総務省
Ministry of Internal Affairs and Communications

The Experiences and Lessons from the Great East Japan Earthquake

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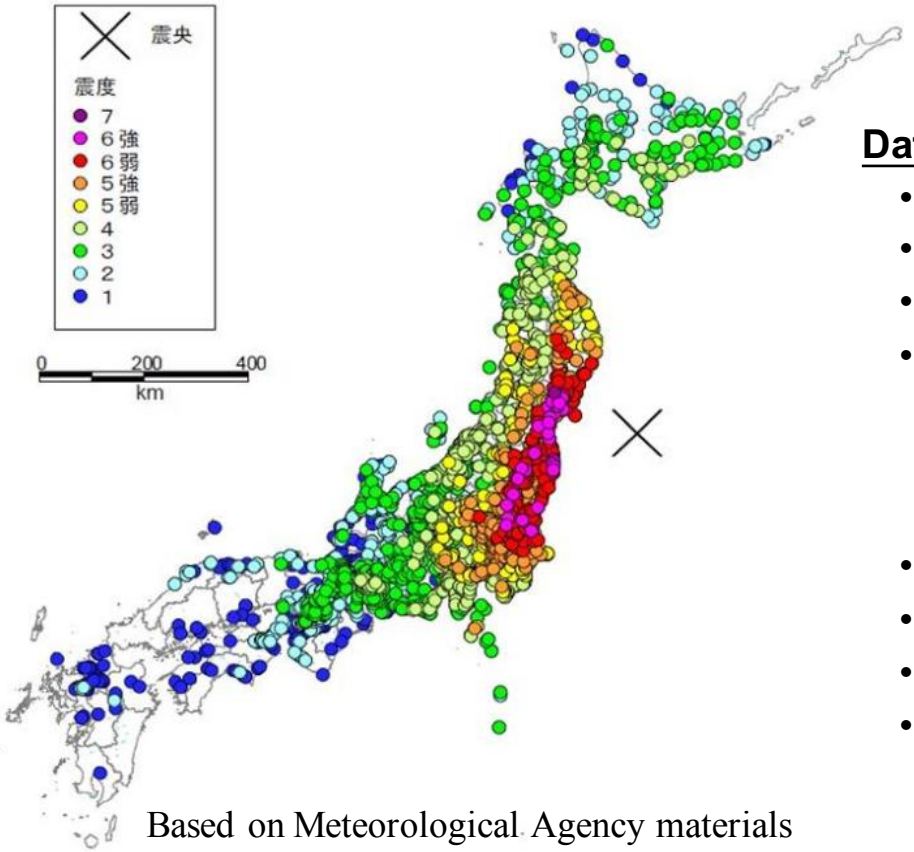
- Overview of the Great East Japan Earthquake
- Lessons from the Great East Japan Earthquake about telecommuncation network infrastructure
- Information delivery to the public in the Great East Japan Earthquake

Overview of the Great East Japan Earthquake

- The largest earthquake recorded in Japan
- 6 minute long tremor observed
- Destruction by Tsunami (the highest ever recorded in Japan)
- Tsunami caused fires
- Damage by liquefaction
- Subsequent Fukushima Daiichi nuclear power plant accident



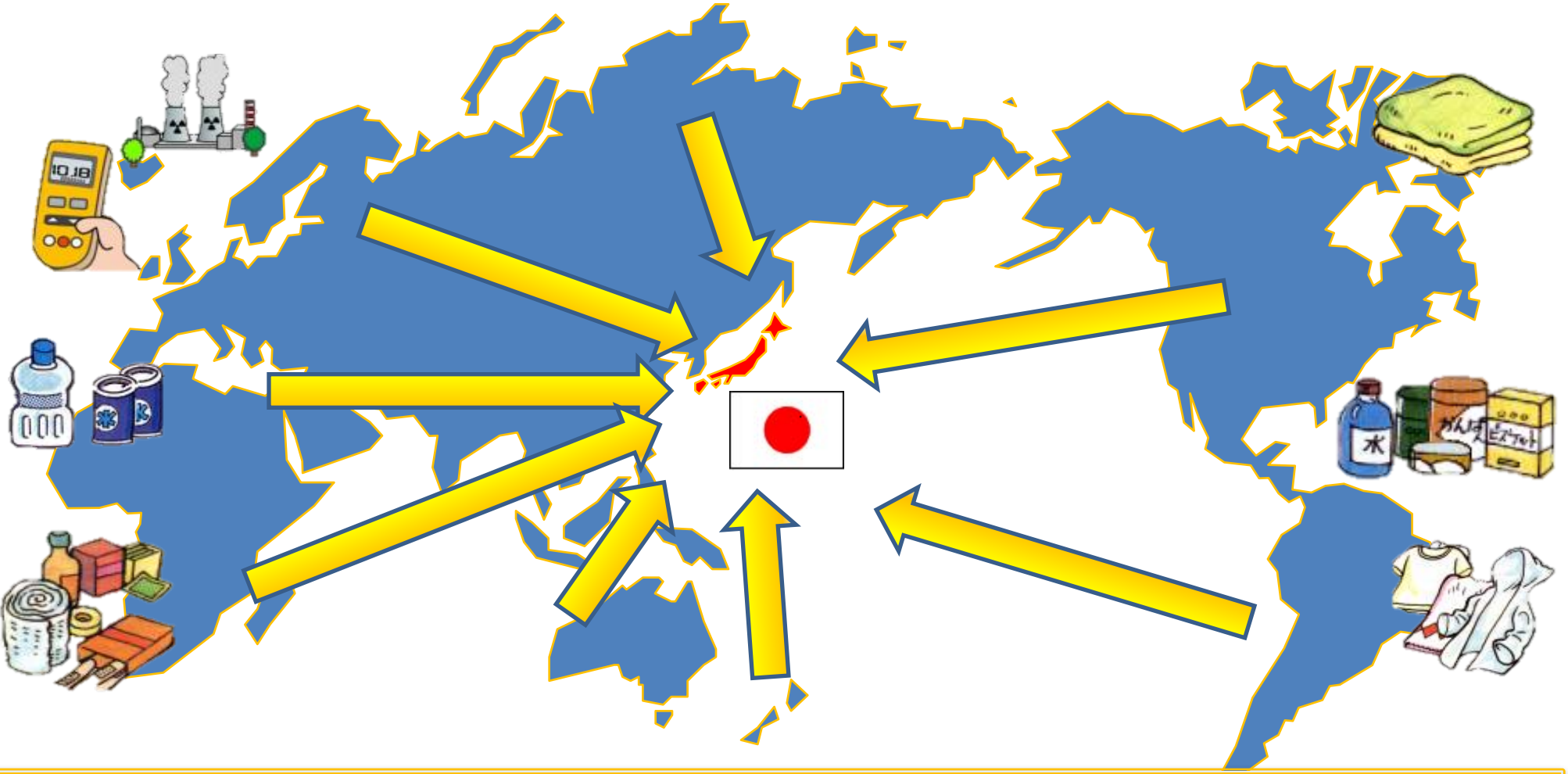
Based on Meteorological Agency materials

Data of the earthquake

- Occurred on 11 March 2011, 14:46pm
- Moment Magnitude: 9.0
- Epicenter: N38.1, E142.9, Depth 24km
- Massive tsunami :
  - the maximum height of the water level: 9.3m
  - run up of tsunami wave height: 39.7m
  - total inundation area: 535km^2
- Number of death or missing: about 20,000
- Number of completely collapsed houses: about 130,000
- Maximum number of evacuees: 450,000 (14th March, 2011)
- Direct economic losses: about 17 trillion Yen ($178 billion)

The Arrival of the Tsunami (Taro District, Miyako City)

Thanks for assistance from all around the world



Offers from 163 countries and regions, and 43 international organizations
Condolences expressed by **more than 180** countries and regions, and **more than 60** international organizations

As of October 17,2011, survey by Ministry of Foreign Affairs Japan

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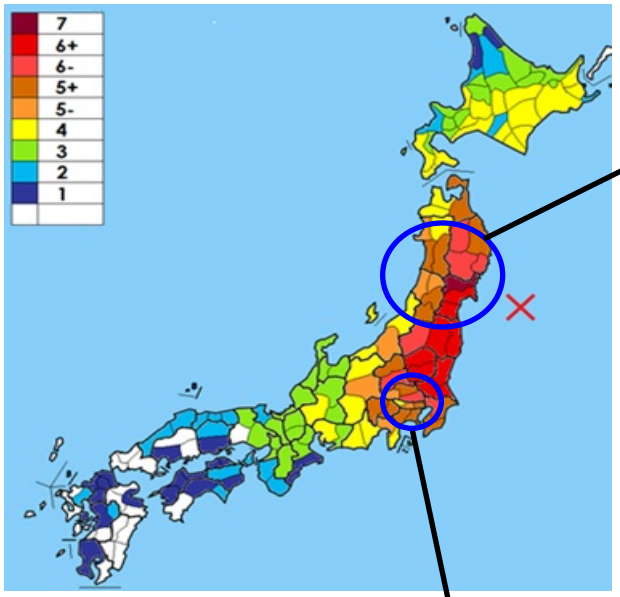
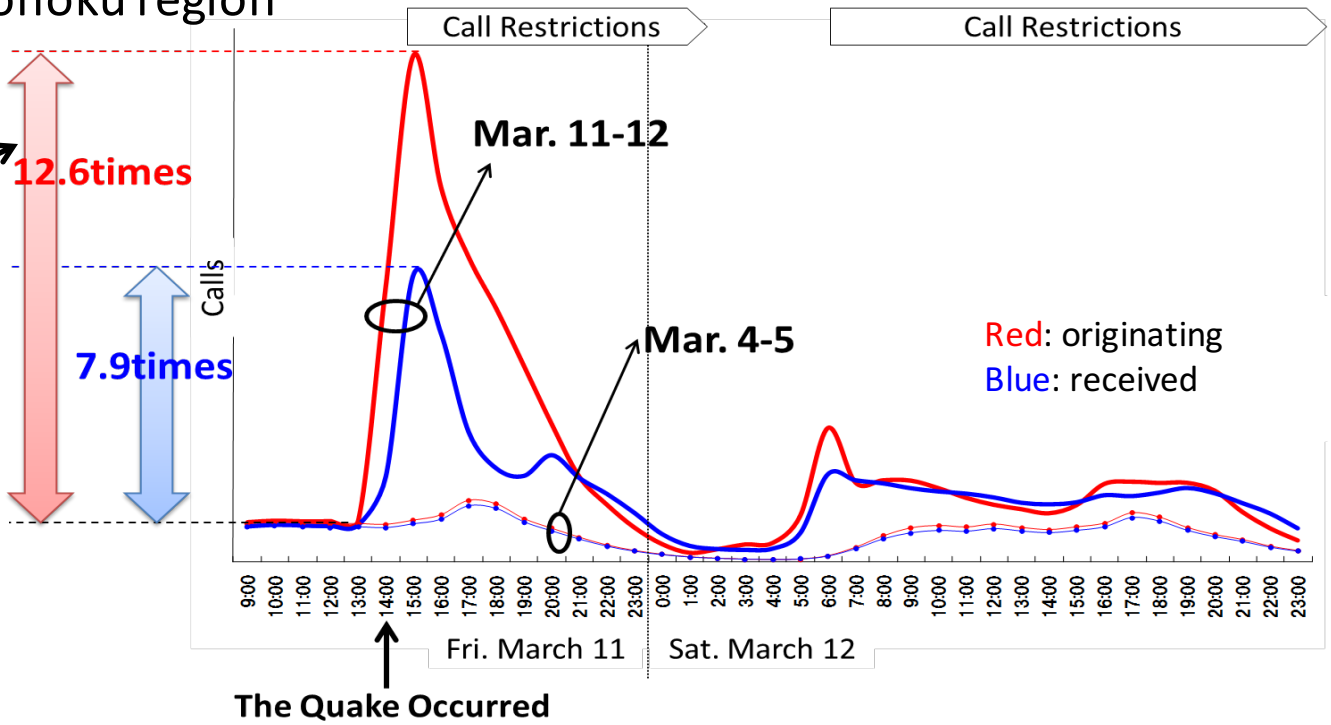
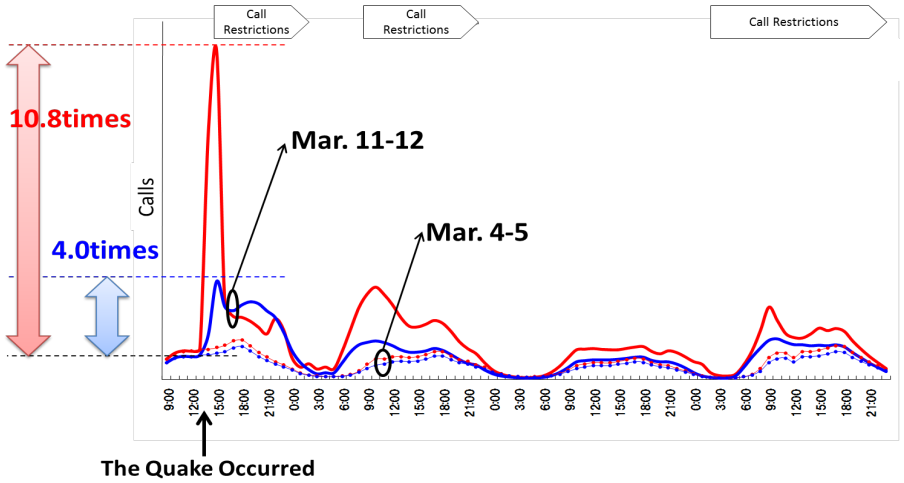
Voice traffic congestion (mobile network)



Tohoku region



Tokyo



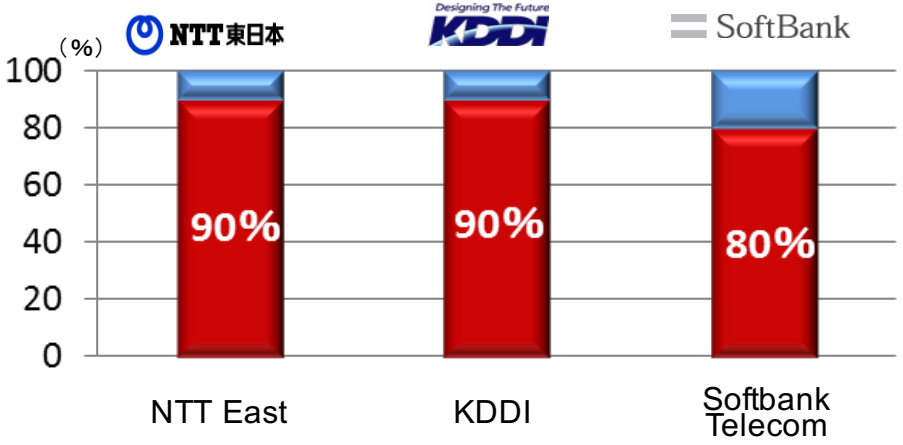
The traffic increased
more than 10 times after the quake

Estimated to be 60 times
if the restriction was not applied

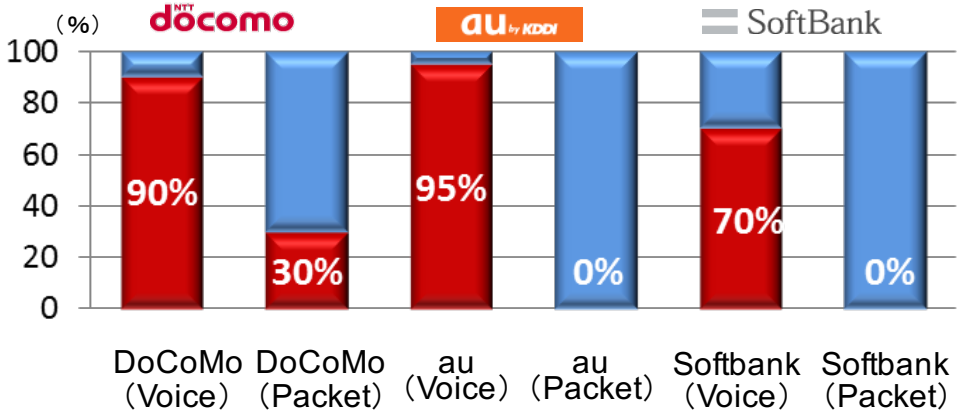
Traffic Restrictions

Due to heavy congestions, carriers applied traffic restrictions.

Fixed-line Telephones



Mobile Communications



(Ministry of Internal Affairs and Communications)

Voice traffic was restricted by as much as 70-95%!

Packet traffic was restricted by 30% or no restriction.

Damage to Mobile Networks

Base stations collapsed
or
Backup batteries ran out

Backup generators ran out of fuel because of long power outages

Central office
(housing building)

Central office,
customer building, etc.
(relay building)

Transmission line
relay station

Area A

Base station

RNC

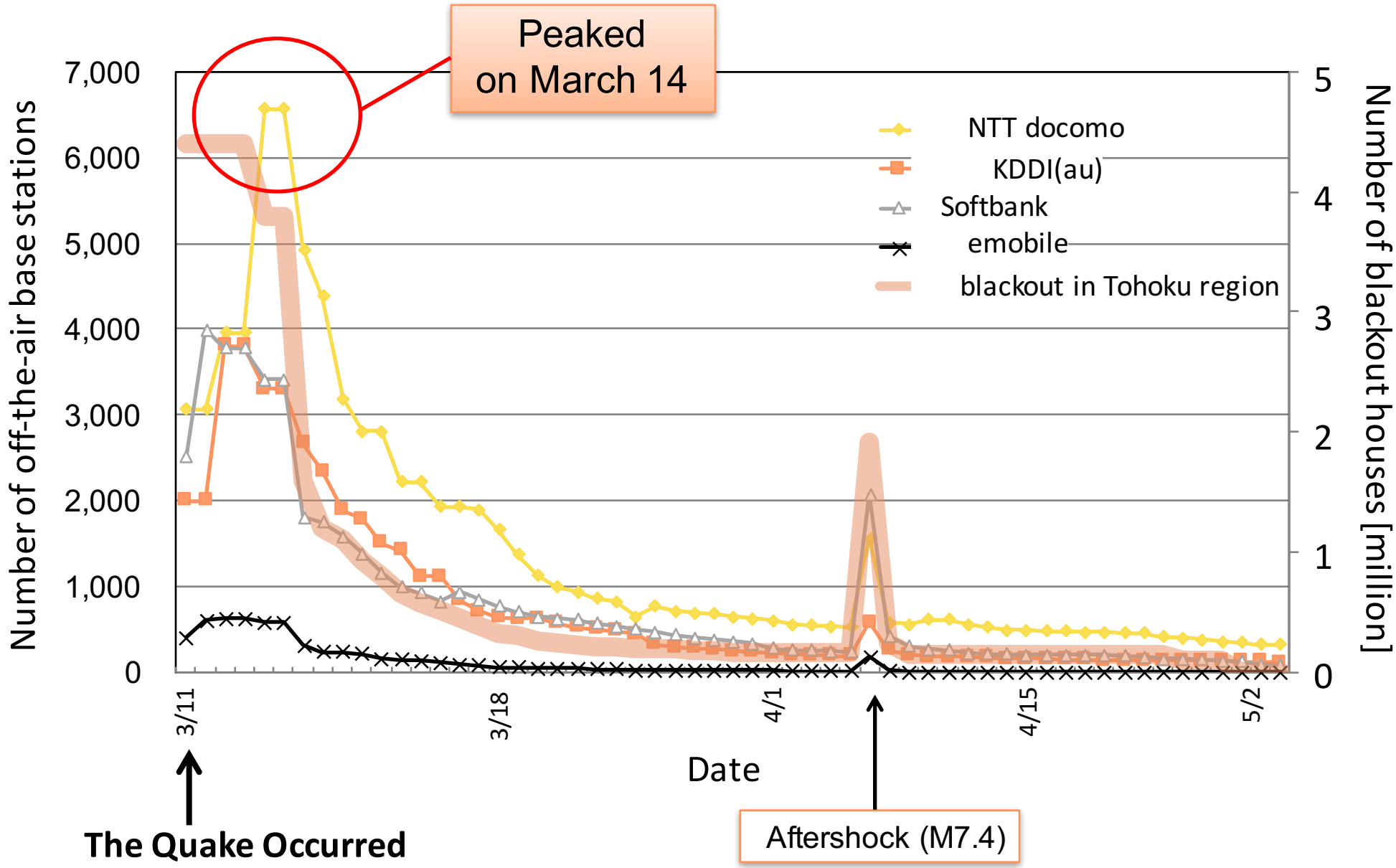
Trunk exchange

Communication cable

Cables cut off
or
Network duct destroyed

Area B

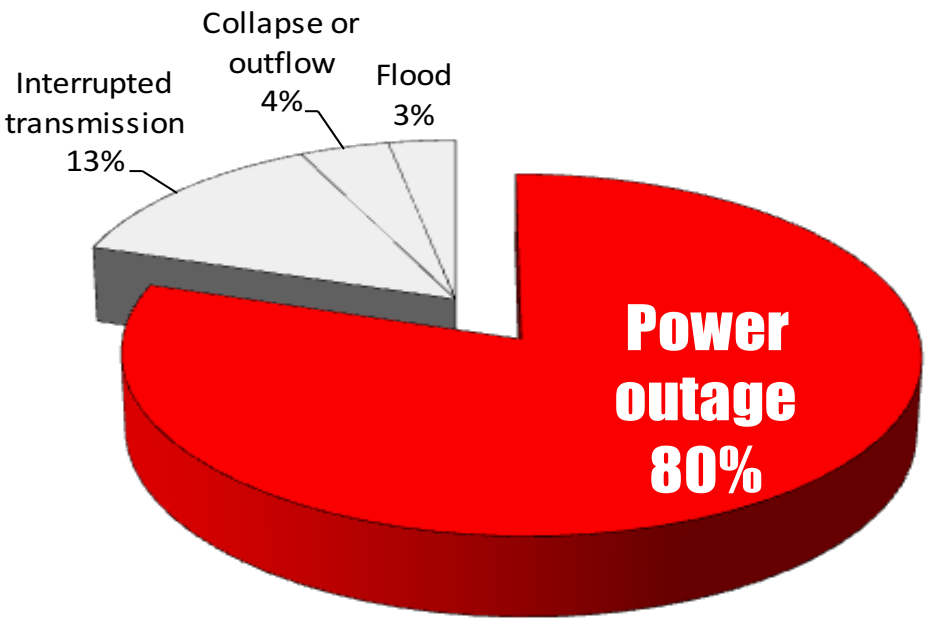
Base station damages and blackouts



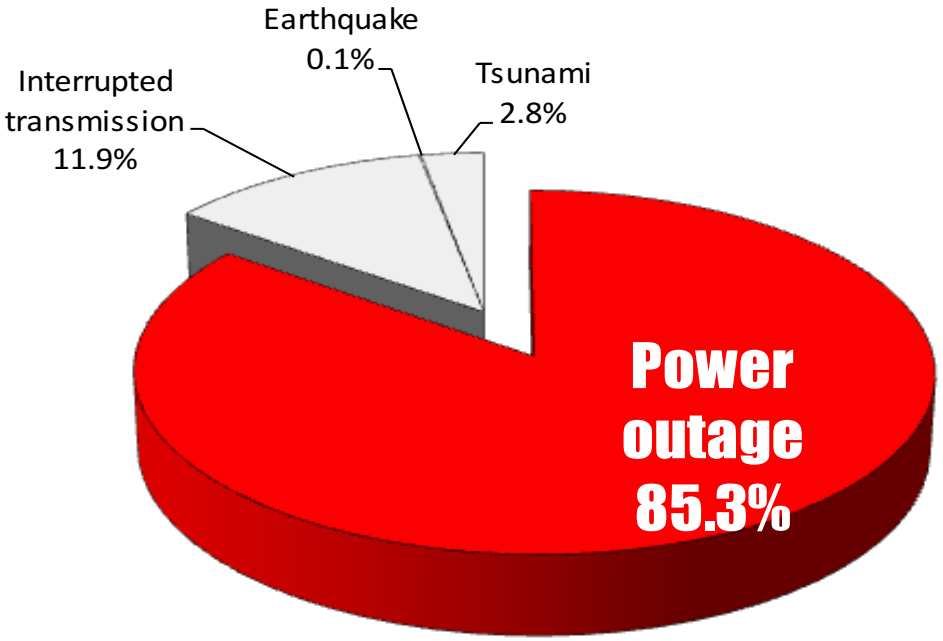
Disconnection

Over 80% of communications disconnection of fixed and mobile was caused by widespread and prolonged power outages.

Fixed telephone



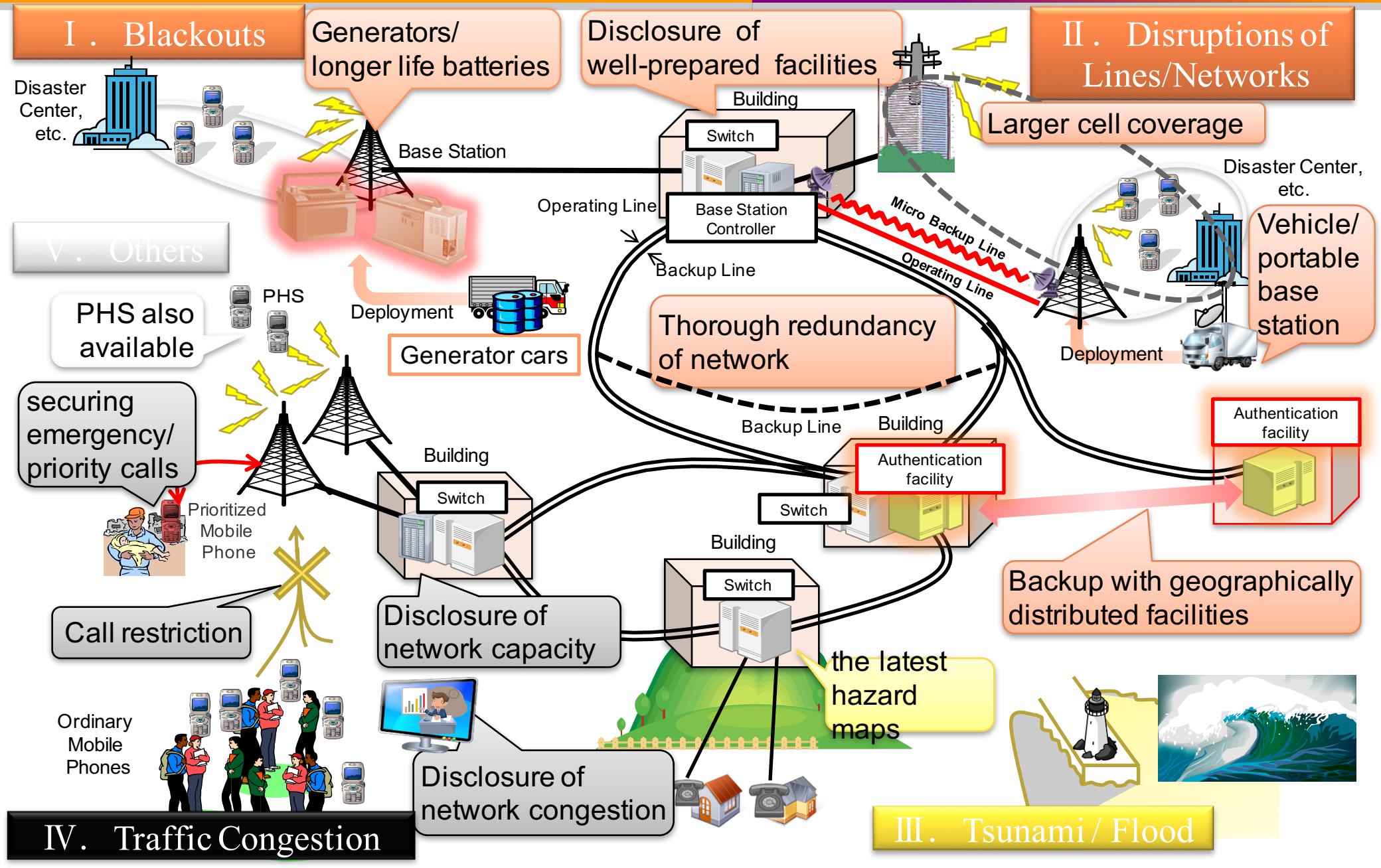
Mobile telephone



Summary of the 3.11 disaster

	Preparation before the 3.11 disaster		3.11
Earthquake	- Anti-seismic buildings & cables based on the Hanshin earthquake (1995) - Route diversity	⇒	Minimum problems
Tsunami	- Flood prevention based on local government hazard maps	⇒	Serious damage Unexpectedly high tsunami
Congestion	- **Emergency message services** (started after the Hanshin earthquake (1995))	⇒	The services worked, but lack of awareness
Blackout	- Emergency battery and generator	⇒	Serious disruption Unexpectedly long and wide-area blackouts

Countermeasures
(reported by Information Communications Council, February 17, 2012)



Example(Delivery) : ICT Disaster Management Unit

- ICT disaster management unit are radio communications equipment mainly transported to areas stricken by disasters for the emergency restoration of communications functions. Three types of ICT disaster management units are available; units of car type and attaché case type, both of which are referred to as MDRU(Movable and Deployable ICT Resource Unit), as well as units of container.
- The ICT disaster management unit incorporates functions to provide disaster management officials and disaster-affected residents of means of information communication, such as compact portable base stations and disaster-dedicate IP phone.

Container type

Car type

Attaché case type

Characterized with high-quality infrastructure technology

- Possible to provide a minimum-required ICT environment (incorporating a compact portable base station, Wi-Fi network, and information processing server) immediately in case of disaster.
- Possible to transport easily because units of container type, car type, and attaché case type are miniaturized (and its contents are exchangeable according to needs).
- Possible to contribute to bridging the digital divide in villages not provided with electric power even in ordinary times by using solar panels.

Foreign case examples

- ITU, Ministry of Internal Affairs and Communications of Japan and Department of Science and Technology of Philippines signed a cooperation agreement for the joint project (in May 2014). Following this, the parties concerned have been working on the introduction of ICT disaster management units, including the start of a feasibility study using MDRU in the Philippines (in December 2014).

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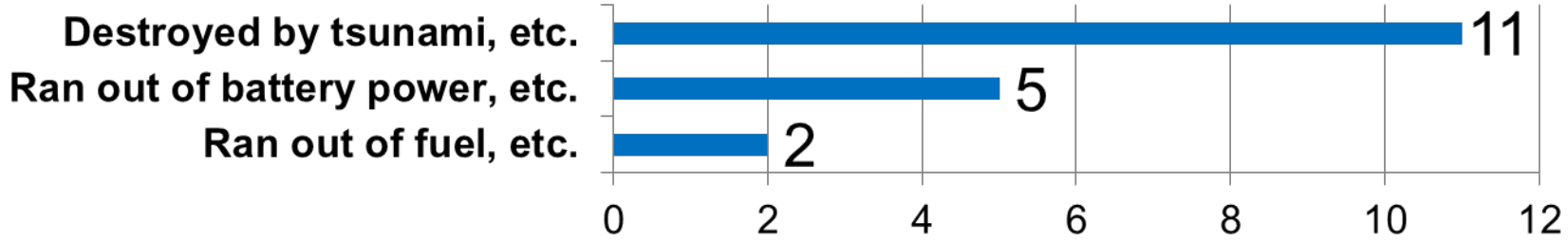
Survey on usage of disaster prevention(DP) radio system in the Great East Japan Earthquake

1. **Usage of disaster prevention radio system (27 municipalities in coastal areas)**

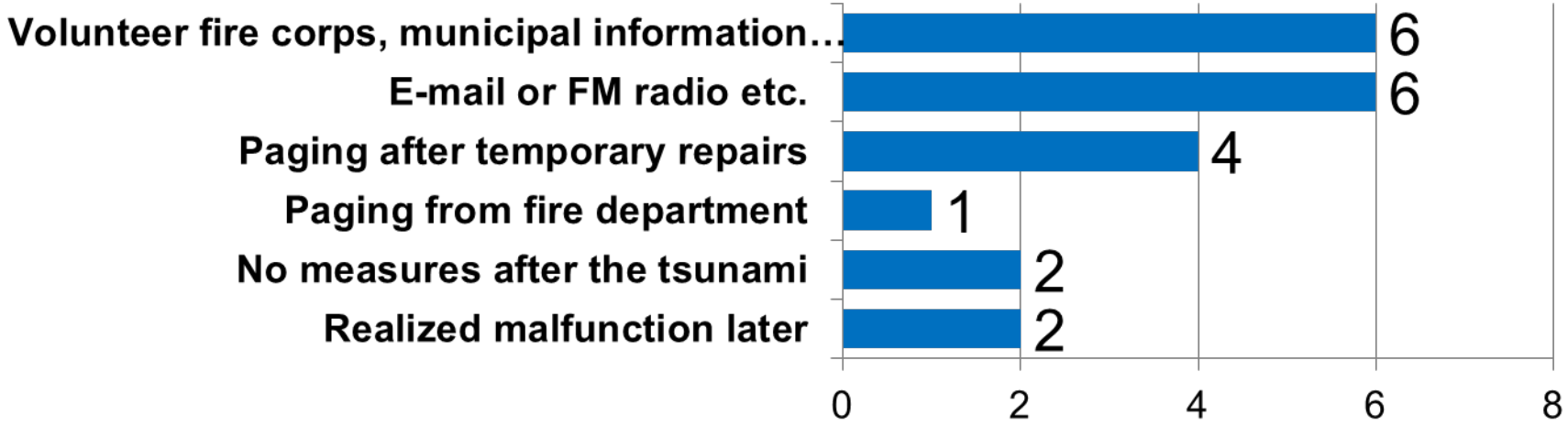
   Disaster prevention radio systems were used without any problem・・・・・10

   There were some problems in the usage of disaster radio systems ・・・・ 17

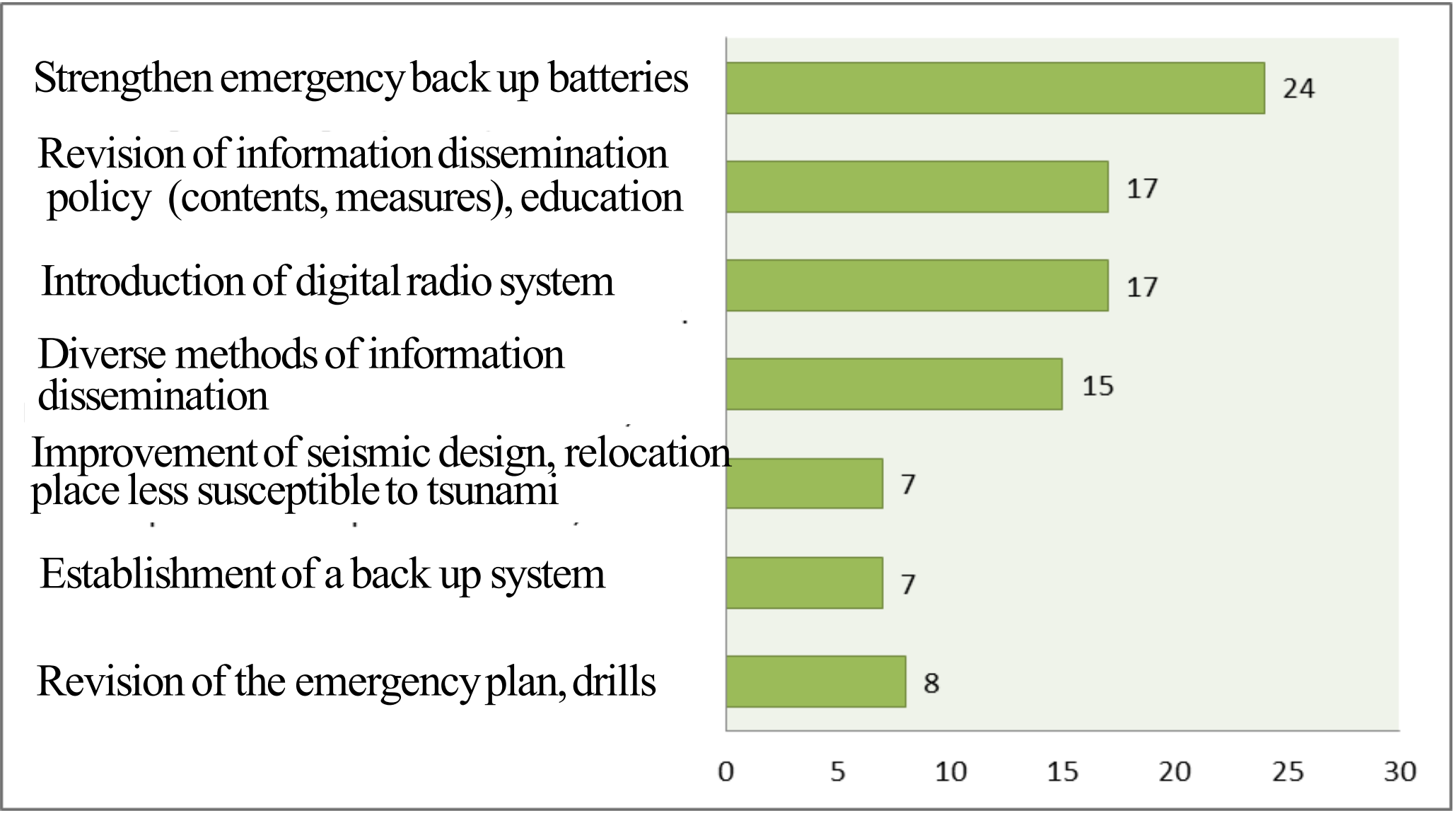
2. **Reason for malfunction of DP radio systems (17 municipalities)**



3. **Alternative measures while DP radio system did not work (17 municipalities)**



Lessons and solutions learned from municipalities affected by tsunami



【Strengthening information dissemination methods】

1. Emergency back up batteries for the radio system
   →Ensure that back up batteries last for at least 24 hours, by using generators, solar batteries, wind generators, high performance batteries, etc.

2. Introduction of a digital radio system, information dissemination in diverse methods
   →e-mail, FM radio, TV, introduction of a digital disaster radio system etc.

3. Anti-seismic design, relocation of equipment to places less susceptible to tsunami, etc., remote control for the radio system

【Revision of the emergency plan.】

4. More practical drills
5. Ensuring alternative measures to disseminate information, in case the disaster radio system is damaged

Thank you!

Ministry of Internal Affairs and Communications, JAPAN

http://www.soumu.go.jp/main_sosiki/joho_tsusin/eng/index.html
(English)