

*Mt. Fuji*



*Mt. Mayon*



# ***Disaster Risk Reduction and Disaster Management in Japan***

***May 2014***

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***Fire and Disaster Management Agency (FDMA)  
Ministry of Internal Affairs and Communications  
Government of Japan***

# ***Outline of the Presentation***

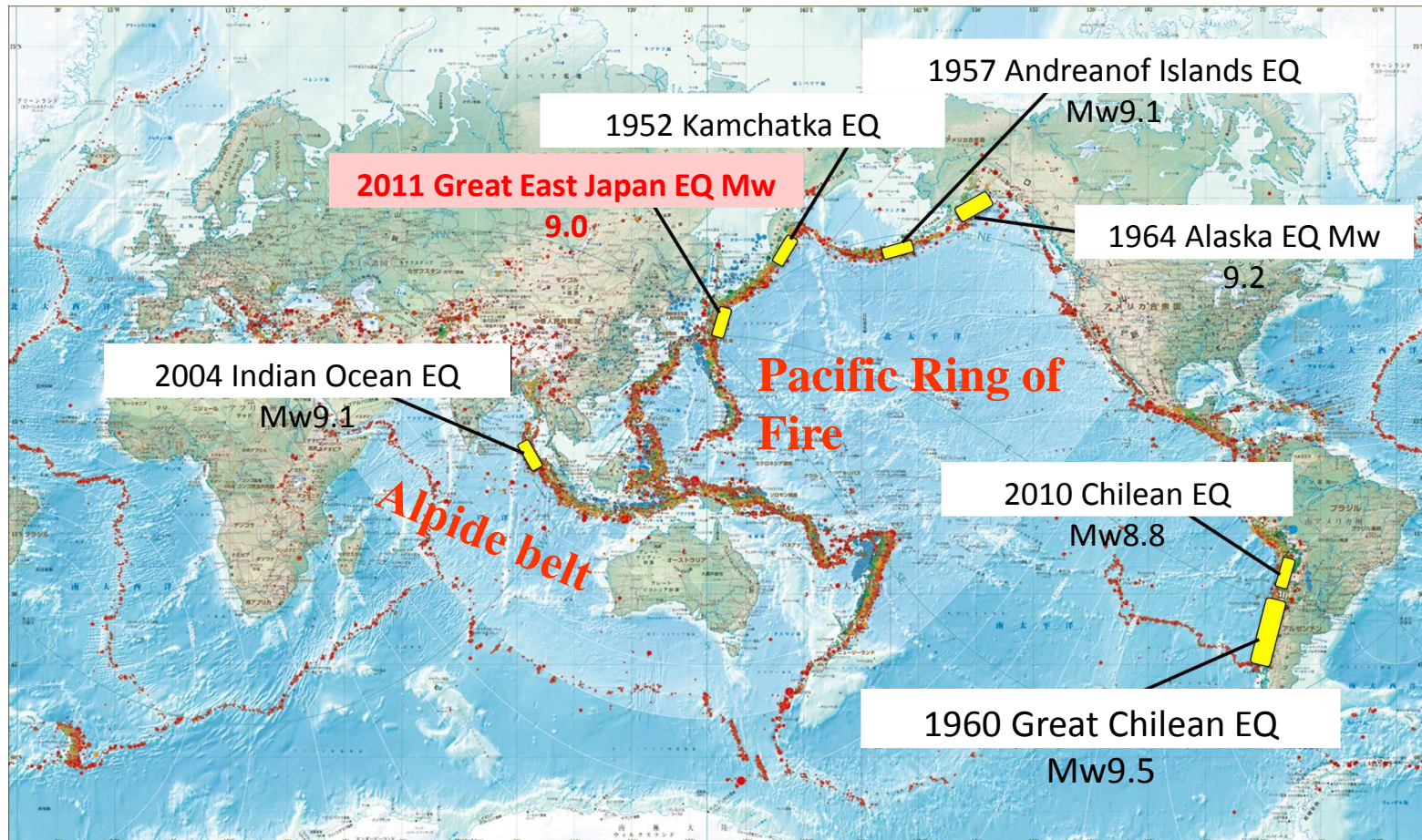
- I. Disaster Situation in Japan and the Philippines***
- II. Progress in Disaster Management System of Japan***
- III. Fire and Disaster Management System***
- IV. Response to the Great East Japan Earthquake***
- V. New developments after the Great East Japan Earthquake***
- VI. Conclusions***

# ***I. Disaster Situation in Japan and the Philippines***

***- More similarities than differences -***

# Mega Earthquakes in the world

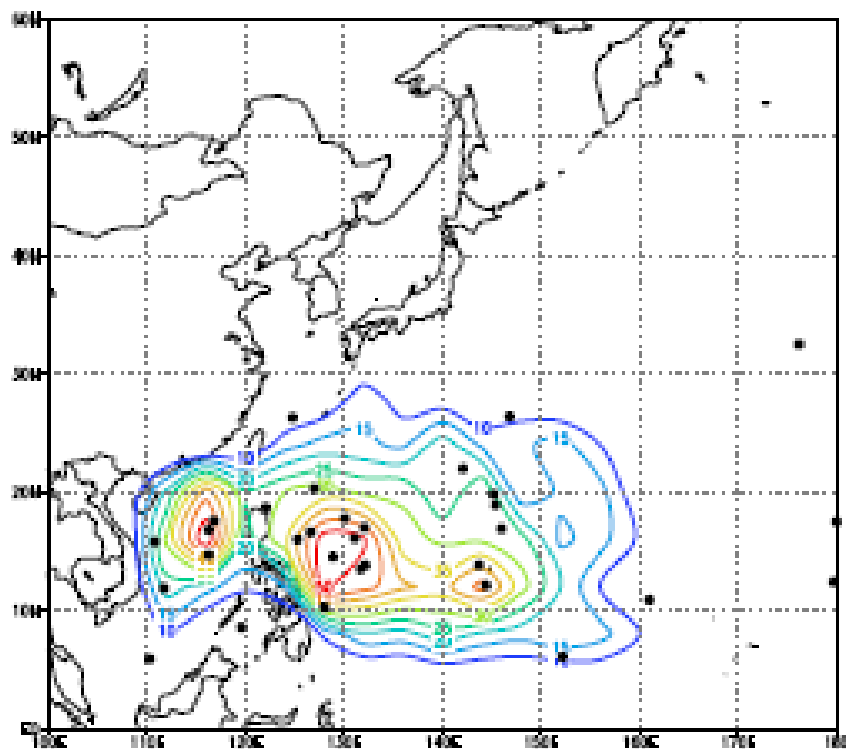
Nearly 80 % of large-scale earthquakes (M 6 or above) occur along the Pacific Ring of Fire, and 20% occur in or nearby Japan. Moreover, the world largest earthquakes also occurred along this basin.



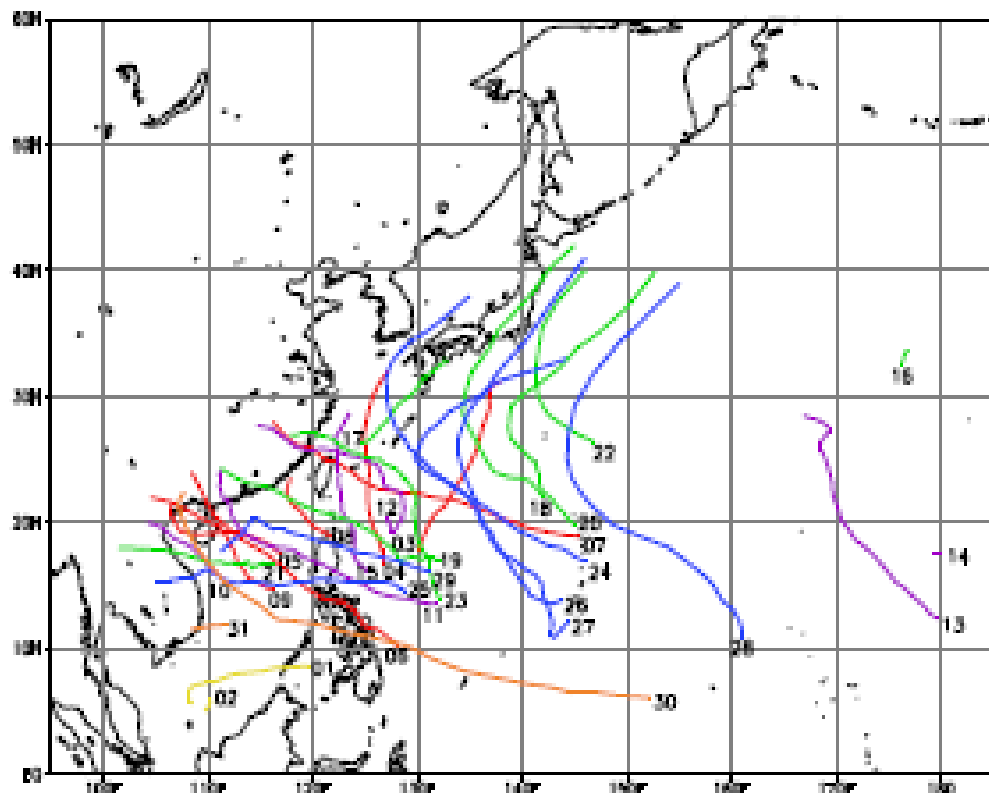
# Tropical Cyclones in 2013

*The west North Pacific is the most active among seven tropical cyclone basins in the world - accounting for one-third of all tropical cyclone activities. In 2013, 31 named tropical cyclones (TCs) formed, out of which 13 reached typhoon (TY) intensity.*

**Genesis points of Tropical Cyclones**

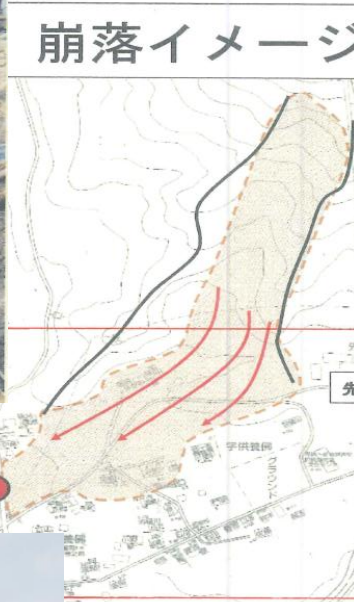


**Tracks of Tropical Cyclones**



# Record rainfalls in Japan

## Debris flows devastated a small community



# *Mud-slide on Izu Oshima Island, Tokyo*

## *16 October, 2013*



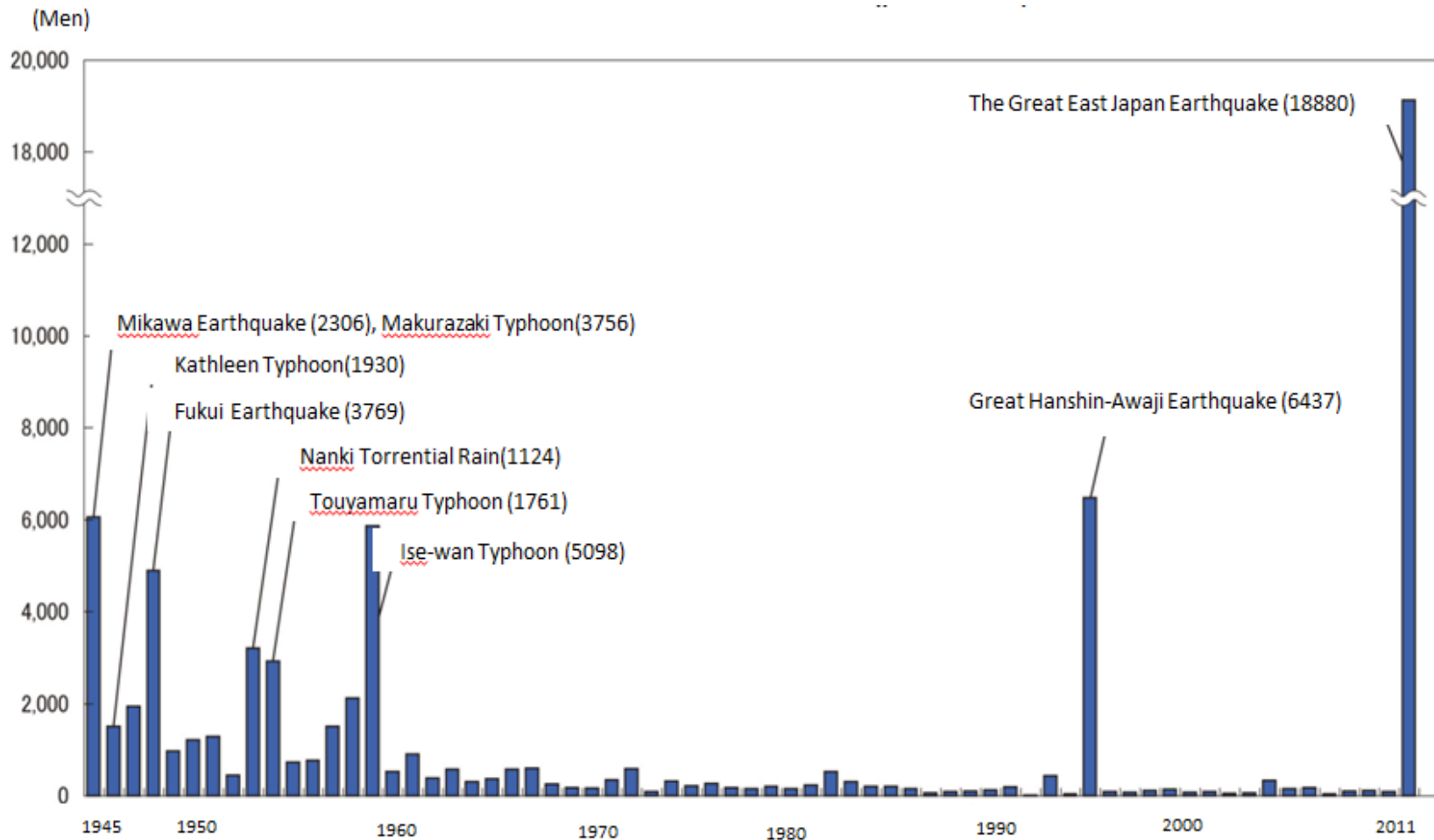
## ***II. Progress in Disaster Management System of Japan***

***- Learning from past disasters -***



# Recent History of Natural Disasters in Japan

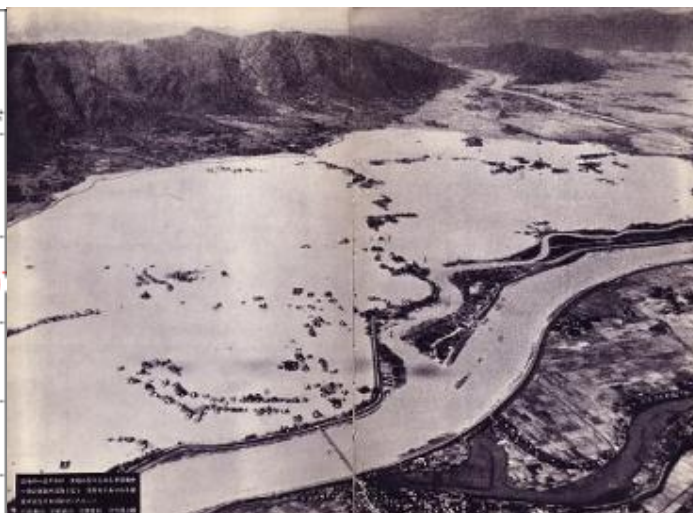
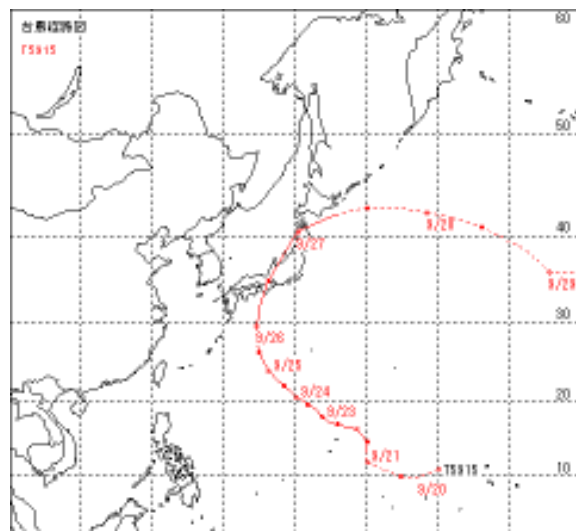
*The number of the dead and missing persons by natural disaster since 1945*



Source) 2012 Disaster Management White Paper

# 1959 Ise-Bay Typhoon

- ✓ *Hit Nagoya city and surrounding region, killing more than 5 K people;*
- ✓ *Abnormally high storm surge (3.55 m at maximum);*
- ✓ *Weak structure and insufficient height of coastal dykes;*
- ✓ *People settled in low-lying areas, many of which were reclaimed from the sea for the use of agriculture, industries, etc.;*
- ✓ *Moreover, they were subsiding because of groundwater withdrawal;*
- ✓ *Lack of preparedness, lack of effective early warning system and communication system to reach out to individual communities, and so on.*

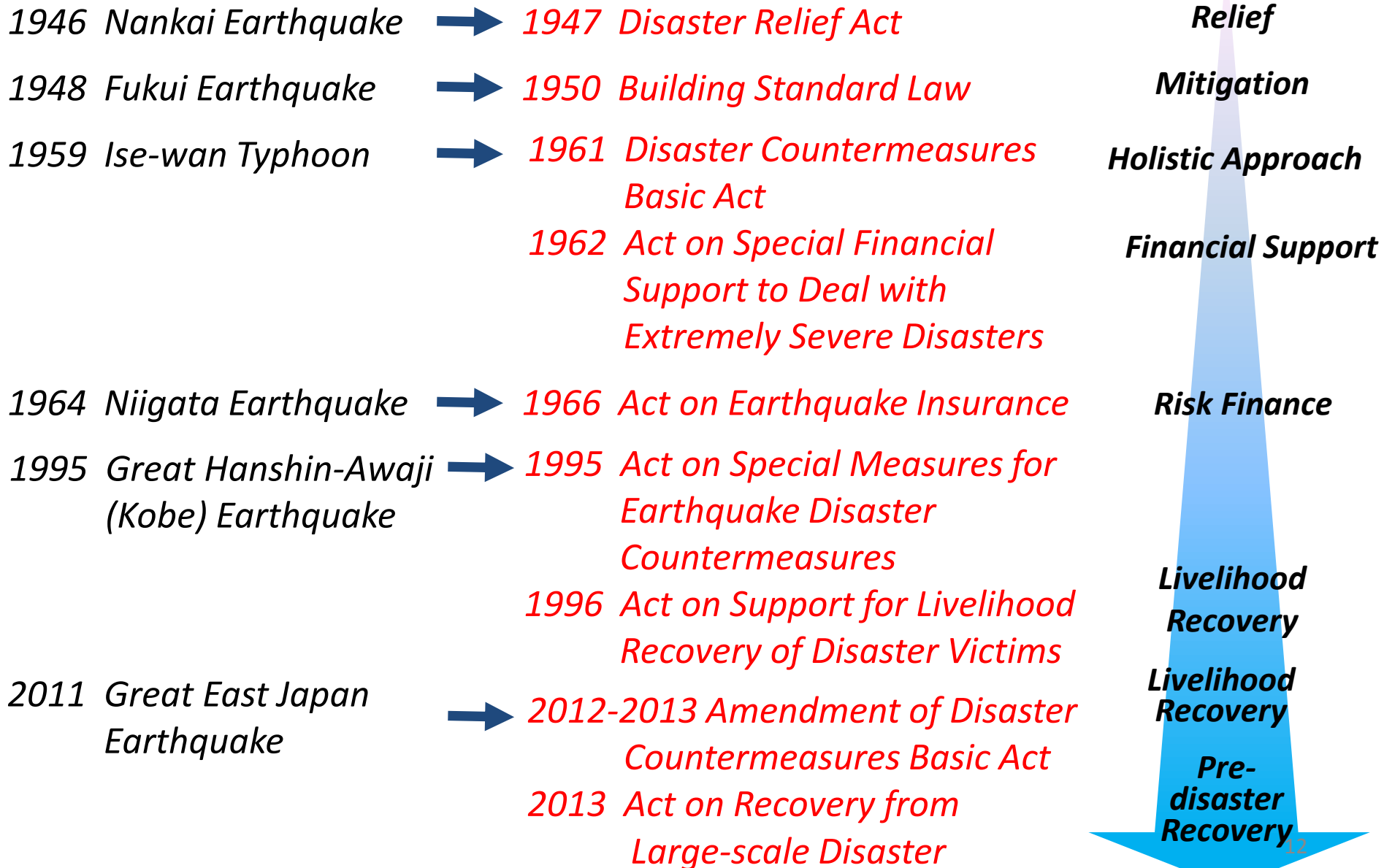


# 1995 Great Hanshin-Awaji (Kobe) Earthquake

- ✓ *Directly hit Kobe and surrounding areas, resulting in the deaths of more than 6 K people;*
- ✓ *Also damaged administrative and industrial functions and communication and transport networks;*
- ✓ *Little knowledge about an inland earthquake and no preparation;*
- ✓ *More than 80 % of victims were killed by collapse of buildings: enforcement of building regulations and retrofitting;*
- ✓ *Most of the victims buried under debris were rescued by families and neighbors.*



# Progress in Disaster Management Legislation



# Main Features of Disaster Countermeasures Basic Act

- ✓ *The most fundamental law for disaster management in Japan, defining overall policy framework as well as roles and responsibilities for government at all levels while addressing all of the disaster management phases of disaster prevention, mitigation, preparedness, emergency response, recovery and rehabilitation*
- ✓ *Disaster Management Council is established at each level, i.e. national, prefectural and municipal, responsible for developing disaster management policies and plans*
  - *Horizontal coordination mechanism in normal time*
- ✓ *Headquarters for emergency response at each level*
  - *Coordination mechanism in emergency response*
- ✓ *Annual Gov't Official Report (White Paper) on Disaster Management is submitted to the Diet for deliberation:*
  - *to enhance awareness among politicians, citizens, etc.*

# Disaster Management System: Overview

[National level]

Prime Minister

Central Disaster Management Council

Designated Government Organizations (a)

Designated Government Corporations (b)

Formulate and implement  
policies and plans

Basic Disaster Management Plan

Disaster Management Operation  
Plan

- (a) 24 Government's ministries and agencies designated by the Disaster Countermeasures Basic Act.  
(b) 56 organizations designated by the Basic act, which include Bank of Japan, Japanese Red Cross Society, NHK, electric and gas companies, etc.

[Prefectural level]

Governor

Prefectural Disaster Management Council

Designated Local Government Organizations

Designated Local Government Corporations

Prefectural Local Disaster  
Management Plan

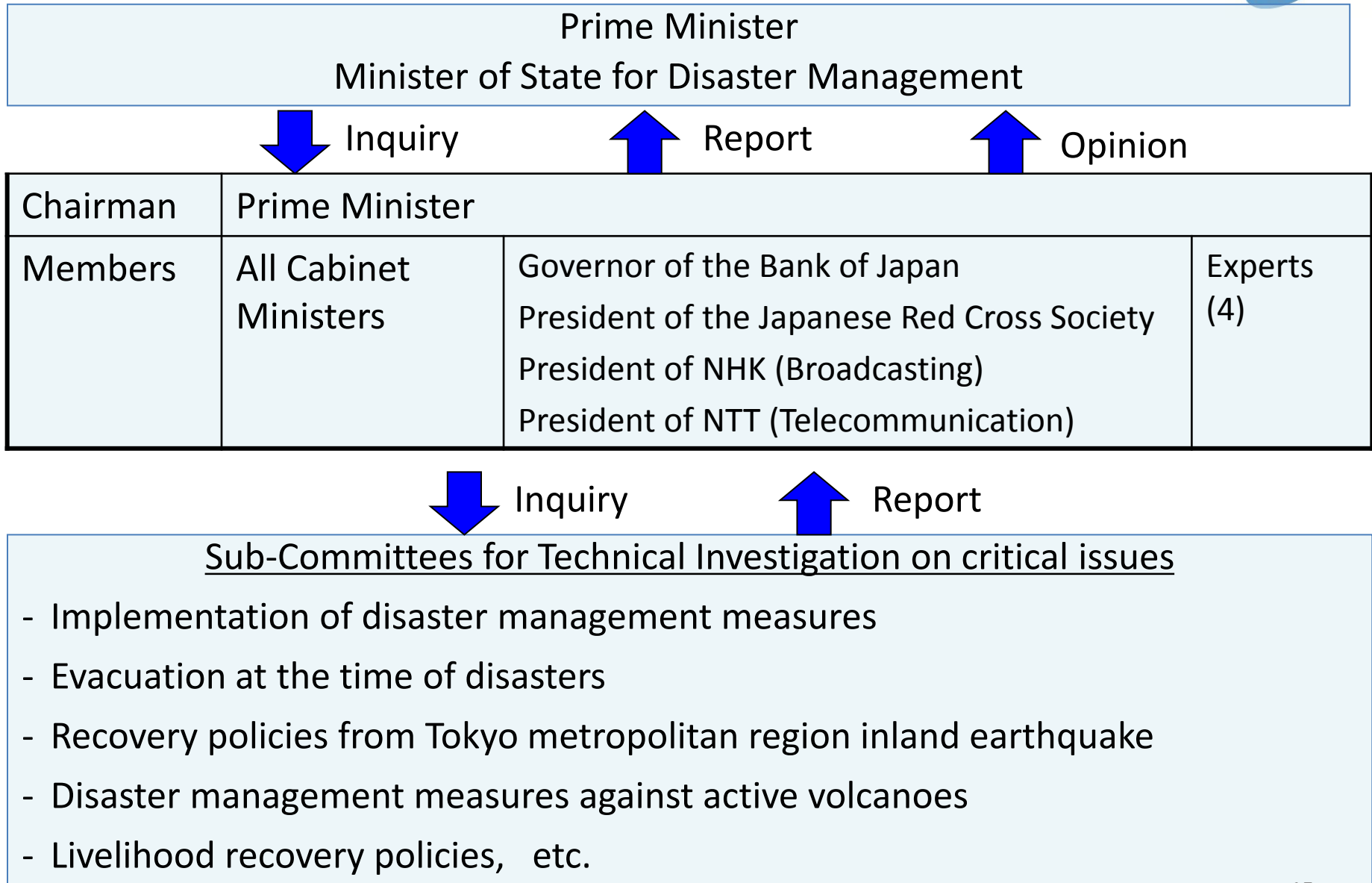
[Municipal level]

Mayor

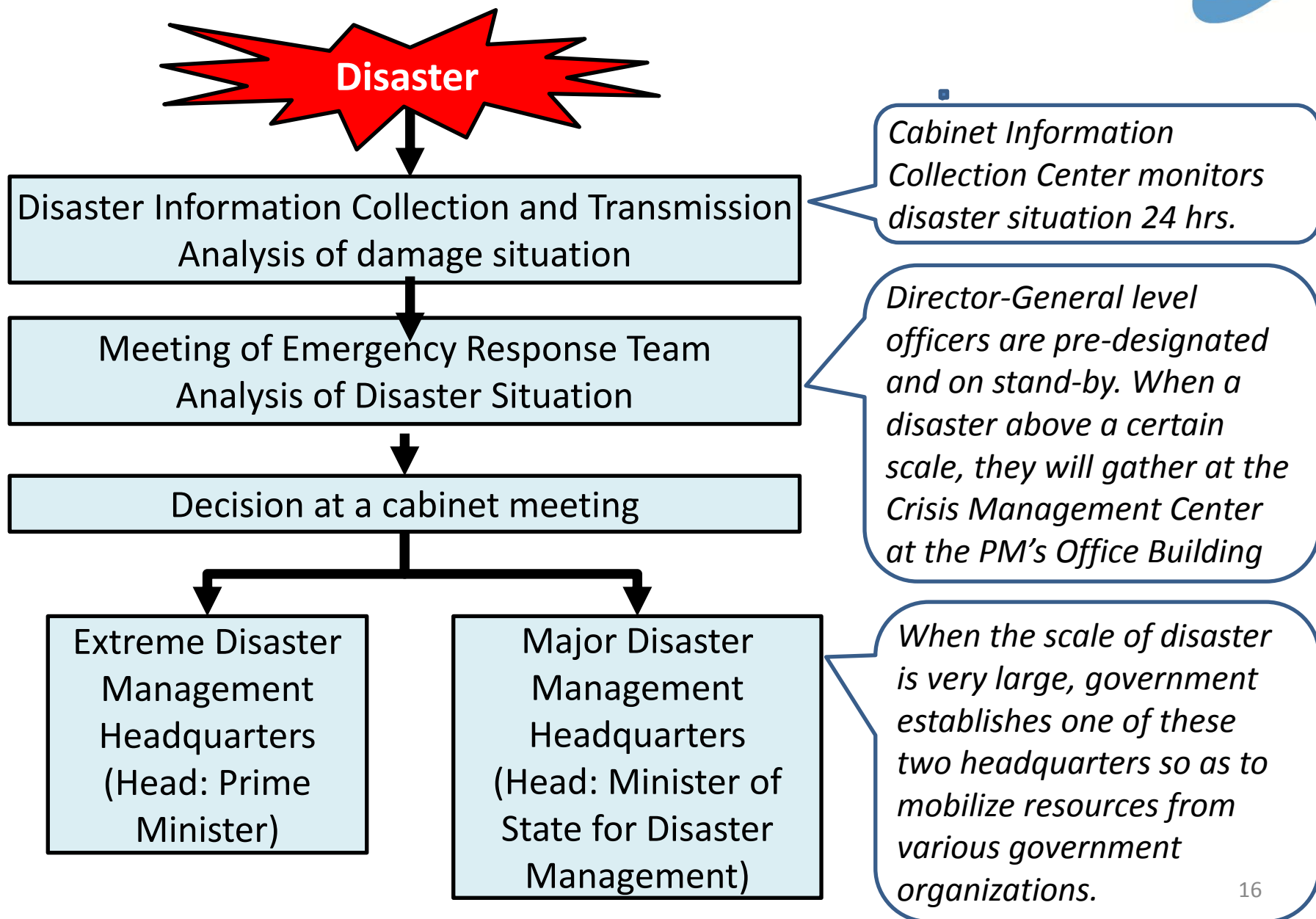
Municipal Disaster Management Council

Municipal Local Disaster  
Management Plan

# Central Disaster Management Council



## In times of a disaster





# Government's response on March 11

## Great East Japan Earthquake

14:46

14:50 Emergency Response Team started situation analysis

15:14

**Extreme Disaster Management Headquarters** established by a cabinet decision

15:37

The First meeting of the HQs convened and **decided on priorities in government's emergency response**

21:05

The Government's Advance Team flew by SDF's helicopters and arrived in the Miyagi Prefecture

Response (Lead) time shortened as compared to the past practices

# ***Emergency Response Priorities decided by the Emergency Disaster Management Headquarters***



1. Make every effort to gather information and grasp the extent of the damage;
2. Put priority on saving people's lives by taking the following actions:
  - Dispatch Self-Defense Force (SDF) disaster response units, police wide-area emergency response units, emergency fire response teams, Japan Coast Guard teams, and Disaster Medical Assistance Teams (DMAT) to disaster areas from all over Japan to the maximum extent;
  - Do the utmost to secure routes such as expressways and trunk roads for the transport of emergency response personnel and emergency supplies;
  - Secure air traffic over disaster-stricken areas and around them by issuing NOTAM (Notice to Airmen) when necessary and cooperating with relevant organizations to facilitate emergency response operations including search and rescue.

# ***Directions decided by the Emergency Disaster Management Headquarters on March 11***



3. Make every possible effort to recover lifelines (electricity, gas, water, communications, etc.) and transportation including railroads;
4. Strengthen the nationwide support system through collaboration between the public and private sectors to secure the supply of emergency medical supplies, food, water, other daily necessities, personnel necessary for recovery work of emergency transport routes and lifelines, and;
5. Provide accurate information to people in disaster-hit areas and elsewhere, with local authorities and other relevant organizations helping them make appropriate decisions and take appropriate actions.

# Government's initial response to saving lives

In response to the Great East Japan Earthquake, Government mobilized the following all available resources from outside hardest-hit 3 prefectures from the very early stage:

**National Police Agency** : a total of approx. 110 thousand personnel deployed

**Fire and Disaster Management Agency**: a total of approx. 30 thousand firefighters deployed

**Ministry of Defense**: a total of approx. 10580 thousand **Self Defense Force** personnel deployed

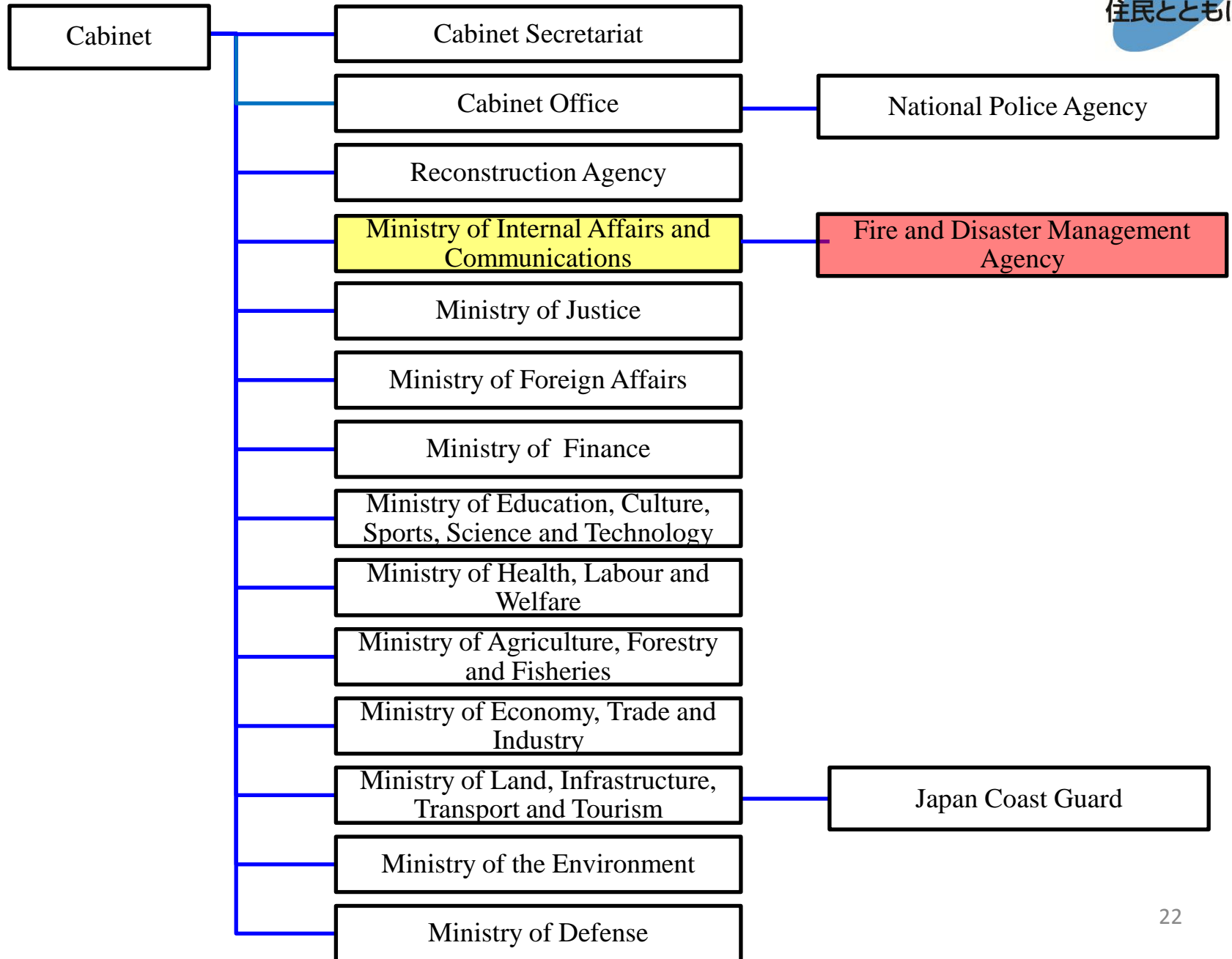
They together with local first responders, **saved lives of more than 27 thousand people**



### ***III. Fire and Disaster Management System***

***- Main engine of emergency response -***

# National Government



## *Fire Services in Japan*

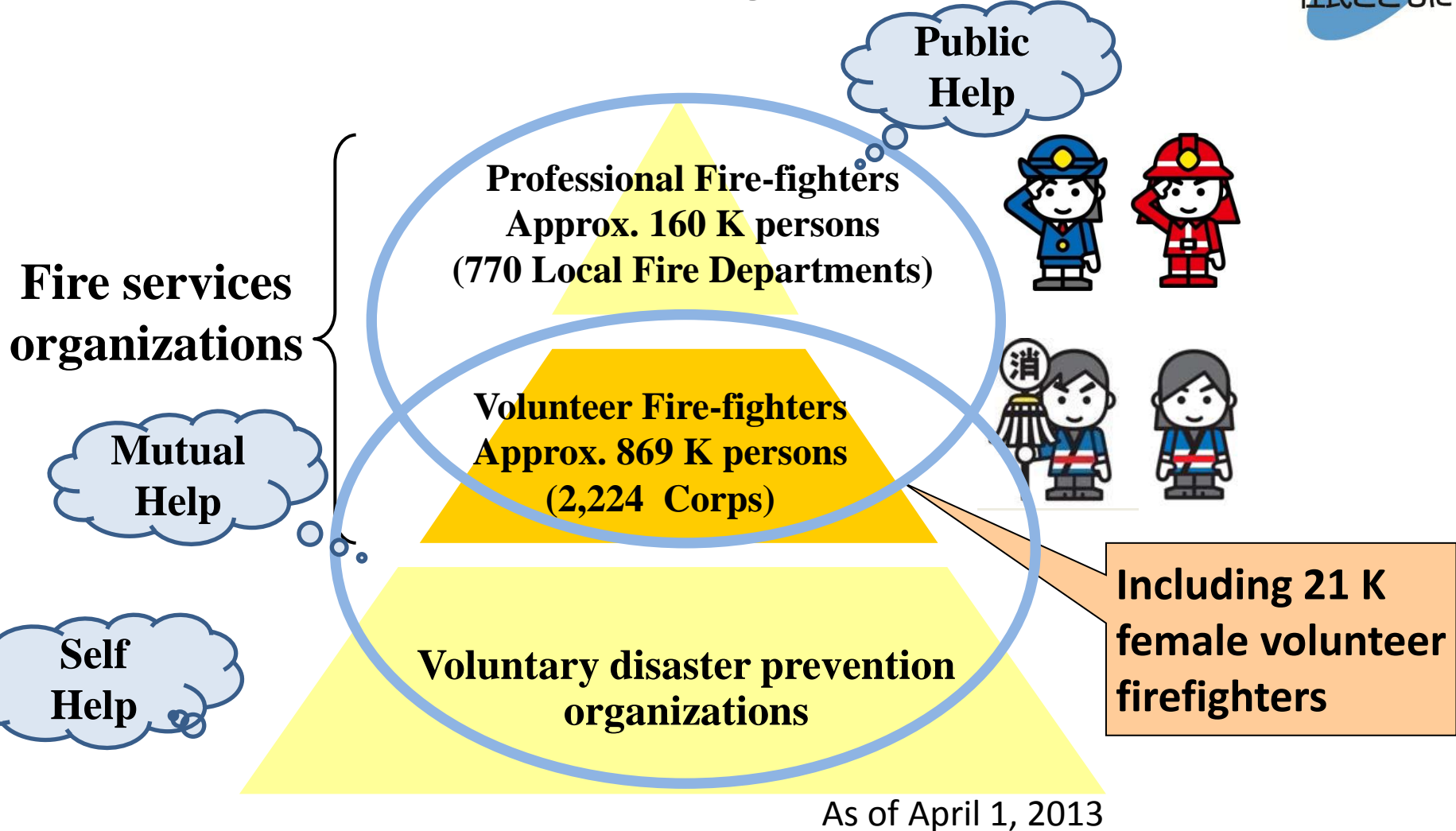
### Main duties (Fire Service Organization Law Article 1)

- Protect people’s lives, bodies and properties from fires;
- Prevent and minimize damage due to fire, flood, earthquake and other disasters;
- Transfer injured and sick people caused by disasters, etc.

### Organization

- “Fire services” in Japan is a function of municipalities (except Tokyo Metropolitan Government) which are closely linked to local communities and thus expected to play a key role in ensuring the safety and security of the public.
- They comprise various activities, including fire suppression, fire prevention, ambulance service (EMS), rescue operation, hazardous materials regulation, etc.

# Fire Service Organizations



Volunteer Fire Corps plays a pivotal role in communities, linking conventional fire service and voluntary disaster prevention organizations



# Volunteer Fire Corps

## Status

- ✓ Engaged in their own jobs, such as farmer, fisherman, etc. under normal conditions;
- ✓ They, being entitled to be a part-time local government official, participate in response activities



## Activities

- ✓ Implement fire fighting at an initial stage in communities and respond to natural disasters by using their own capacities



# Pre-disaster activities in communities



## **Roles of the FDMA**

### **FDMA in ordinary situation**

- *functions as the foundation for fire service administration nationwide and works for the development of legislations, rules and regulations, technologies, equipment, etc.;*
- *provides financial and technical support and equipment to prefectures and local fire departments;*
- *plays a pivotal role as a member of the Central Disaster Management Council, particularly in relation to prefectures and municipalities.*

### **FDMA in times of emergencies**

- *coordinates emergency response particularly between national government and prefectures*
- *also coordinates emergency response directly with local fire departments.*

# Emergency Response Center of the FDMA

11 March, 2011

## Command and Control



Minister of Internal Affairs and Communications and Commissioner of FDMA took the lead

Information collection from prefectures

Information analysis and consolidation

Deployment of Emergency Fire Response Teams

ICT

Coordination with PM office

Public relations

# FDMA Response Activities

Prime Minister's Office:  
Risk Management Center



FDMA

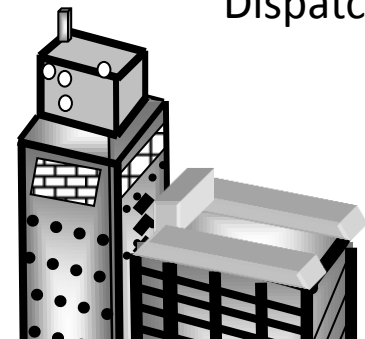


Dispatch of FDMA's advance team



Consolidate Information

Activate and Coordinate the  
Emergency Fire Response  
Teams

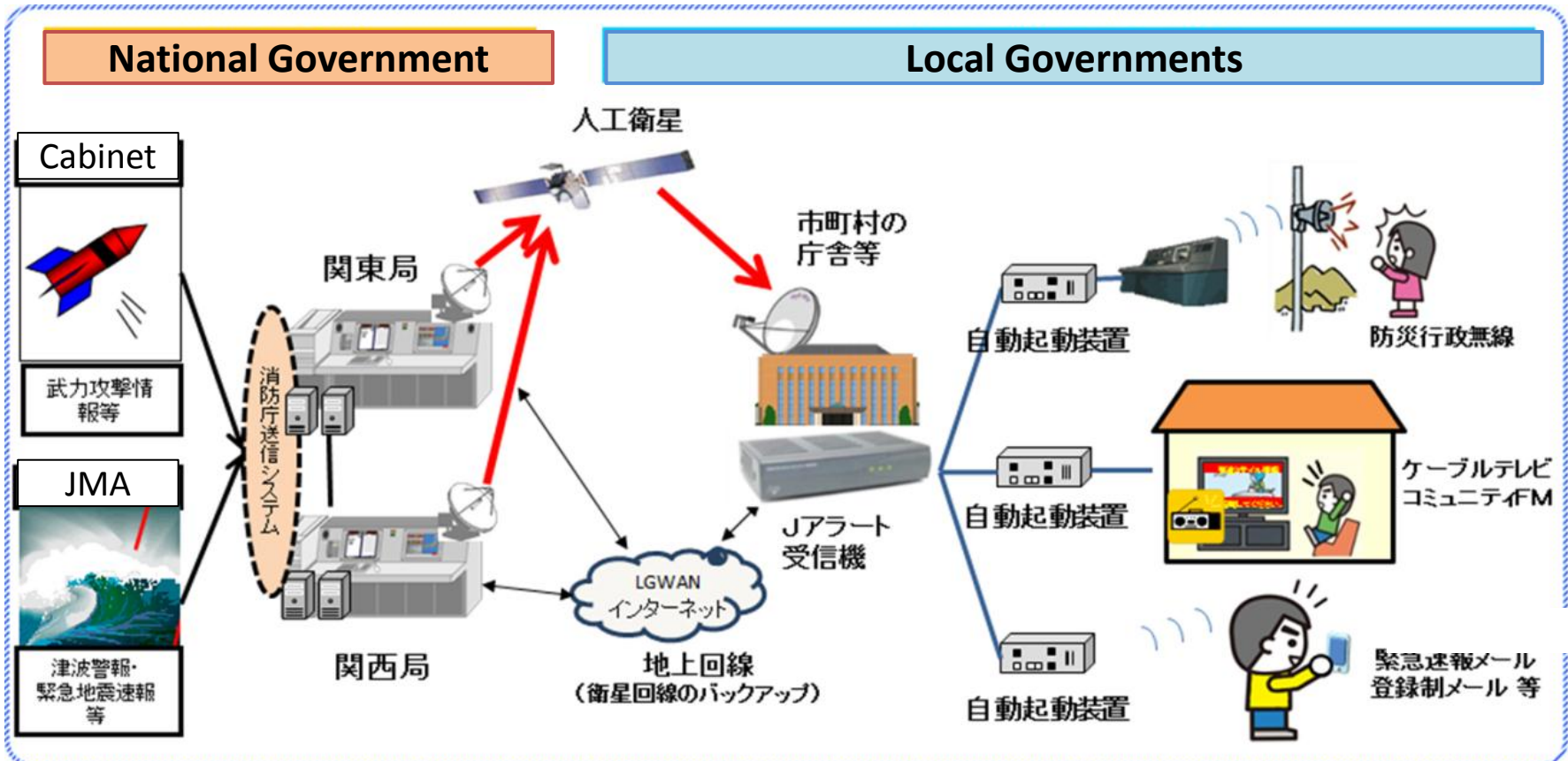


Prefecture



# Delivery of early warning to the people

Information on missiles, tsunami, earthquake early warning early and others is instantly transmitted from national government's agencies to local governments through satellite (J-ALERT System): then such information is delivered to individuals by automatically activating "Fire and Disaster Management Radio Communication Network". This automatic activation system now covers 78 % of all the municipalities, but it will be 100 % by the end of FY 2014.



# Mutual Aid System among fire departments

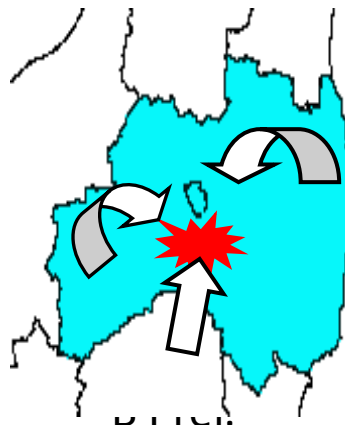
## In case of fire/accident/ natural disaster in an ordinary scale

Fire department of a municipality responds to it.



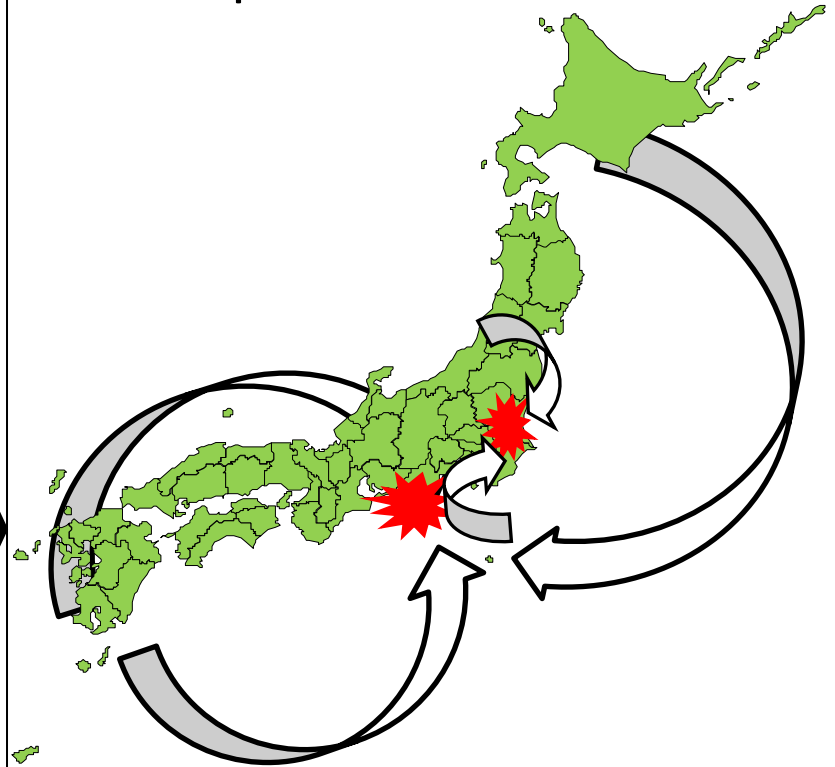
## In a bigger scale

Support is provided by fire departments within a same prefecture



## In an enormous scale

Support is provided by fire departments in other prefectures as “Emergency Fire response Teams”



# Emergency Fire Response Teams

- *Based on lessons learned from the 1995 Great Hanshin-Awaji (Kobe) Earthquake, the system of the Emergency Fire Response Teams was established in 1995. It started with the registration of Tokyo Fire Department and other major cities' fire departments.*



Great Hanshin-Awaji Earthquake,  
January 1995



- *Later, the Fire Service Organization Law as amended in June, 2003, officially launched the Emergency Fire Response Teams.*
- *The Commissioner of the FDMA is tasked with mobilization of the system and coordination.*



# Emergency Fire Response Teams

*The scale of the Emergency Fire Response Teams has been growing since its inception. At present, 4,600 units from 770 fire departments are registered:*

|                          |                    |                          |                  |
|--------------------------|--------------------|--------------------------|------------------|
| <i>Fire suppression:</i> | <i>1,633 units</i> | <i>Rescue:</i>           | <i>412 units</i> |
| <i>Ambulance:</i>        | <i>1,044 units</i> | <i>Air (Helicopter):</i> | <i>74units</i>   |
| <i>Special disaster:</i> | <i>276 units</i>   | <i>etc.</i>              |                  |

*FDMA provides special equipment necessary for deployment as the Emergency Fire response teams*



**Helicopter**



**Blower truck**



**Chemical protection suits<sup>33</sup>**

# Emergency Fire Response Teams



Flood in Niigata Pref.(July 2004)



Train accident in Amagasaki City (April 2005)



Niigata-Chuetsu Earthquake (October 2004)



Iwate-Miyagi Earthquake (June 2008)

## ***IV. Response to the Great East Japan Earthquake***

***- How fire services responded to unprecedented challenges and what lessons learned as a result-***

# *Tsunami hitting fire service building*



Tsunami overtopping 10 m high sea walls in Miyako City in Iwate Prefecture (photo taken by a local fishermen's cooperative staff)



Tsunami washing the rooftop of the town's disaster center in Minami-sanriku town in Miyagi Prefecture (photo taken by a survivor)



# Widespread Inundation (Miyagi Prefecture)



# Catastrophic Damage (Rikuzentakata City, Iwate Prefecture)



第一中学

県立高田病院

気仙川

Photo by Asia Air Survey Co.

2011.3.12 (c)Asia Air Survey



# *Explosion at Oil Refinery in Chiba Prefecture*



Tokyo Bay

*A huge fire ball  
generated due to an  
explosion of LPG tank*



# *Damage to municipal buildings in coastal areas*



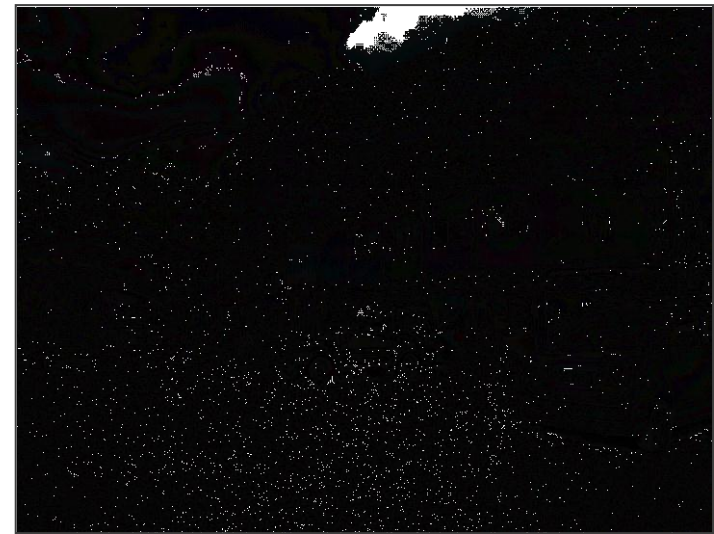
**City hall at Rikuzentakata in Iwate Prefecture**



**Town hall in Otsuchi Town, Iwate Prefecture**



**Town hall in Onagawa Town, Miyagi Prefecture**



**Temporary town hall in Otsuchi Town**

# Damage to fire services

Otsuchi fire station



Kuwagasaki District, Miyako City

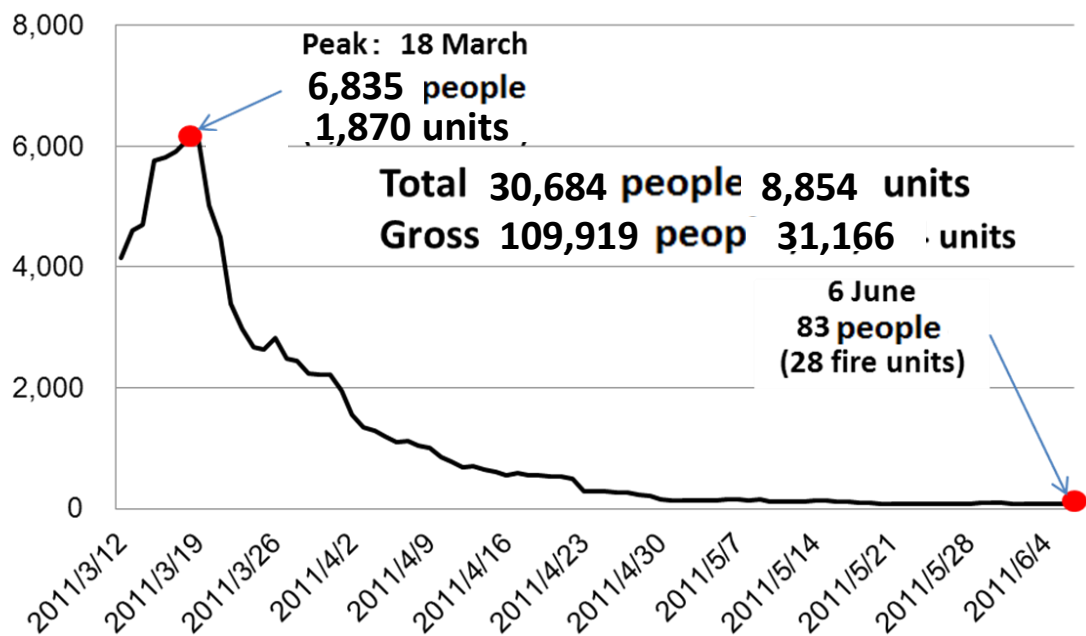


| Damage to fire department |   | Damage to volunteer fire corps |                                    |
|---------------------------|---|--------------------------------|------------------------------------|
| Fire Personnel            | Dead : 23<br>Missing : 4                                    | Volunteer firefighters         | Dead : 242<br>Missing : 12         |
| Building damage           | Fire Service HQs/<br>Fire stations/<br>Branch stations: 149 | Building damage (out of use)   | Depot of volunteer fire corps: 412 |
| Damage to vehicles etc.   | Vehicles: 77<br>Fire boats: 2<br>Helicopter: 1              | Damage to vehicles etc.        | Vehicles: 257                      |

Source) White Paper on Fire and Disaster Management 2011

# Emergency Fire Response Teams

- *Emergency Fire Response Teams from 44 prefectures were dispatched to worst hit prefectures; Iwate, Miyagi and Fukushima (11 March to 6 June 2011 (88 days));*
- *The total number of personnel dispatched was 30,684, equivalent to one sixth of the total fire personnel;*
- *They were engaged in various duties; rescue, firefighting, ambulance services, etc. They rescued 5,064 people in total.*



# Activities of the Emergency Fire Response Teams (Iwate)



14<sup>th</sup> March: Fire trucks deployed to Otsuchi Town



15<sup>th</sup> March: Rescuing people in Otsuchi Town (2)



15<sup>th</sup> March: Rescuing people in Otsuchi Town



15<sup>th</sup> March: Rescue activities in Otsuchi Town 45

# Activities of the Emergency Fire Response Teams (Miyagi)



Outbreak of fire



Hoses extended through the city



Firefighting activities by Team



Firefighting activities by Team (2)

# Activities of the Emergency Fire Response Teams (Miyagi)



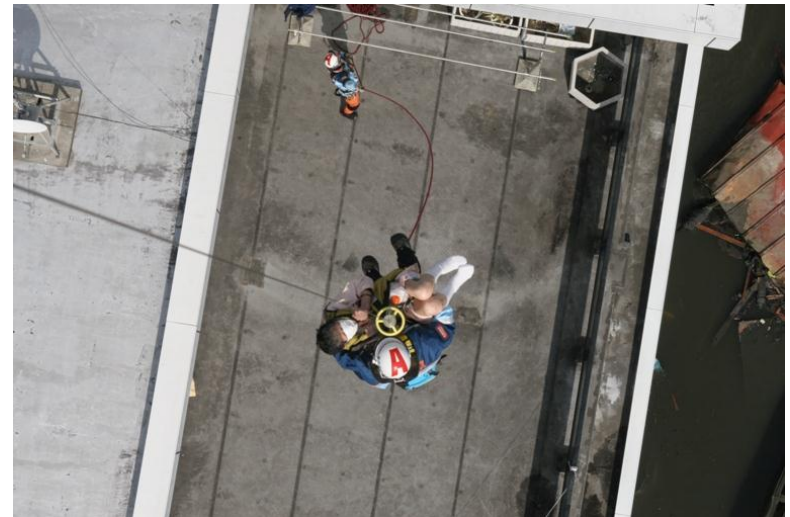
Rescue activities by Team



Rescue activities by Team



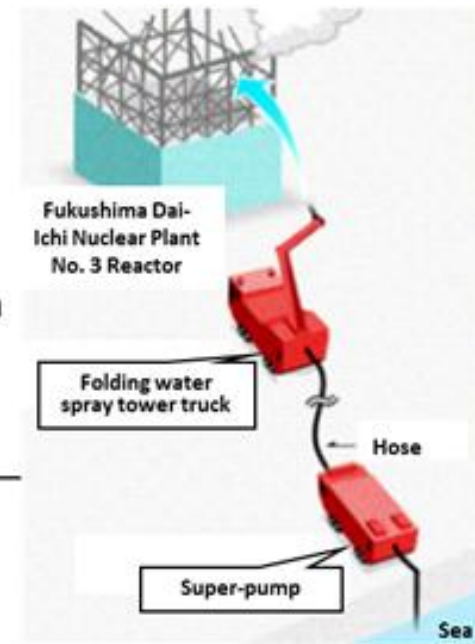
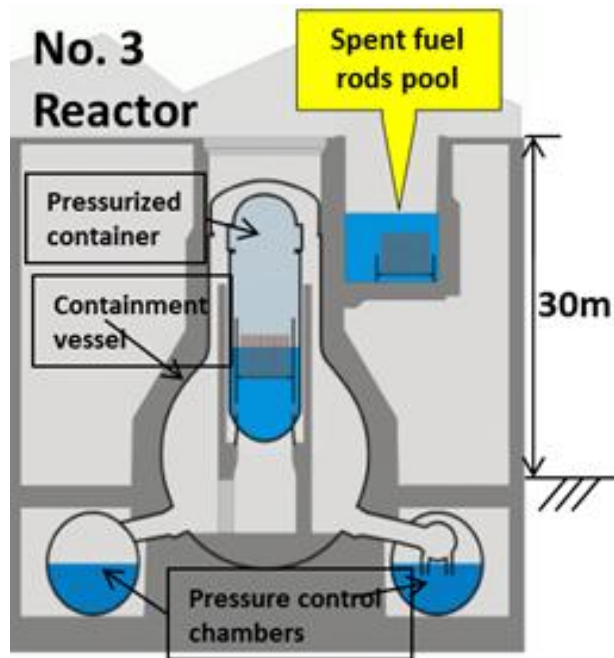
Rescue activities by Team



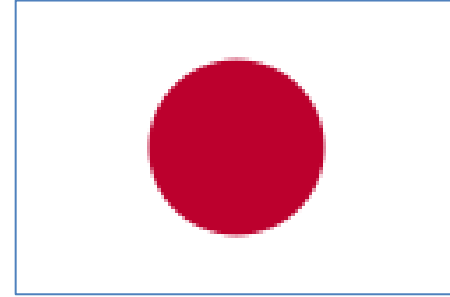
Rescue activities by Team

# Cooling operation of spent fuel pool

- *Fukushima Dai-Ichi Nuclear Power Plant lost external power, resulting in total power loss, except a single emergency diesel generator in reactor no. 6.*
- *As a result, cooling functions for both reactors and a pool to restore spent fuel rods were lost.*
- *The fuel in the spent fuel pool in no. 3 reactor was particularly in danger of overheating due to loss of water, thus it was necessary to pump a large quantity of seawater into the pool for cooling it.*







Thank you very much for very kind support from the people and government of the Philippines

Salamat sumasainyo sa mainit-init ng suporta mula sa pamahalaan at mga tao ng Pilipinas

## ***V. New developments after the Great East Japan Earthquake***

- What concrete measures have been taken based on painful experiences -***

# *Lessons from the Great East Japan Earthquake*

*The FDMA's Advisory Council, consisting of experts and academicians from various fields, submitted the Report "How to Strengthen Fire and disaster Management System Based on Lessons Drawn from the Great East Japan earthquake" on January 30, 2012 that suggests:*

## ***1. Enhance earthquake and tsunami measures and upgrade disaster response capacity***

- Re-examine hazard maps developed by municipalities*
- Inspect seismic strength of tsunami evacuation routes and buildings and to conduct seismic retrofitting*
- Re-examine the stock of emergency supplies*
- Promote disaster education and practical evacuation drills*
- Enhance fire radio communication system*
- Ensure diverse alternative channels including national early warning system (J-ALERT), community FM radio, early warning e-mail*

## ***Recommendations by the Council***

### ***2. Enhance functions of volunteer fire corps***

- Strengthen safety measures for volunteer fire corps, to upgrade their equipment, and to provide necessary care for incident stress*
- Enhance functions of volunteer fire corps as a core of communities*
- Enhance the capability of emergency transportation by ambulance*
- Re-examine functions of deployed rescue teams, including collaboration with relevant organizations*

## ***Recommendations by the Council***

### ***3. Enhance functions of the “Emergency Fire Response Teams”***

- *Strengthen logistical support by providing vehicles to transport personnel, equipment and fuel*
- *Review functions of operational bases to provide logistical support for prolonged activities*
- *Explore the possibility of air transportation of personnel and equipment*
- *Reexamine plans to deploy the Emergency Fire Response Teams*
- *Enhance communication and information sharing between FDMA and the Emergency Fire Response Teams*

## ***Recommendations by the Council***

### ***4. Earthquake and tsunami countermeasures to be taken by private enterprises***

- *Verify seismic strength of facilities to handle hazardous materials and emergency shut-down system*
- *Enhance disaster countermeasures against earthquake and tsunami at petrochemical complexes*
- *Review fire prevention and disaster management at high-rise or large buildings*
- *Strengthen seismic strength of buildings and of firefighting equipment*

# Fire Apparatus provided by FDMA



[Support vehicle: Type I]

- Body can be extended. Equipped with toilets, shower facilities, and a kitchen.
- Provided 17 fire head offices nationwide



[Equipment/materials for supporting Emergency Fire Response Teams]

- A set of air-tents, air-conditioners, portable beds, generators, portable toilets
- 500 sets provided for each prefecture depending on the number of registered Emergency Fire Response Teams



[Vehicle for transporting equipment/materials]

- The bed part is made of aluminum, equipped with a power gate
- One provided for each prefecture



[Fuel servicing car]

- Equipped with a 950L tank (diesel oil)
- Provided for at fire head offices in 30 prefectures



[Personnel carrier]

- Able to transport 24 personnel or more and has space for loading
- One provided for each prefecture

# Fire Apparatus provided by FDMA



- [Vehicle for a large decontamination system]
- Equipped with decontamination shower booths (able to decontaminate 200 people per hour)
  - Provided for 4 fire head offices nationwide

## Equipment/materials provided



[Remote exploratory detection device]



[Bio-hazard detector]



- [NBC reconnaissance vehicle]
- Able to detect bio hazards, chemical hazards, radiation and combustible gases
  - Provided for 1 fire head office



[Battery-operated strikers for rescue]



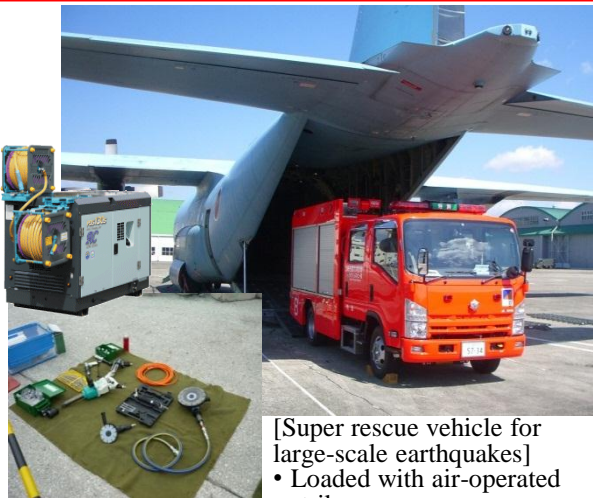
[Dry suit]



[A large decontamination system]



[Toxic gas detecting tube]



- [Super rescue vehicle for large-scale earthquakes]
- Loaded with air-operated strikers
  - Provided for 3 fire head offices nationwide



- [Heavy machines and vehicles for transporting them]
- Utilized for clearing roads and debris
  - Provided for 19 fire head offices nationwide



# Strengthen the capability of volunteer firefighters

*Volunteer Fire-fighters play a critical role in communities to protect the residents from various types of disasters, such as typhoon, tornado, torrential rain, etc. Therefore, their capability needs to be strengthened by providing better education and trainings.*

*Hence, the FDMA has revised their education standards and provided necessary equipment loaded fire vehicles loaded with various types of equipment based on experiences of the 2011 Earthquake and Tsunami.*

A small fire vehicle equipped with various types of SAR equipment.



Hydraulic cutter



Engine cutter



Chain saw



Stretcher



Walkie-talkies



AED



Balloon Rump

# Strengthen the capability of the “Emergency Fire Response Teams”

The FDMA has renewed the target of the number of the registered “Emergency Fire Response Teams” from 4,600 units to 6,000 units. In addition, a new unit tentatively named “Dragon Hyper Command Unit” specially for petrochemical disasters and a special task force that will be promptly deployed will be established. For this objective, the FDMA will provide financial and in-kind support. Moreover, specific equipment such as logistical support vehicles and amphibious buggies will also be provided.

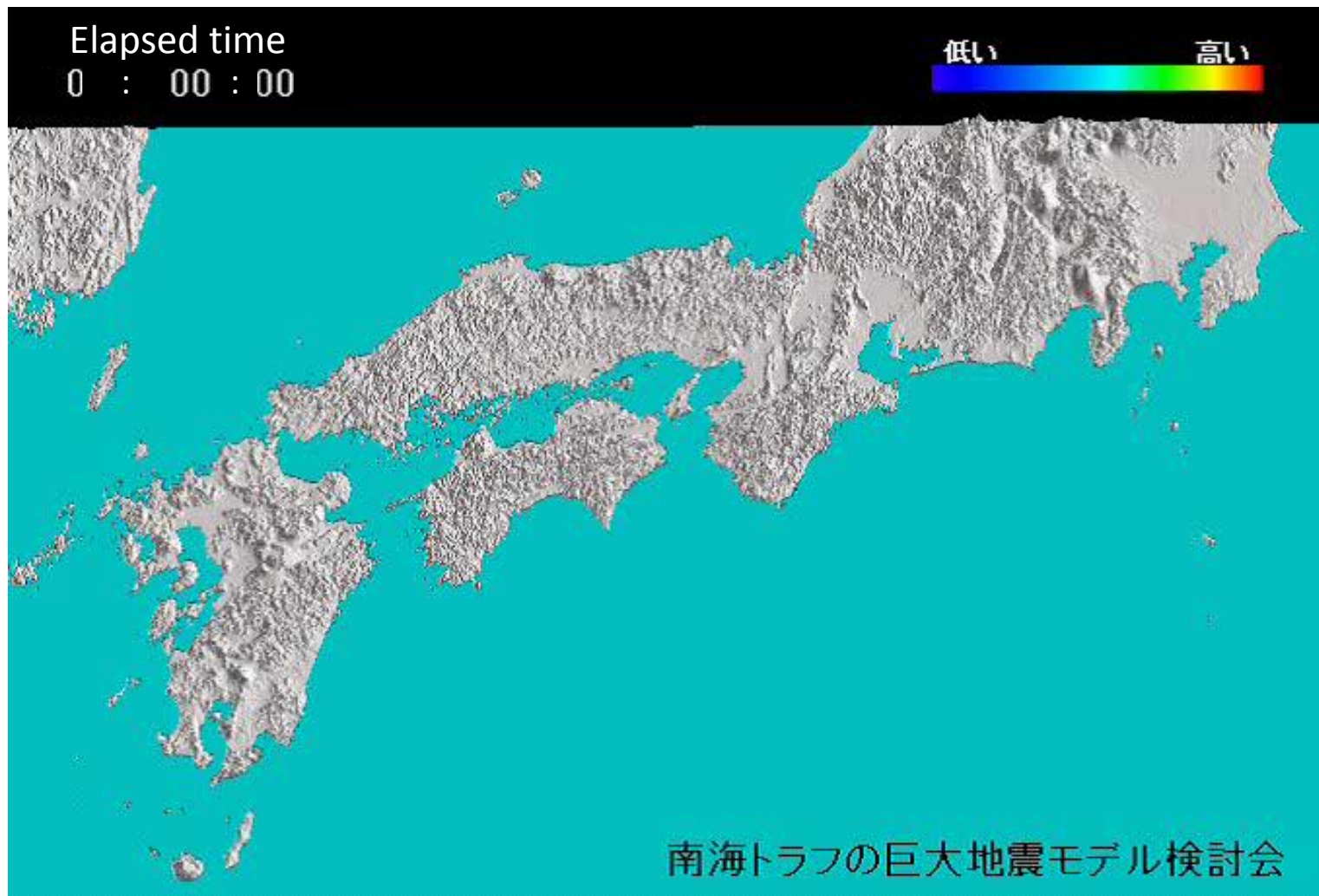


水陸両用バギー

※取り外し可能な消火・救急用設備を搭載



# Nankai Trough Earthquake and Tsunami



## ***VI. Conclusions***

## *Conclusions*

1. Disaster management capacity had been gradually built up based on painful experiences of past disasters. Nevertheless, the Great East Japan Earthquake posed unprecedented challenges.
2. Based on the lessons learned, the Japanese society has been making progress to strengthen its disaster response capacity at all levels. Particularly, response capacity at the local level is critical. In Japan, local fire departments and volunteer fire-fighting corps play a central role. Hence, their capacity is now being upgraded.
3. In the event of an extraordinary large disaster, mutual support beyond administrative boundaries becomes extremely important. In the field of fire services, the capacity of the Emergency Fire Response Teams, which provide support from other prefectures under the guidance by the FDMA, is now being upgraded.



*Maraming salamat!*

*Thank you very much!*

*Arigatou gozaimasu!*