
crisis
response
Restoring Public Services in the
Immediate Aftermath of a Disaster
IPAA
Institute of Public
Administration Australia
WA

Lessons From The Great Hanshin Earthquake

Shingo Kouchi
Senior Recovery Expert
International Recovery Platform (IRP)


Greetings from Hyogo, Japan
Greetings from IRP

Earthquake and Tsunami (Mar 11. 2011)

Operation Pacific Assist (Mar 14. 2011)

消防隊員と打ち合わせを行う豪州支援チーム

Kobe City in 1946 (One year after WWⅡ)

Downtown in Kobe City (One year after WWⅡ)

Kobe Earthquake in Jan. 1995

The Hanshin Awaji Earthquake (M 7.3)
Jan 17, 1995, 5:46am

Source: Hyogo Prefecture

Lessons from
The Great Hanshin Earthquake

Disaster Response, Reconstruction and Recovery
-- Looking Backward, Moving Forward --

19 March (Wed), 2014

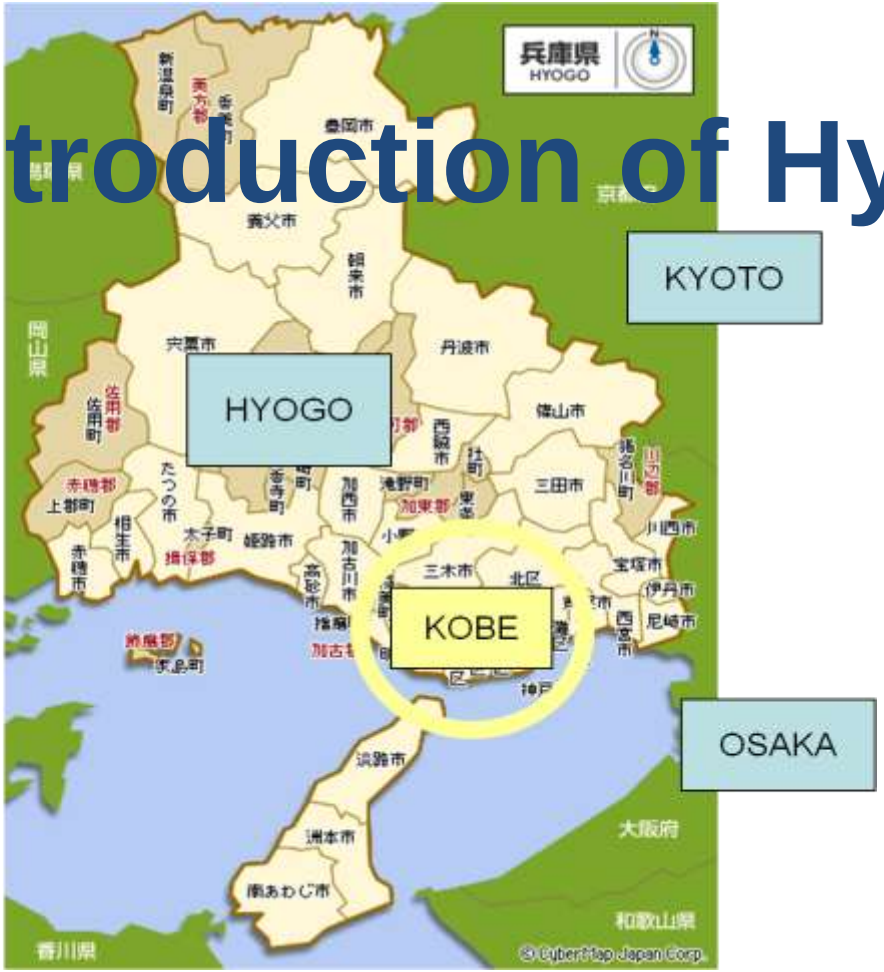
Perth, Western Australia

Shingo KOUCHI (Mr.)

International Recovery Platform (IRP)


Map of Japan
Kyoto
Miyagi Pre.
Osaka
Ibaragi
Mt. Fuji
Hyogo
Tokyo
Nagasaki City
Shimabara City
Okinawa

Brief Introduction of Hyogo



Japan's Government System
(3 Layers of Government)

National Government

(Prime Minister is elected by the National Diet)

47 Prefectural Government

(Governor is elected by the residents)

Largest Prefecture: Tokyo 13.1 million

Smallest Prefecture: Tottori 0.6 million

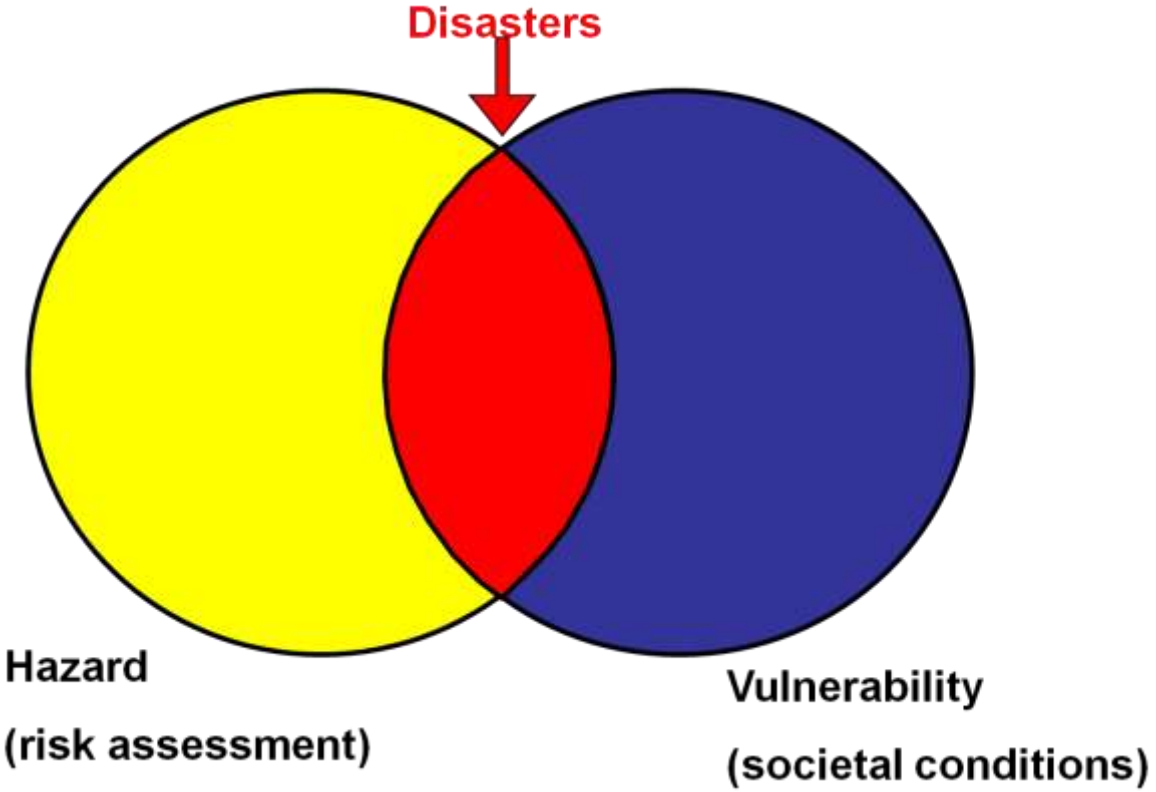
(Population data based on national census in 2011)

1,742 Cities, Towns, Villages Municipal Government

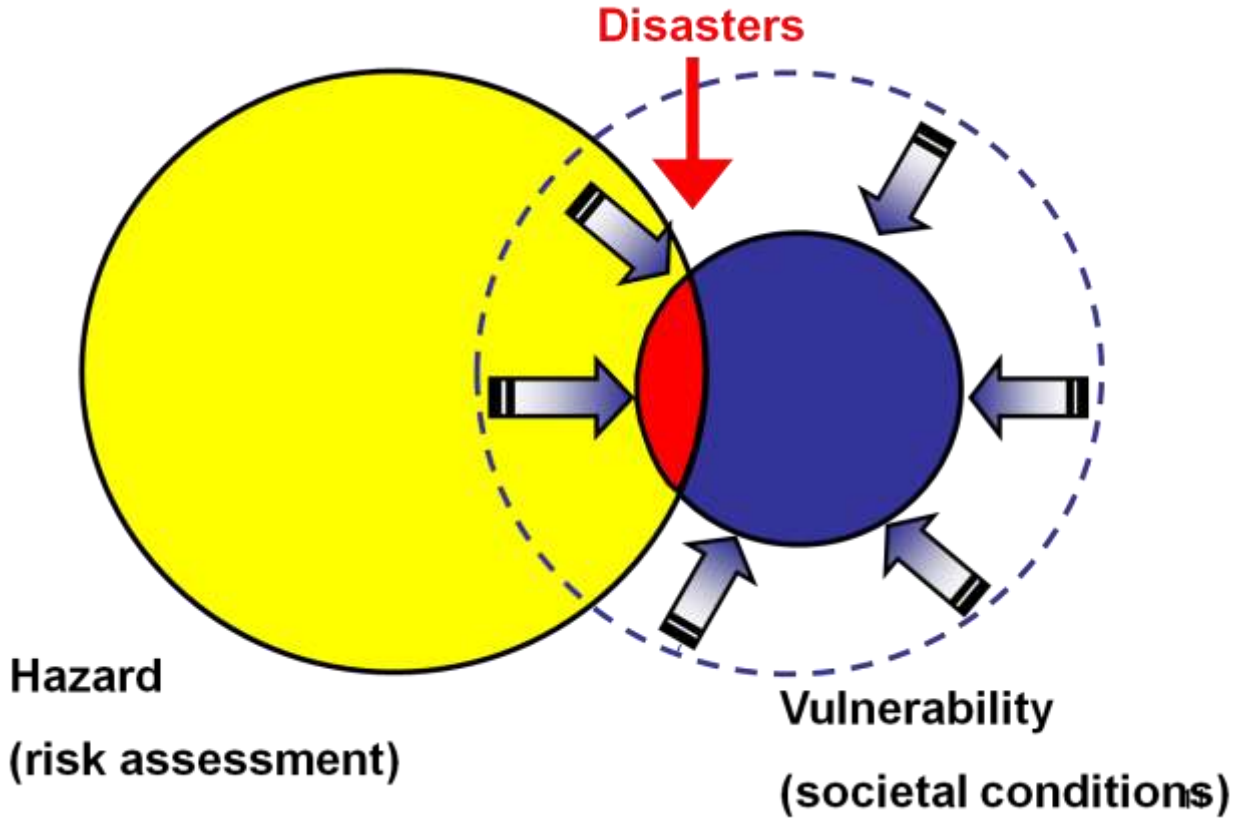
(Mayor is elected by the residents)

(as of 26 February 2014)

Hazards Confronting Vulnerable Communities Cause Disasters



Less Disasters



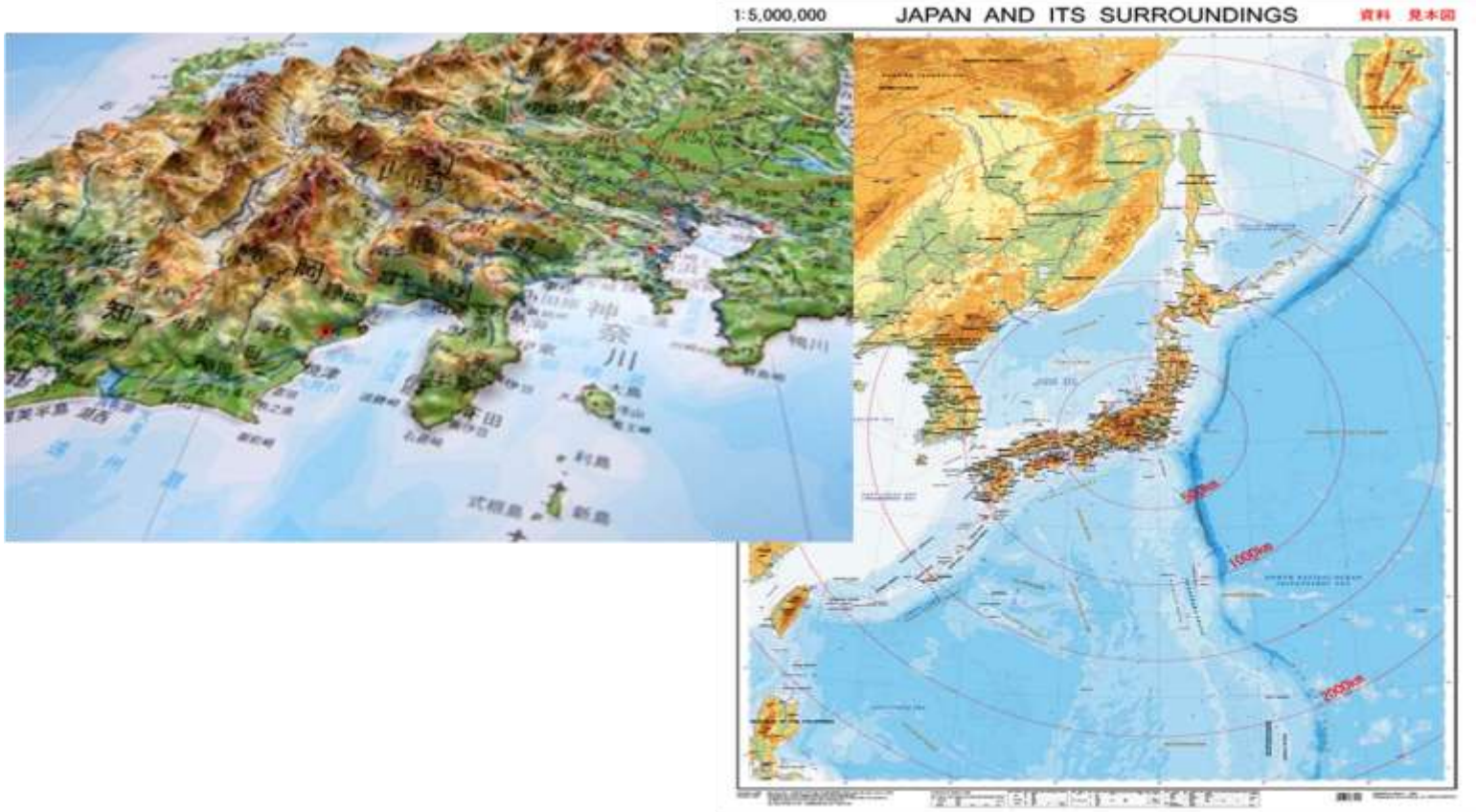
- **Risk Management**

  - **Risk Avoidance**

  - **Risk Reduction**

  - **Risk Transfer**

Japan and Its Surroundings



And, How ?

Four Phases of Disaster Reduction

Pre-Disaster

- Prevention & Mitigation
- Preparedness

Post-Disaster

- Response
- Recovery & Reconstruction

Countermeasures taken in Japan

Structural measures

Sea walls, breakwater, dike,
storm surge barrier etc.

For protecting both property and human lives

High cost

Construction period: Long

Non-structural measures

Tsunami early warning system,
Evacuation buildings,
Disaster education,

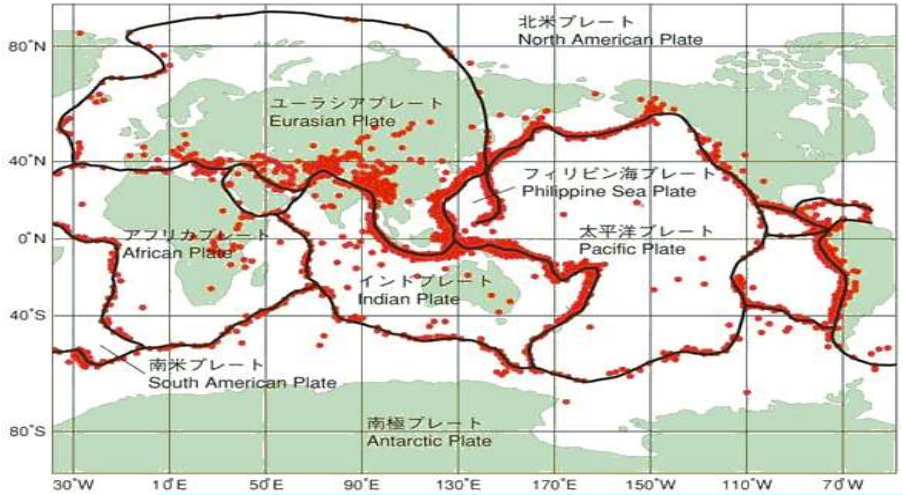
For protecting human lives

Low cost

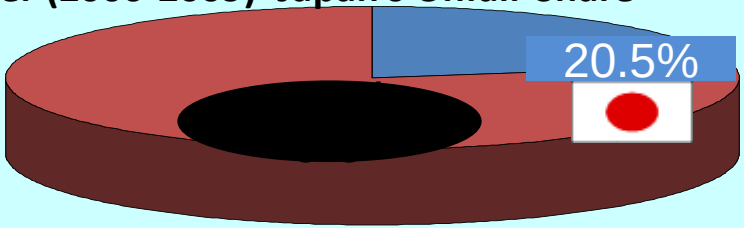
Implementation period: Short

Mother Nature is not Gentle in Japan

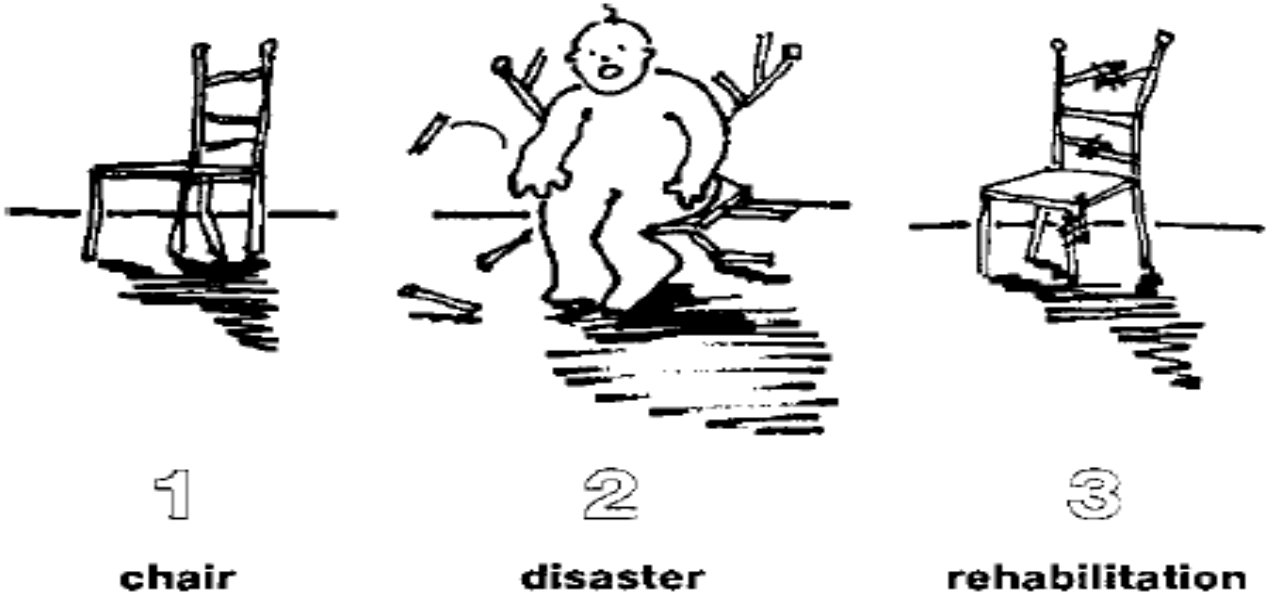
- **Earthquakes**
- **Tsunamis**
- **Volcanic Eruptions**
- **Typhoons (July – October)**
- **Heavy Monsoon Rains (May – July)**
- **Floods**
- **Landslides**
- **Snow Avalanches**



Number of earthquakes with magnitude of 6.0 or larger (2000-2009) Japan's Unfair Share

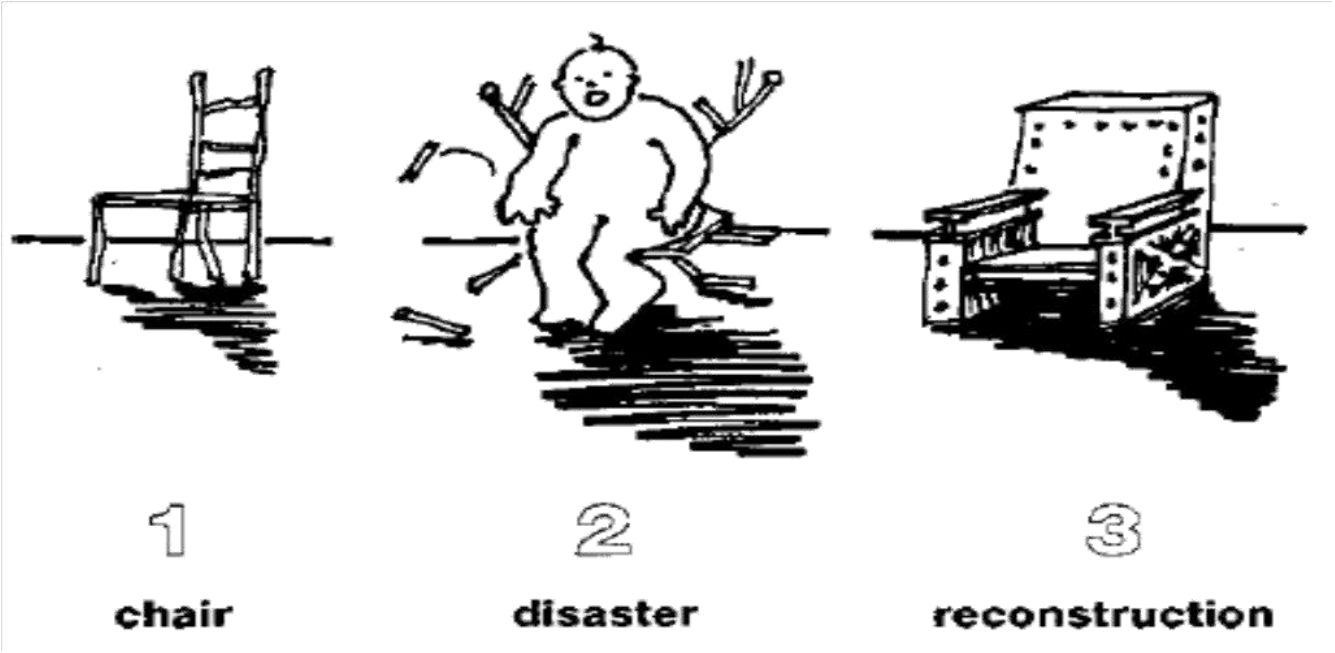


Rebuilding Pre-existing Vulnerabilities



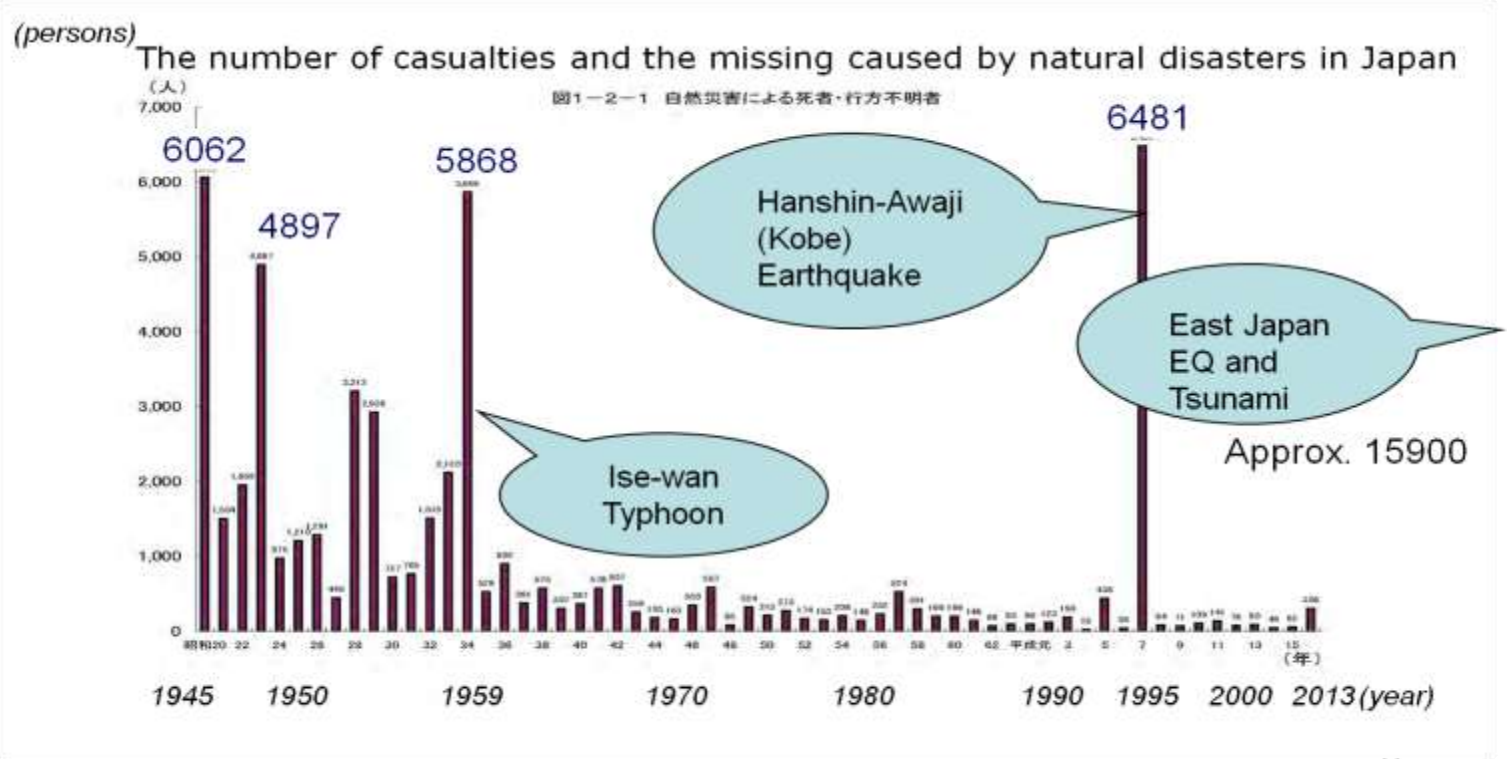
United Nations Disaster Management Training Programme (DMTP)

Building Back Better than Before



United Nations Disaster Management Training Programme (DMTP)

The Holistic Approach to cope with Disasters
-The Japanese Experience -



- **Natural Disasters**

-- Weather-Related Disasters

(Typhoon, Cyclone, Heavy Rain, Flood…)

-- Sudden Disasters

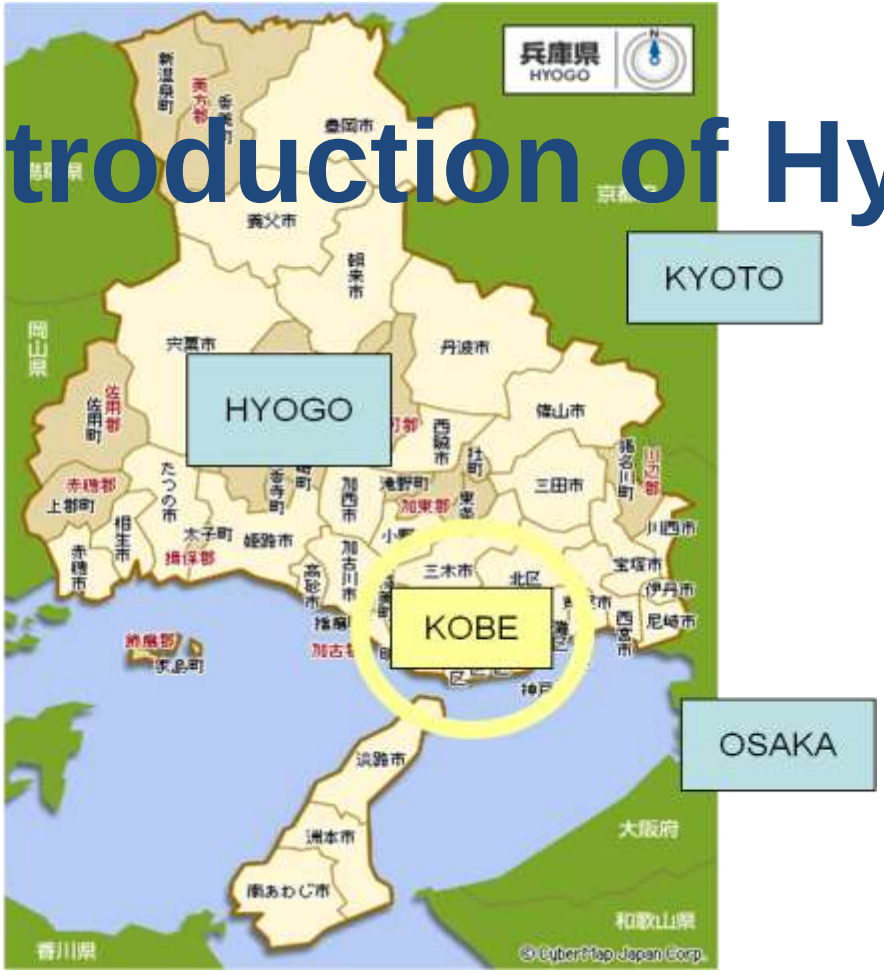
(Earthquake, Volcanoes…)

Earthquakes -- Active Fault-type EQ

-- Trench-type EQ

- **Manmade Disasters**

Brief Introduction of Hyogo



Great Hanshin-Awaji Earthquake in 1995

Jan. 17, 1995

M 7.3

1995 Kobe Earthquake (Jan 17, 1995, M7.3) was the Epoch-Making Turning Point

Casualty	Death: 6,434
	80 % were killed by building collapse (crush and suffocation)
	Injured: 43,792
Damage to buildings	Housing:639,686 units - 104,906 completely destroyed - 144,274 half destroyed
	Public buildings destroyed: 1579units
	Other buildings destroyed: 40,917 units
Fire	Fire outbreaks: 293 units

Kobe Earthquake

6,434 deaths

- Direct loss : 5,520
- Relevant loss : 914

80% immediately killed by building collapse

surgeon general's report

Characteristics of Stricken Area

- **Directly hit the Metropolitan area**
  -Major Center for Government, Economic and Culture with 3.6million

- **Capital of Prefecture**
  -Local Governments (Prefecture, Cities) Headquarter were also heavily destroyed
  -Government Officials including Disaster Management Experts were also victims

Kobe Municipal Government Headquarter

Built after 1981 Building Standard

Built before 1981 Building Standard

HYOGO Prefectural Government Headquarter

HYOGO Prefectural Government Headquarter

Difficultly in Communication at HYOGO Prefecture Headquarter

Lesson 1

Delay of Immediate Response due to lack of information

- Damaged Headquarter
- Local Government Command initially paralyzed
- Destroyed almost all traffic system
- Telecommunication, even satellite telecommunication system were cut off due to power failure ⇒ It took three days to grasp the entire picture of damage

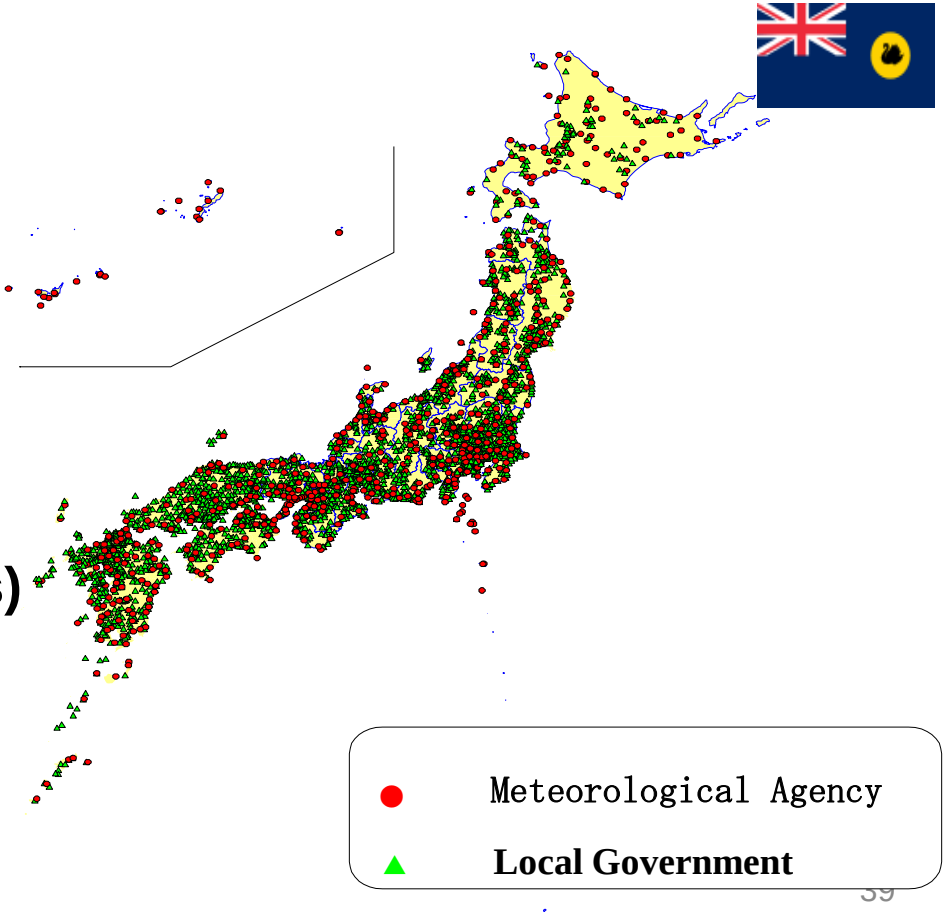
National Countermeasure 1

- **Establishment of the Cabinet Information Collection Center**
- **Enhanced Governmental System**
  -Minister of State for Disaster Management
  -Chief Cabinet Secretary for Crisis Management
- **Development of Disaster Information System(DIS)**
  -Early Estimation System
  -Emergency Measure Support System

Seismic Intensity Observation Point

March, 2011

JMA: 600points, Local Gov. 3,800
(Before the Earthquake 150points)



Lesson 2
Coordination among organizations

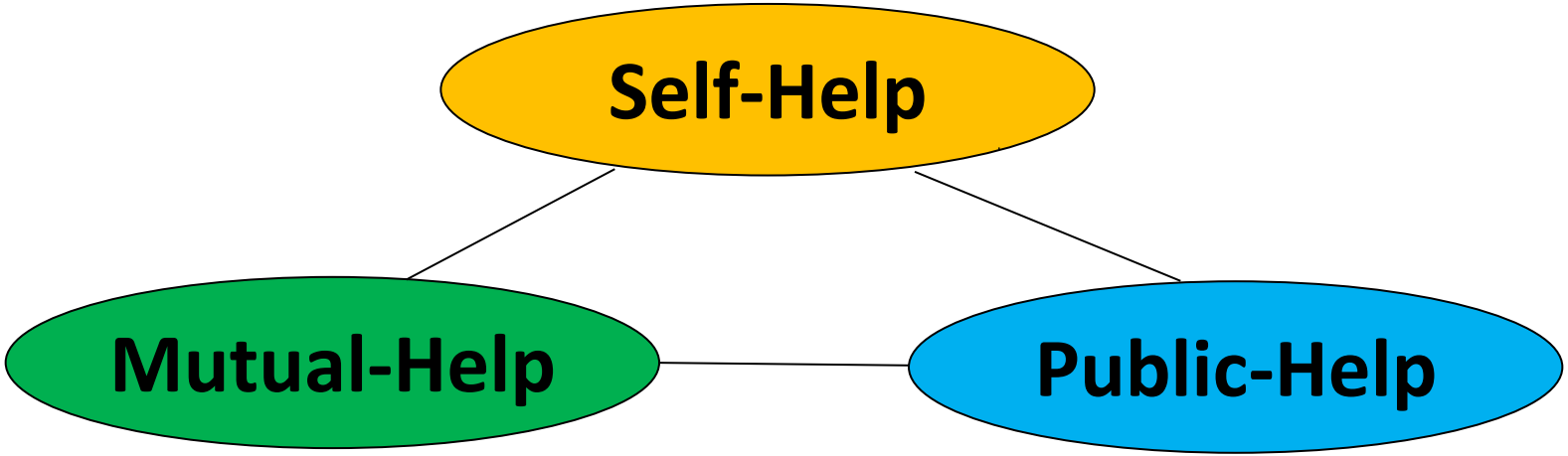
- Damage was too huge for local governments to cope with
- Local government could not request the National government or other agencies to help because headquarter itself was damaged
- Medical cooperation was not effective enough

National Countermeasure 2

- Nation wide support system for disaster emergency response

- National Police Agency, Fire and Disaster Management Agency, Coast Guard and Self Defense Forces
- Inter-Prefectures Mutual Support Agreement
- Medical transport Action Plan
- Designation of Emergency Hospital
- Designation of Heliport

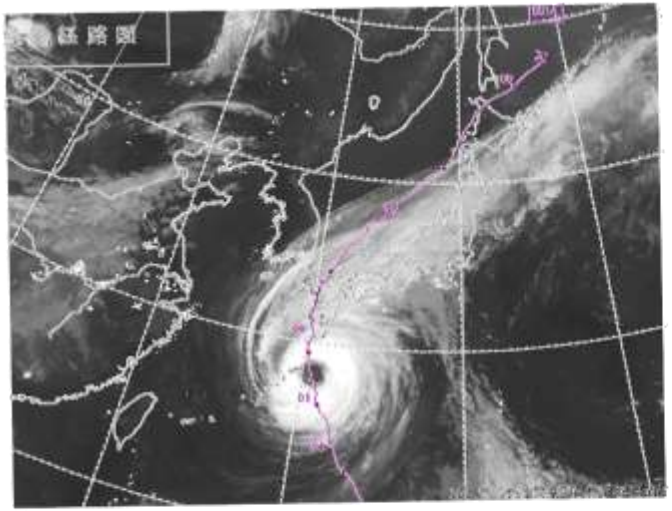
Call for a Nation-Wide Movement for Disaster Reduction Actions

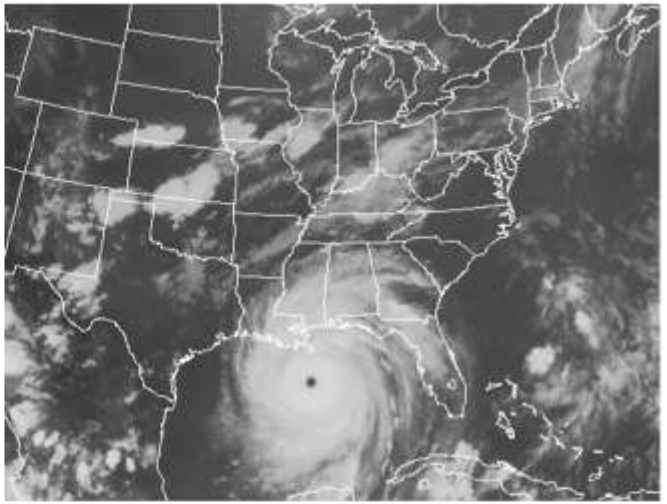


Self-help action by individuals, families and companies
Mutual-help action at neighborhoods and local communities
Public-action by governments

Case Study

Typhoon Nabi(No.14) 2005





Typhoon Nabi T0512
Central Pressure: 935hPa (min925)
Maximum Wind Speed: 45m/s (max50)
Storm Warning Area: 300km

Hurricane Katrina
Central Pressure: 902hPa
Maximum Wind Speed: 75m/s
Storm Warning Area: 140～220km

Precautions by Government

- Strong Warning by JMA
- 5 September High Level Emergency Response Team Convened 1day Prior to Landfall5 Action Points Decided
- 5 September Call to the Public by the Chief Secretary of the Cabinet

Immediate Response: Massive Evacuation

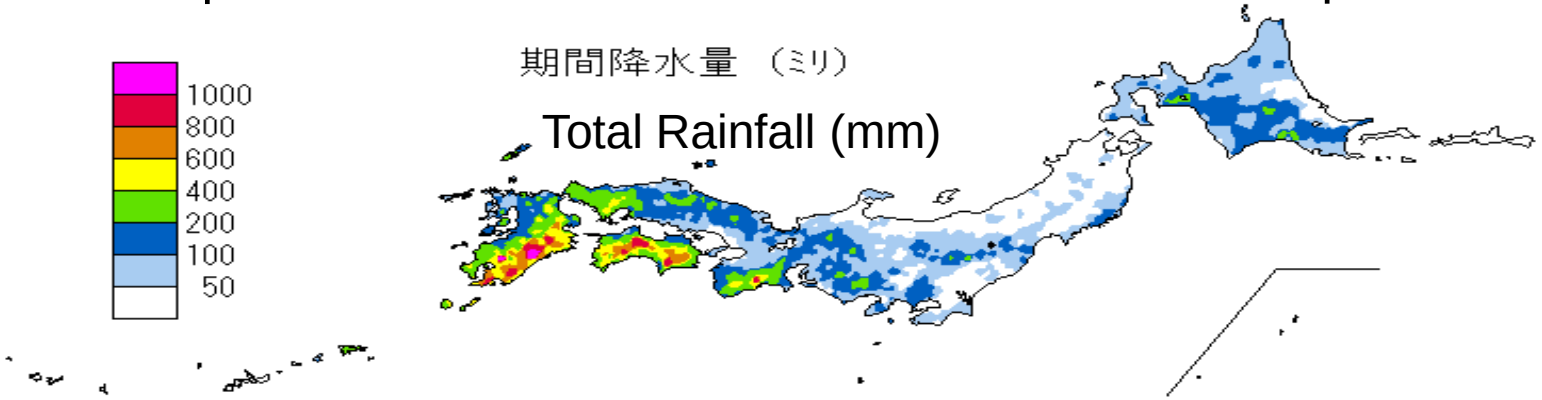
- 384,105 evacuees






Typhoon Record

- **Record Breaking Rainfall**
  - 757mm/day at Saijyou city, Aichi pref.
  - 713mm/day at Ino town, Kochi pref.
  - 644mm/day at Niyodo town, Kochi pref.
- **Record Breaking Peak Gust**
  - 59.2m/s at Tanegashima island, Kagoshima pref.
  - 58.1m/s at Yaku island, Kagoshima pref.
  - 55.6m/s at Minami-daito island, Okinawa pref.



Quick Response by Government (2005)

- 1st Government response coordination meeting - 6th Sep.
- 2nd Government response coordination meeting – 8th Sep.
- Government On-Site damage survey team headed by Minister of State for Disaster Management Mr. Yoshitaka MURATA – 9th Sep.

casualties & damage to minimum

(casualties: 27 Dead, 2 Missing)

Japan's Government System

(3 Layers of Government)

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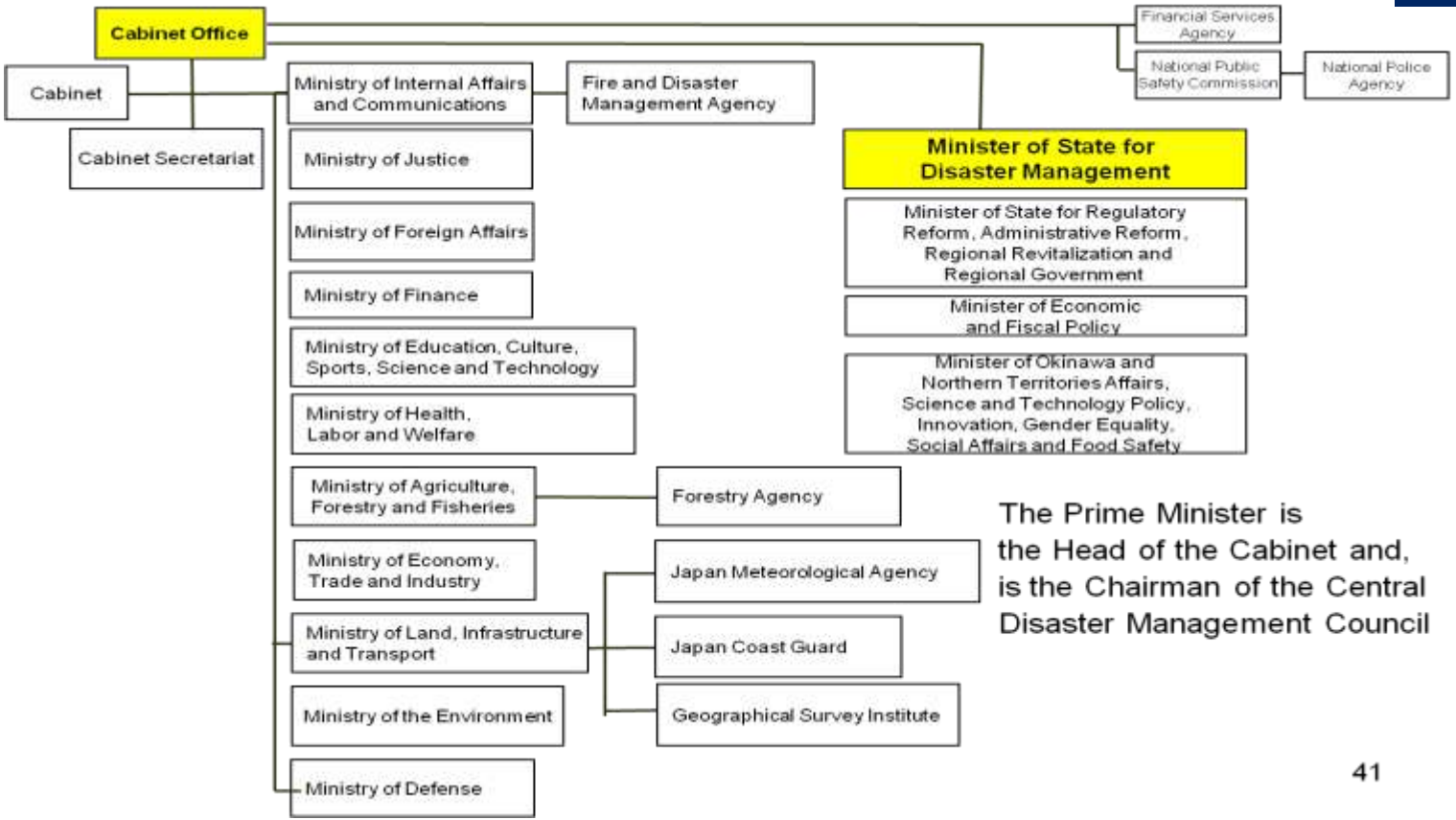
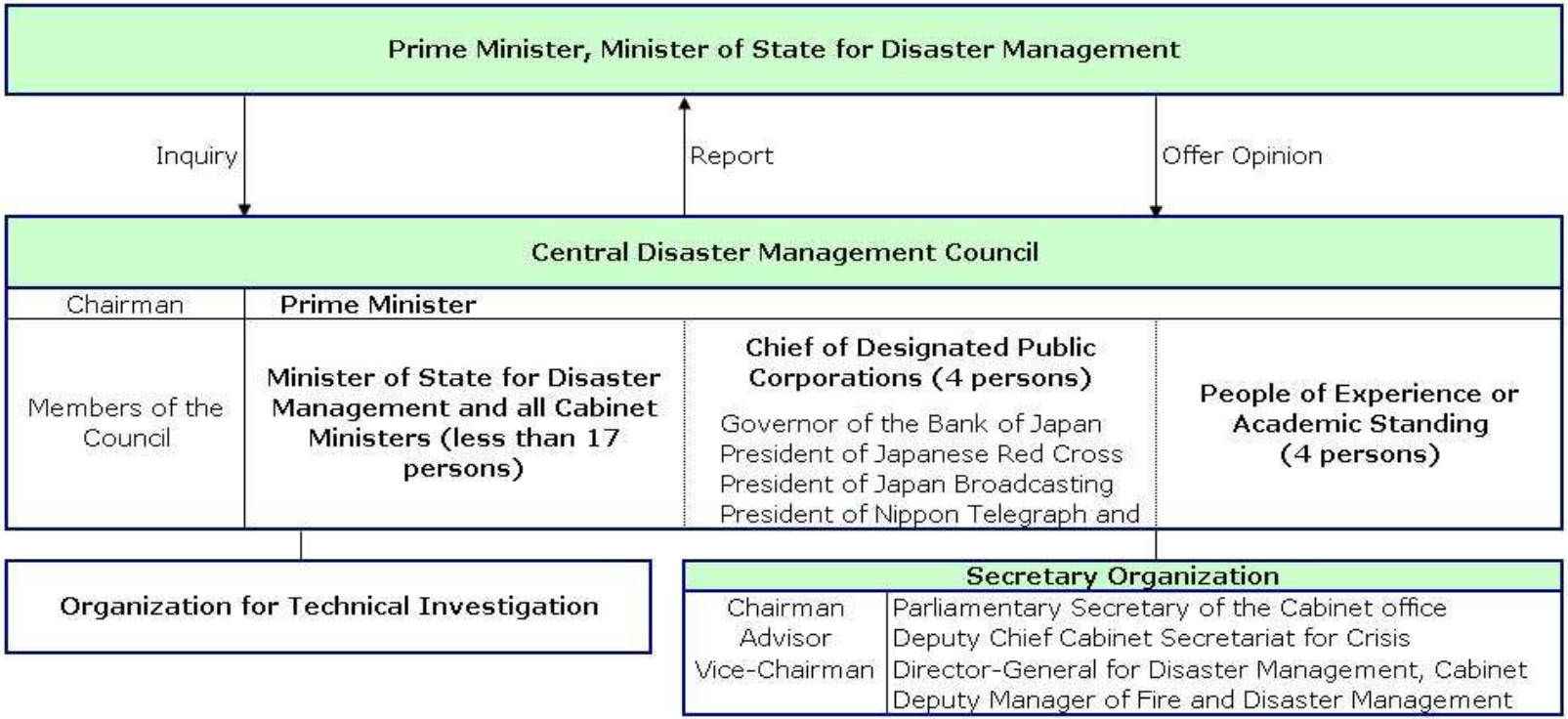
The National Government



The Prime Minister is the Head of the Cabinet and, is the Chairman of the Central Disaster Management Council

Organizational Chart of Central Disaster Management Council.



Case Study: Earthquake and Tsunami in Eastern Japan, March 11, 2011

Central Disaster Management Council (March 26, 2013)

Disaster Countermeasures Basic Act 1961

Central Disaster Management Council chaired by the Prime Minister

National Coordinating Body with all relevant Ministers & Japanese Red Cross, Public Broadcasting, Semi-Public Sectors

Annual Gov't Official Report on Disaster Countermeasures

The Cabinet must officially report the disaster countermeasures to the National Diet

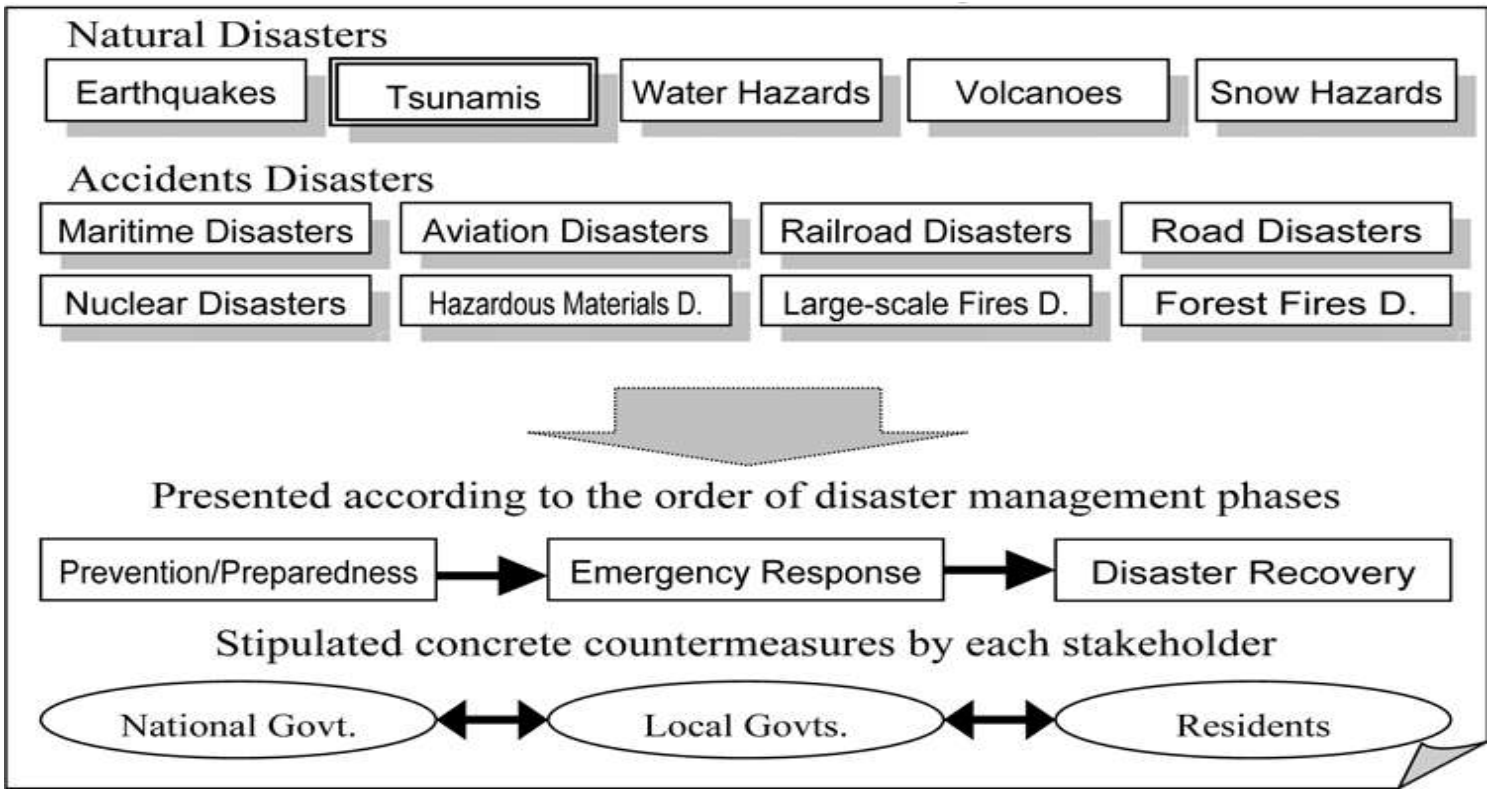
Formulation of "National Basic Disaster Management Plan for Disaster Prevention"

The Disaster Management Operation Plan (Sectoral)
The Local Disaster Management Plan

Designation of "Disaster Prevention Day"

Public Awareness Programs

Structure of Basic Disaster Management Plan



Disaster Management System in Japan

National Level

Prime Minister	Formulation and execution of disaster management plan, comprehensive coordination
Central Disaster Management Council	Formulation and promoting execution of the Basic Disaster Management Plan
Designated Administrative Organs	Formulation and execution of the disaster management operation plan
Designated Public Corporations	

Prefectural Government Level

Governor	Formulation and execution of disaster management plan, comprehensive coor
Prefectural Disaster Management Council	Formulation and promoting execution o Disaster Management Plan
Designated Local Administrative Organs	
Designated Local Public corporations	

Municipal Level

Mayors of Cities, Towns and Villages	Formulation and execution of disaster management plan
Municipal Disaster Management Council	Formulation and promoting execution of Regional Disaster Management Plan

Residents Level

Recent Case: Earthquake and Tsunami in Eastern Japan March 11, 2011

Public Schools and Halls as Evacuation Places

Search And Rescue Units In Japan

- Ministry of Defense
- Japan Coast Guard
- Police Department
- Fire Agency

Case Study: Earthquake and Tsunami in Eastern Japan, March 11, 2011 Ministry of Defense

Ministry of Defense
(former Self-Defense Agency)

Japan Coast Guard

Police Department

Fire Agency

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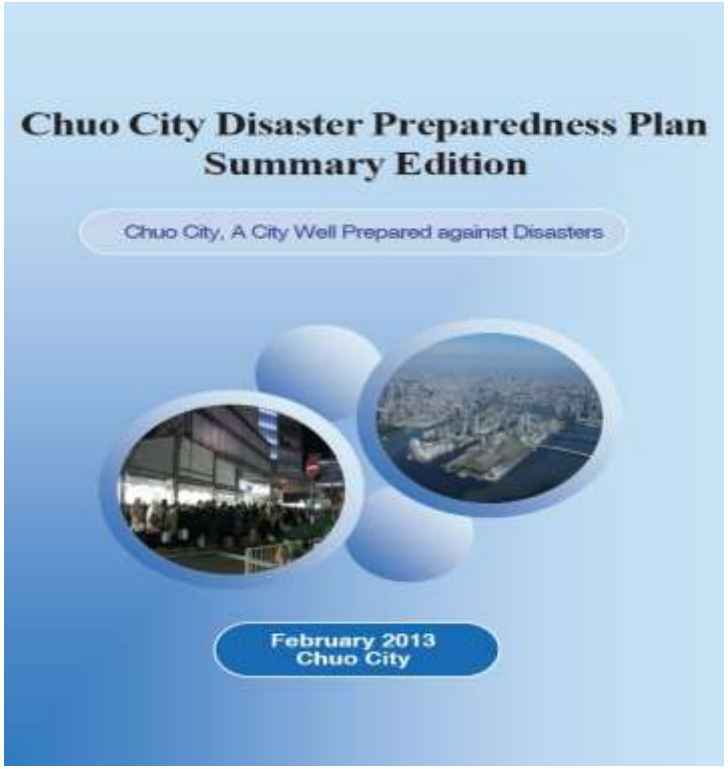
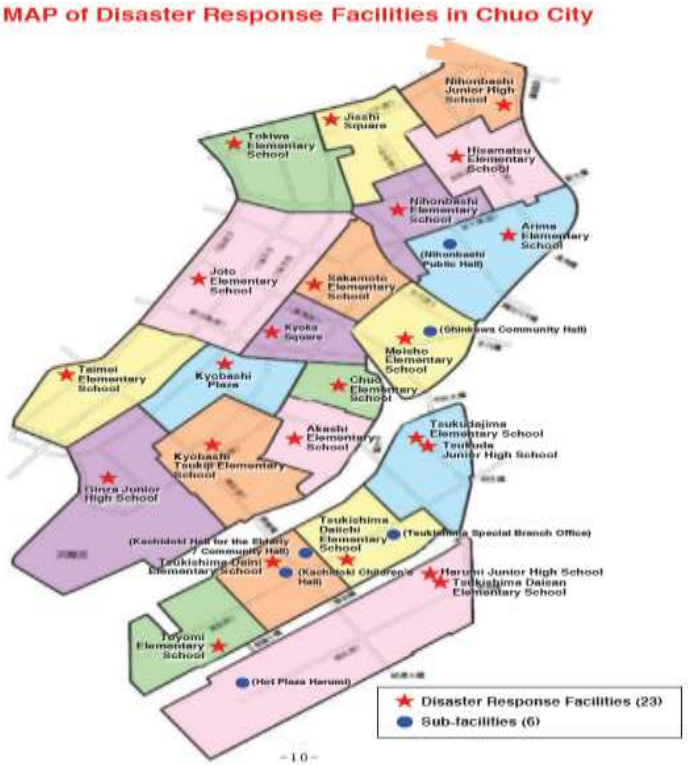
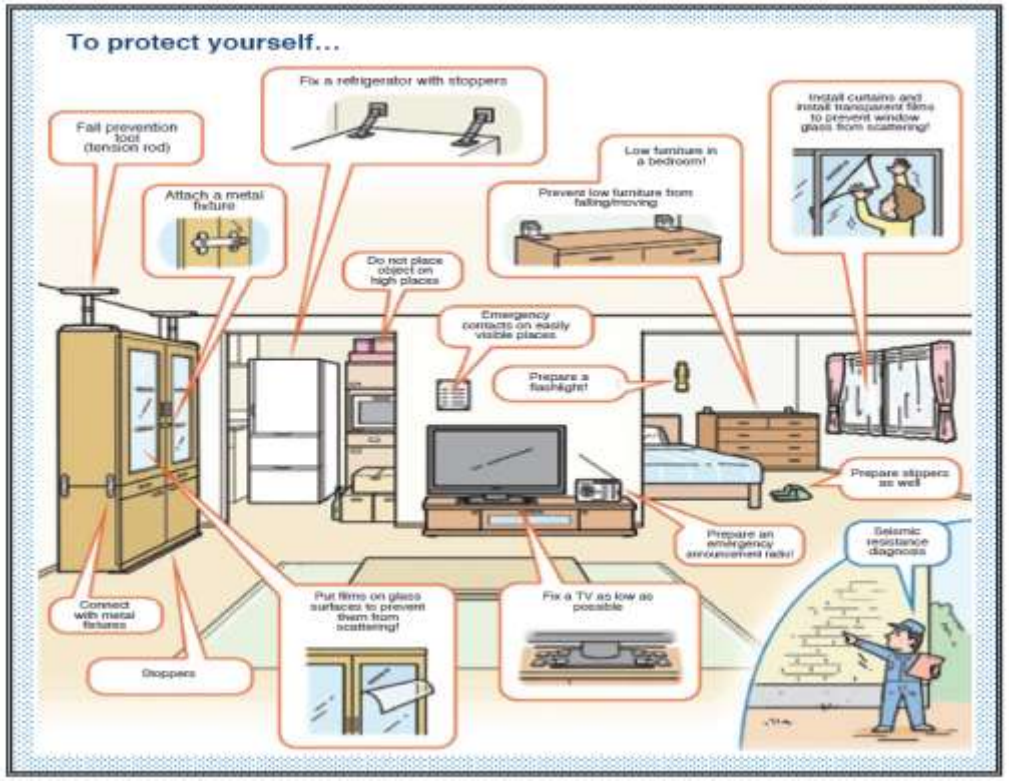
Example of Regional Disaster Management Plan (by Chuo-ku, Tokyo)

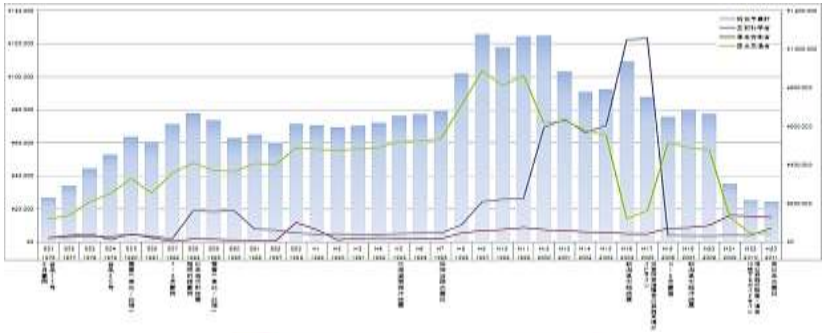




Contents of Regional Disaster Management Plan (What people are expected to do)



“White Paper on Disaster Management” published Every Year



Disaster Drill

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Disaster Management Cycle

DISASTER

①Preparedness / Mitigation

- Hazard mapping, evacuation drill
- Organization Reinforcement
- Establishment of Disaster Management Plan
- Development of Early Warning System

②Emergency Response/Relief

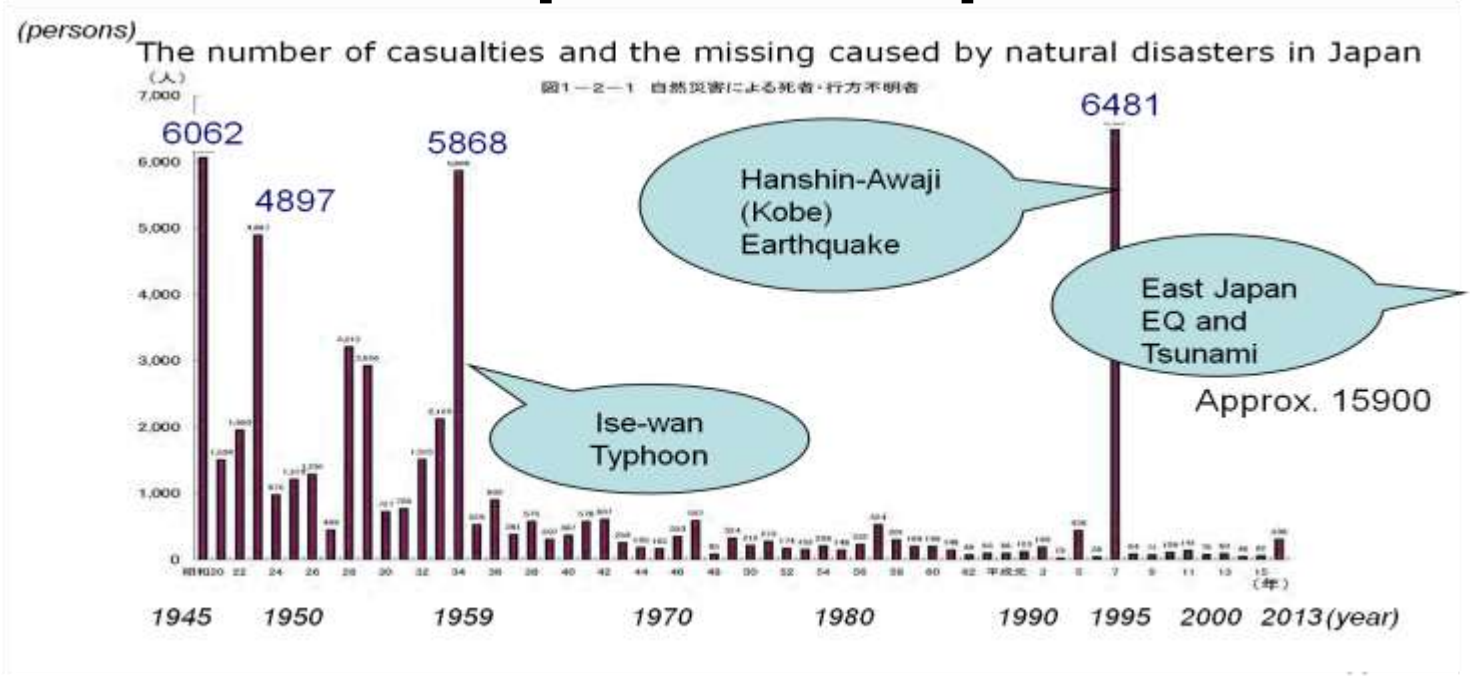
- Dispatch of Rescue team
- Provision of Rescue supply

③Recovery

- Reconstruction and Rehabilitation of Infrastructure
- Mental Health Care

The Holistic Approach to cope with Disasters

-The Japanese Experience -



Severe Damage caused by Series of Typhoons

Year	Typhoon	Death Toll
1945	Makurazaki Typhoon	3,756
1947	Catherine Typhoon	1,930
1948	Ion Typhoon	838
1949	Kitty Typhoon	160
1950	Jane Typhoon	539
1951	Ruth Typhoon	943
1954	Toyamaru Typhoon (with big ferry shipwreck)	1,761
1958	Kanogawa Typhoon	1,269
1959	Ise-wan Typhoon	5,098

Japanese Instrument of Surrender

(Signed at Tokyo on 2 September 1945)

Reconstruction after WW Ⅱ

Hiroshima City
(1946, One year after the A-Bomb)

Hiroshima City
(Summer of 1947, Two years after the A-Bomb)

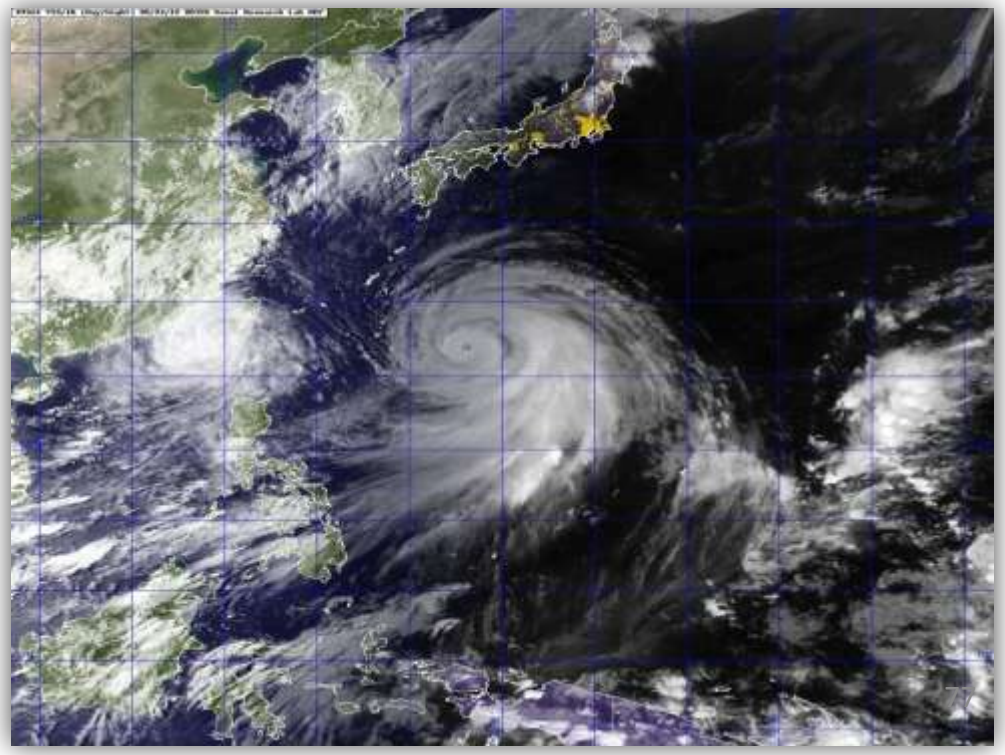
San Francisco Peace Treaty

(Signed on 8 September 1951, Enacted on 28 April 1952)

Occupation of Japan following WWII
Headed by General Headquarters,
the Supreme Commander for the Allied Powers
(Sep. 1945 to Apr. 1952)

Meteorological observation supported by US NAVY

(1945 to early 1960's)



Ise Wan (Ise Bay) Typhoon (Sep.1959)

Many people knew After the Typhoon landed

(September 1959)

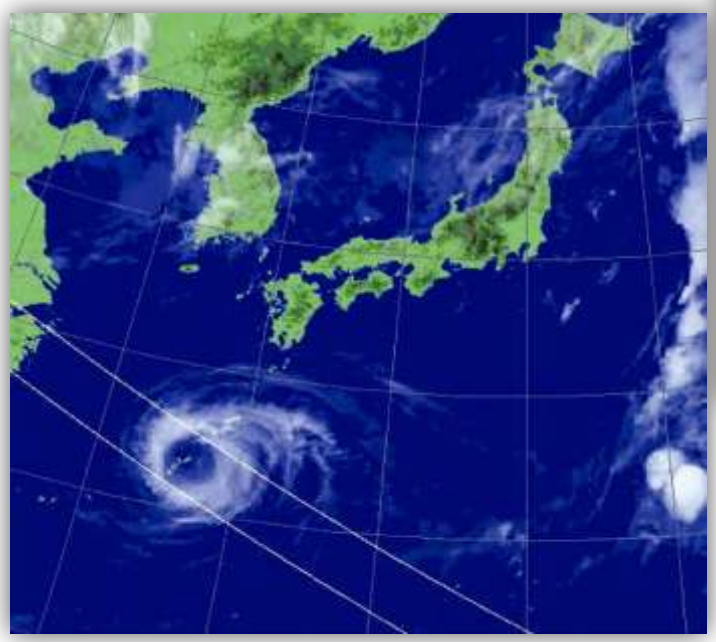

伊勢湾台風
37°
950 ● 24 時
金沢
福井
945 ● 23 時
高山
36°
945 ● 22 時
岐阜
飯田
彦根
名古屋
35°
940 ● 21 時
大阪
津
940 ● 20 時
大王崎（灯）
34°
930 ● 19 時
尾鷲
潮岬
930 ● 18 時
136°
137°

1959 Ise-Wan Typhoon was Another Epoch-Making Turning Point

- Response oriented approach to **preventive approach**
- Individual approach to **comprehensive multi-sectoral approach**
- **Investment** for disaster reduction
- National, Prefecture and Municipal Gov’ts were given **responsibilities**

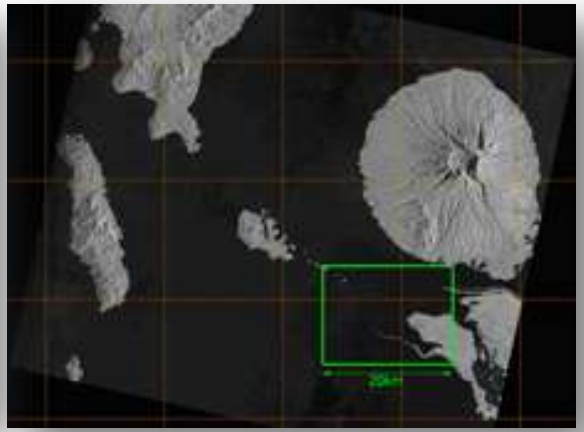
Meteorological observatory Radar Installed by Gov. of Japan (1964)

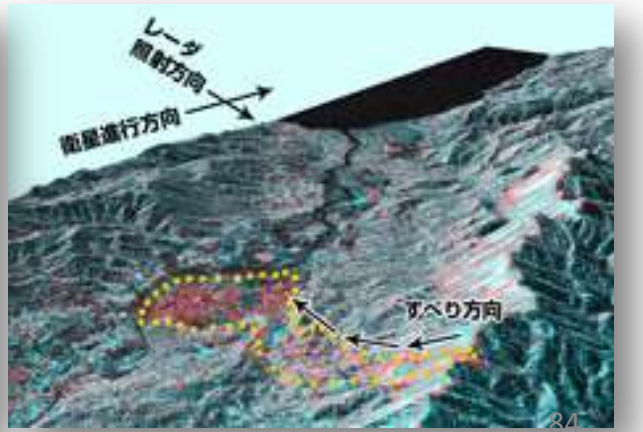
Geostationary Meteorological Satellite “Sunflower” (Launched in 1977)



Advanced Land Observing Satellite by JAXA (Today, 2014)

Gazing into Earth's Expression





Meteorological Information provided by JMA, should be transferred to NHK, and must be announced to the people.

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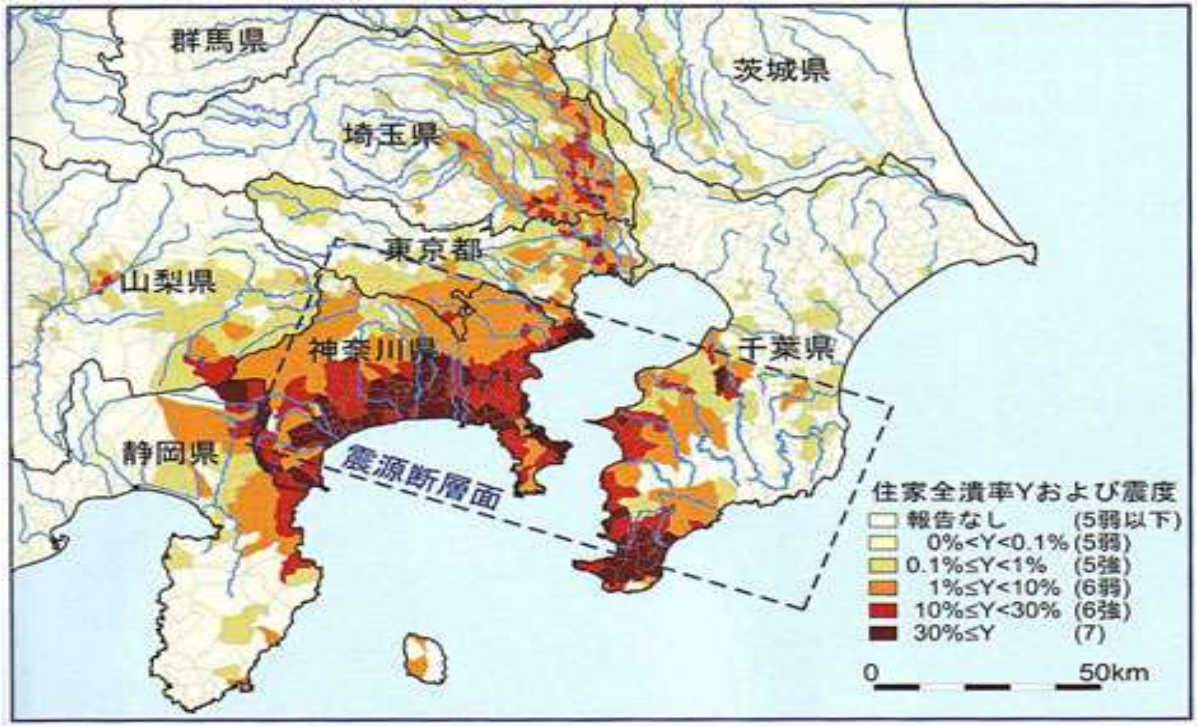
Major changes of Regulation/Law

Year	Regulation and Law to be revised
1959	Ise-wan Typhoon ⇒Disaster Countermeasures Basic Act (1961)
1978	Miyagi-ken oki Earthquake ⇒Amendment of Building Standards Law (1981)
1995	Great Hanshin-Awaji Earthquake ⇒Minister for Disaster Management (2001) ⇒Act for Supporting Livelihood Recovery of Victims

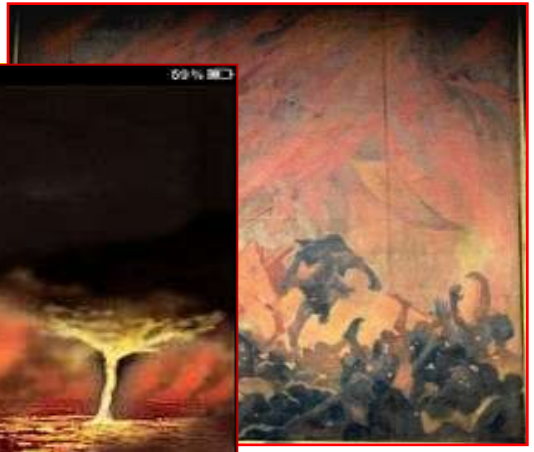
Great Kanto (Tokyo) Earthquake (M7.9) (Sep 1st, 1923)

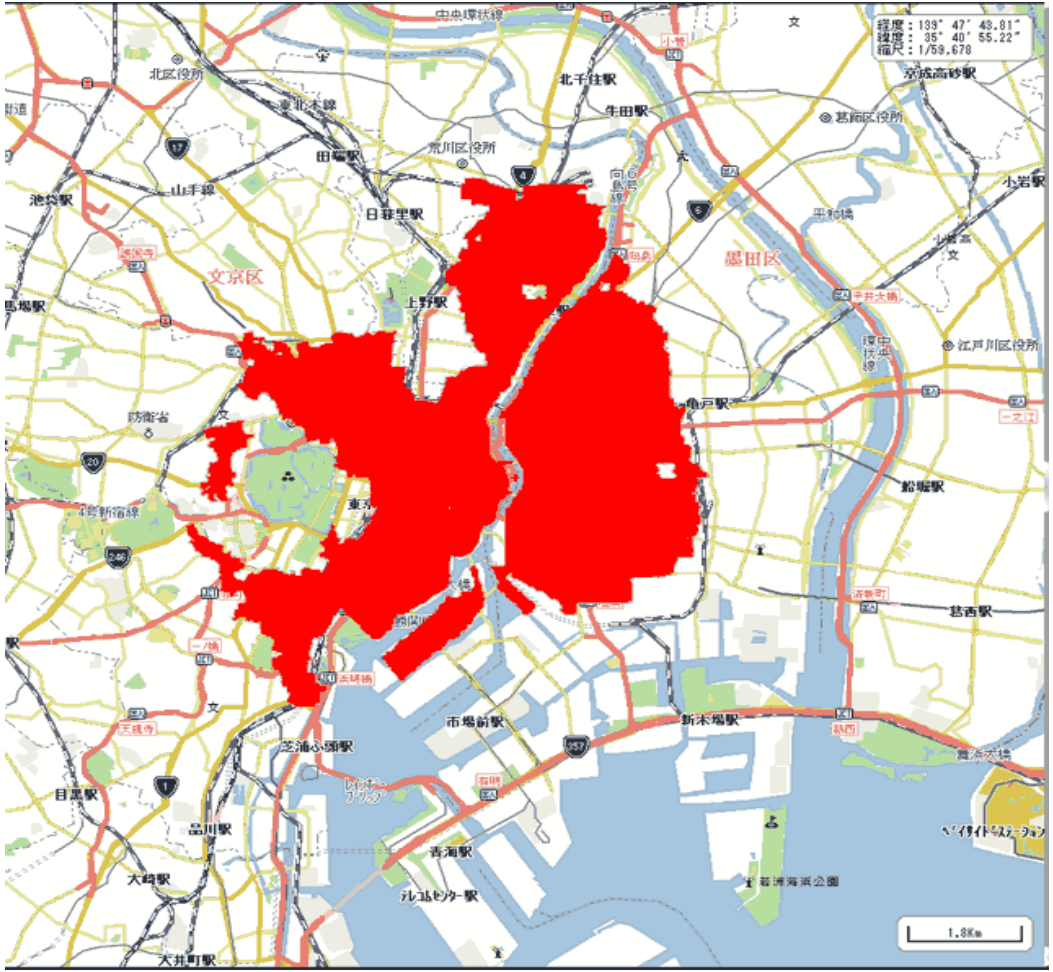
Item	Description
Date/Time of occurrence	Sep. 1, 1923/11:58
Location	Kanto area centered on Tokyo and Kanagawa
Max. seismic force	Level 6（M7.9）
Deaths & missing	142,807 (Most of Victims were…)
Fully collapsed structures	128,266
Homes lost to fire	447,128
Damage area	Approx. 3,830 ha lost to fire in Tokyo
Damage in yen	¥5.5 billion (1923)

Great Kanto (Tokyo) Earthquake (M7.9) (Sep 1st, 1923)




iPad
14:24
ワーストケース——火災旋風が多数出現
火災旋風がどこでおきるのかは、今の研究レベルでは解明されていません。そのため東京都の被害想定では、火災旋風による被害は含まれていません。また火災旋風を考慮に入れると、安全な避難場所がなくなってしまいます。
しかし実際に火災旋風がおきれば、火災による被害が飛躍的に拡大するはずです。
大規模な火災のときには、いつでも火災旋風がおきる可能性があります。戦争中の空襲のときにも各地で多数おきています。
火災旋風は竜巻とちがい、炎や火の粉、煙、有毒ガスなどを巻き込んでいます。火災旋風に巻きこまれれば、家屋などには一瞬のうちに火がついてしまいます。大規模な火災旋風が多数発生したときが、まさに「ワーストケース」ということになるのかもしれません。

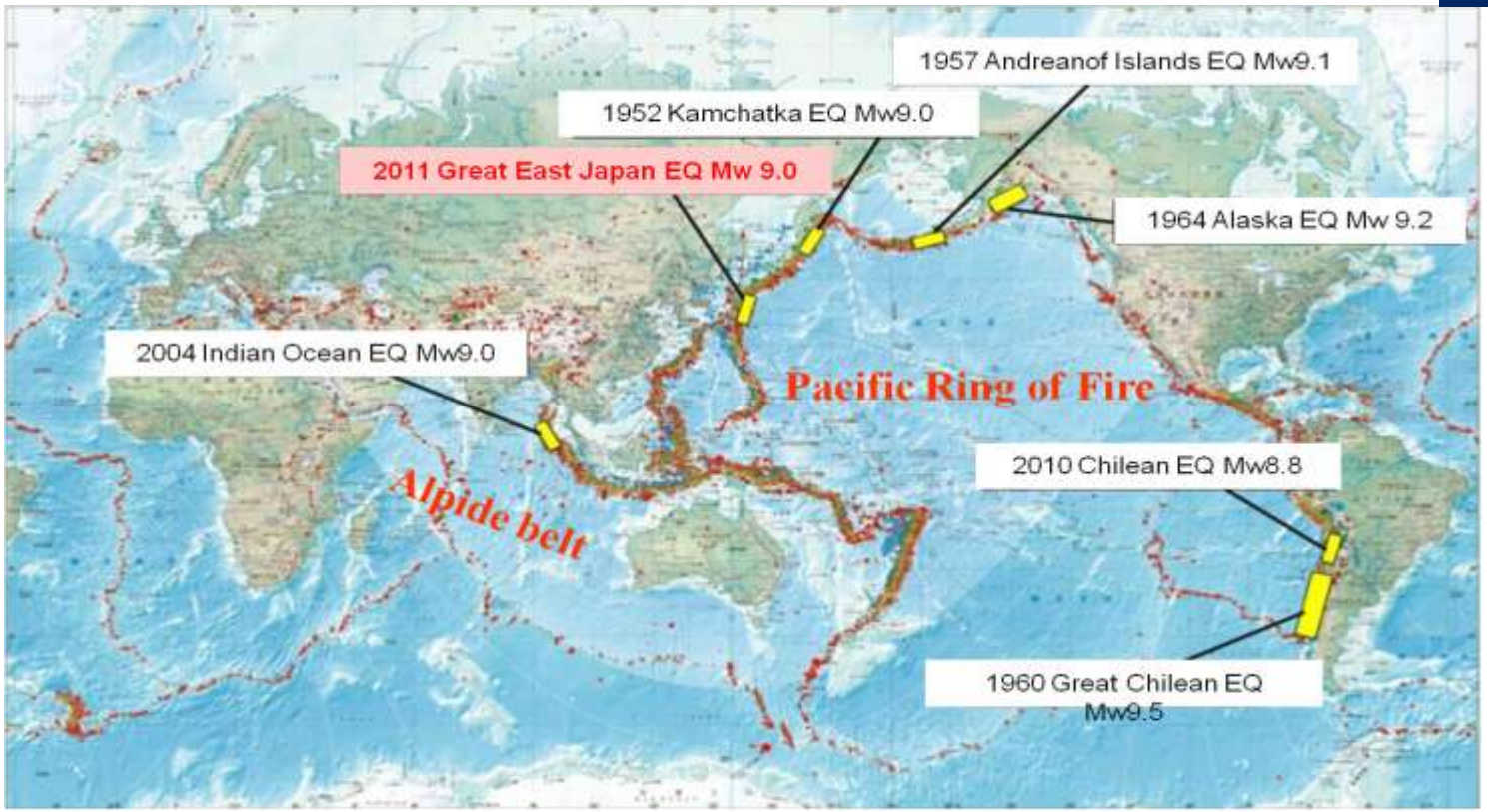



経度：139° 47′ 48.81″
緯度：35° 40′ 55.22″
縮尺：1/59,678
北区役所
北千住駅
牛田駅
京成高砂駅
荒川区役所
葛飾区役所
田端駅
山手線
池袋駅
日暮里駅
小岩駅
文京区
墨田区
上野駅
馬場駅
江戸川区役所
亀戸駅
防衛省
東京
都営新宿線
船堀駅
葛西駅
市場前駅
新木場駅
芝浦ふ頭駅
目黒駅
品川駅
青海駅
大崎駅
テレコムセンター駅
若洲海浜公園
大井町駅
1.8Km

Great Kanto (Tokyo) Earthquake (M7.9) (Sep 1st, 1923)

Beginning in 1961, every September 1 is designated as “Disaster Prevention Day”

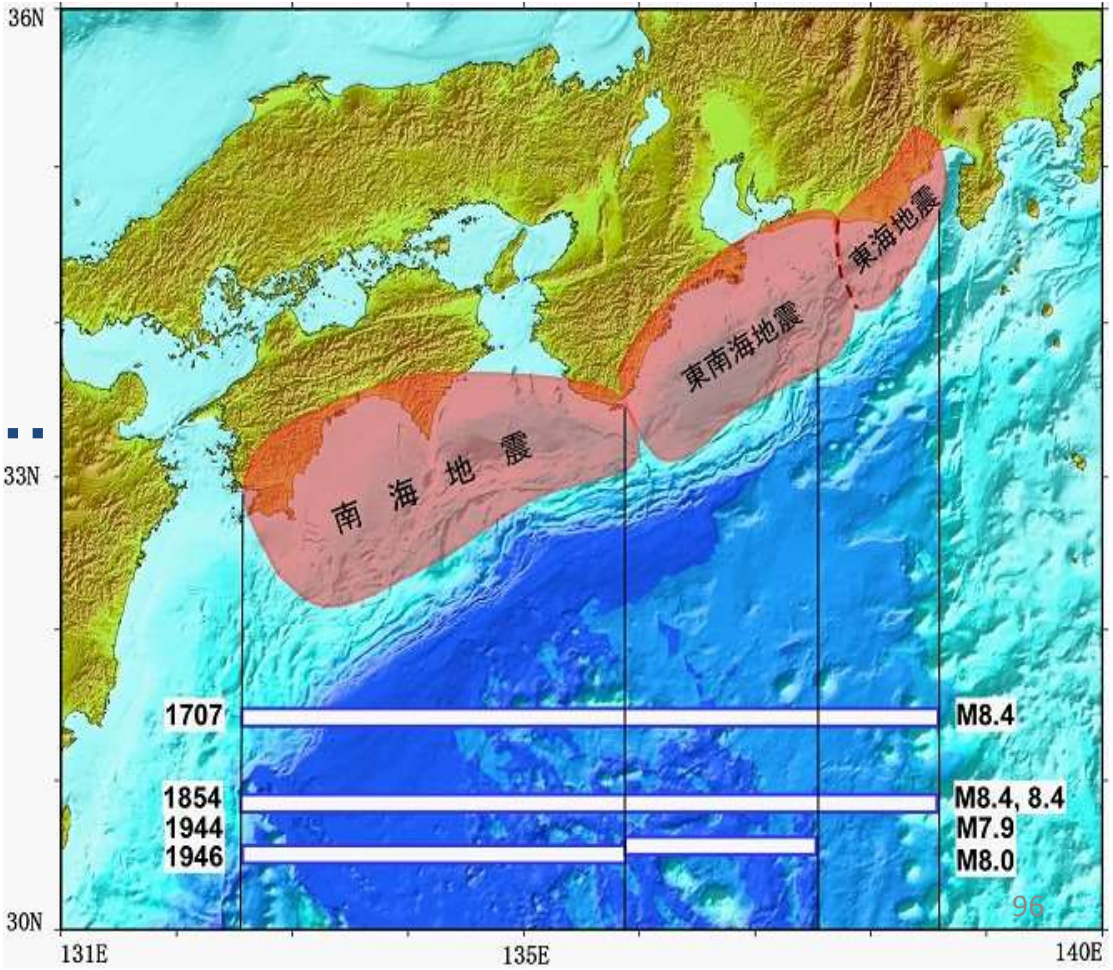
World's Mega Earthquakes in History



Earthquake Research Institute, University of Tokyo

Looking Backward…

and What's Next?



A Series of Earthquakes: late “Edo” Period (1854.11-1855.10)

Edo (Old name of Tokyo) citizens beating the legendary Big Catfish Monster which was believed to cause earthquake

“Big Catfish Monster” as an inducing factor, or a myth ?

Could NOT Expected “Unexpected”

Ansei Earthquake and a Tsunami reached Osaka (Nov 5th, 1854)

Tsunamis from Pacific Ocean (Nov. 1854)

Earthquake and Tsunami (2011)

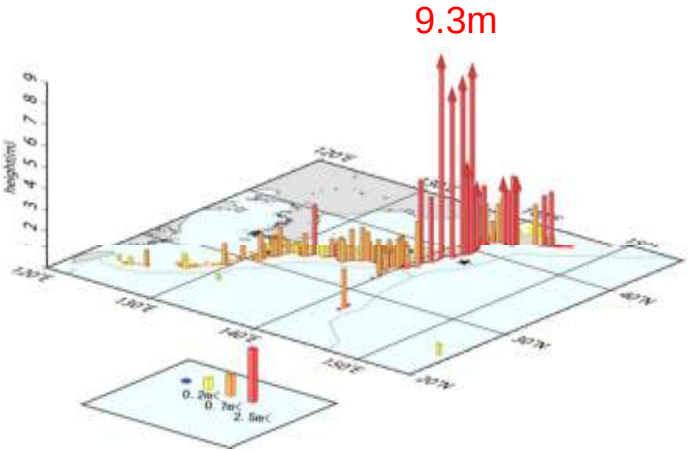
Date and Time:

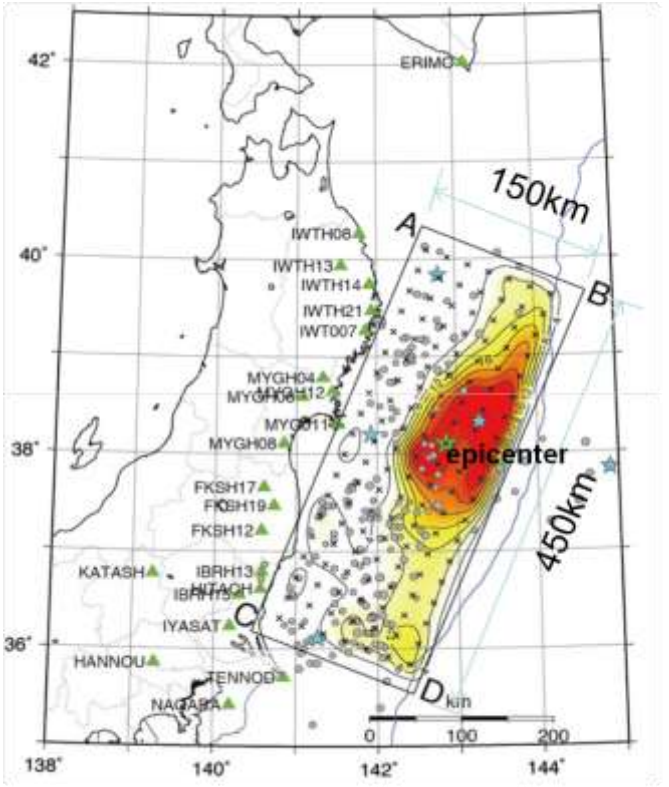
11 March 2011 at 14:46 JST (5:46 GMT)

Type of earthquake:

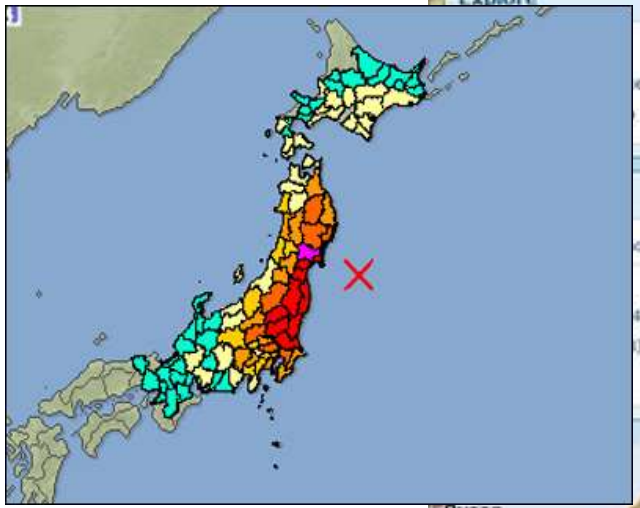
Plate-boundary thrust-faulting earthquake near the Japan Trench seductions zone

Height of Tsunami Tide





Recent Case: Earthquake and Tsunami in Eastern Japan, March 11, 2011



Recent Case: Earthquake and Tsunami in Eastern Japan, March 11, 2011

Recent Case: Earthquake and Tsunami in Eastern Japan

March 11, 2011

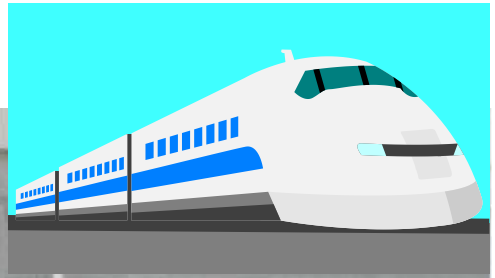
Recent Case: Earthquake and Tsunami in Eastern Japan, March 11, 2011

Lessons Learned from 2011 EQ

- Earthquake
- Tsunami
- “Refugees” on return (Tokyo)
- Nuclear Power Plant
- Interruption of power supply
- long-period ground motion
- Public Relation, and Risk Communication
- Infrastructure
- Others

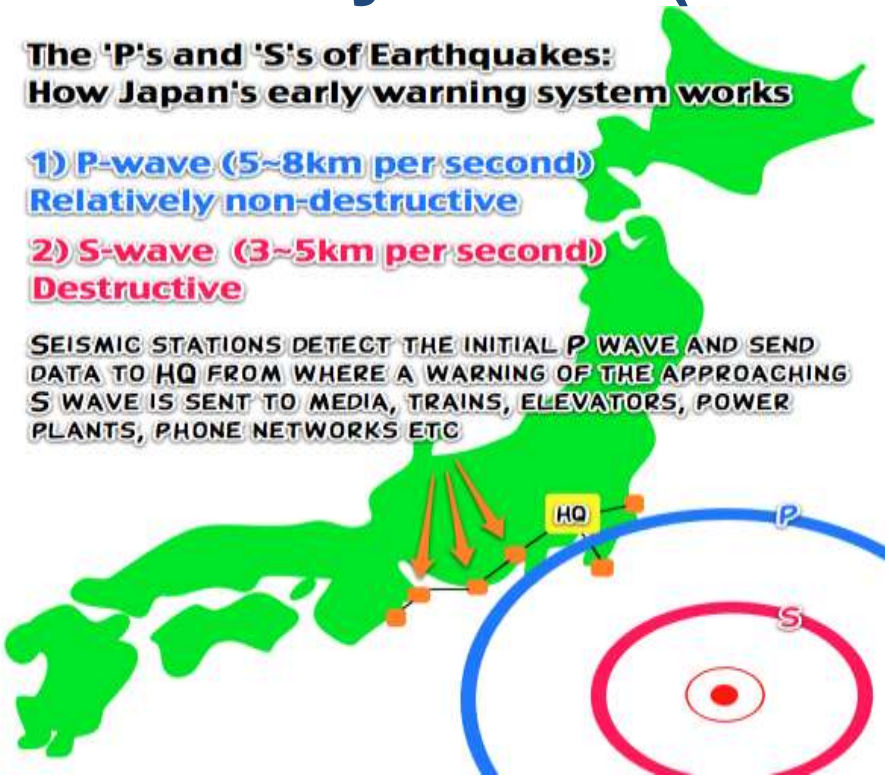
Damage from the Earthquake

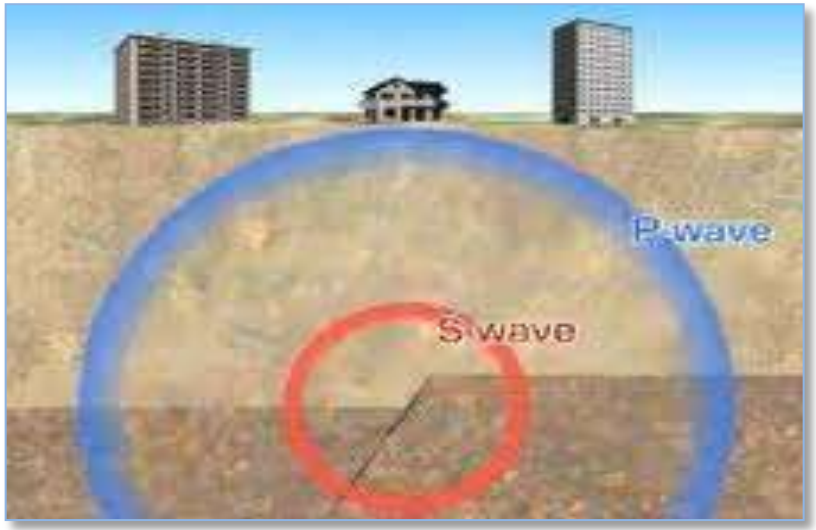
•Damage was relatively small even though the magnitude of the quake was over M 9.0 (JMA Intensity was also as big as that of Hanshin-Big Earthquake.



Ichinoseki Sta, Iwate pref.

“Earthquake Early Warning System” (Oct. 2007 to date)





“Know before the EQ occurs”, And the icon is…..

A network of 97 EQ detectors functioned 15 seconds in advance.
27 bullet trains stopped. No causality.

“Tsunami Disaster Prevention Day” was designated (June 2011)

津波防災の日

2011年6月、津波による被害から国民の生命、身体及び財産を保護することを目的とする「津波対策の推進に関する法律」が制定されました。この法律において、11月5日は「津波防災の日」と定められ、国及び地方公共団体は、その趣旨にふさわしい行事を実施することとされました。

Memorial Days of Disasters in Japan

“Disaster Prevention Day”

Sep. 1959 (Ise-Wan Typhoon)

→1 Sep. 1923 (Tokyo EQ)

“Tsunami Disaster Prevention Day”

11 March,2011 (Japan EQ & Tsunami)

→ 5 Nov. 1854 (Ansei EQ & Tsunami)

Not March 11, but November 5.

津波防災

11月5日は「津波防災の日」です。

Today's status of "Catfish" (2013)

Culture of Disaster Prevention, Culture of Safety

AR実証実験告知部分

AR実証実験告知部分（拡大）

How Can We Make Our People Fear ?

-- Japan National Broadcasting Corp. Changed its Risk Communication Method on March 2012 --


津波注意報 三重県南部
午後4時0分ごろ
予想50cm
岩手・宮城・福島
大津波警報
観測された津波
石巻鮎川 午後 2:52 50cm
宮古港 午後 2:54 20cm
大船渡港 午後 2:54 20cm
釜石港 午後 2:56
八戸港 午後 2:49
むつ関根浜 午後 2:54
沖縄
小笠原
大津波警報
津波警報
津波注意報


津波警報が追加されました
北海道太平洋沿岸東部
岩手・宮城・福島
大津波警報
第1波到達予想時刻・予想高さ
大津波警報 (予想)
岩手県 到達と確認 6m
宮城県 到達と確認 10m以上
福島県 到達と確認 6m
青森県太平洋沿岸 到達と確認 3m
千葉県九十九里・外房 午後 3:20 3m
茨城県 午後 3:30 4m
沖縄
小笠原
大津波警報
津波警報
津波注意報


0:43
訓練
すぐ にげて!
大津波警報
青森県太平洋沿岸 すでに到達 5m
岩 手 県 すでに到達 10m超
宮 城 県 すでに到達 10m超
福 島 県 すでに到達 10m
茨 城 県 午後 3:30 5m


震源は三陸沖
深さ10キロ マグニチュード7.3
津波!避難!
東北・関東で震度5弱
M7.3 宮城に津波警報
LIVE中継 岩手 釜石
津波到達予想
津波警報
宮 城 県 午後 5:40 1m
津波注意報
岩 手 県 午後 5:40 50cm
福 島 県 午後 5:50 50cm
青森県太平洋沿岸 午後 6:00 50cm
茨 城 県 午後 6:00 50cm
津波警報
津波注意報


イメージ 津波到達予想
すぐ にげて!
大津波警報
すぐ来る 巨大
午後 9:00 巨大
午後 9:10 巨大
津波警報
午後 9:20 高い
午後 9:20 高い
LIVE 中継
TSUNAMI Subchannel or Radio2

- **Culture of Prevention**
- **Culture of Safety**

Tohoku Predecessors say “Do NOT build houses Below This point”

三陸地方にある、「ここより下に家を建てるな」との津波の教訓を伝える石碑。右は宮古市、左は大船渡市

Lessons from Past Disasters
Stone Monument of Tsunamis

- **Natural Disasters**

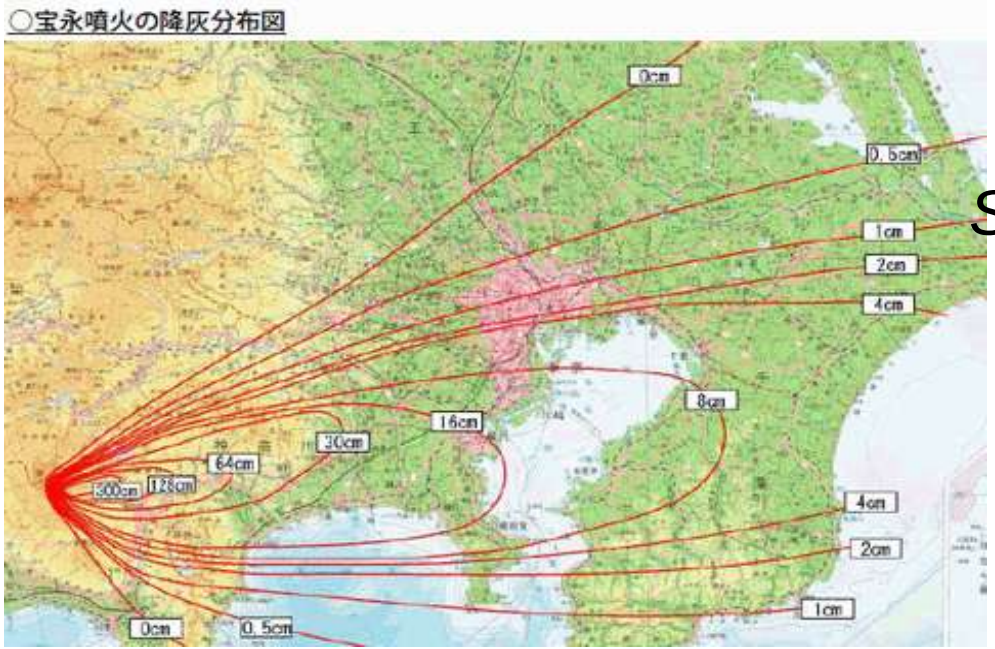
-- Weather-Related Disasters
(Typhoon, Cyclone, Heavy Rain, Flood…)

-- Sudden Disasters
(Earthquake, Volcanoes…)
Earthquakes -- Active Fault-type EQ)
-- Trench-type EQ)

- **Manmade Disasters**

Did We Expect “The Unexpected” ?
Heavy Snow Hit Tokyo (2014.2.8-2.16)

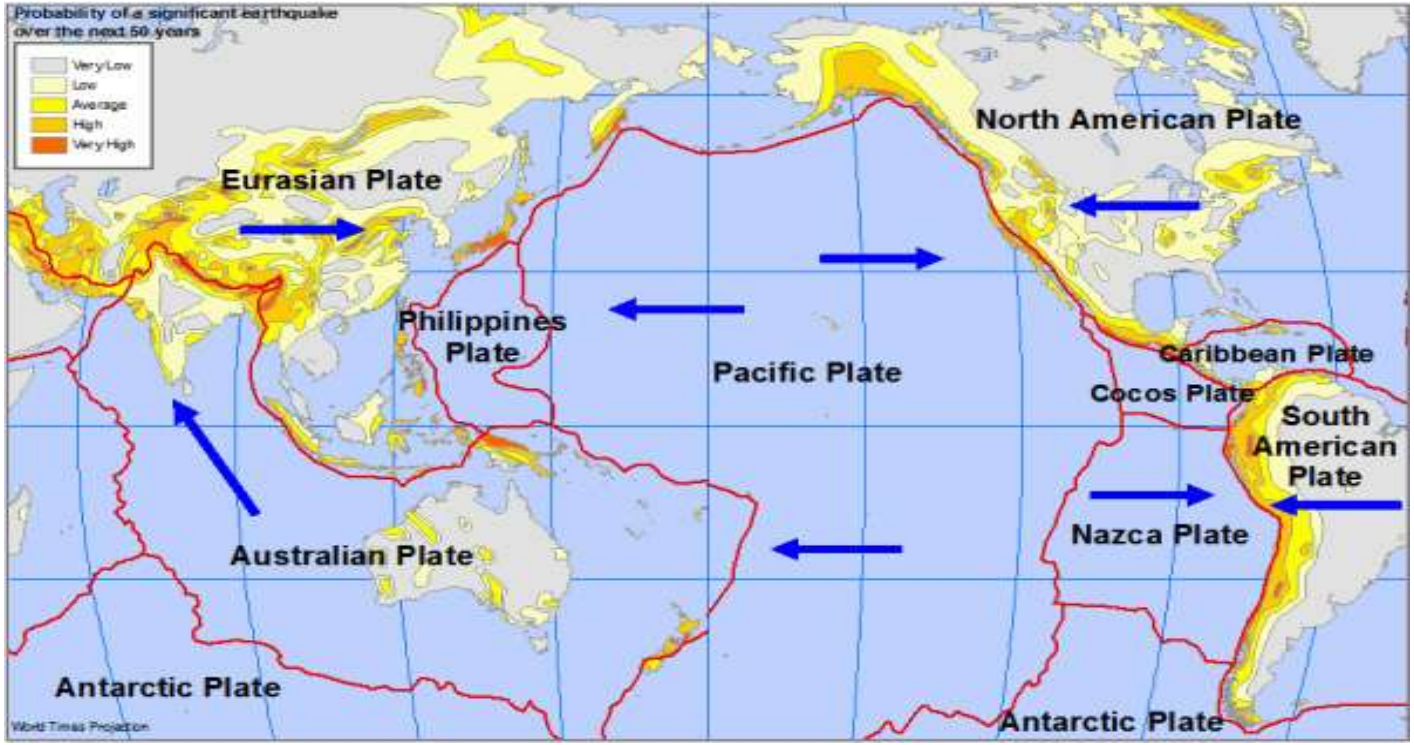
No EQ in Tokyo since 1923,
No Mt. Fuji Eruption since 1707



Simulated Image of Mt.Fuji Eruption

Mt. Fuji was Erupted (1707)

Geological and Geographical Similarities
A similar range of Natural Disasters



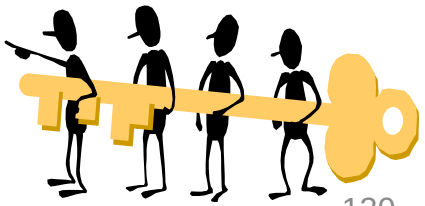
The Puyehue volcano in Chile Erupted (June 4 2011)

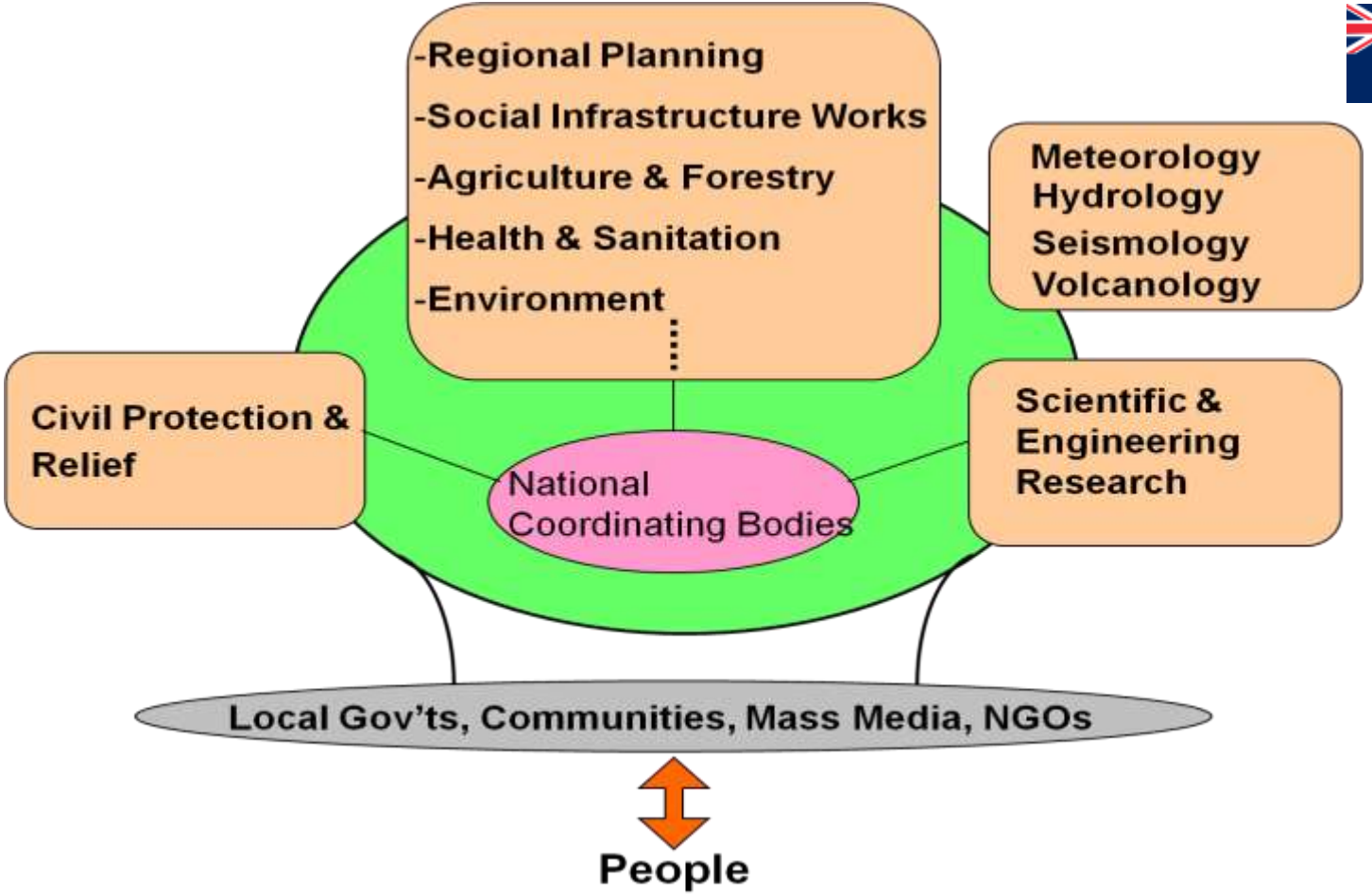
The Challenges Ahead in Japan

- **How can we decrease casualties by possible Earthquakes !**
  - **Retrofit / Rebuild old existing houses & buildings**
  - **Affix furniture and adhere protective films on old windows**
  - **Encourage companies to make their own contingency plans etc.**

- **How can we decrease casualties by possible Tsunamis !**
  - **Distribute Tsunami Hazard Maps**
  - **Disseminate Tsunami Warning effectively**
  - **Ensure that people run immediately to safe place etc.**

- **How can we further decrease casualties by Typhoons & Floods !**
  - **Effective advance evacuation warnings for elderly & disabled**
  - **Distribute Flood Hazard Maps etc.**



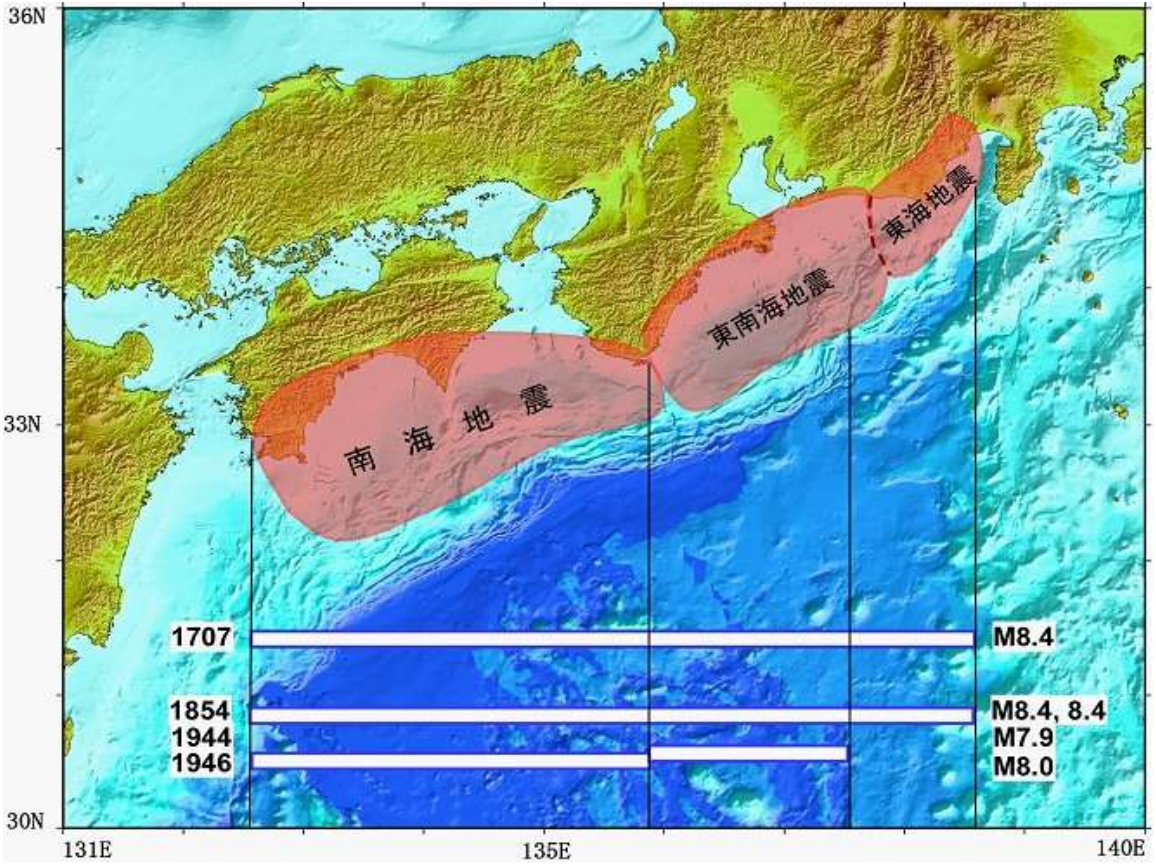

-Regional Planning
-Social Infrastructure Works
-Agriculture & Forestry
-Health & Sanitation
-Environment
Meteorology
Hydrology
Seismology
Volcanology
Civil Protection & Relief
Scientific & Engineering Research
National Coordinating Bodies
Local Gov'ts, Communities, Mass Media, NGOs
People

Proverb by Japanese Physics Scientist Dr. Torahiko TERADA (1878-1935)

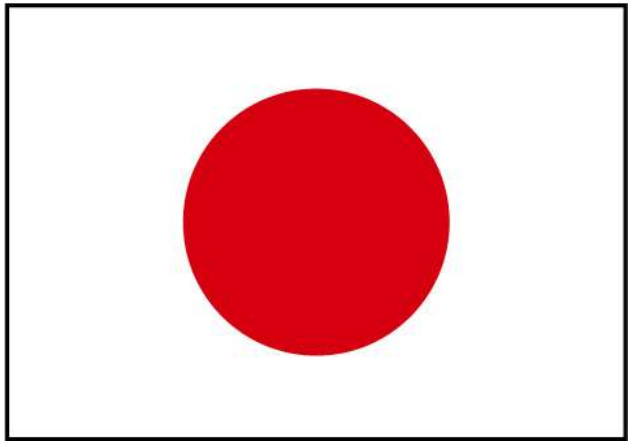
「天災は忘れた頃にやってくる」

“Natural Disasters will hit us by the Time people have forgotten about it”

What We Are NOT Sure About …



Toward More Resilient Countries Against Disasters



Dear all the participants of:

Crisis Response: Restoring public services in the immediate

Thank you very much for your attention.

Shingo Kouchi, from IRP (International Recovery Platform)
Also, Hyogo Prefectural Government Official, Japan
E-mail: kouchi@recoveryplatform.org
Phone: +81-78-262-6041

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