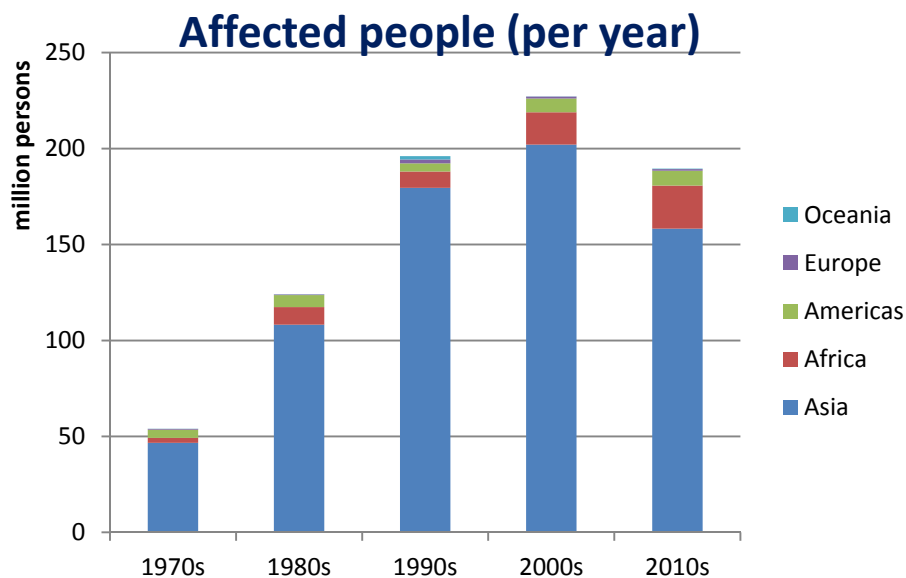
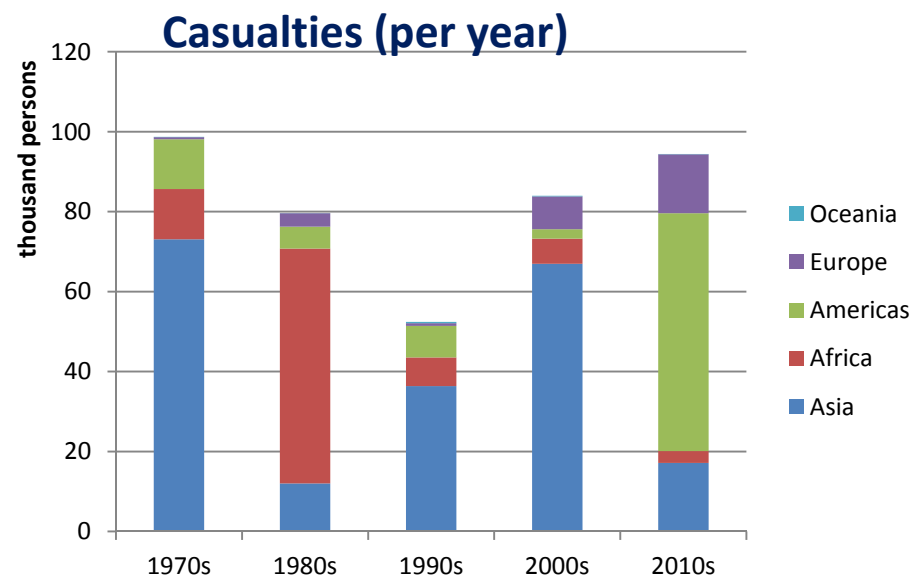
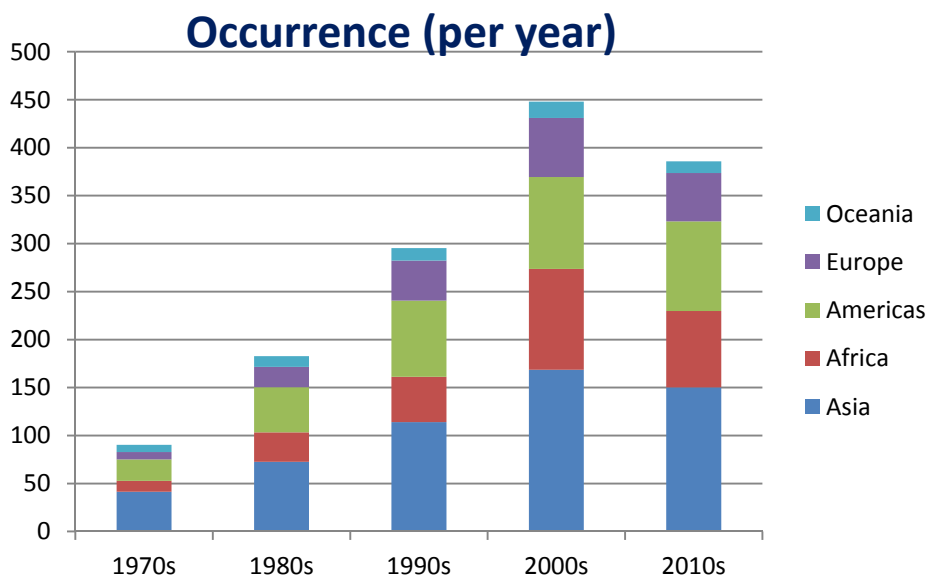
For 2014 International
Training Workshop
27 OCT, 2014



The Recovery and Lessons of the Great East Japan Earthquake and Tsunami 2011

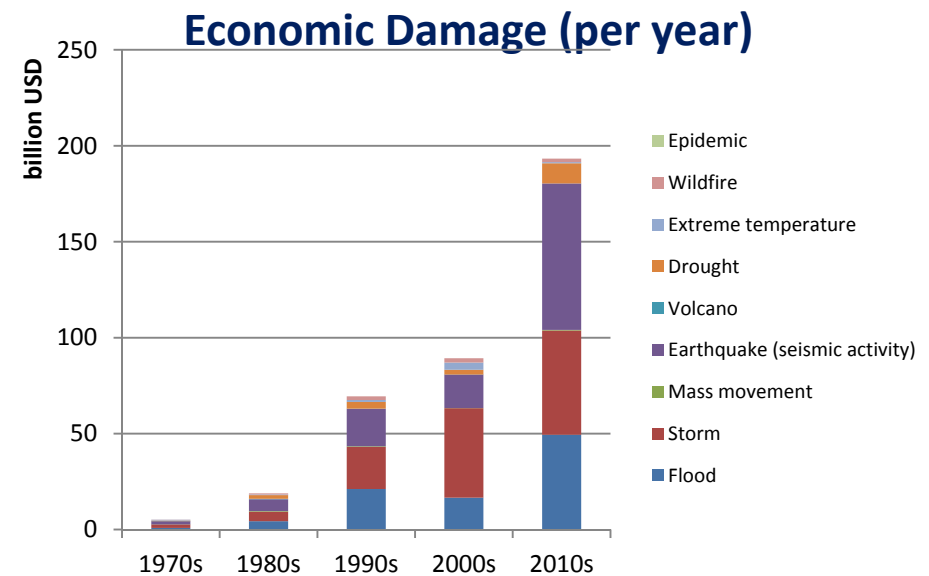
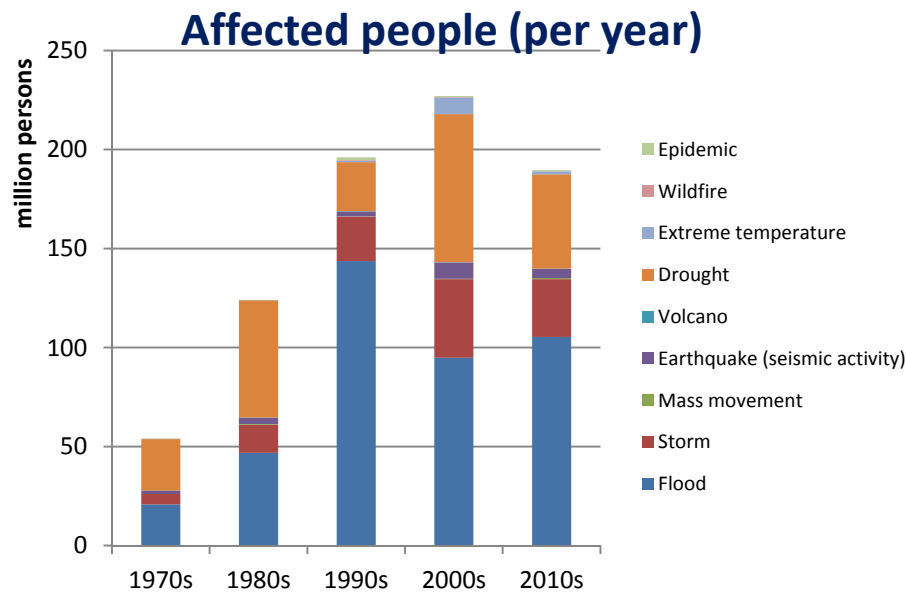
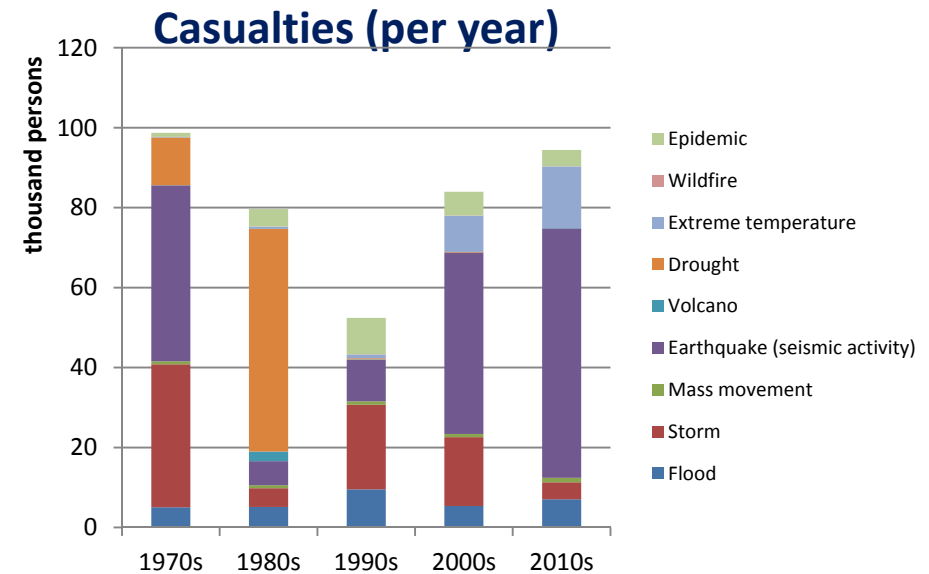
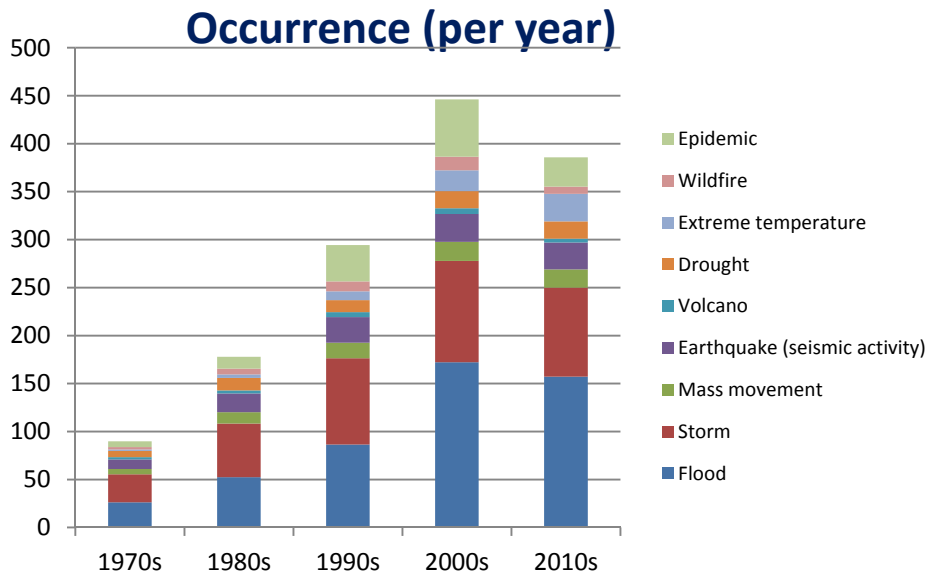
Asian Disaster Reduction Center (ADRC)
NATORI Kiyoshi

Trends of Natural Disasters by Region (1970-2013)



Source: ADRC, Based on data from EM-DAT: The OFDA/CRED International Disaster Database – www.emdat.be, Université Catholique de Louvain, Brussels (Belgium)

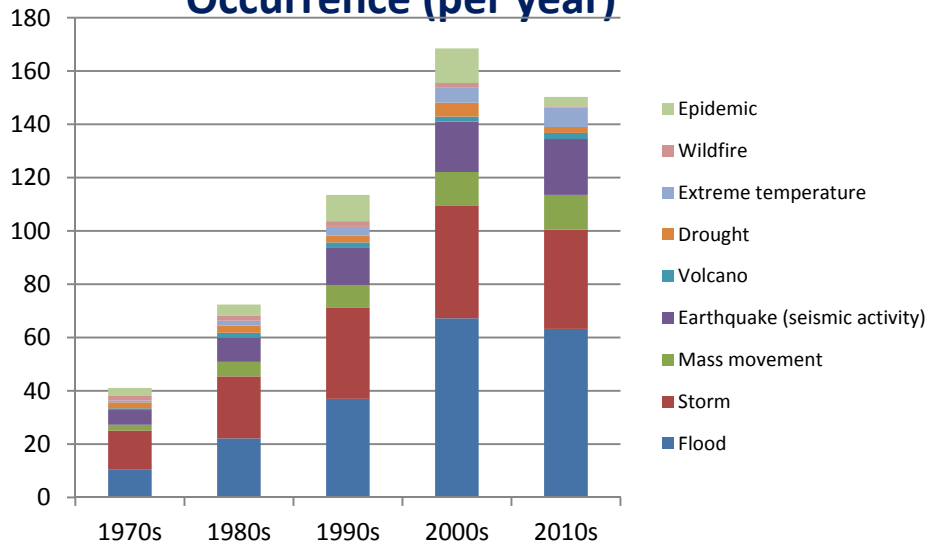
Trends of Natural Disasters by Hazards (1970-2013)



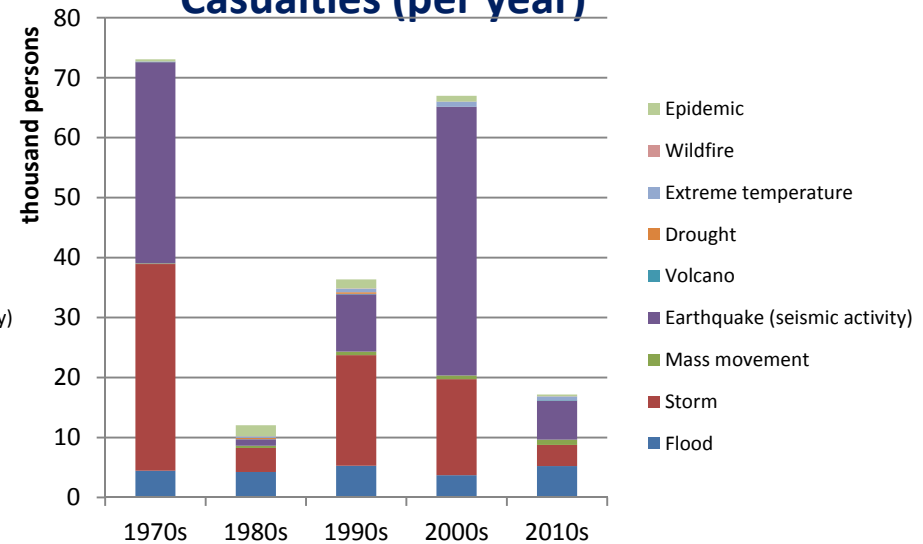
Source: ADRC, Based on data from EM-DAT: The OFDA/CRED International Disaster Database – www.emdat.be, Université Catholique de Louvain, Brussels (Belgium)

Trends of Natural Disasters by Hazards in Asian Region (1970-2013)

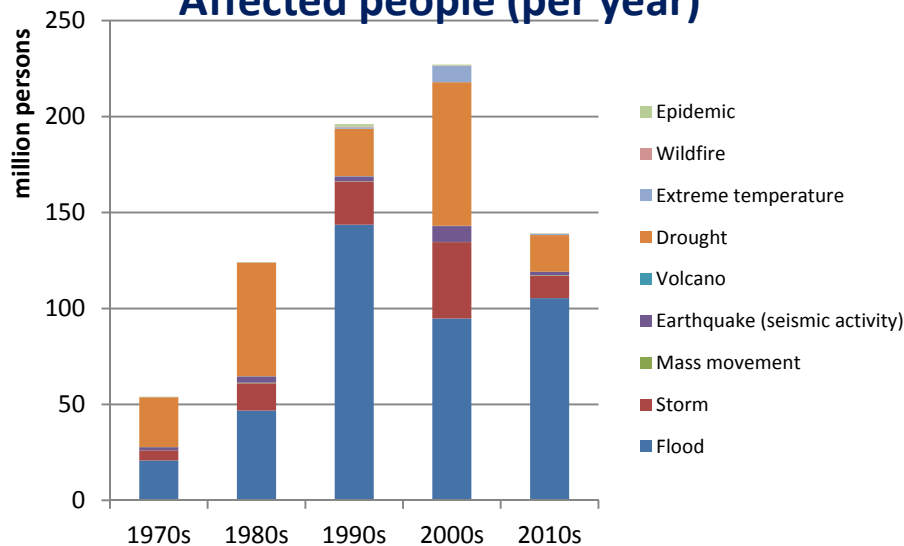
Occurrence (per year)



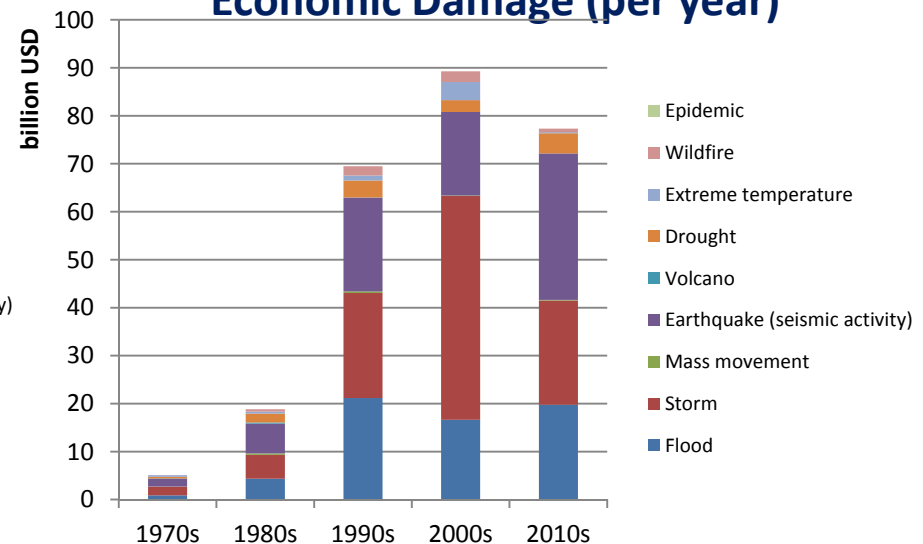
Casualties (per year)



Affected people (per year)



Economic Damage (per year)

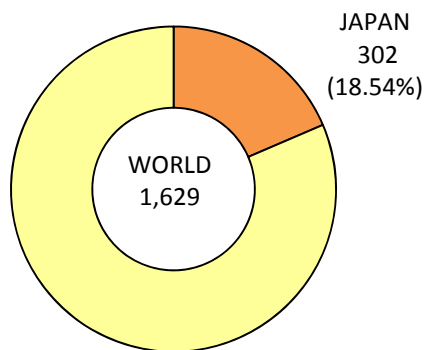


Source: ADRC, Based on data from EM-DAT: The OFDA/CRED International Disaster Database – www.emdat.be, Université Catholique de Louvain, Brussels (Belgium)

Although Territory of Japan is only 0.25% of the Land of the World...

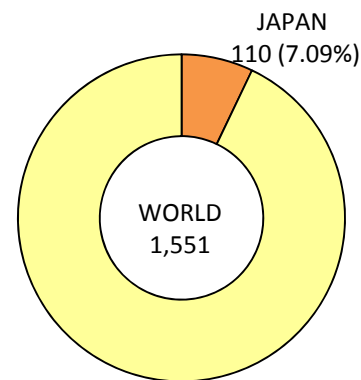


**Occurrence of Earthquake
M \geq 6.0 (2004-13)**



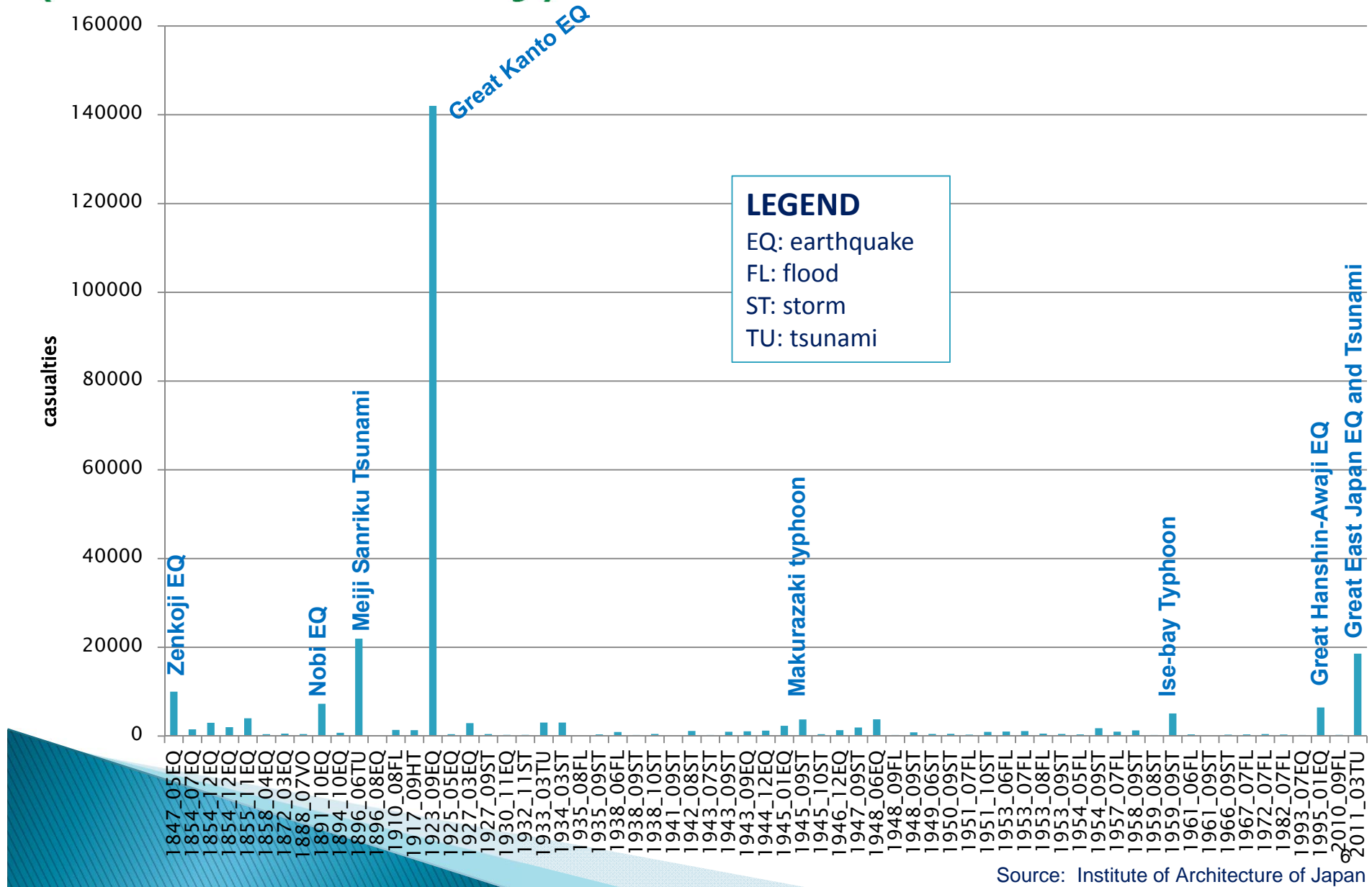
Data Source: USGS (World), JMA (Japan)

Number of Active Volcano



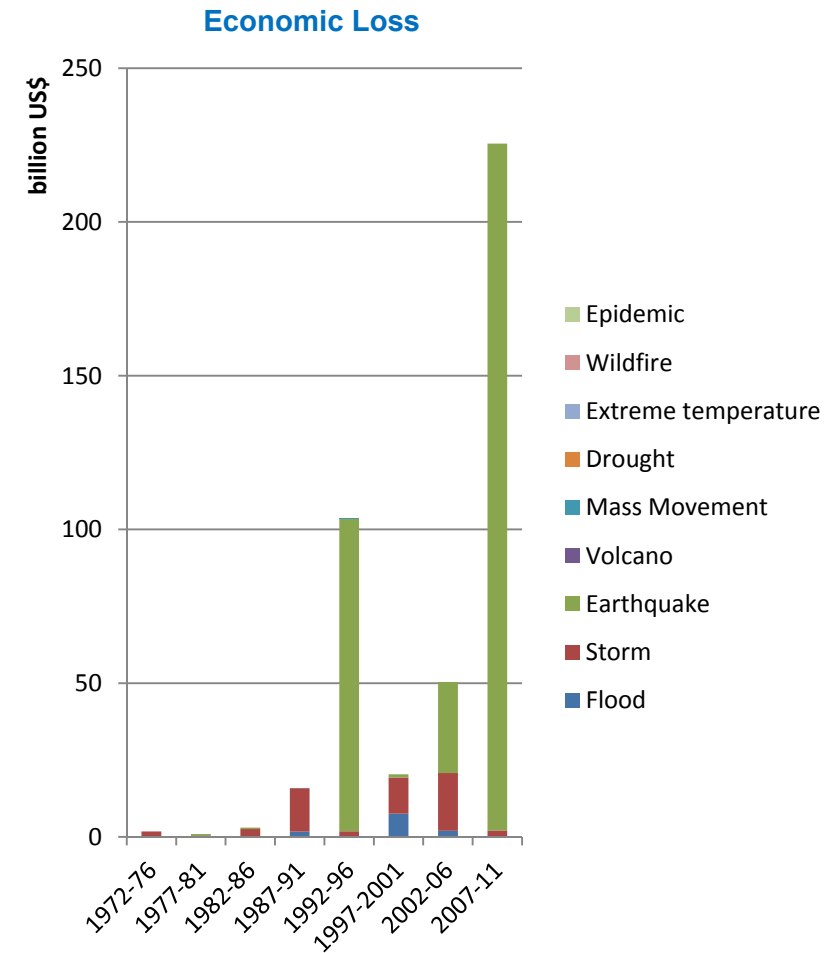
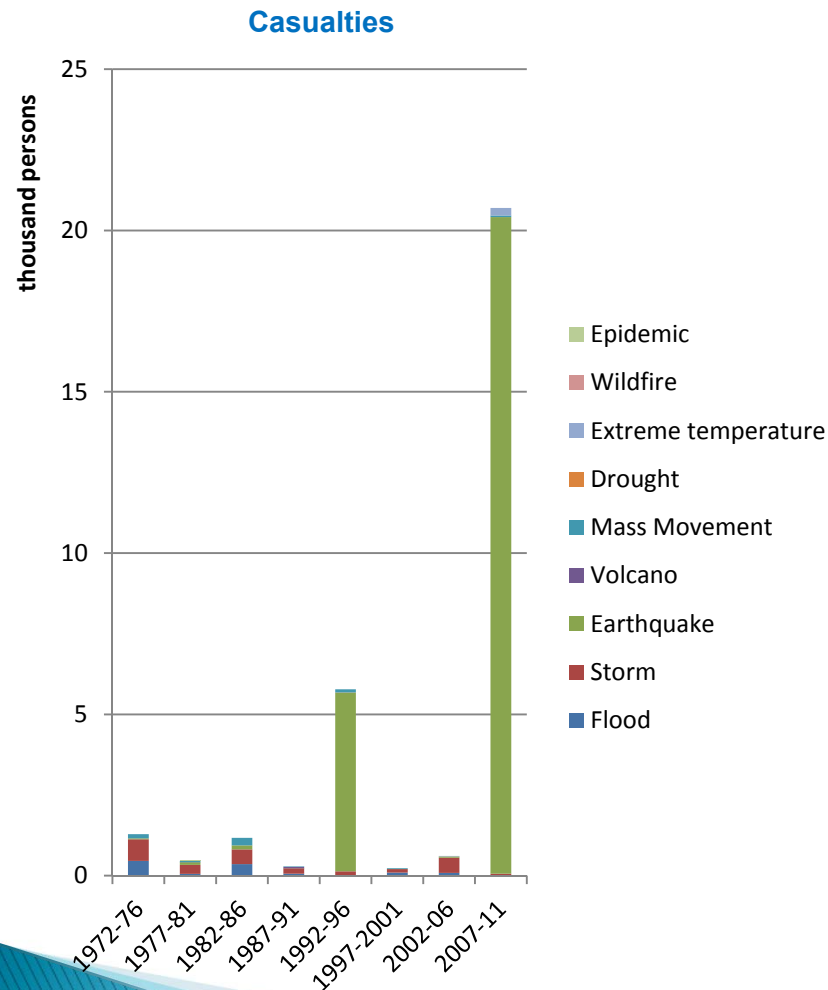
Data Source: Smithsonian Institution (World), JMA (Japan)

The Past Large Natural Disasters in Japan (since 19th century)

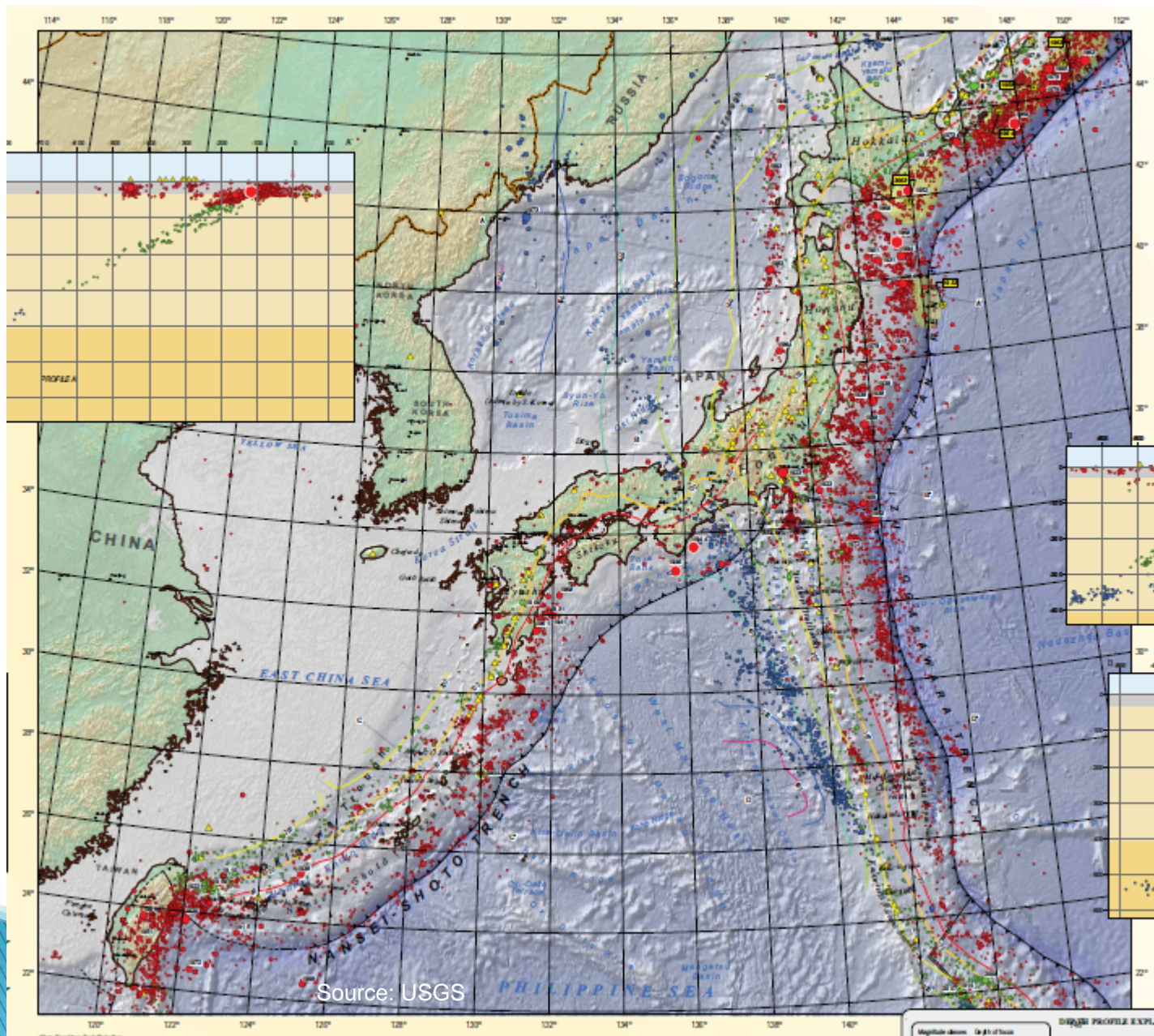


Source: Institute of Architecture of Japan

The Casualties and Economic Loss in Japan (type of hazards) (1972-2011)



Epicenter of Earthquake around Japan

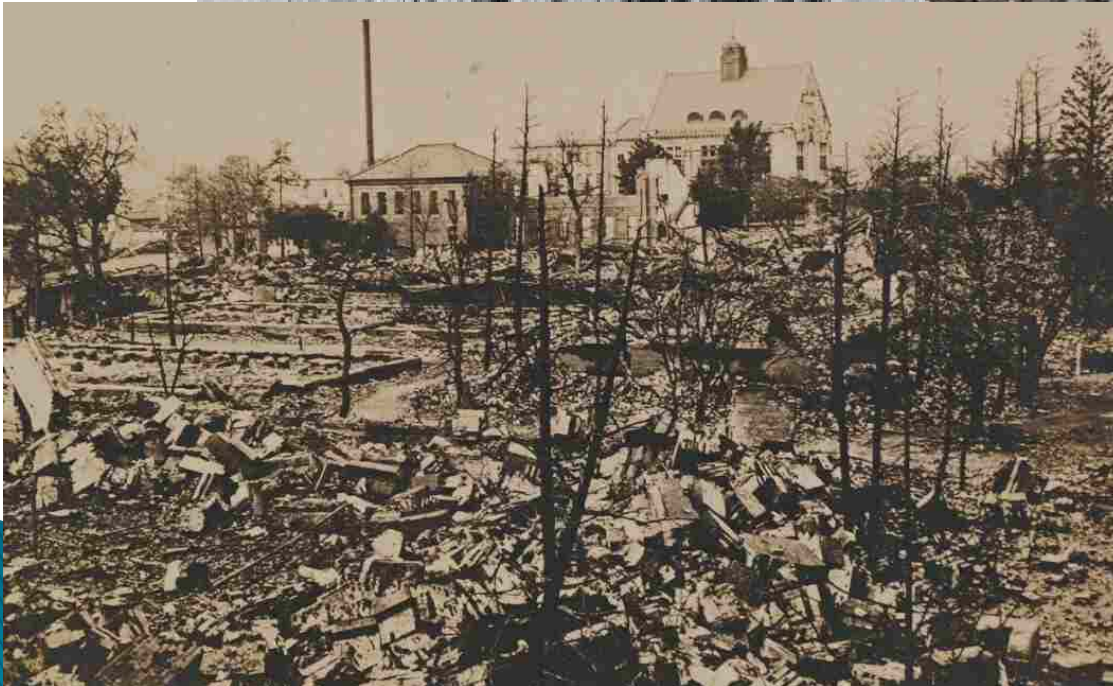


Great Kanto Earthquake (1923)



Killed people: about 140,000

Destroyed/Burnt Building: about 580,000



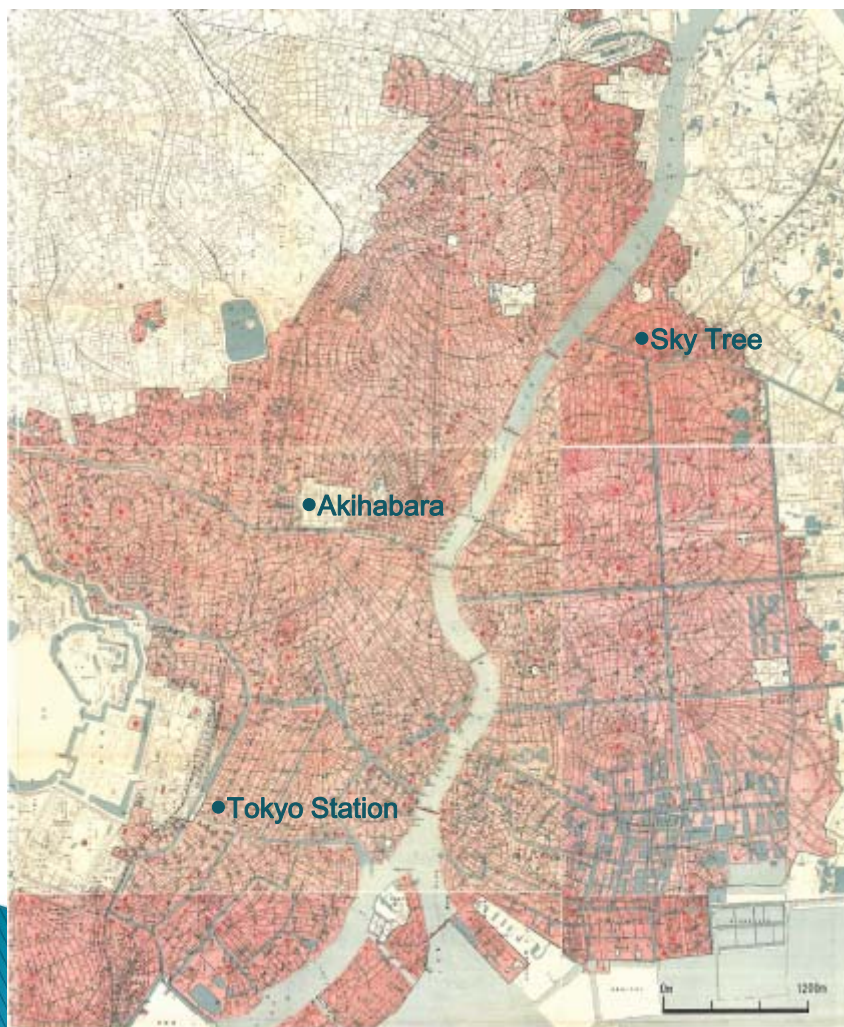
Evolution of DRR Policy in Japan: Great Kanto Earthquake (1923)



Killed people: about 140,000

Destroyed/Burnt Building: about 580,000

Burnt Area of Central/Eastern Tokyo



Eastern Tokyo



- Traditional Japanese building, made of “woods and paper”, were easily burned out and caused large scale fire
- Need for the rule of fire/quake resistant building and modern city infrastructure

The Hanshin Awaji Earthquake 17.1.1995, 5:46 M7.3



Damages by The Hanshin Awaji Earthquake



Source: City of Kobe

Damages by The Hanshin Awaji Earthquake



Human	Killed		6,434 persons
	Injured	Heavily	10,683 persons
		Slightly	33,109 persons
Physical	Residents	Total Collapse	104,906 buildings
		Half Collapse	114,274 buildings
		Partial Damage	390,506 buildings
	Non-Residents	Public Buildings	1,579 buildings
		Others (Factories etc.)	40,917 buildings
	Educational Facilities		1,875 buildings
	Roads		7,245 places
	Bridges		330 bridges
Stoppage of Services	Water supply		Max 1.3 million users Fully recovered Apr 17
	Electricity		Max 2.6 million users Fully Recovered JAN 23
Economic Value of Physical Damage			9.9 Trillion Japanese Yen



The Great Hanshin-Awaji Earthquake: Restoration Process and Efforts Toward “Creative Reconstruction”

- The Great Hanshin-Awaji Earthquake Reconstruction Plan (**Hyogo Phoenix Plan**) (JUL 1995)

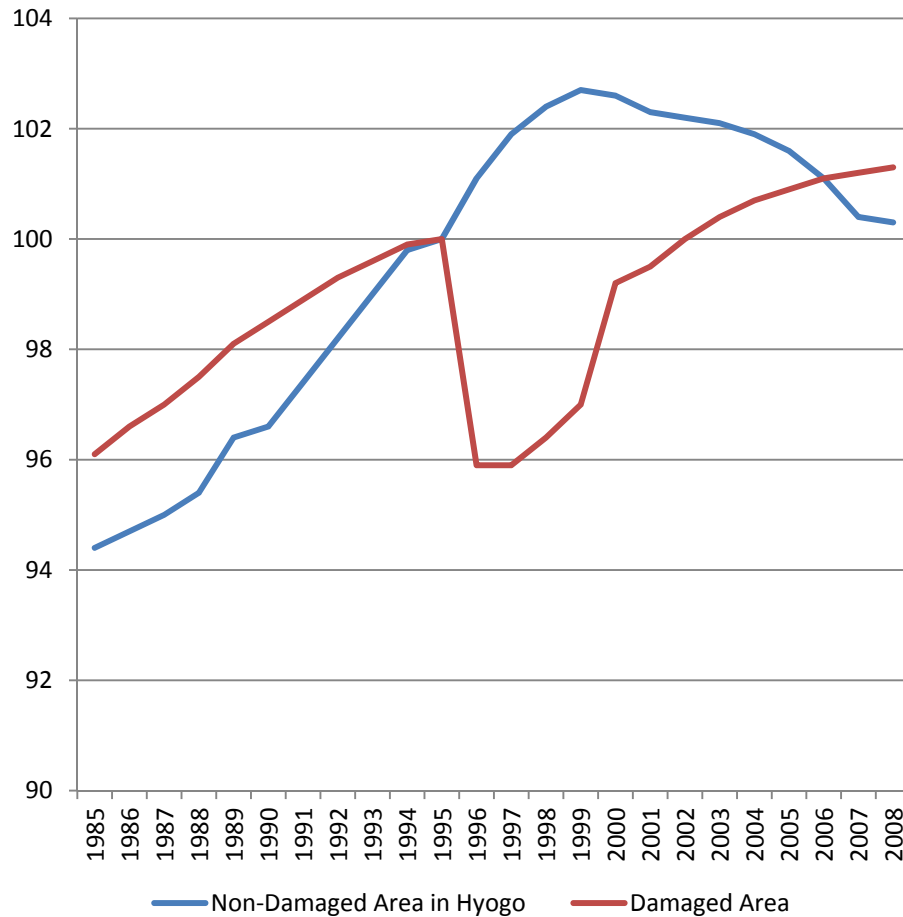
- Basic Targets and Policies of Reconstruction Plan

1. Community Planning focused on Welfare
 - ✓ Hi-quality Public Housing for Refugees
 - ✓ Medical Care System for Disaster Response
2. Multicultural Society
3. Improving Existing Industry and Incubating New Industry
4. Investment in Disaster Risk Reduction
 - ✓ Improving Facilities for Disaster Risk Reduction
 - ✓ Establishment of Comprehensive Disaster Management
 - ✓ Community Based Disaster Risk Reduction
5. Establishment of Resilient Metropolitan System
 - ✓ Redundant Transportation System

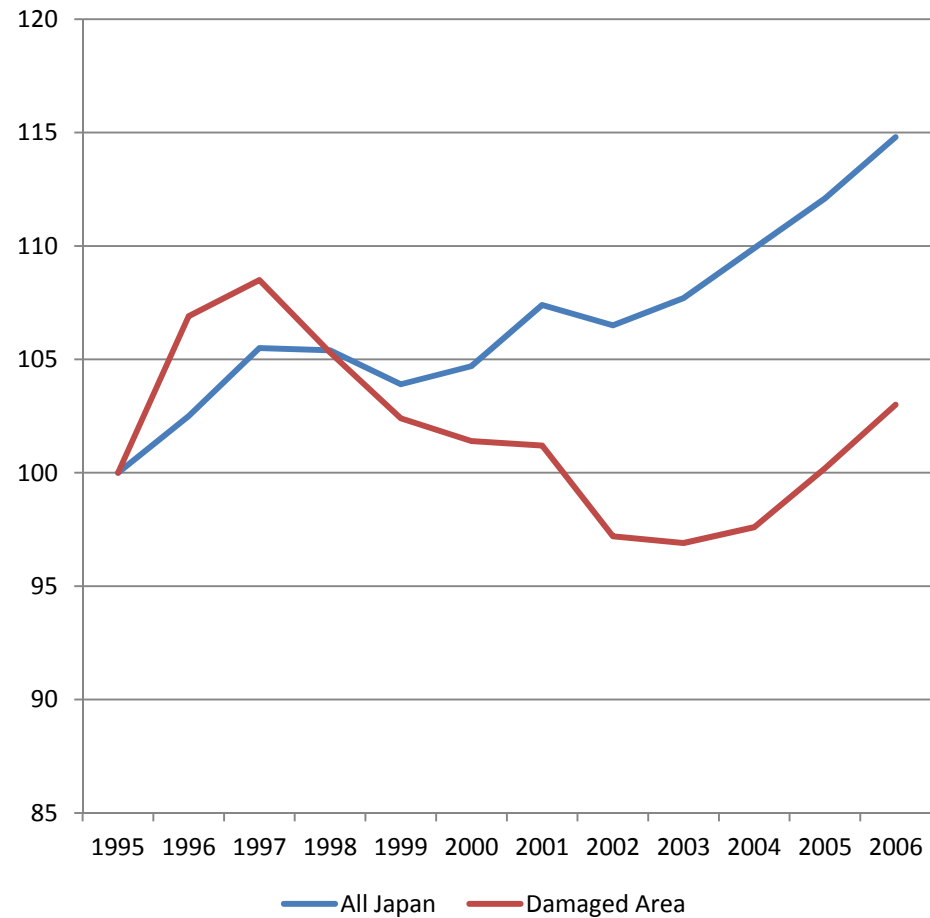
Recovery Process of The Hanshin Awaji Earthquake



Population (1995=100)



GDP (1995=100)



HAT Kobe: Big Reconstruction Project by Hyogo Prefecture

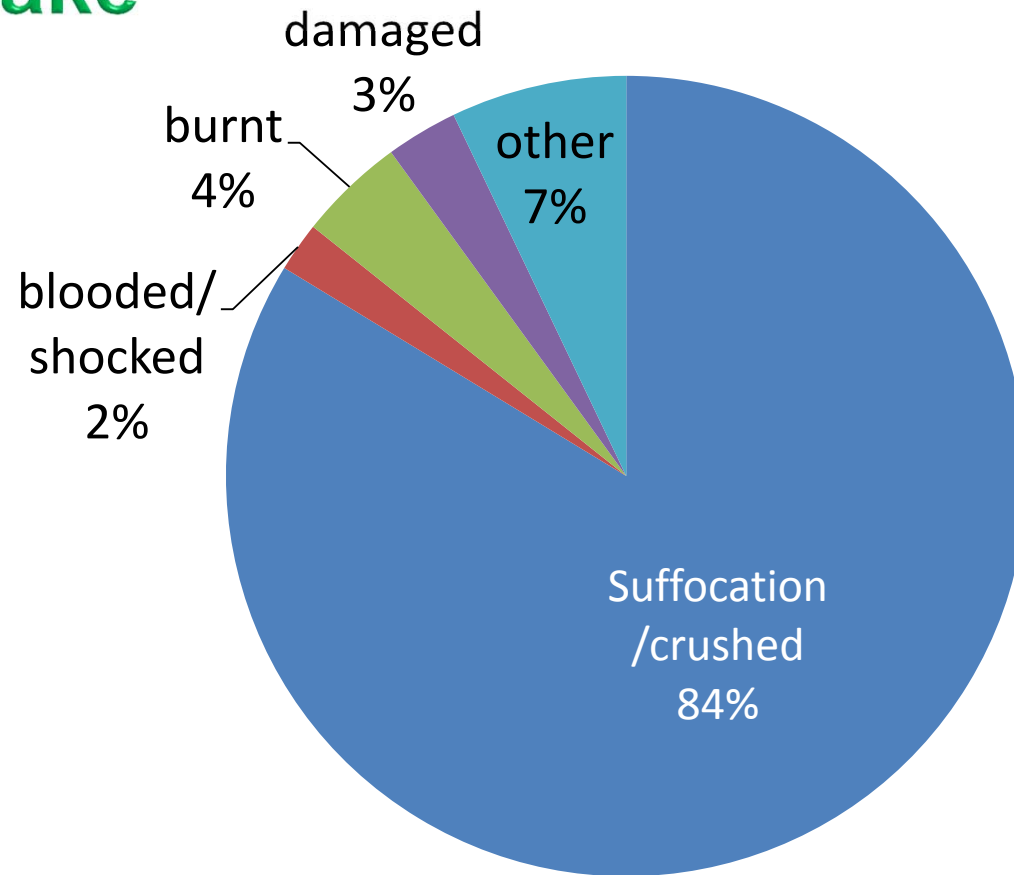


HAT Kobe was the region redeveloped as one of the symbols of recovery from the 1995 earthquake.



Where many disaster- or health-related institutions are located, including the so-called Earthquake Museum (DRI), JICA training center, Japanese Red Cross Hospital, UNISDR, UNOCHA, IRP etc.

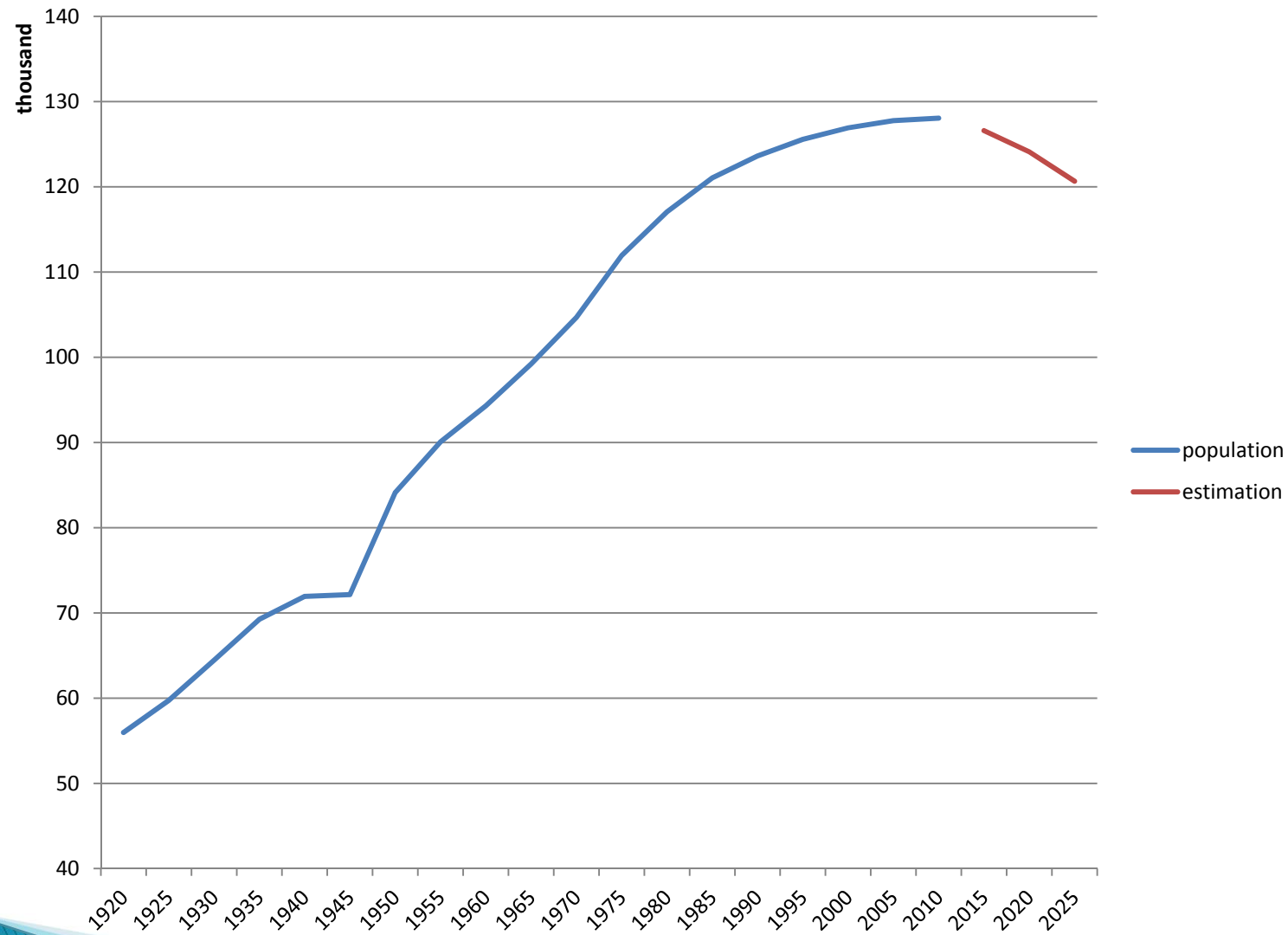
Causes of Death in Hanshin-Awaji Earthquake



People died immediately after the earthquake caused by building/house collapse

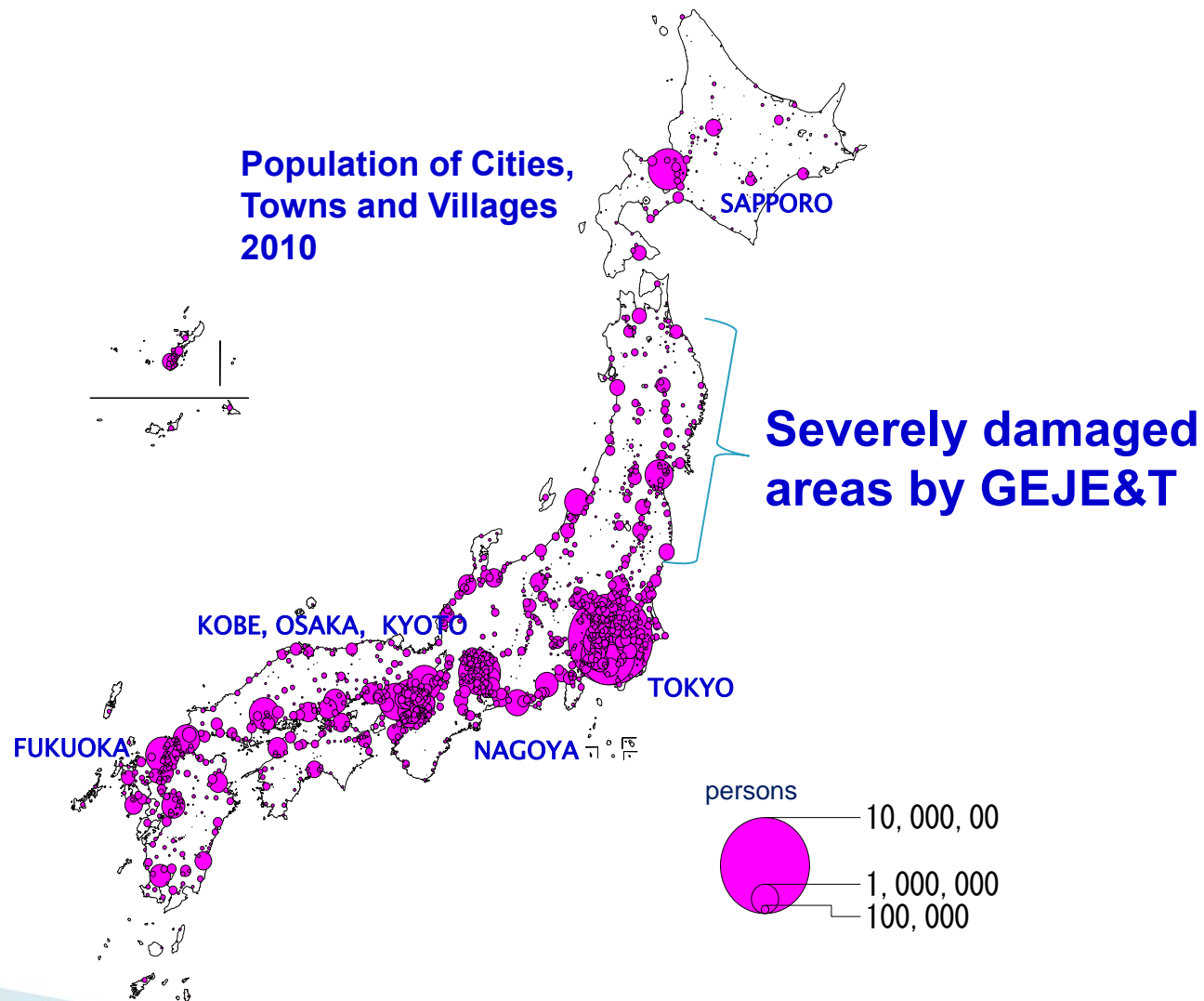
⇒ **Law for the Promotion of Seismic Retrofitting of Buildings 1995**

Long-range Trend of Population in Japan



Source: ADRC, Based on Data by Census Bureau of Japan

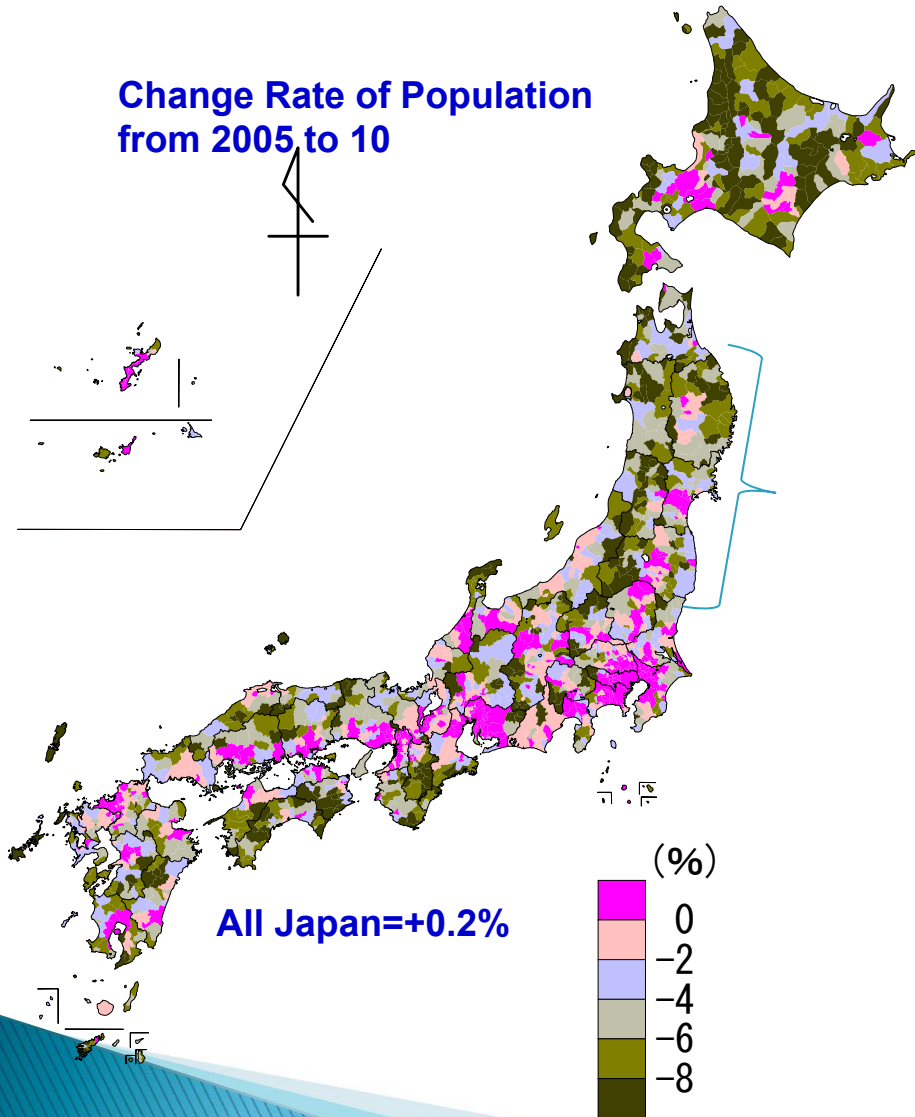
Distribution of Population in Japan



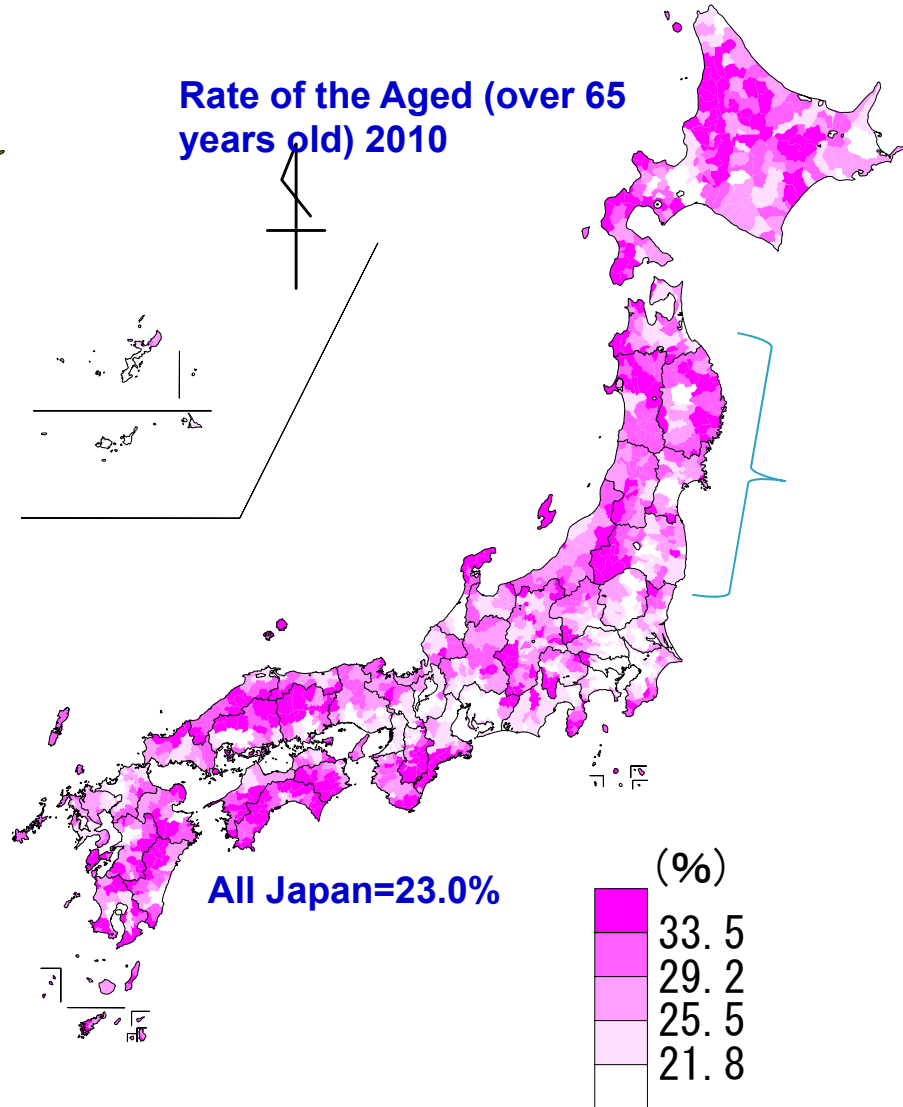
Social & Economic Situations of Japan (2)



Change Rate of Population
from 2005 to 10



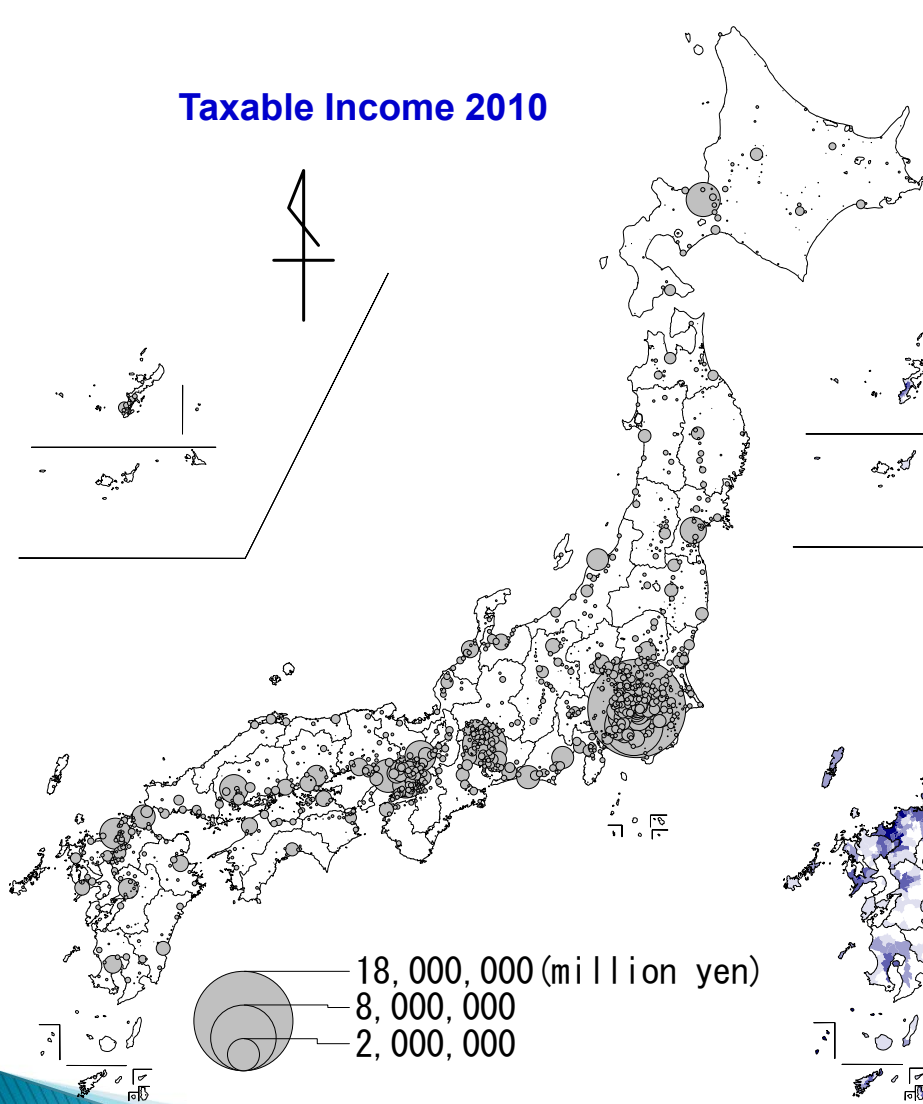
Rate of the Aged (over 65
years old) 2010



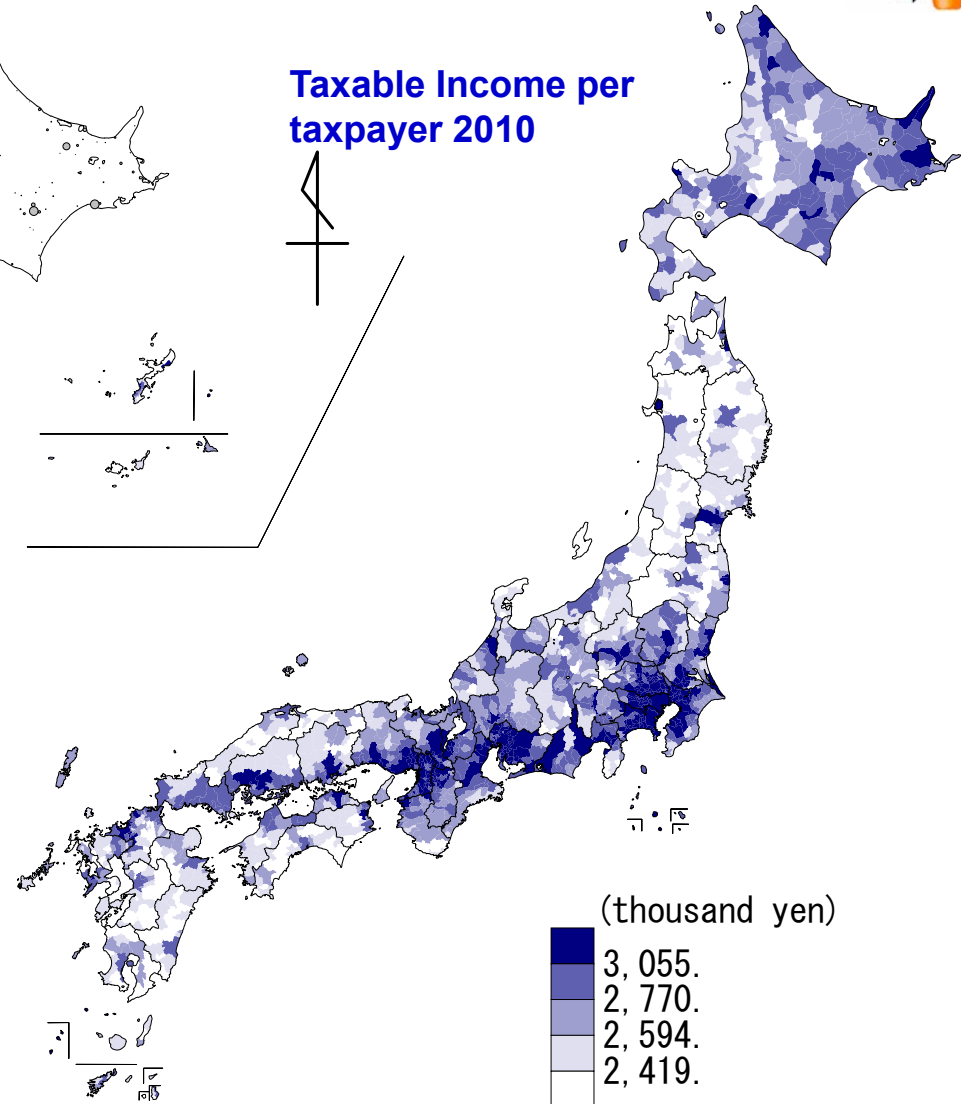
Social & Economic Situations of Japan (3)



Taxable Income 2010



Taxable Income per taxpayer 2010



The Great East Japan Earthquake 2011



Kesen-numa City (1st Apr. 2011)

Source: DRI (Disaster Reduction and Human Renovation Institution)

1. Immediate Impact of the 3.11 Disaster



Earthquake Magnitude: 9.0

Casualties:

Deceased : over 15,800

Unaccounted for: over 3,200

Injured: over 6,000

Evacuees:

Over 321,000 as of December 2012

1. Economic Damage:

16.9 trillion yen (approx. 177.7 billion dollars)

Buildings etc.
(housing, offices, factories, machinery
etc.)

approximately **10.4 trillion yen** .
(109.4 billion dollars)

Lifeline utilities
(water service, gas, electricity,
communication and broadcasting
facilities)

approximately **1.3 trillion yen**
(13.7 billion dollars)

Social infrastructure
(river, road, ports & harbors, drainage,
and airport etc.)

approximately **2.2 trillion yen**
(23.1 billion dollars)

Others
(including facilities for agriculture,
forestry and fisheries)

approximately **3.0 trillion yen**
(39.4 billion dollars)

1. Alleviated Damage

Japan's **swift response** to the disaster contributed to minimizing the damages



(Courtesy of JR East)

- Quake-resistant construction and technology
- Enhanced safety and early-warning systems on transportation
- Disaster education and preparedness

1. Outline of a framework for reconstruction

TIMEFRAME

- 10 years for the reconstruction period, with the first 5 years being the intensive reconstruction period for swift recovery

MEASURES TO BE IMPLEMENTED:

- for recovery and reconstruction of the disaster-afflicted areas and restoration of livelihood of people affected by the disaster
- for areas closely connected with those afflicted by the disaster to be taken in coordination with the aforementioned measure
- Nationwide disaster prevention and reduction that require urgent action

BUDGET SCALE (roughly estimated, both for national and local governments)

- Not less than 23 trillion in the next 10 years (19 trillion in the first 5 years*)

SUPPORT FOR RECONSTRUCTION

- Establish a system of “Special Zones for Reconstruction”
- Establish easy-to-use grants for the conduct of reconstruction projects planned by local governments
- Collaboration with the private sector for reconstruction

* As a result of the review of the financial framework for the five-year period (intensive reconstruction period), the figure was **increased to 25 trillion** yen in January 2013.

2. Town Rebuilding Efforts Underway

Collective household relocation



24 municipalities

245 districts

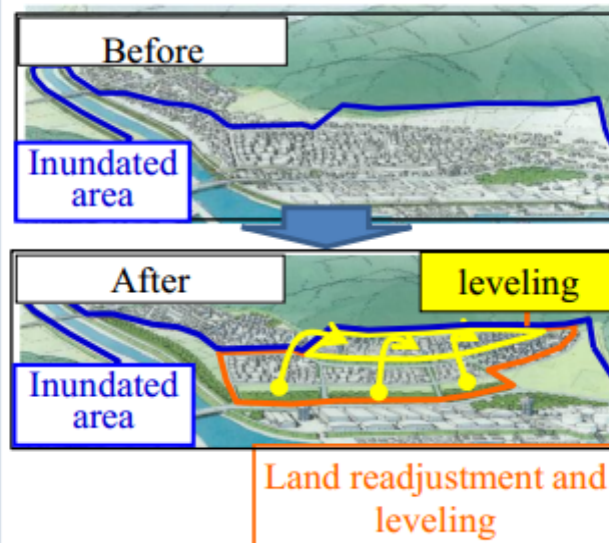
3 municipalities

3 districts

Chuetsu Earthquake
(project term: 2 years)

Great East Japan
Earthquake

Land readjustment



**Unprecedented scale of
devastation results in
a massive amount of
projects**

20 municipalities

5 municipalities

58 districts

20 districts

Great Hanshin-Awaji
Earthquake (average
project term: 8 years)

Great East Japan
Earthquake

Public housing development

[Soma City, Fukushima Prefecture]
Construction: Feb. 2012 to Aug. 2012
Structure: Wooden flat compound for
12 houses



26,000
houses

Over
20,000
houses

Great Hanshin-Awaji
Earthquake (project
term: 6 years)

Great East Japan
Earthquake

Source: Reconstruction Agency

3. Current Status of Reconstruction of Public Infrastructure, Agriculture and Fisheries

Items	Progress	Current status	Items	Progress	Current status
Public housing development *as of Jan. 2013	37% 	Land secured For 7,779 / 20,952 houses (excluding Fukushima Pref.)	Agricultural lands *as of Jan. 2013	38% 	8,190 / 21,480 ha of farming areas restored, with 63% having a clear prospects of resuming operation
Collective household relocation *as of Jan. 2013	92% 	Consent of the Minister for Land, Infrastructure and Transport secured for 205 / 224 districts	Fishing ports *as of Nov. 2012	35% 	111 / 319 fishing ports resumed operation
Land readjustment *as of Jan. 2013	61% 	Urban planning decisions made for 35 / 57 districts	Aquaculture facilities *as of Dec. 2012	77% 	Clear prospects of resuming business for 51,568 / 67,121 aquaculture facilities
Hospitals *as of Nov. 2012	90% 	166 / 184 hospitals resumed service	Fish catches *as of Dec. 2012	69% 	Fish catches: 69% on a weight basis (80% on a value basis) compared with the same period prior to the disaster
Schools *as of Nov. 2012	81% 	1,876 / 2,325 schools resumed classes	Fish processing facilities *as of Sep. 2012	69% 	567 / 820 facilities resumed fish processing

Tohoku University



Kobe University



International Recovery Platform



The Great East Japan Earthquake 2011

case studies



Cabinet office of Japan



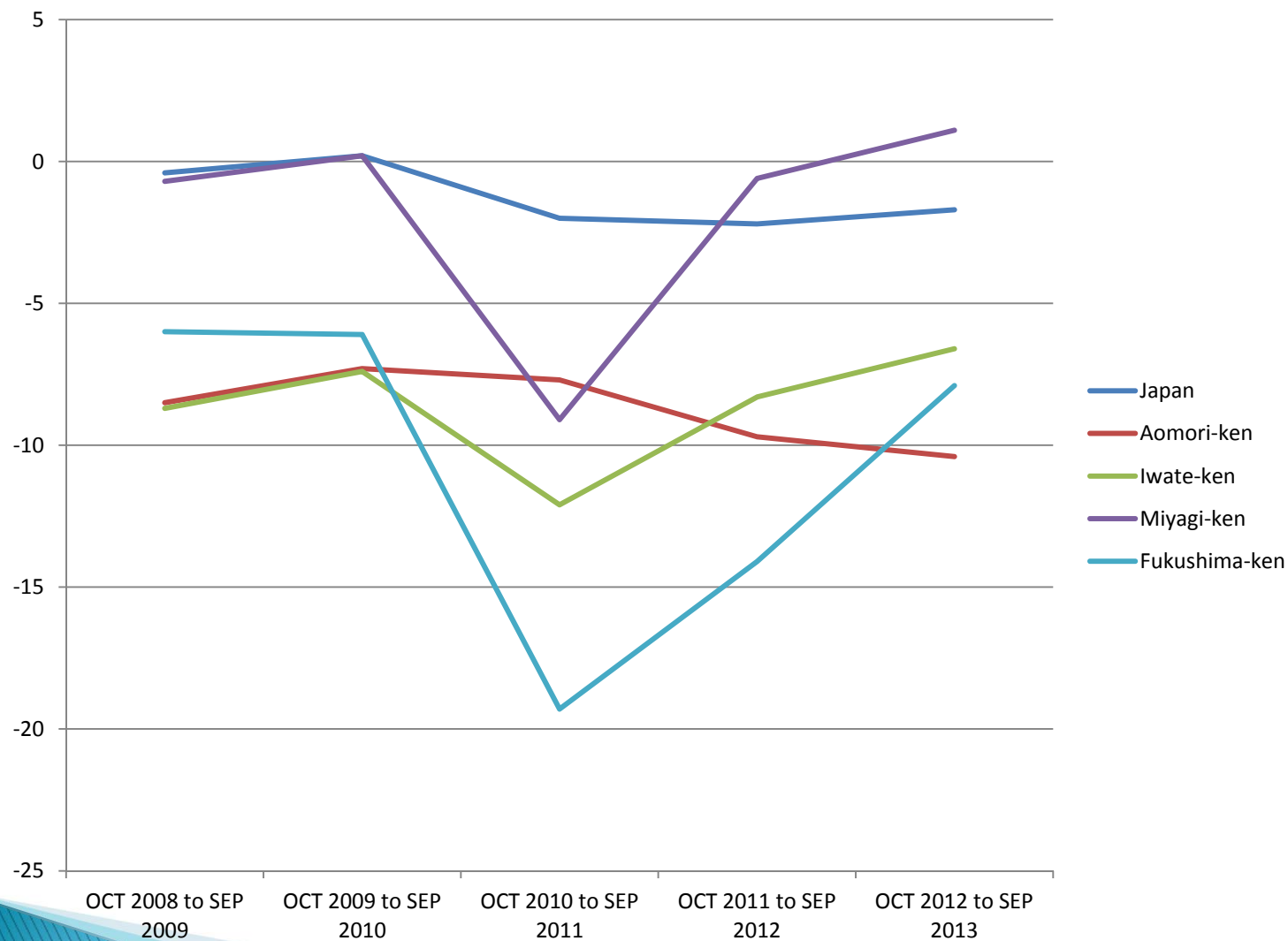
Asian Disaster Reduction Center



United Nations Office for Disaster Risk Reduction

Recovery Status Report ■ 06

Trend of Population of Tsunami Affected Areas in GEJE&T



Source: ADRC, Based on Data by Census Bureau of Japan

Lessons learnt from GEJE: Wisdom of Each Community



Stone Monument says: “Never build houses below this point”
→ Villagers kept ancestors’ precept and survived the tsunami



Aneyoshi District, Miyako City,
Iwate Prefecture

Lessons learnt from GEJE: Limitation of Structural Measures to Unexpected Scale Disaster



Hachinohe Port Breakwater



Shiogama Port Breakwater



Taneichi Seashore Dyke

An Example of Land Use & Infrastructure Recovery Plan

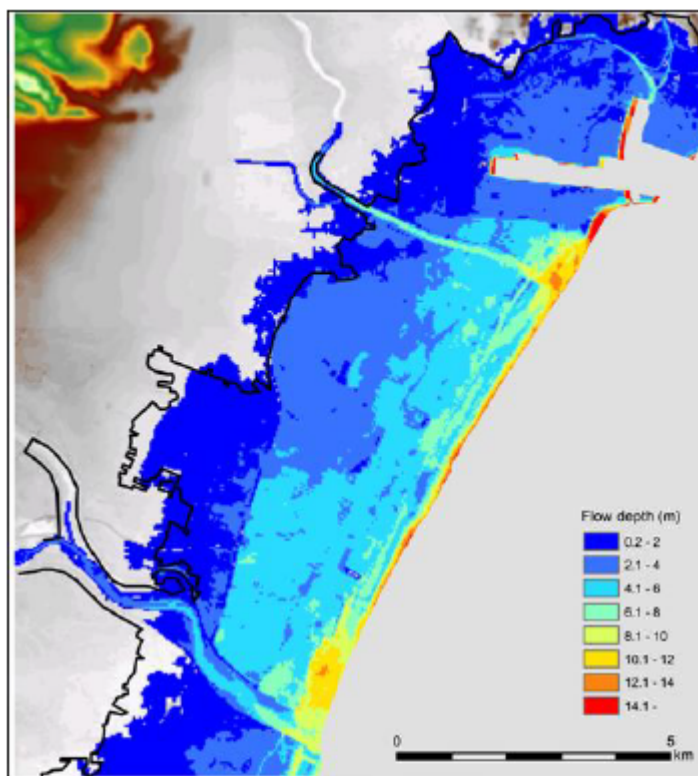


Figure 2.5 The result of numerical modeling of the 2011 tsunami inundation in Sendai city (Maximum flow depth). Black solid line is the tsunami inundation extent obtained by GSI (GSI, 2011b).

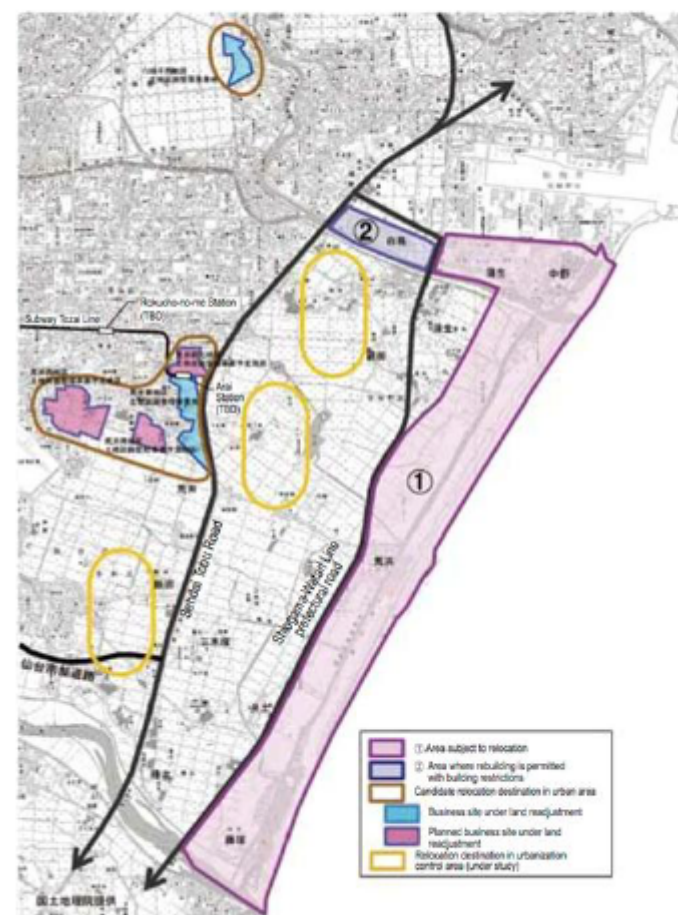
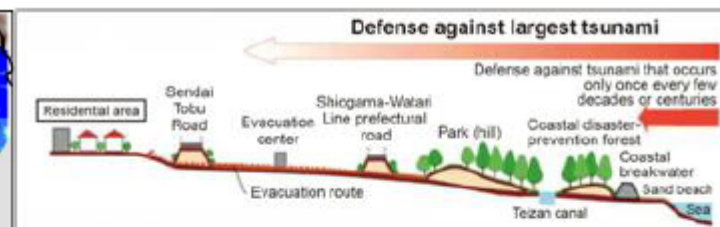


Figure 2.6 Conceptual image of reconstruction and land use plan in Sendai city (Sendai city, 2011).

An Example of Land Use & Infrastructure Recovery Plan

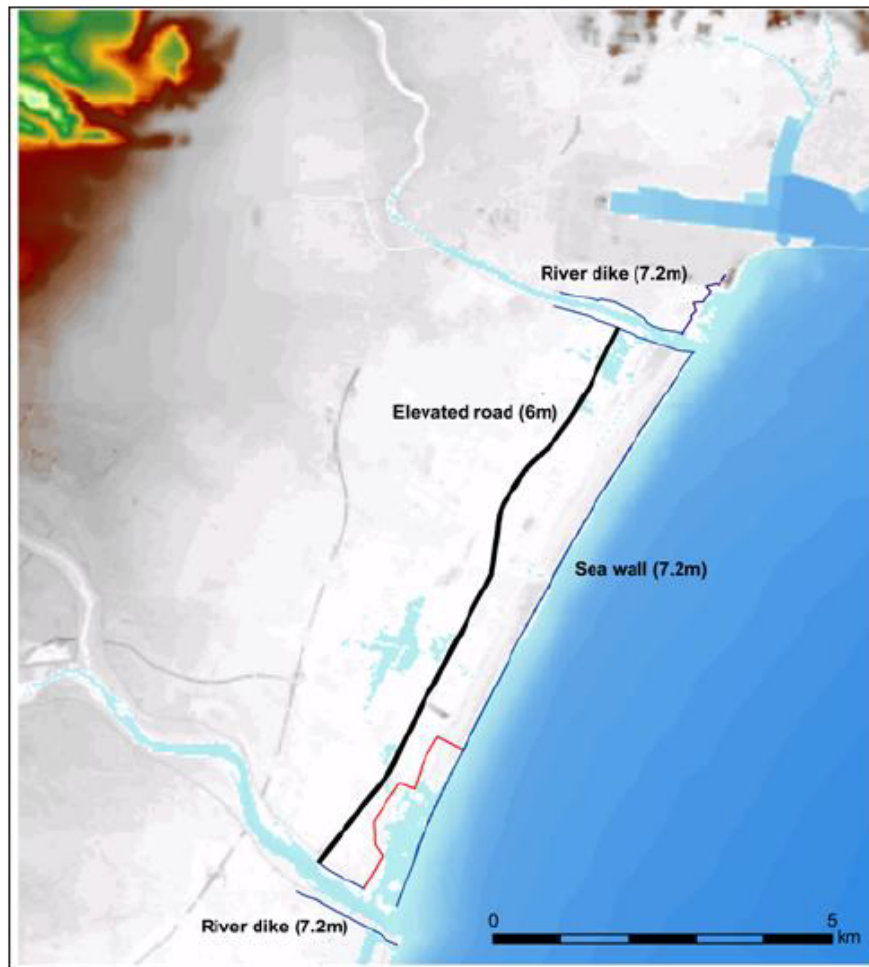


Figure 2.7 Setting of tsunami prevention facilities in Sendai city reconstruction plan.

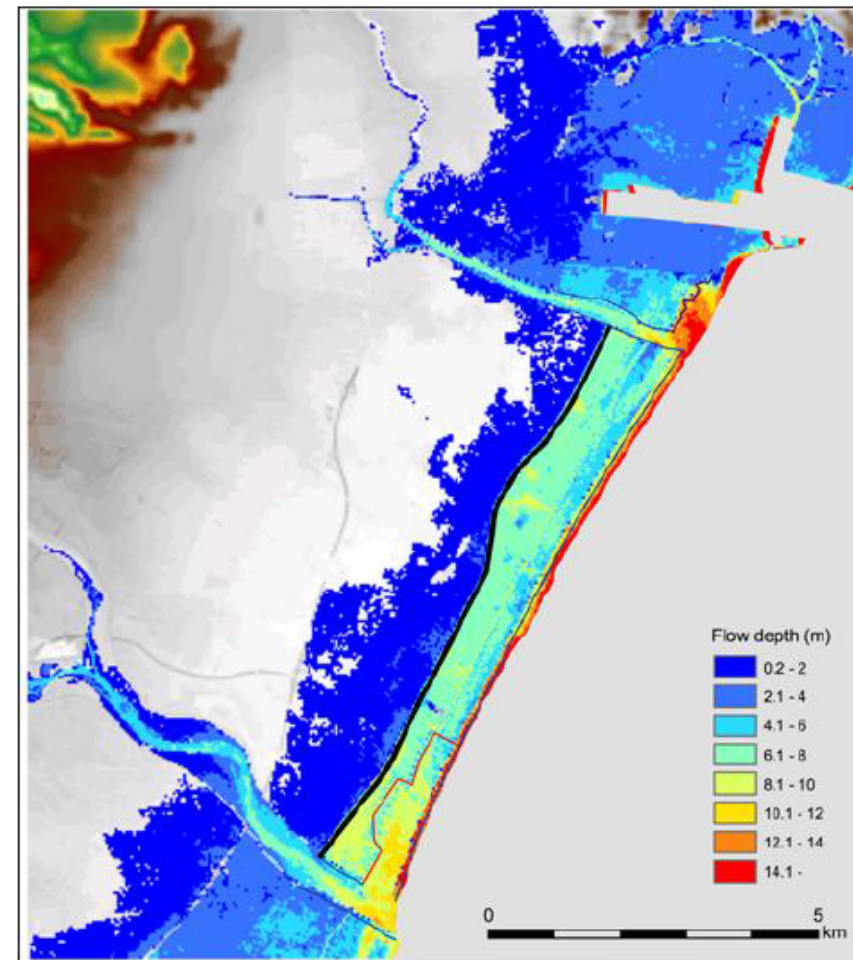


Figure 2.8 Preliminary result of tsunami numerical modeling to evaluate the effect of the proposed reconstruction plan in Sendai city (Maximum flow depth).

An Example of Land Use & Infrastructure Recovery Plan: Planning for Shrinking Town



Figure 3.1 Pre-disaster quiet in the city center of Ishinomaki

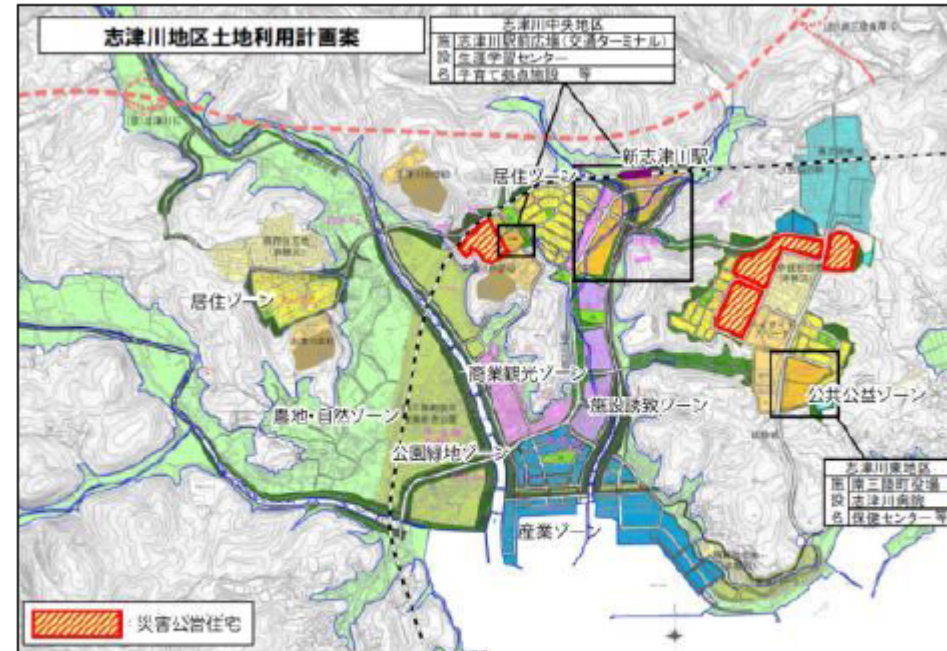
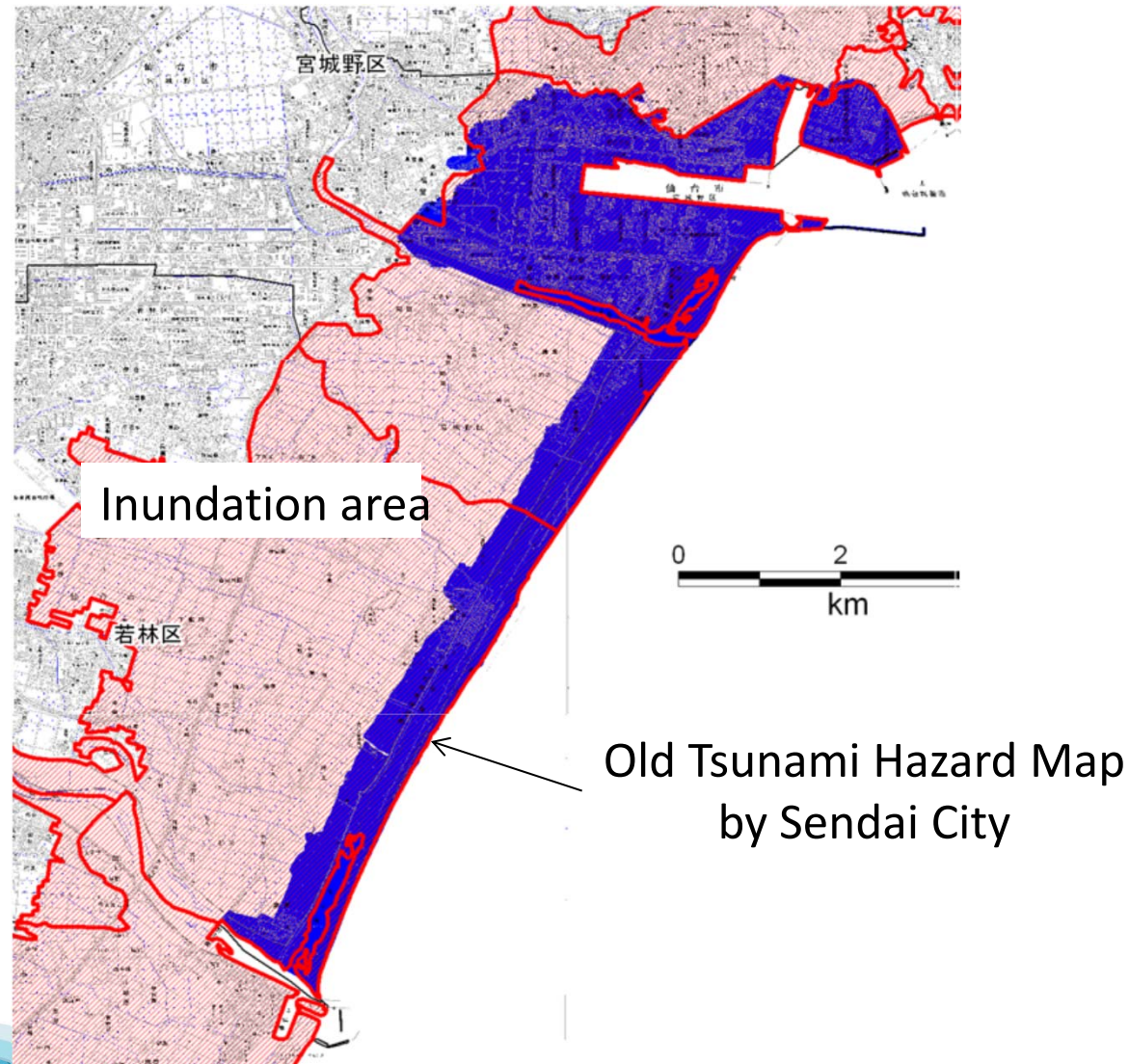
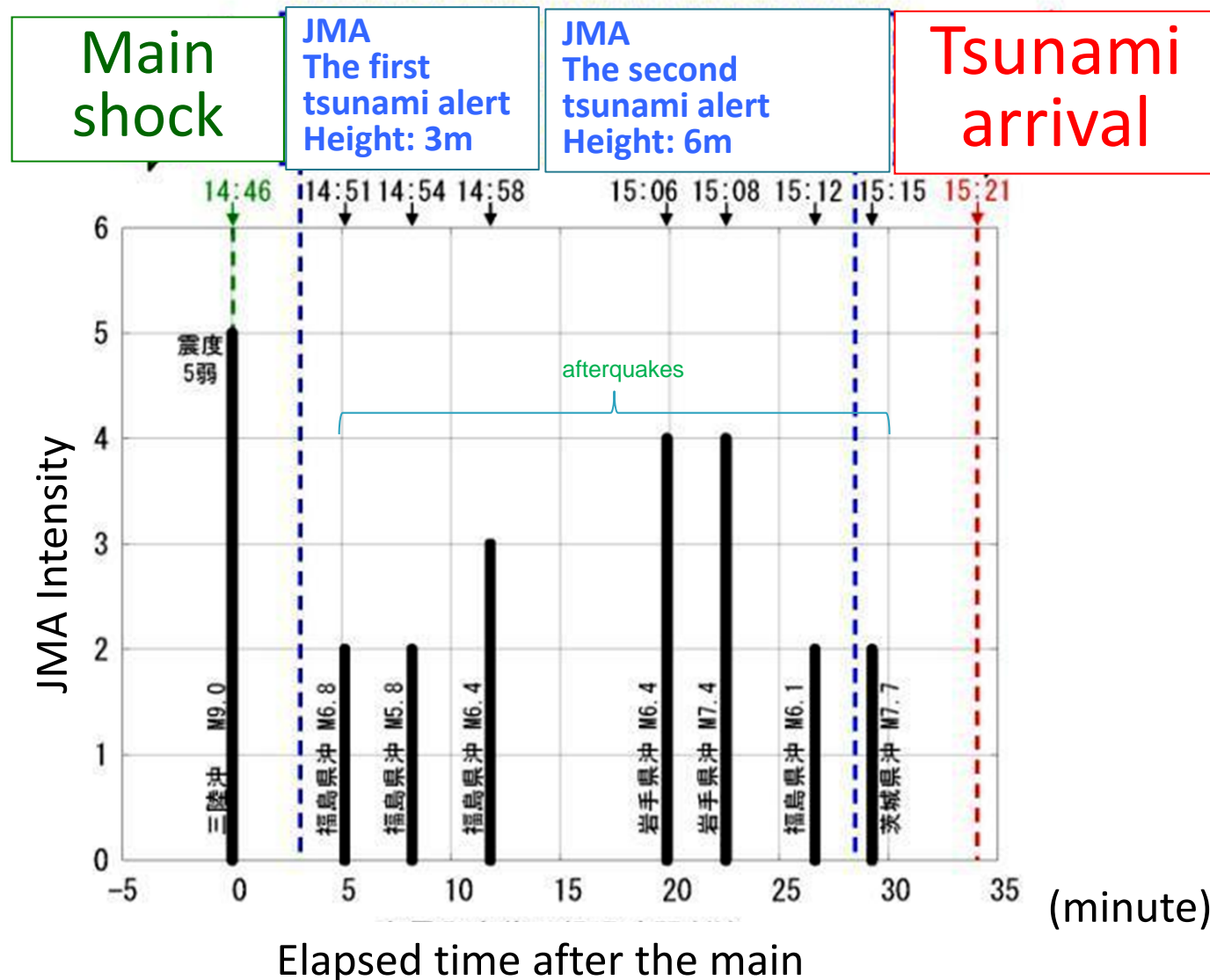


Figure 3.2 Land use plan for the Shizugawa district in Minamisanriku-cho

Lessons learnt from GEJE: Inundation area and hazard map



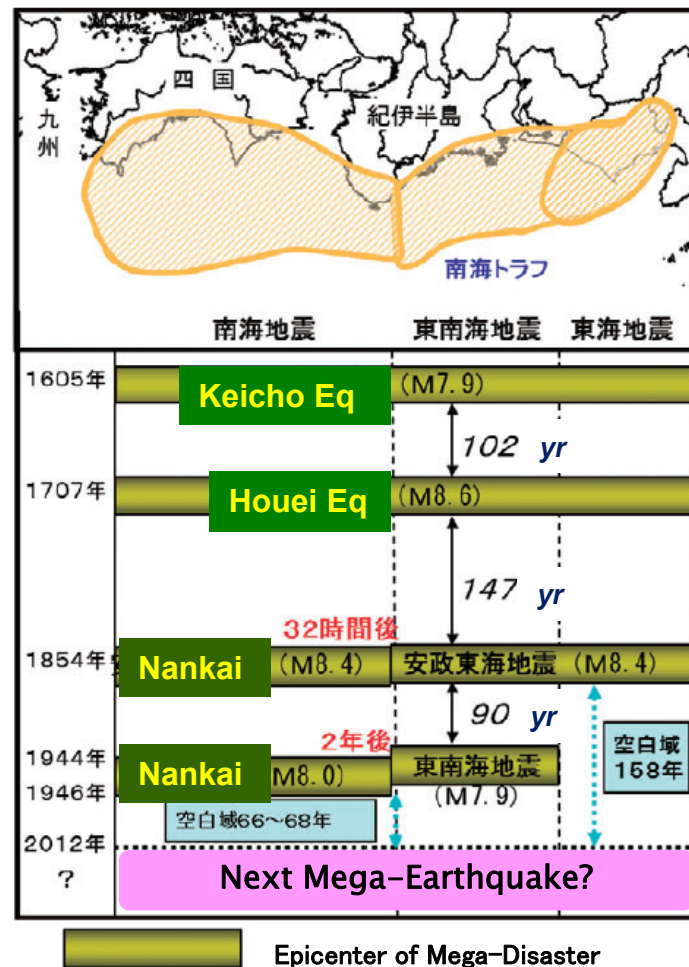
Lessons learnt from GEJE: Importance of Quick and Correct Warning



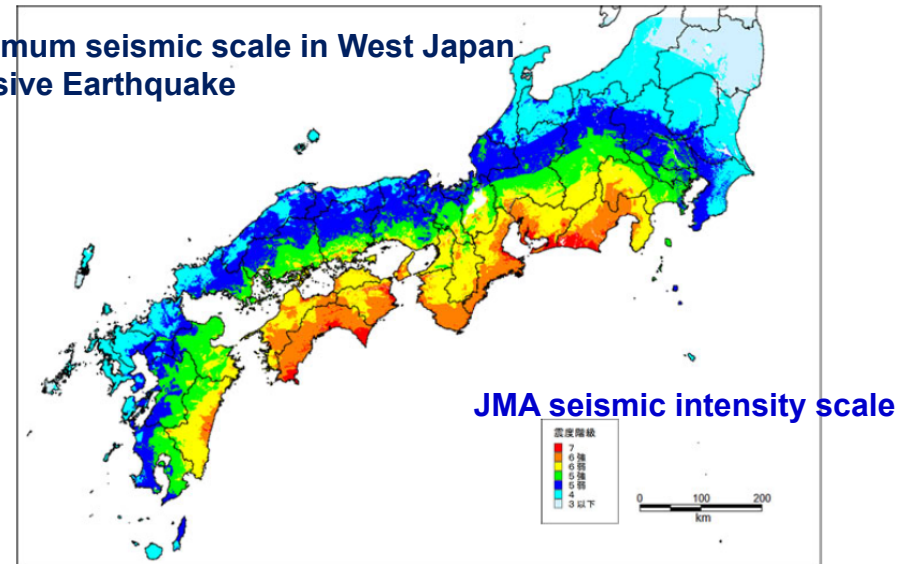
Source) Yozo GOTO, the University of Tokyo

Threatening Next Mega-Disaster; West Japan Massive Earthquake

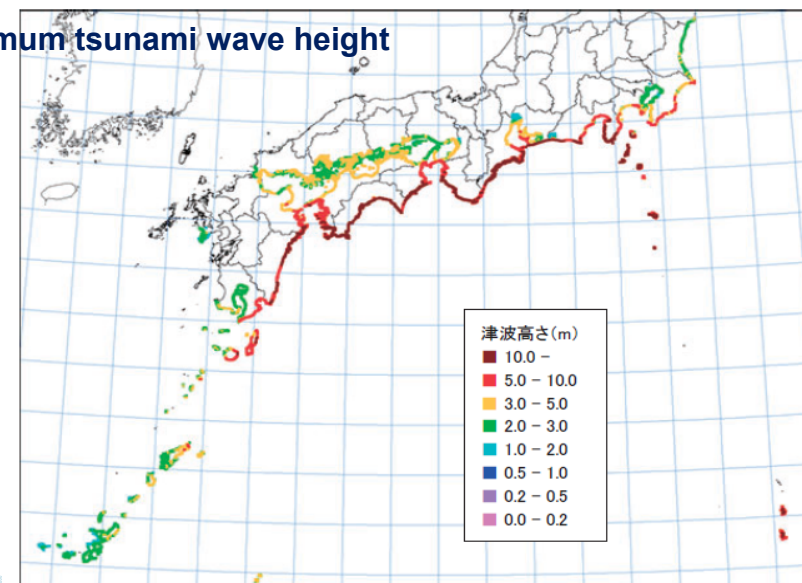
Massive Earthquakes and Tsunamis have been occurred periodically in West Japan



Maximum seismic scale in West Japan
Massive Earthquake

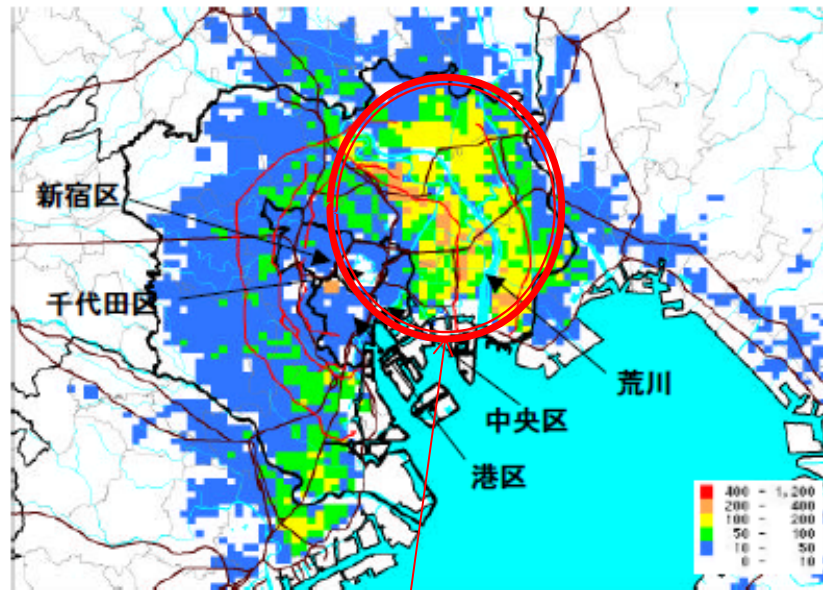


Maximum tsunami wave height



Threatening Next Mega-Disaster; The Inland Big Earthquake in Tokyo

Estimation of Buildings Destroyed by Tremor of Earthquake



As eastern Tokyo was on the alluvium soil, it's afraid that Inland earthquake would destroy a lot of buildings in those area.

Estimation of Buildings Burnt in Big Fire caused by Earthquake

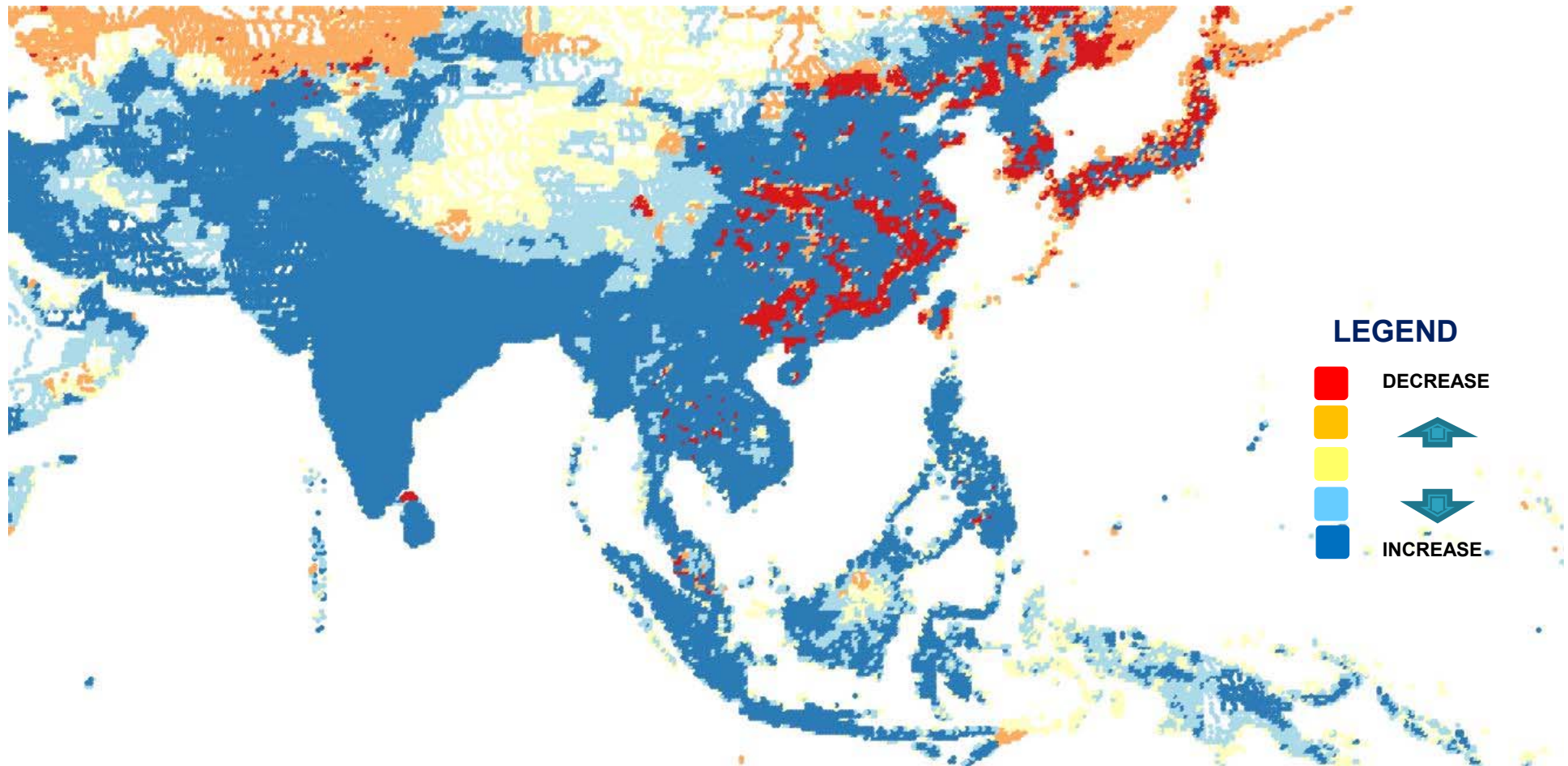


As inner Tokyo (especially western area) was densely packed by small wooden houses, it's afraid that big fire caused by Inland earthquake would wipe out those areas.

Is Experience of Japan Effective to Other Countries?

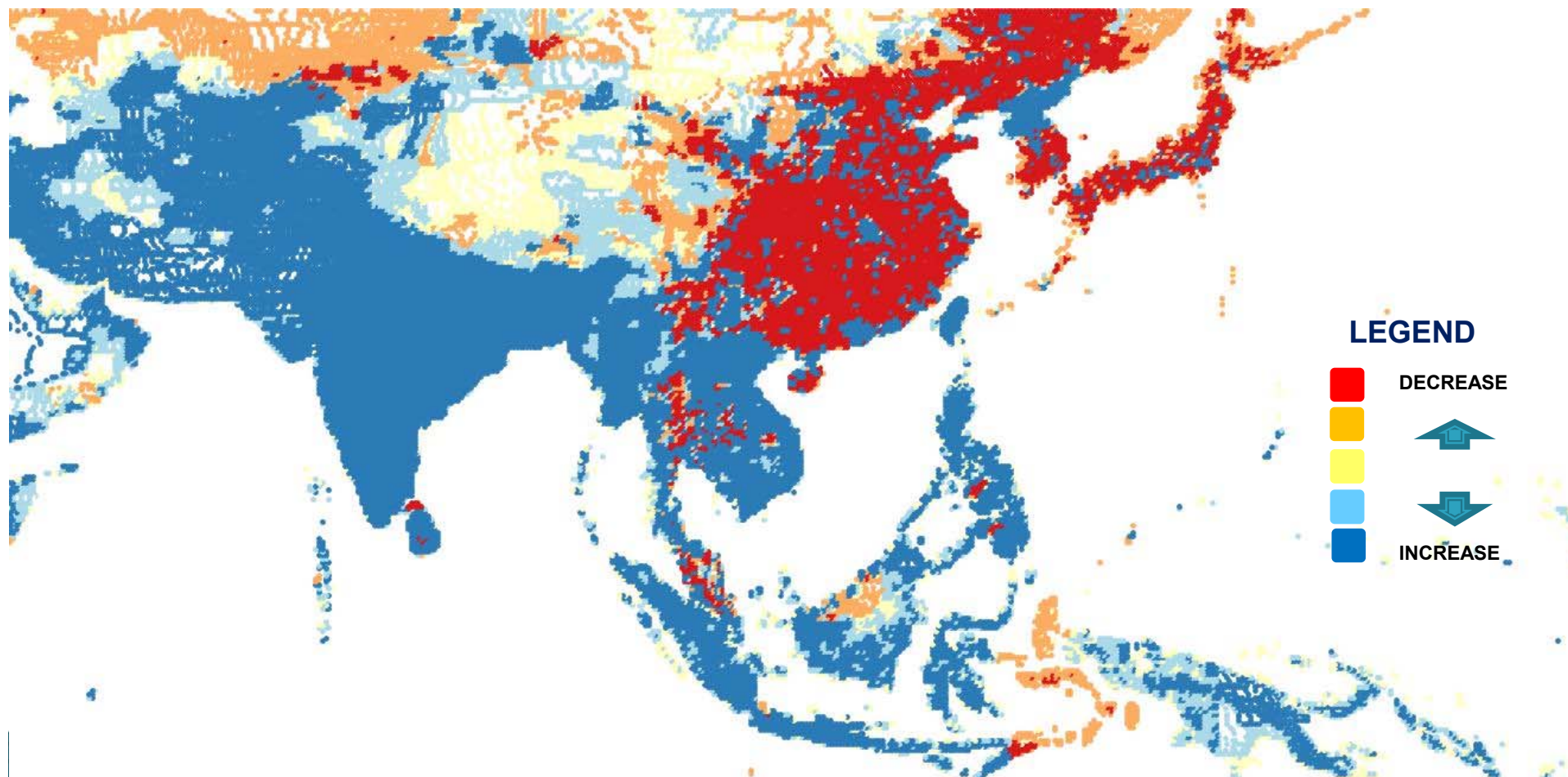


Population Change in sub-national regions of South / East Asia (1990–2000)



Source: ADRC, Based on Data of Colombia University

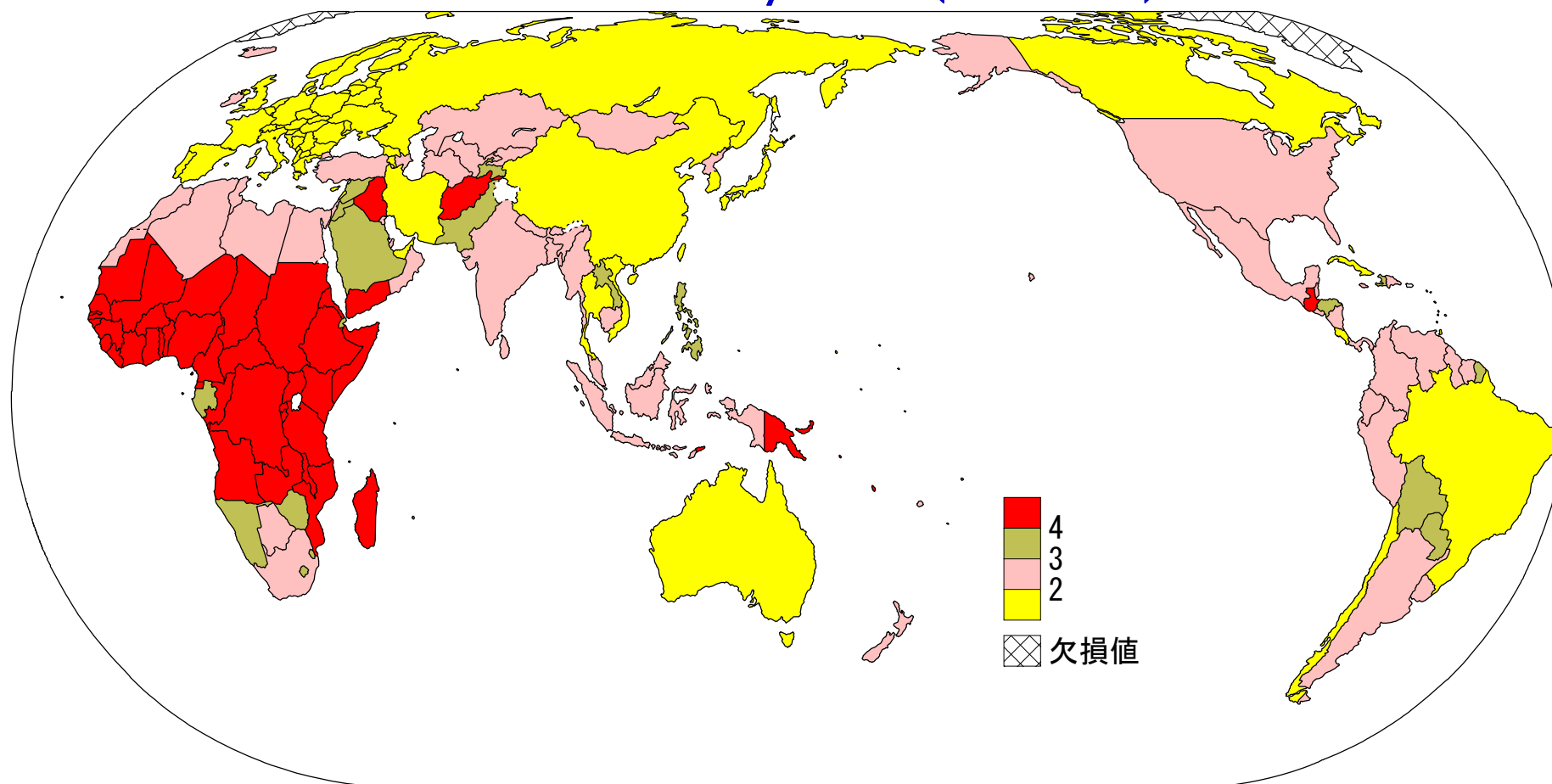
Population Change Estimation in Sub-national Regions of South / East Asia (2000-15)



Source: ADRC, Based on Data of Colombia University

More Development, Less Children

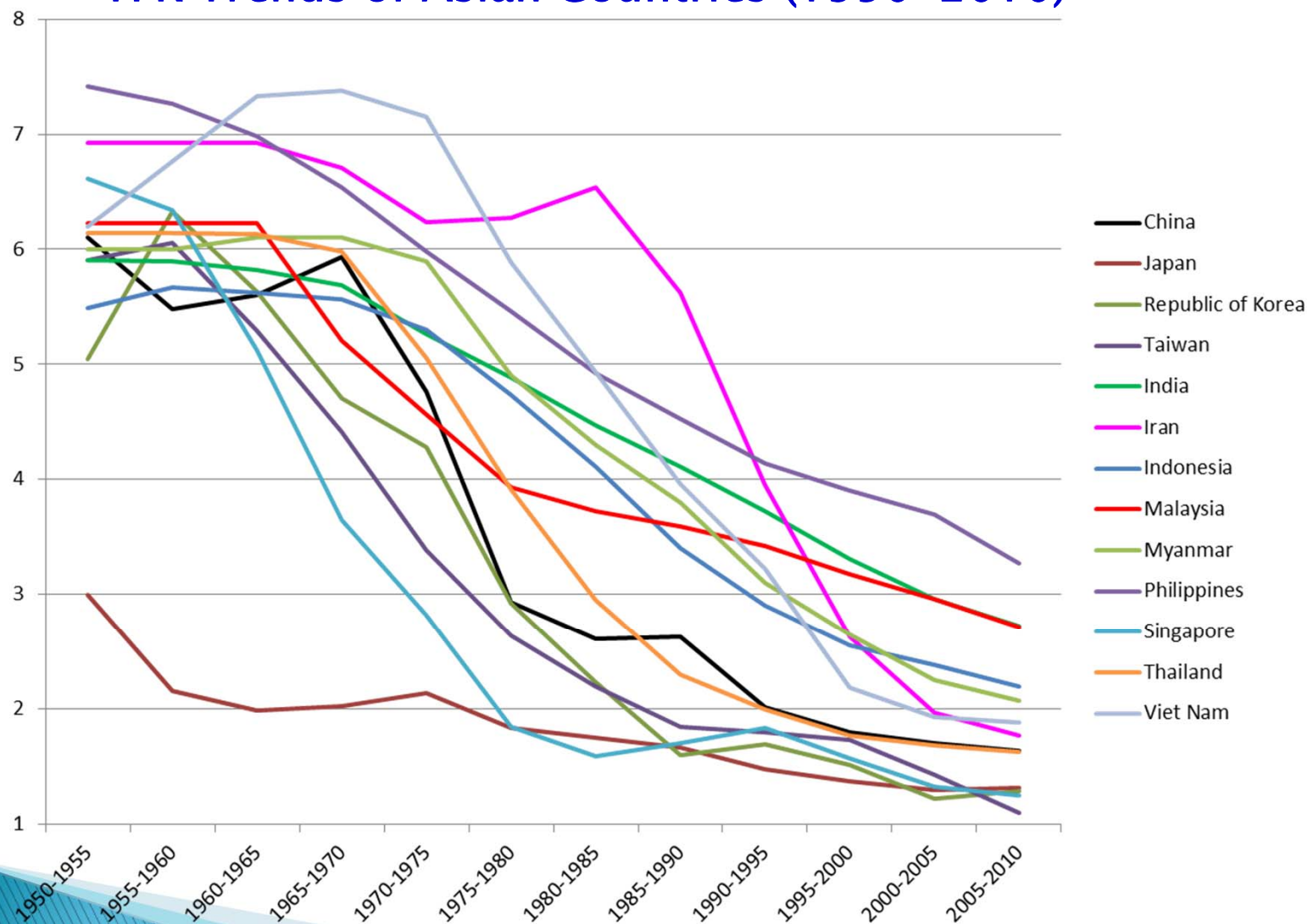
Total Fertility Rate* (2005–10)



Source: United Nations Population Division

* Total Fertility Rate is the average number of children whom a woman would give birth during her lifetime. If TFR of a country is under 2.08 consecutively, the population of that country would decrease in the future.

TFR Trends of Asian Countries (1950-2010)



Source: United Nations Population Division

Chronicle of International Cooperation for Disaster Risk Reduction



1990's	International Decade for Natural Disaster Reduction (IDNDR)
1994	World Conference on Natural Disaster Reduction (Yokohama) - “Yokohama strategy” called upon establishing or strengthening of sub-regional or regional centers for disaster reduction and prevention
1995	The Great Hanshin-Awaji Earthquake
1998	Establishment of Asian Disaster Reduction Center
2000	International Strategy for Disaster Reduction (ISDR) launched
2005	World Conference on Disaster Reduction in Hyogo - Adopted “ Hyogo Framework for Action 2005-2015 (HFA) ” - Established “ International Recovery Platform ”
2011	The Great East Japan Earthquake
2012	World Ministerial Conference on Disaster Reduction in Tohoku
2015	World Conference on Disaster Reduction will be held in Sendai → Next 10-year Framework for Action will be stipulated (Post-HFA)



ADRC's Missions and Activities

Missions

1. Strengthening the Disaster Reduction Capacity of Member Countries
2. Developing a Society where Human Beings can Lead a Safer and more Comfortable Life
3. Helping Create Society Capable of Achieving Sustainable Development

Activities

1. Information Sharing on Disaster Risk Reduction
2. Human Resources Development
3. Cooperation with Member Countries, International / Regional Organizations and NGOs

Exchange and Dissemination of Disaster-Related Information

Online Database

- ✓ Constantly Updated
- ✓ A wide range of information
 - The latest disaster information
 - Disaster management systems in member countries
 - On-going projects and activities

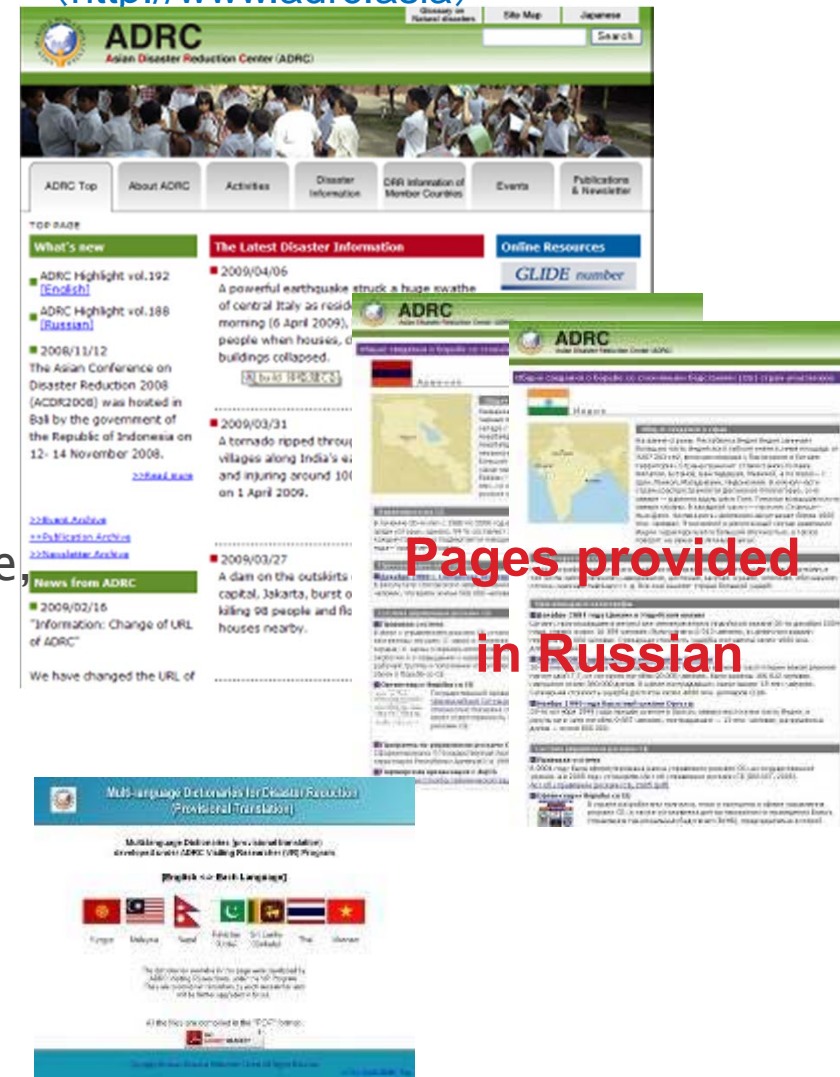
Online Multilingual Glossary

- Chinese, English, French, Japanese, Korean and Spanish

** Multi-language Dictionaries

- Provisional and abridged version
- Kyrgyz (new), Russian, Malay, Myanmar (new), Nepalese, Urdu, Sinhalese, Thai, Vietnamese and Arabic

ADRC website (<http://www.adrc.asia>)



Information Dissemination of Disasters



Disaster Information Archive

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From record No.1 to record No.10 out of 1627records.

Latest Disaster Information

[Kazakhstan : Cold Wave : 2012/12/26](#)

[Japan : Heavy Snow : 2012/12/27](#)

[China : Landslide : 2013/01/11](#)

[China : Cold Wave : 2013/01/09](#)

[Nepal : Cold Wave : 2012/12/23](#)

[Kyrgyz Republic : Cold Wave : 2012/12/18](#)

[Australia : Bushfire : 2013/01/04](#)

[Bangladesh : Cold Wave : 2012/12](#)

[Malaysia : Flood : 2012/12/25](#)

[India : Cold Wave : 2012/12/25](#)

Details of Disaster Information

India : Cold Wave : 2012/12/25

GLIDE: CW-2012-000207-IND

DRR & Disaster Information

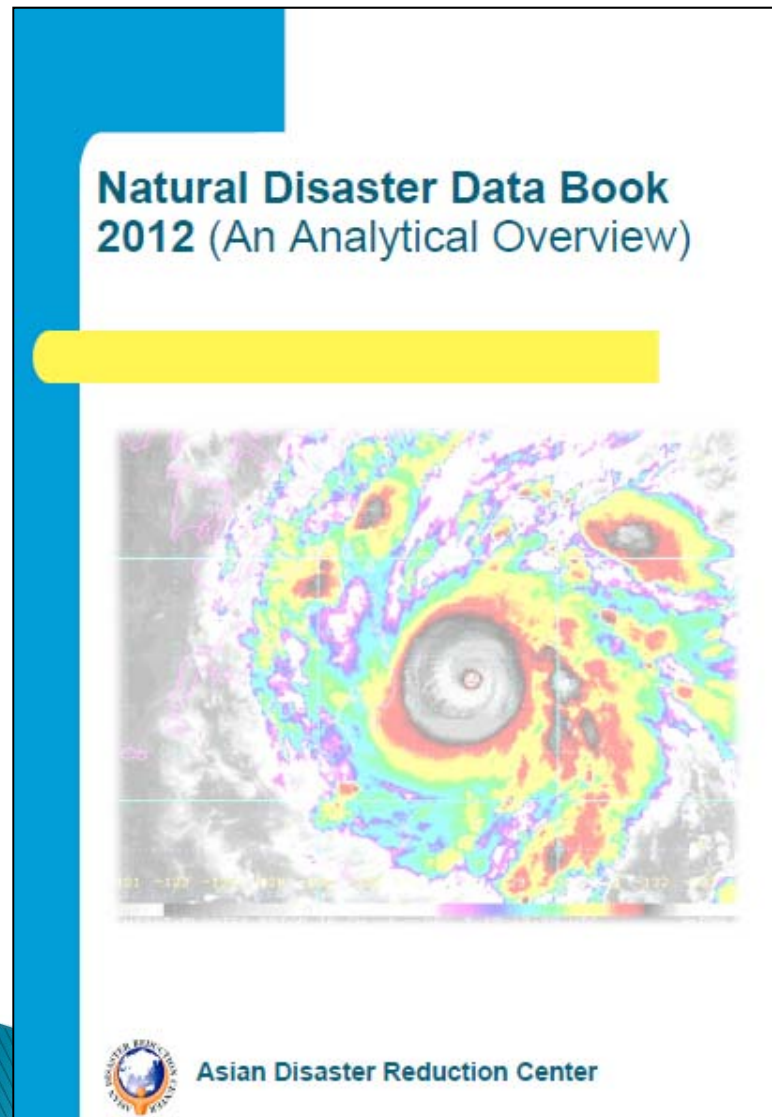
Duration	2012/12/25
Country or District	India
Name	Cold Wave
Outline	Northern India is hit by a cold snap and heavy fog has disrupted flights and train services out of the capital, Delhi, and neighbouring states.

Headline(Source, Date)		
Personal Injury	Material Damage	Others

Related Links
Report/Articles
<ul style="list-style-type: none">Times of India 2013/01/08 The cold wave across north India killed 29 more people, mounting the toll from it this season to around 200.Times of India 2013/01/03 The chill took the death toll this winter to 107.Times of India 2012/12/28 The death toll from cold snap in north India has mounted to at least 40.BBC News 2012/12/26 At least 25 people have died in a cold snap sweeping across northern India, state-run broadcaster All India Radio has said.

During 2012, ADRC reported through our web site the detail of 130 natural disasters around Asia region with GLIDE number.

Example of Dissemination of Disaster-Related Information: Data Book 2012



MAJOR DISASTERS IN THE WORLD (1983-2012)

caused by natural disasters in 2012 (approximately US\$142 billion) shows sharp decline from 2011 but it still ranks fifth in the period 1983-2012. For the 5-year period average analysis, the 2008-reached record high level, which is largely attributed to the earthquake and tsunami in 2011 in

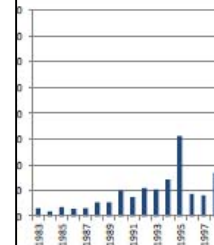


Figure 4-7: Amount of Damage

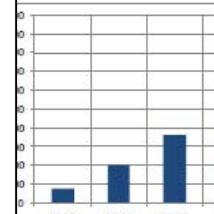


Figure 4-8: Economic Damage (Average of 5-year period)

UNISDR International Disaster Database - www.unisdr.org
Université Catholique de Louvain, Brussels (Belgium)

2. IMPACTS OF NATURAL DISASTERS BY DISASTER TYPE, 2012

This section provides the breakdown of impacts of disasters sorted by disaster type. As Figure 2 shows, flood is dominant in the categories of disaster occurrences, number of people killed and affected. Especially flood has 58.6 percent share in number of people affected, while storm tops in economic damage amounting to 52.8 percent.

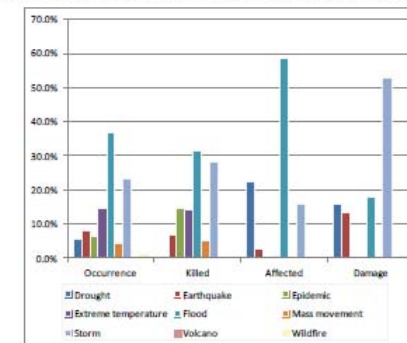


Figure 2: Impacts of Natural Disasters by Disaster Type, 2012

Table 2: Impacts of Natural Disasters by Disaster Type, 2012

Disaster Type	Impact			
	Occurrences (share in %)	Killed (share in %)	Affected (share in %)	Damage (US\$ million) (share in %)
Drought	18 (5.6%)	741 (0.0%)	23,301,085 (22.3%)	22,370 (15.7%)
Earthquake	26 (7.9%)	1,561 (0.0%)	2,794,553 (2.7%)	18,669 (13.1%)
Epidemic	21 (6.4%)	1,561 (0.0%)	107,521 (0.1%)	0 (0.0%)
Extreme temperature	48 (14.6%)	1,525 (0.0%)	580,525 (5.6%)	133 (0.1%)
Flood	121 (36.9%)	3,406 (0.0%)	61,156,619 (58.6%)	25,494 (17.9%)
Mass movement	14 (4.3%)	527 (0.0%)	3,852 (0.0%)	0 (0.0%)
Storm	76 (23.2%)	3,015 (0.0%)	18,335,911 (17.7%)	75,202 (52.8%)
Volcano	1 (0.3%)	8 (0.0%)	10,000 (0.0%)	500 (0.4%)
Wildfire	3 (0.9%)	8 (0.0%)	1,795 (0.0%)	0 (0.0%)
Total	328 (100.0%)	10,783 (100.0%)	104,275,361 (100.0%)	142,387 (100.0%)

Source:
EM-DAT: The OFDA/RED International Disaster Database - www.emdat.be
Université Catholique de Louvain, Brussels (Belgium)

Survey of the typhoon-affected areas in the Philippines (19–20 Dec, 2013)



Survey of the typhoon-affected areas in the Philippines (19–20 Dec, 2013)



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**MDRRMC
Operation Center**

Mayor Remedios "Matin" Petilla
Vice Mayor Ronnan "Boling" Reposar
Over-all Coordinators

Felipe "Pypes" Ygrubay
Secretariat

Working Committees

- Transportation, Equipment and Clearing Operation - Hon. Jojo Chisillo
- Security - Hon. Jun-Jun Dolina
- Retrieval of Casualties - Hon. Junie Agner
- Markets & Business Establishments - Hon. Rey Lejarde
- Food Preparation - Mr. Paul Tiston
- Attendance - Mr. Armand Caballero
- Safety of Office Records (Gym) - Mr. Ricky Portulo
- Information Officer - Ms. Eunelia Orer
- Clinic - Ms. Lorna Bonife
- Relief Goods and Distribution - Ms. Lina Baldaras
- Mayor's Men - Ms. Virgie Ortega
- DRRMO & LAC - Kim Pulgo
- Liaison Officer - Mr. Ritchie Gilang
- Radio Communications - Mr. Noel Elono
- for Operation Center - Mr. Jose Mendoza
- - Mr. Juan Sison
- - Mr. Robert Sison
- - Mr. Michael Sison

MDRRMC MONITORING
PALO, LEYTE
As of Dec. 19, 2013

NO. OF FAMILIES AFFECTED	NO. OF REPORTED DEAD	NO. OF REPORTED MISSING	NO. OF HOUSEHOLDS (FAMILIES)	NO. OF PEOPLE AND AFFECTED MEDICAL SERVICES	PRIORITY NEEDS
100% of the total population	895	136	136	Total = 913	MEDICINES
TOTAL POPULATION = 67,966	IDENTIFIED 797		5/37	Dec 01 - 61	FOOD
NO. OF HOUSEHOLDS = 16,605	M = 379			01 - 104	WATER
NO. OF FAMILIES = 18,000	F = 411			01 - 104	SHELTER
	CHL = 7 (4) (3)			01 - 104	CLOTHING
	UNIDENTIFIED 98			01 - 104	

NO. OF FAMILIES AFFECTED	NO. OF REPORTED DEAD	NO. OF REPORTED MISSING
100% of the total population	895	136
TOTAL POPULATION = 67,966	IDENTIFIED 797	
NO. OF HOUSEHOLDS = 16,605	M = 379	
NO. OF FAMILIES = 18,000	F = 411	
	CHL = 7 (4) (3)	
	UNIDENTIFIED 98	



**ADRC promotes disaster reduction through
multi-national/multi-stakeholder/multi-lateral
cooperation in the Asian region**



<http://www.adrc.asia>

Thank You For Your Attention