

White Paper Disaster Management in Japan 2018

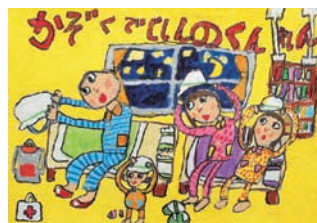
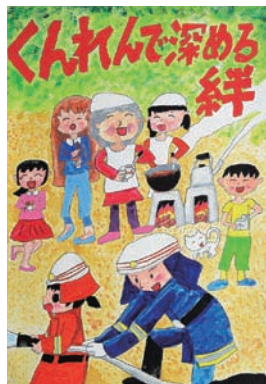


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Appendix

Introduction

The White Paper on Disaster Management 2018 has a special feature with a title of “Threats of Meteorological Hazards - Focusing on the Northern Kyushu Torrential Rain” which covers loss and damage caused by the July 2017 Northern Kyushu Torrential Rain, responses by the government, collaboration with volunteers and nonprofit organizations, and future challenges.

Part 1 describes the initiatives for disaster risk management measures by the government in FY2017, including:

- Revision of the Basic Plan for Disaster Management regarding responses to the issues from the Kumamoto Earthquake (2016) and Typhoon No. 10 in 2016 (April 2017);
- Improvement of procedures for designating Extremely Severe Disasters (December 2017);
- Comprehensive revision of the “Large-Scale Earthquake and Tsunami Disaster Emergency Operations Policy” according to the lessons learned from the Great East Japan Earthquake and Kumamoto Earthquake (December 2017);
- Decision of government responses regarding the announcement of the “Nankai Trough Earthquake Information” when anomalous phenomena occurs or the relatively high possibility of earthquakes are assessed along the Nankai Trough (September 2017); and
- Report of the “Basic Approach for Large-scale, Extensive Evacuation from Flooding or Storm Surge Inundations” which discussed the way of evacuation from flooding and storm surge inundation in three major metropolitan areas (e.g. Tokyo metropolitan area) (March 2018).

New and revised major laws and guidelines described in this White Paper (in order of appearance)	Page No.
● Revision of the Basic Plan for Disaster Management	65
● Improvement of procedure for designating Extremely Severe Disasters	67
● Decision of the Large-Scale Earthquake and Tsunami Disaster Emergency Operations Policy	70
● Government Responses regarding the announcement of the Nankai Trough Earthquake Information	95
● Basic Approach for Large-scale, Extensive Evacuation from Flooding or Storm Surge Inundations (report)	100

Special Feature
Threats of Meteorological
Hazards
- Focusing on the Northern
Kyushu Torrential
Rain, etc. –

Chapter 1 Climate Change

Chapter 2 Northern Kyushu Torrential Rain

Chapter 3 Future Approach

Special Feature “Threats of Meteorological Hazards - Focusing on the Northern Kyushu Torrential Rain, etc.”

Large-scale meteorological hazards have frequently occurred worldwide in recent years. In 2017, meteorological hazards hit Japan and many places in the world, with immense damage and loss caused by rainstorm and flooding. For example, flooding and mudslides in India and neighboring areas caused more than 1,200 casualties in August 2017. The same month, flooding, mudslides and landslides in West Africa (Sierra Leone) rendered more than 900 people dead or missing (see Attachment 26 (page A-42)). In Japan, Northern Kyushu Torrential Rain in July caused significant human and economic damage.

The World Meteorological Organization (WMO) publicized its estimation on economic damage caused by frequent meteorological hazards worldwide in 2017 due to the progress of global warming, resulting in a record-high 320 billion dollars (approximately 34 trillion yen), of which around 80 percent (about more than 260 billion dollars) were considered attributed to the U.S. which suffered large hurricanes such as “Harvey,” “Irma” and “Maria.”

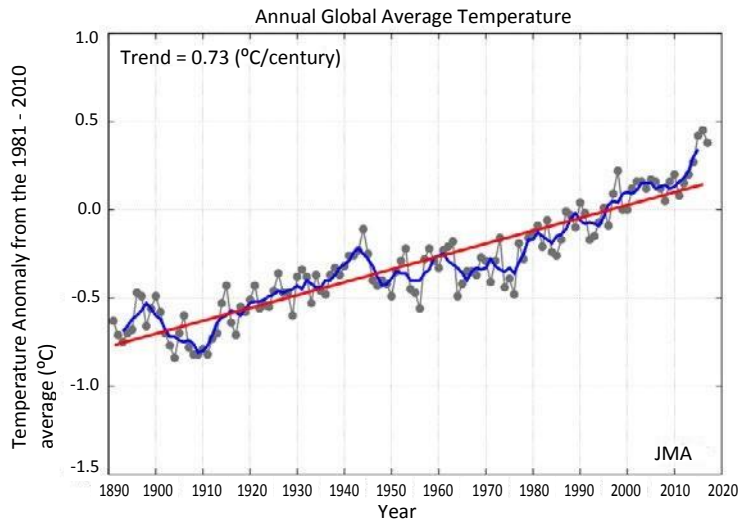
Climate change due to global warming also has a major impact on weather phenomena, and this tendency is considered to continue for some considerable time in the future. According to the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), all scenarios, regardless of future emissions of greenhouse gases, forecast a rise of global average temperature towards the end of the 21st Century and increasing risk of the impact of climate change.

Accordingly, the feature of the White Paper on Disaster Management in 2018, discusses recent frequent meteorological hazards in Japan to understand the trend of climate change in Japan (Chapter 1), and describes damages caused by meteorological hazards; particularly the Northern Kyushu Torrential Rain Disaster in 2017, which seriously damaged the area. It also explains the responses and measures by the government and other organizations (Chapter 2). Based on these assessments, the White Paper outlines the approaches taken to date and to be taken in the future by the government (Chapter 3).

Chapter 1 Climate Change

Section 1 Global trends

The annual anomaly of the annual global average temperature (i.e., the combined average near-surface air temperature over land and sea surface temperature) in 2017 is $+0.38^{\circ}\text{C}$ (definite value) above the 1981 – 2010 average ($+0.74^{\circ}\text{C}$ above the 20th century average), which is the third highest value since 1891 when the statistics were first recorded. In a longer timescale, the annual global average temperature has risen at a rate of about 0.73°C per century. In particular, many years with high temperature have been observed since the mid-1990s.

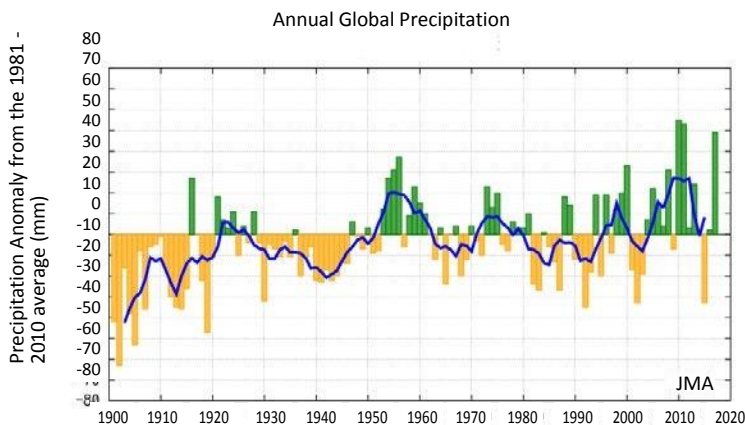


Note: Thin line (black): Average temperature anomalies (deviations from the baseline) for each year; Thick line (blue): 5-year running mean; Straight line (red): Long-term linear trend. The baseline is the average for the 30-year period from 1981 to 2010.

Source: Japan Meteorological Agency website (as of February 1, 2018)

(Reference: https://ds.data.jma.go.jp/tcc/tcc/products/gwp/temp/ann_wld.html)

The annual precipitation in land areas anomaly in 2017, as estimated from precipitations recorded at observation stations worldwide, is $+49$ mm above the 1981 – 2010 average. In semispherical terms, the annual precipitation anomaly in 2017 is $+54$ and $+37$ mm for the Northern and Southern Hemispheres, respectively.



Note: Bar: Precipitation anomalies (deviations from the baseline) for each year; Thick line (blue): 5-year running mean. The baseline is the average for the 30-year period from 1981 to 2010. Only land-based observations are used.

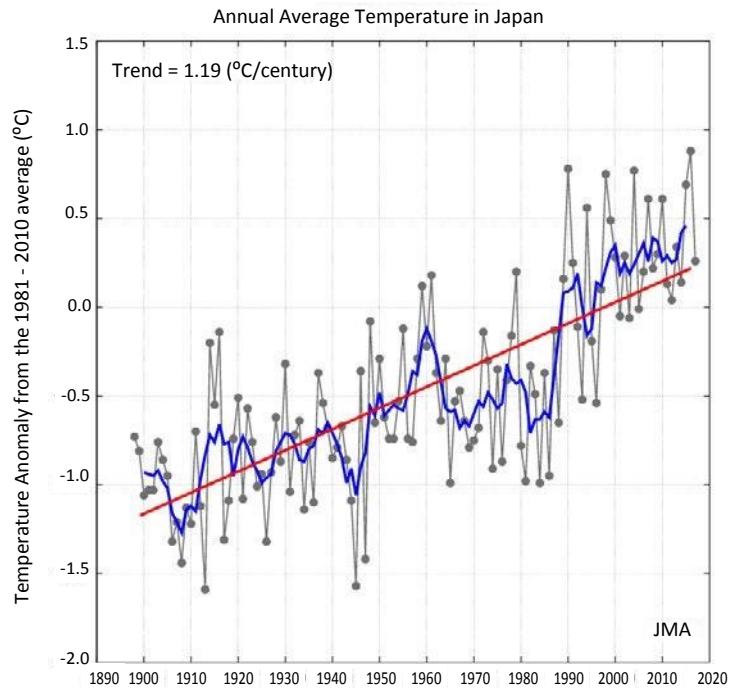
Source: Japan Meteorological Agency website (as of April 2, 2018)

(Reference: https://www.data.jma.go.jp/cpdinfo/temp/an_wld_r.html (in Japanese))

Section 2 Trend in Japan

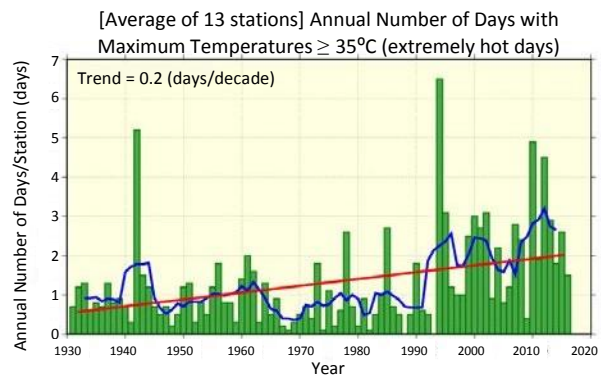
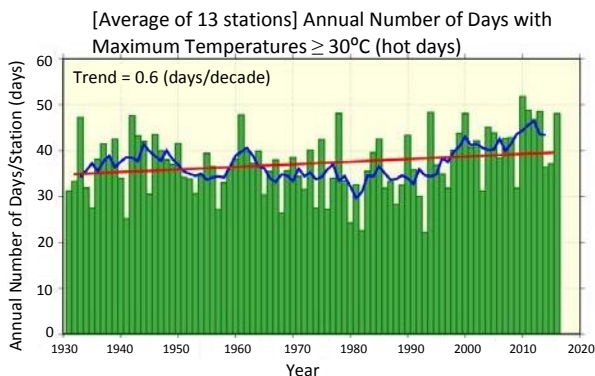
2-1 Temperature

In Japan, the anomaly in annual average temperature in 2017 was +0.26°C above the 1981 – 2010 average (+0.86°C above the 20th century average). In a longer time scale, the annual average temperature in Japan has risen at a rate of approximately 1.19°C per century. In particular, many years with high temperature have been observed since the mid-1990s.



Note: Thin line (black): Average temperature anomalies (deviations from the baseline) for each year; Thick line (blue): 5-year running mean; Straight line (red): Long-term linear trend. The baseline is the average for the 30-year period from 1981 to 2010.
Source: Japan Meteorological Agency website (Reference: https://www.data.jma.go.jp/cpdinfo/temp/an_jpn.html (in Japanese))

The number of days with maximum temperatures $\geq 30^{\circ}\text{C}$ (hot days) is very likely to have increased during the statistical period between 1931 and 2016 (statistically significant at a confidence level of 90%) and with maximum temperatures $\geq 35^{\circ}\text{C}$ (extremely hot days) is virtually certain to have increased during the same period (statistically significant at a confidence level of 99%).

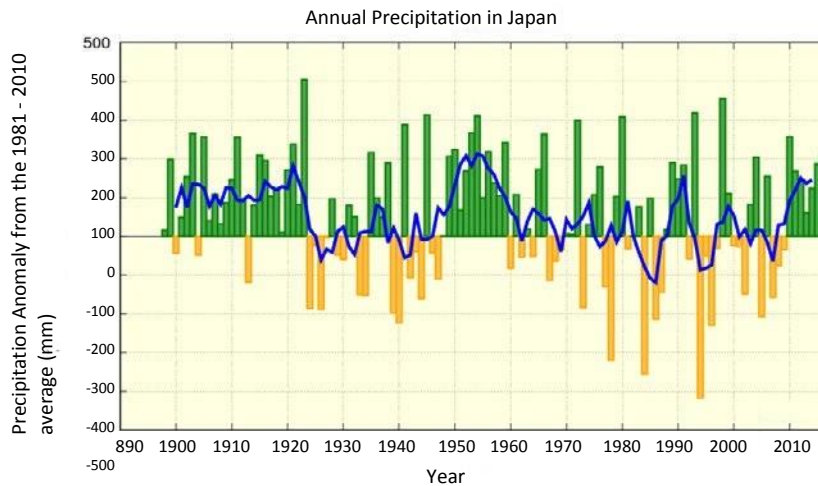


Note: Bar (green): Annual number of days per station (value in terms of the total number of days in each year divided by the total number of valid locations); Thick line (blue): 5-year running mean; Straight line (red): Long-term linear trend.

Source: Climate Change Monitoring Report 2016 (JMA)

2-2 Precipitation

Long-term trends in precipitation over Japan between 1898 and 2016 were analyzed based on annual precipitation anomalies (deviations from the 1981 – 2010 average) derived from precipitation records from 51 observation stations of the Japan Meteorological Agency. The annual precipitation anomaly in 2016 was +212.3 mm, indicating that there is no significant change in the long-term. Japan experienced relatively large amounts of rainfall until the mid-1920s and around the 1950s. The annual figure has become more variable since the 1970s.



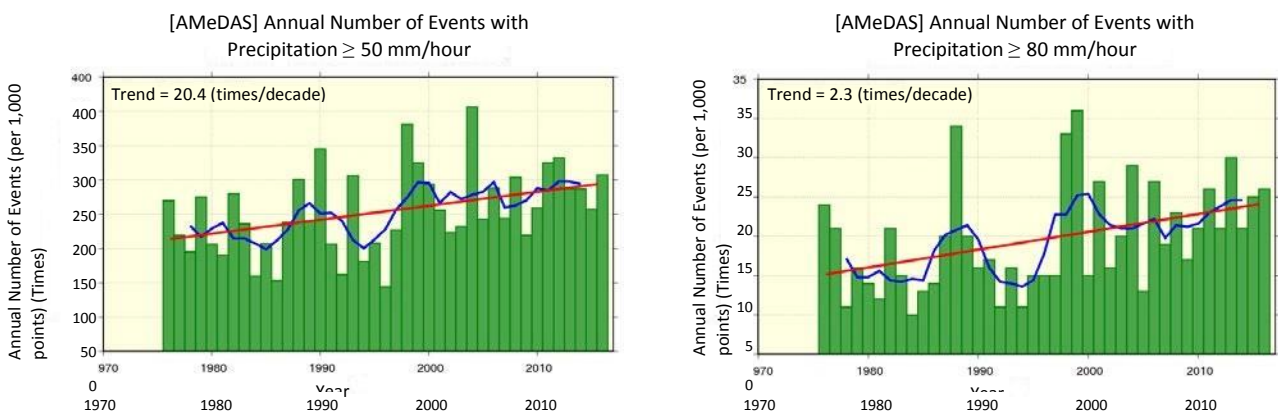
Note: Bar: Precipitation anomalies for each year; Thick line (blue): 5-year running mean.

The baseline is the average for the 30-year period from 1981 to 2010.

Source: Climate Change Monitoring Report 2016 (JMA)

The annual numbers of events with hourly precipitation ≥ 50 mm and ≥ 80 mm (every-hour-on-the-hour observations by AMeDAS stations) are virtually certain to have increased for the statistical period from 1976 to 2016 (statistically significant at a confidence level of 99%). The annual number of days with daily precipitation ≥ 200 mm shows no significant trend, while the annual number of days with daily precipitation ≥ 400 mm is very likely to have increased (statistically significant at a confidence level of 90%).

As the frequency of downpours and short-duration downpours differs significantly every year and the observation period of AMeDAS is relatively short, the future accumulation of data is necessary to increase the reliability of statistical trend detection.

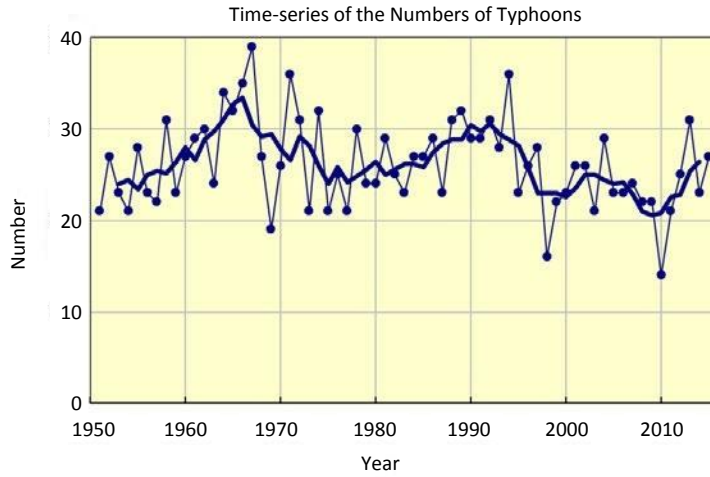


Note: Bar (green): Annual number of events (per 1,000 AMeDAS stations); Thick line (blue): 5-year running mean; Straight line (red): Long-term linear trend.

Source: Climate Change Monitoring Report 2016 (JMA)

2-3 Typhoons

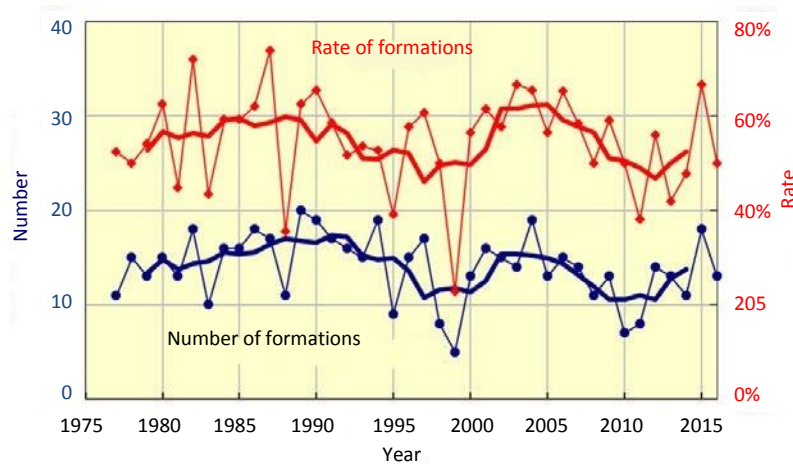
In 2017, 27 typhoons¹ were formed, which was near the normal of 25.6. The number of formations shows no discernible long-term trend during the analysis period from 1951 to 2016, however, it has often been lower since the latter half of the 1990s than in previous years.



Note: Thin line indicates annual values and the thick line indicates 5-year running means.
Source: Climate Change Monitoring Report 2016 (JMA)

The trend of number and rate of typhoon class “strong or more”² have been assessed after 1977, because of data availability regarding the maximum wind speed near the center of the typhoon. The number of the typhoon class “strong or more” typhoon shows no discernible trend during the analysis period from 1977 to 2016.

Time-series of the number and rate of typhoon class “strong or more” among all the total typhoons



Note: Thin line indicates annual values of the number of typhoon class “strong or more” (blue) and rate to the total typhoons (red).
The thick line indicates their 5-year running means.
Source: Climate Change Monitoring Report 2016 (JMA)

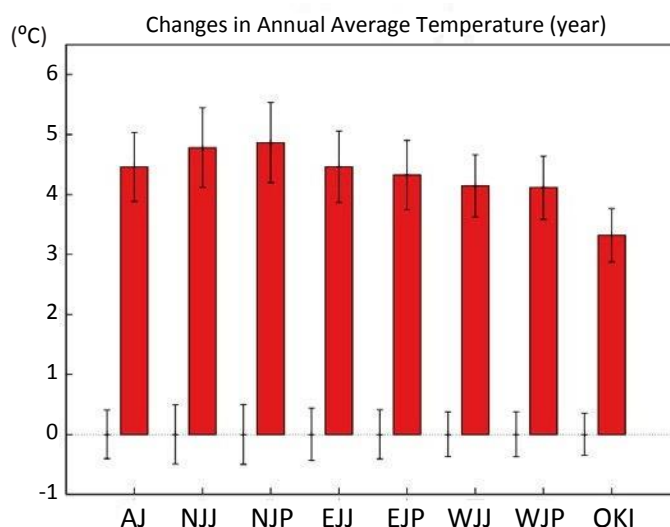
¹ Tropical cyclones with maximum wind speeds of 17.2 m/s or higher formed over the western North Pacific and the South China Sea

² Tropical cyclones with maximum wind speeds of 33 m/s or higher formed over the western North Pacific and the South China Sea

Section 3 Projections for Japan

3-1 Temperature

The annual average temperature in Japan is projected to significantly rise nationwide for the end of the 21st century (future climate: 2076 – 2095), and increase in the national average is projected to be 4.5°C under RCP8.5 scenario, compared to the end of the 20th century (present climate: 1980 – 1999). The temperature will rise by 4.8°C in northern Japan on the Japan Sea side, 4.9°C in northern Japan on the Pacific side, 4.5°C in the eastern Japan on the Japan Sea side, 4.3°C in the eastern Japan on the Pacific side, 4.1°C in the western Japan on the Japan Sea side, 4.1°C in the western Japan on the Pacific side and 3.3°C in Okinawa and Amami. These projections indicate a greater increase at higher latitudes.



Note: Bar (red): Future change under RCP8.5 scenario (difference between future and present climates); Thin vertical line (black): Annual variation (left: present climate, right: future climate in all regions)

Source: Global Warming Projection Vol. 9, Chapter 2 (JMA)

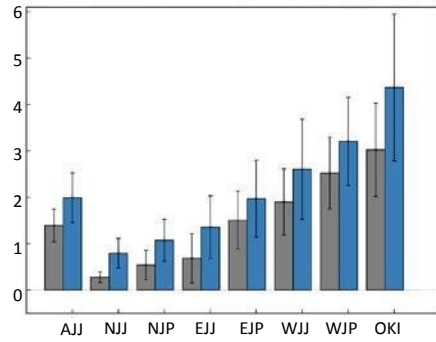
(Reference: <https://www.data.jma.go.jp/cpdinfo/GWP/index.html> (in Japanese))

3-2 Precipitation

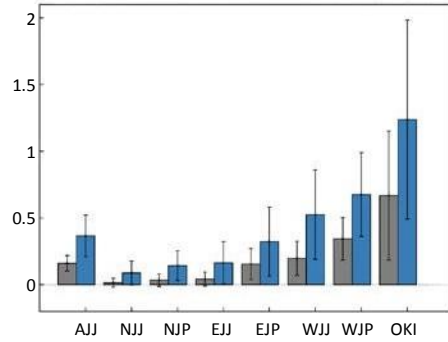
Projected changes in annual and seasonal precipitation showed no significant trends in almost all regions in Japan. The precipitation in summer is projected to decrease in many areas from eastern Kyushu to Honshu on the Pacific side, including eastern Japan on the Pacific side and increase in western Kyushu. This is attributed to southwesterly wind blowing into western Kyushu and topographical effects. The southwesterly wind is associated with a projected pattern in air pressure consisting of increase around the Nansei Islands, caused by the enhanced Pacific high-pressure systems particularly in August, and decrease around the Yellow Sea and Korean Peninsula. The southwesterly wind may also result in a clear decrease in precipitation in eastern Kyushu, which is on the leeward side. Also, in summer, a significant increasing trend in precipitation is projected in northern Japan on the Japan Sea side, as well as an increase in annual precipitation around Hokkaido.

The number of days with daily precipitation ≥ 100 and 200 mm will significantly increase in almost all regions and seasons. The frequency of short-duration downpours will significantly increase and the number of dry days will significantly increase in all regions and seasons.

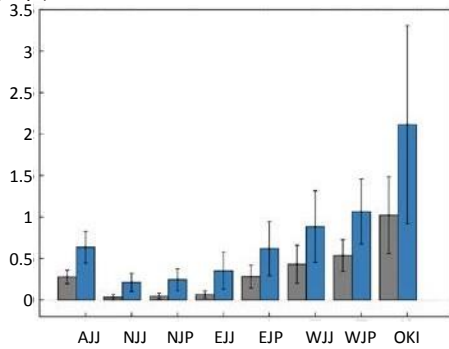
(Days) Annual Number of Daily Precipitation ≥ 100 mm



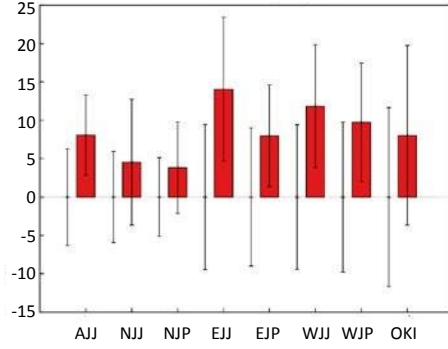
(Days) Annual Number of Daily Precipitation ≥ 200 mm



(Days) Annual Number of Hourly Precipitation ≥ 50 mm



(Days) Annual Number of Dry Days

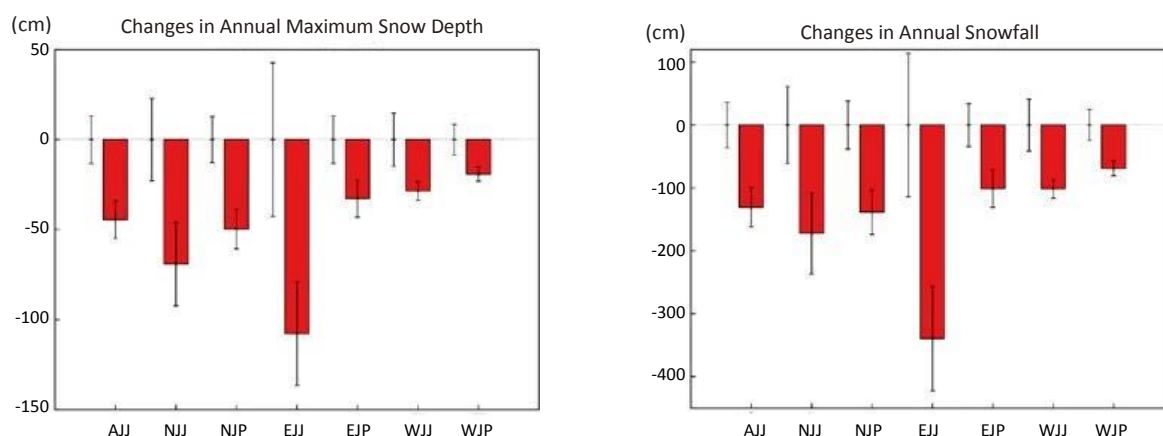


Note: For the charts of annual number of daily precipitation ≥ 100 mm and 200 mm and hourly precipitation ≥ 50 mm: Bar: Average frequency (per station); Thin vertical line (black): Annual variation (left: present climate, right: future climate in all regions). For the chart of the number of dry days: Bar (red): Future change under RCP 8.5 scenario (difference between future and present climates); Thin vertical line (black): Yearly variation (left: present climate, right: future climate in all regions)
Source: Global Warming Projection Vol. 9, Chapter 3 (JMA) (in Japanese)

3-3 Snow Cover and Snowfall

The annual maximum snow depth is projected to significantly decrease nationwide, except for a part of inland Hokkaido, and particularly in Honshu on the Japan Sea side. The maximum snow depth will significantly decrease in all seasons and regions.

The annual snowfall is also projected to significantly decrease nationwide, except for a part of inland Hokkaido, and particularly in Honshu on the Japan Sea side. Snowfall will significantly decrease in all seasons and regions. The winter precipitation is also projected to significantly decrease in eastern and western Japan on the Japan Sea side, suggesting that decrease in snowfall in Honshu on the Japan Sea side is attributable not only to snow turning into rain as temperature increase, but also to the effect of the change in atmospheric flow around Japan.



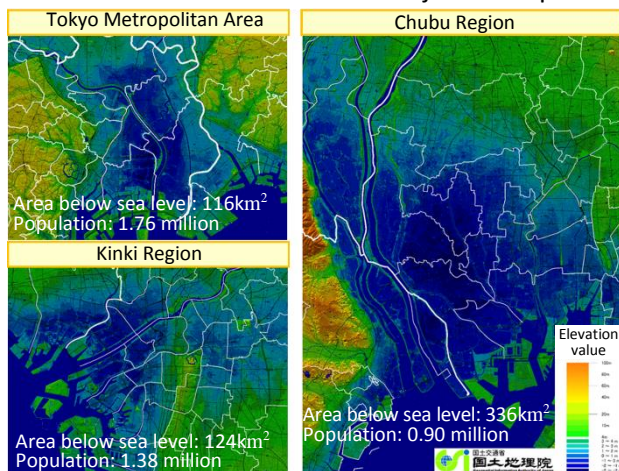
Note: Bar (red): Future change under RCP 8.5 scenario (difference between future and present climates); Thin vertical line (black): Annual variation (left: present climate, right: future climate in all regions).
 Source: Global Warming Projection Vol. 9, Chapter 4 (JMA) (in Japanese)

Section 4 Impact on Natural Disasters

Global and domestic climate changes were addressed in Sections 1 to 3, and following natural phenomena may be intensified as hazards due to the impact of global warming trends:

- Flooding
- Inundation of below-sea-level areas
- Underground inundation in urban areas
- Sediment disasters
- Deep-seated landslides
- Storm surge

Areas below Sea Level in the Three Major Metropolitan Areas



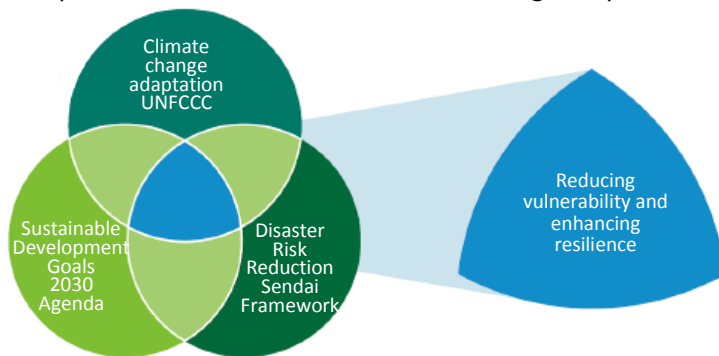
Source: Geospatial Information Authority of Japan (GSI)

However, damage caused by these natural phenomena depend not only on the magnitude of hazards, but also on the vulnerability of society to manage said hazards and the degree of exposure to the same.

- **Vulnerability:** In the 2nd Working Group Report, Box SPM. 2, of the Fifth Assessment Report (AR5) of IPCC, vulnerability is defined as “the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.”
- **Exposure:** In the 2nd Working Group Report, Box SPM. 2, of the Fifth Assessment Report, exposure is defined as “the presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected.”

As was underlined at the 23rd Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC-COP23) held in Bonn in November 2017, it is crucial to further decrease vulnerability and increase resilience to reduce disaster risks in collaboration with the Sustainable Development Goals (SDGs) and Framework Convention on Climate Change.

Relationships of disaster risk reduction, climate change adaptation and SDGs

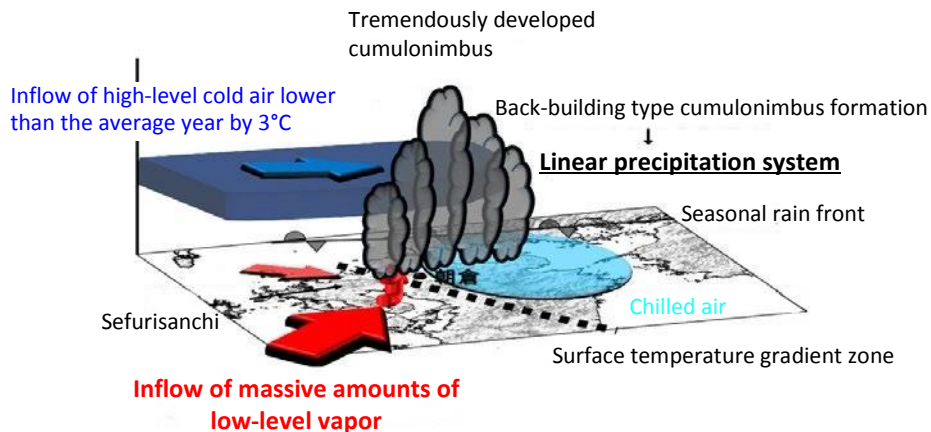


Source: Excerpts from UNFCCC-COP23 materials

Chapter 2 Northern Kyushu Torrential Rain

Section 1 Overview and Damage

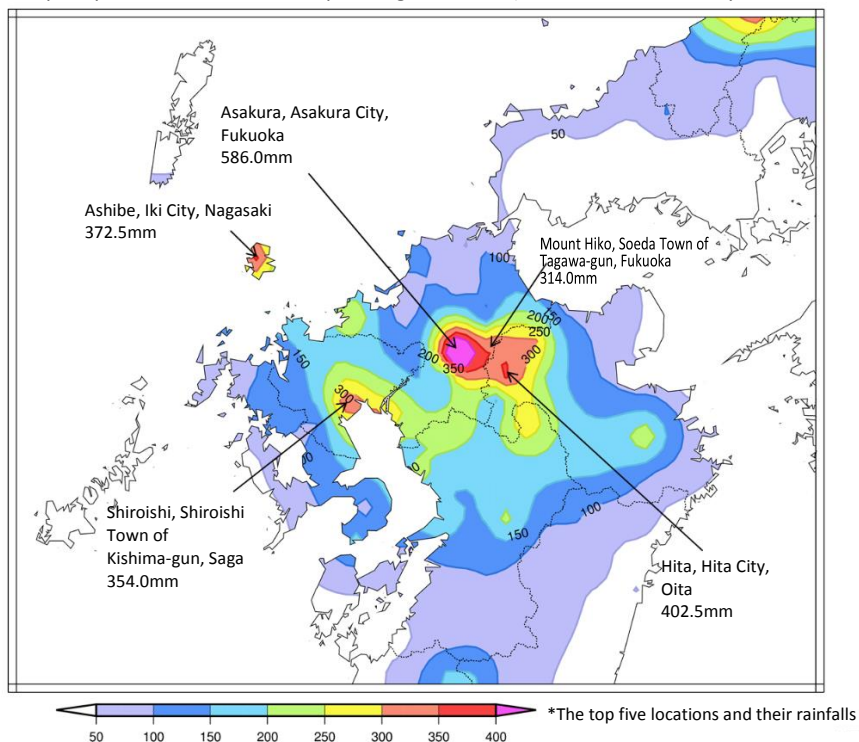
During July 5-6, 2017, a linear precipitation system was formed and stayed due to the effect of warm and very humid winds flowing into a stationary seasonal rain front in the vicinity of the Tsushima Straits. This brought continued torrential rain to the same areas, resulting in record heavy rain in northern Kyushu.



Source: Japan Meteorological Agency

The precipitation total for the period 5-6 July in northern Kyushu peaked at over 500 mm and in some areas surpassed the normal value for the total monthly precipitation in July. This heavy rain also established new observation records – namely 24-hour precipitation of 545.5 mm in Asakura (Asakura City, Fukuoka Prefecture) and 370.0 mm in Hita (Hita City, Oita Prefecture).

The periodic precipitation distribution map during the event (between 00:00 on July 5 and 24:00 on July 6)



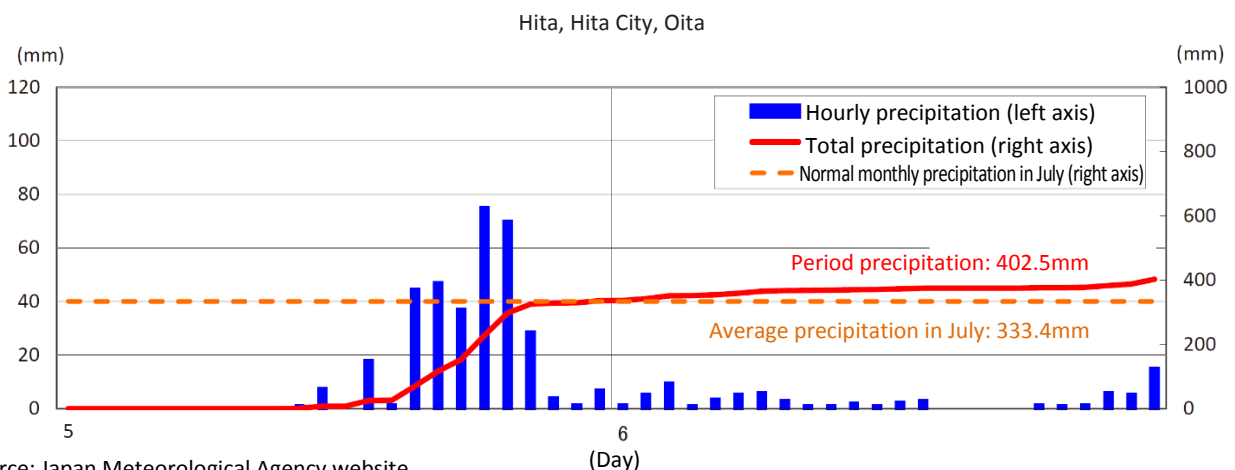
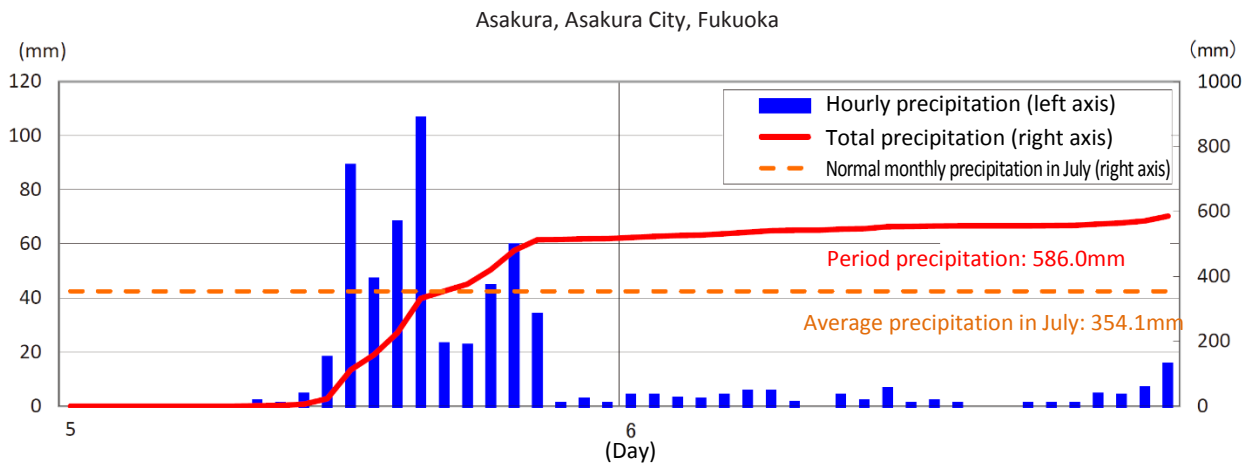
Source: Japan Meteorological Agency website
 (Reference: http://www.jma.go.jp/jma/press/1707/19a/20170719_goumeimei.html)

Top 20 areas for 24-hour precipitation (00:00 on July 5 - 24:00 on July 6)

Rank	Prefecture	City/town	Location	Precipitation (mm)	Date	
					Date	Time
1	Fukuoka	Asakura	Asakura	545.5	7/06	11:40
2	Oita	Hita	Hita	370.0	7/06	10:50
3	Nagasaki	Iki	Ashibe	362.5	7/06	24:00
4	Saga	Shiroishi, Kishima-gun	Shiroishi	328.5	7/06	22:30
5	Oita	Nakatsu	Yabakei	292.5	7/06	08:40
6	Saga	Saga	Kawasoe	290.5	7/06	22:50
7	Fukuoka	Soedamachi, Tagawa-gun	Hikosan	288.0	7/06	08:00
8	Kumamoto	Minamioguni, Aso-gun	Manamioguni	272.5	7/06	09:10
9	Oita	Higo Ohno	Inukai	268.0	7/06	11:50
10	Fukuoka	Yanagawa	Yanagawa	256.5	7/06	23:00
11	Fukuoka	Itojima	Maebaru	247.5	7/06	23:30
12	Nagasaki	Iki	Ishida	*247.0	7/06	23:50
13	Kumamoto	Tamana	Taimei	219.0	7/06	24:00
14	Kumamoto	Yamaga	Kahoku	217.5	7/06	24:00
15	Kumamoto	Yamato-cho, Kamimashiki-gun	Yamato	210.0	7/06	24:00
16	Saga	Saga	Saga	195.5	7/06	22:40
17	Kumamoto	Uto	Uto	185.0	7/06	24:00
18	Nagasaki	Minamishimabara	Kuchinotsu	184.5	7/06	24:00
19	Kumamoto	Minamiasomura, Aso-gun	Mt. Aso	175.0	7/06	22:20
20	Oita	Taketa	Taketa	169.5	7/06	11:30

*: Missing observations are included in the period.

Precipitation timeline chart (00:00 on July 5 - 24:00 on July 6)



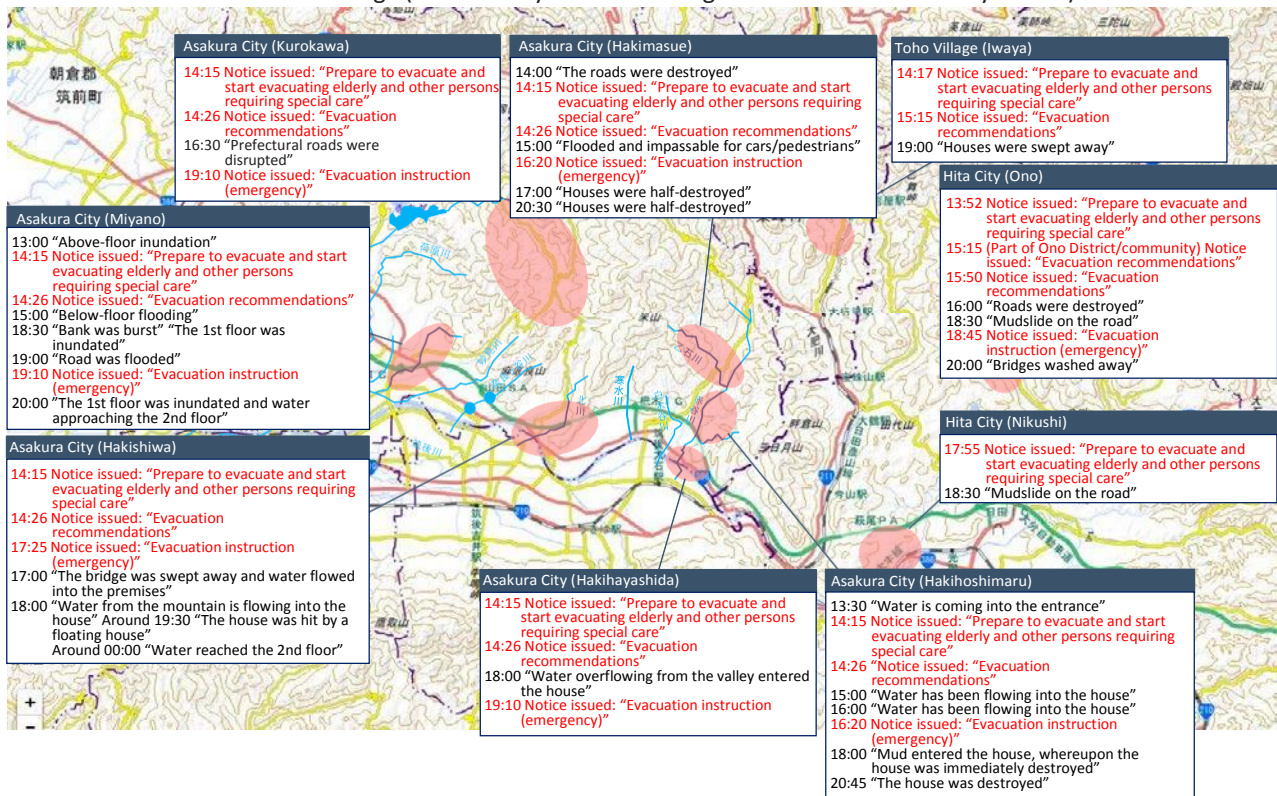
Source: Japan Meteorological Agency website
 (Reference: http://www.jma.go.jp/jma/press/1707/19a/20170719_goumeimei.html)

This record-breaking precipitation left serious damage in Fukuoka and Oita Prefectures including 40 people dead and two missing persons and more than 1,600 houses completely or half-destroyed and inundated above floor level (as of February 22, 2018, Fire and Disaster Management Agency (reference: <http://www.fdma.go.jp/bn/2017/detail/1007.html>). See Appendix 15 (A-26)). The areas affected by this heavy rain had also caused serious damage by record heavy rain in July 2012, causing 30 deaths and two missing persons in five prefectures in northern Kyushu.

The torrential rain seriously damaged utilities such as water supplies and electricity, as well as roads, railways, agriculture and forestry; all of which are key industries in this region. More than 2,000 people were forced to live in evacuation centers just after the disaster occurred.

In particular, flooding damage occurred in Asakura City, Fukuoka Prefecture due to the levee burst at the right bank of a branch river of Chikugo River in the city and the river becoming clogged with a large volume of debris and driftwood. The damage was especially serious in the Akatani River basin in Asakura City, including Hakimasue, Hakihoshimaru and Hakihayashida districts, where sudden and torrential rain in the basin is considered to cause slope failure and mud slides in the mountainous areas, thus bringing massive mud and driftwood to the middle and lower reaches of the river. Fatalities and housing damage were considered attributable to it, coupled with river clogging. It was assessed that 22 persons, more than half of the dead and missing persons, were dead by the hazard in the basin of Akatani River, and many people chose to evacuate inside houses.

Extent of damage (Asakura City and Toho Village in Fukuoka and Hita City in Oita)



* Original map: GSI Map

Note: Details of damage to houses and roads, etc. were based on information from residents in the areas where fatalities occurred (information was distributed from Asakura, Toho and Hita. Only physical damage, including to houses and roads, was extracted; none is described for areas for which no information was obtained).

Source: Formulated by the Cabinet Office based on the Future Initiatives for Evacuation based on Lessons from the July 2017 Northern Kyushu Torrential Rain (Notice). (Reference: http://www.bousai.go.jp/fusuigai/kyusyu_hinan/index.html)



(Downstream)



Damage due to river flooding by heavy rain
(Asakura City, Fukuoka Prefecture)

Section 2 Responses to Northern Kyushu Torrential Rain

1. National Government responses

(1) Institutional setup by the National Government

Before the heavy rain occurred in northern Kyushu, the National Government, understanding the risk of disaster caused by the seasonal rain front and Typhoon No. 3, held Inter-Agency Disaster Precautionary Meeting on July 3, 2017 to share information and response measures among ministries and agencies, The National Government ensured the precautionary system by whole of the government, while the Minister of State for Disaster Management of the Cabinet Office called for citizens to proactively secure their own safety and defend themselves against disasters through the website and Twitter of the Cabinet Office.

The government held “Meeting by the Relevant Ministries” and Inter-Agency Disaster Management Meeting immediately after the disaster on a daily basis, sent survey missions to the affected areas to assess damage from July 6 and conducted field surveys. On July 12, Prime Minister, Mr. Abe visited the affected areas and determined the problems and needs in the affected areas in details. The National Government implemented necessary measures for rescue and research, supporting the affected people and early recovery (see Attachment 15 (A-26)).

The National Government set up a local liaison and coordination office in Fukuoka Prefecture Government Office (July 7-28) to ensure close cooperation with the local governments to deal with problems such as improving the living environment of evaluation centers, including precautions against the heat, and accelerating the disposal of driftwood and disaster waste which were hindering recovery in the affected areas.



Driftwood in Haki District, Asakura City



Prime Minister Abe visits affected area (Haki, Asakura City) with (then) State-Minister of Cabinet Office Matsumoto.



(Then) Minister of State for Disaster Management, Jun Matsumoto as the survey mission team, exchanges opinions with the Governor of Fukuoka Prefecture and the Mayor of Toho Village.

(2) Application of the Disaster Relief Act and Act on Support for Reconstructing Livelihoods of Disaster Victims, and Designation of Extremely Severe Disasters

The Disaster Relief Act was applied to Asakura City, Toho Village and Soeda Town in Fukuoka Prefecture and Hita and Nakatsu Cities in Oita Prefecture, and disaster affected people were supported (e.g. installation of evacuation sites) accordingly. Given the numerous houses destroyed by the disaster, the Act on Support for Reconstructing Livelihoods of Disaster Victims was applied to all municipalities of Fukuoka Prefecture and Hita City in Oita Prefecture, and assistance grants were provided for affected people from a fund contributed by all prefectures.

The government dispatched staff from the Cabinet Office to hold meetings to explain the implementation of the Disaster Relief Act, the survey for housing damage certification and issues concerning disaster certificates based on the survey results. It also strove to support disaster affected people in cooperation with the affected prefectures and local governments by supplying emergency temporary housing units and providing emergency repairs of houses to ensure living conditions.

The disaster was designated as an “extremely severe disaster” (decided by the Cabinet on August 8 and promulgated and enforced on August 10, 2017) for a series of heavy rain disasters caused by the seasonal rain front that summer (see 2-2 of Section 2, Chapter 1, Part 1). Accordingly, bailout measures such as increasing the ratio of state liability for disaster restoration projects were determined and to allow the devastated municipalities to promptly work on recovery and reconstruction without financial concerns, the government announced “prospective for designation” for those which met the criteria for extremely server disaster designation on July 21 without awaiting the end of the nationwide rainy season (August 2).

To announce the prospective for designation immediately, the government offered full support for prompt damage surveys by the affected local governments, including damage assessments using drones and aerial photos, as well as technical assistance by dispatching TEC-FORCE from the Ministry of Land, Infrastructure, Transport and Tourism and the Farming and Rural Disaster Relief Unit (Midori Disaster Relief Squad) from the Ministry of Agriculture, Forestry and Fisheries to the affected areas.

(3) Evacuation centers and living in evacuation

Evacuation centers were set up in the affected areas; mainly Asakura City for numerous evacuees. Oita and Fukuoka Prefectures closed all evacuation centers on August 31, 2017 and -November 25, 2017, respectively. In Asakura City and Toho Village, a total of 107 “construction-type emergency temporary housing units” had been built by October 18, 2017 and “rental type emergency temporary housing units” were offered by private rental housing businesses. As of March 31, 2018, 390 households (953 persons) were forced to evacuate.

Overview of the Disaster Relief Act			
1. Purpose	<ul style="list-style-type: none"> The government conducts the necessary emergency rescue operations to protect disaster-affected people and preserve social order during disaster in cooperation with local public bodies, the Japanese Red Cross Society, other organizations and citizens. 		
2. Implementation system	<ul style="list-style-type: none"> The prefectural governor shall conduct legitimate rescue operation to those currently needing help (statutory entrusted affairs). Part of the rescue operation may be entrusted to the municipal mayor as required. In preparation for broad-based, large-scale disaster, it is preferable that the local government arrange with other prefectures or implement a system to call for support from other prefectures immediately after disaster occurs. (all the expenditures required for support may be charged to the affected prefecture.) 		
3. Available rescue services	<table border="0"> <tr> <td> <ul style="list-style-type: none"> Setting up evacuation centers Provision of emergency temporary housing Supply of hot meals and other foods Supply of drinking water Provision of clothing, bedding and other daily necessities (including rental goods) Medical and childbirth care </td> <td> <ul style="list-style-type: none"> Rescue of affected people Temporary repair of houses Supply of school goods Burial operation Search for and disposal of bodies Removal of obstacles </td> </tr> </table>	<ul style="list-style-type: none"> Setting up evacuation centers Provision of emergency temporary housing Supply of hot meals and other foods Supply of drinking water Provision of clothing, bedding and other daily necessities (including rental goods) Medical and childbirth care 	<ul style="list-style-type: none"> Rescue of affected people Temporary repair of houses Supply of school goods Burial operation Search for and disposal of bodies Removal of obstacles
<ul style="list-style-type: none"> Setting up evacuation centers Provision of emergency temporary housing Supply of hot meals and other foods Supply of drinking water Provision of clothing, bedding and other daily necessities (including rental goods) Medical and childbirth care 	<ul style="list-style-type: none"> Rescue of affected people Temporary repair of houses Supply of school goods Burial operation Search for and disposal of bodies Removal of obstacles 		
4. Criteria for application	<ul style="list-style-type: none"> A certain number of houses were lost (completely destroyed) in proportion to the population of the affected municipality (Items 1 to 3, Paragraph 1, Article 1) Many people died or were injured, or there is such a possibility and evacuation and continuous rescue operation may be required (Item 4, Paragraph 1, Article 1). 		
5. State liability	<ul style="list-style-type: none"> A system is set up, whereby the state shall bear more than half the expenditures required for such rescue operation. 		

Source: Cabinet Office

(4) Measures to Support Agriculture, Forestry and Fisheries-related Damage caused by Heavy Rains or Rainstorms in the Rainy Season of 2017

On August 8, 2017, the Ministry of Agriculture, Forestry and Fishery announced a decision on Measures to Support Agriculture, Forestry and Fisheries-related Damage caused by Heavy Rains or Rainstorms in the Rainy Season of 2017 to help affected agriculture, forestry and fishery operators restart their operations promptly.

(Reference: http://www.maff.go.jp/j/press/kanbo/bunsyo/saigai/170808_5.html)

Based on these measures, disaster recovery was accelerated by publicizing the commencement of work before assessment to municipalities to start restoration without waiting technical support or disaster assessment by officers of the Ministry of Agriculture, Forestry and Fisheries dispatched to the affected site and streamlining of disaster assessment by, for example, increasing the upper limit by desk assessment without field investigation. Support for restarting agriculture included early payment of mutual aid money, etc., introduction of agricultural houses and replanting of damaged fruit trees.

(5) Early recovery of rivers devastated by July 2017 Northern Kyushu Torrential Rain

The Ministry of Land, Infrastructure, Transport and Tourism decided to implement a “Northern Kyushu Emergency Flood Control Project” (reference: http://www.mlit.go.jp/report/press/mizukokudo03_hh_000934.html) for about five years (by around 2022) to restore rivers seriously damaged by the July 2017 Northern Kyushu Torrential Rain and prevent or mitigate the recurrence of similar disasters in collaboration with river and erosion control projects by improving and recovering flood-control capacity in an urgent and focused manner.

The National Government applied the upward authority delegation system, first time in Japan, based on the amended River Act, so that the National Government could implement emergency conservation of river channels for Akatani River, which is normally managed by Fukuoka Prefecture. The National Government also carried out full-scale restorations for the river channel development in Akatani River and other rivers and construction of driftwood-retention facilities, using the same upward authority delegation system.

(6) Nationwide deployment of measures based on lessons from the July 2017 Northern Kyushu Torrential Rain and other disasters

The Ministry of Land, Infrastructure, Transport and Tourism plans to launch an “Emergency Flood Control Project for Small- and Medium-sized Rivers” (reference: http://www.mlit.go.jp/report/press/mizukokudo03_hh_000933.html) following the result of nationwide emergency assessment on small- and medium- sized rivers conducted due to torrential rain disasters, including the July 2017 Northern Kyushu Torrential Rain. This project provides measures for small- and medium-sized rivers nationwide for approximately three years (by around 2020), constructs erosion control levees which are highly effective at catching debris and driftwood, excavates river channels to avoid flooding that would damage many houses and important facilities, and installs low-cost, water gauges (of the emergency management type) specialized for flooding.

For disaster recovery, the ministry also decided to initiate an improvement-type disaster-recovery project. (River Disaster-recovery project - Plan-based Disaster Recovery) This project is based on plans, e.g. for widening rivers as were conducted for rivers seriously damaged by heavy rain in northern Kyushu, in a view to conduct the similar restoration works for any rivers in Japan which were seriously and extensively damaged by mud, driftwood and debris.

The Forestry Agency also plans to conduct a “Driftwood Disaster Prevention Emergency Forest Conservation Project” (reference: <http://www.rinya.maff.go.jp/j/press/tisan/171201.html>) to construct soil-saving dams at 1,203 sites nationwide and cut down trees which may turn to driftwood to reduce damage caused by driftwood at downstream basins. These two projects, implemented in a coordinated way, are expected to help reduce damage.



An erosion control dam of transmission type able to catch driftwood very efficiently



An example of catching driftwood by an erosion control dam of transmission type

Source: Ministry of Land, Infrastructure, Transport and Tourism

2. Support activities by volunteers and NPOs

(1) Volunteer activities in the Northern Kyushu Torrential Rain

In the affected area by the July 2017 Northern Kyushu Torrential Rain, many volunteers and NPOs gathered to provide various support, including removing mud, debris and driftwood from houses and parking lots, operating evacuation centers, helping home evacuees and supporting evacuees to resettle in temporary housing units and farmers to restore their fields. In addition, meetings were held by government entities, NPOs and volunteers to share information and adjust their activities to ensure smooth support for disaster affected people, including for understanding needs for commodities and living condition in evacuation centers. Following the Hinokuni Conference for Kumamoto Earthquake Support at the Kumamoto Earthquake in 2016, these cooperative operations by government entities, volunteers and NPOs made it clear that cooperative relationships had been firmly established.

Disaster volunteer centers (“disaster VC”) were provided by the Council of Social Welfare in the affected areas, including Asakura City, Soeda Town, and Toho Village in Fukuoka Prefecture and Hita City in Oita Prefecture and a total of about 64,000 volunteers (about 45,000 in Asakura City, 1,000 in Soeda Town, 8,000 in Toho Village and 9,000 in Hita City) joined in with recovery activities such as the removal of mud and debris in houses through the disaster VCs.



Volunteers are working in Asakura City, Fukuoka Prefecture

(i) Individual volunteers

In Asakura City, Fukuoka Prefecture, which was especially hard hit by the heavy rain, a disaster VC was launched by the Council of Social Welfare in the city and started receiving individual volunteers from July 10, 2017. On the first day, about 150 volunteers joined from within and outside the prefecture and engaged in cleaning muddy floors and furniture in houses which had been covered with muddy water. In the morning of July 15, the first day of long weekend immediately after the disaster, nearly 1,000 individual volunteers packed in front of the recipient counter of the disaster VC.

As extremely hot weather continued in the affected areas, preparation for ensuring safety and preventing heat stroke was requested of individual volunteers, including bringing drinking water and food for self-sufficiency style and buying volunteer activities insurance.

(ii) Activities by NPOs which have experience and expertise

More than 100 NPOs gathered from within and outside the prefecture for various activities such as improving the living environments at evacuation centers, operating the evacuation centers, helping home evacuees and supporting the operation of disaster VCs. Organizations functioning as coordinators (“coordinating organizations”) were very active and effective for engaging in communications, sharing information and adjusting the assigned areas and contents of activities among NPOs.

Immediately after the disaster, the affected municipalities, social welfare councils and NPOs, etc. launched an organization to share information and adjust the supportive activities of public entities and volunteers as part of successful application of lessons learned from past disasters. After the Kumamoto Earthquake in 2016 (April 14 and 16 etc.), the “Hinokuni Conference for Kumamoto Earthquake Support” was organized on April 19, asking various support groups which had gathered to help the affected areas, including NPOs, share information and coordinate their activities, which was a key to help streamlining supports in affected areas. Following this experience, a meeting, hosted by an NPO named Japan Voluntary Organizations Active in Disaster (“JVOAD,” reference: <http://jvoad.jp>), was held at Fukuoka Prefecture Government Office on July 9, 2017 as a start for sharing information. About 50 people from support groups within and outside the prefecture, the Fukuoka Prefecture Government and the Cabinet Office, participated in this meeting to share information on volunteer activities in the areas affected by the heavy rain in northern Kyushu. On July 12, it was renamed as the “July 2017 Northern Kyushu Torrential Rain Supporters Information Sharing Meeting” (“Information Sharing Meeting”) and met every evening under the auspices of a NPO in the JVOAD at the Asakura City Hall (Asakura Branch). As of the end of March 2018, the cumulative total number of participants amounted to more than 100 people from NPOs and volunteer groups, Fukuoka Prefecture Government, Asakura City, Japan National Council of Social Welfare and Cabinet Office, etc. for sharing information and coordinating their activities. This meeting was initially held on a daily basis, however, after a while, it has been held with less frequency.

Furthermore, the JA Chikuzen Asakura Agricultural Volunteer Center was opened on November 3, 2017 in collaboration with the JA Chikuzen Asakura, Asakura City and cooperating groups, including JVOAD, to support efforts of affected farmers for restoring their farmland.



The 1st “Information Sharing Meeting”
(Fukuoka Prefecture Government Office)



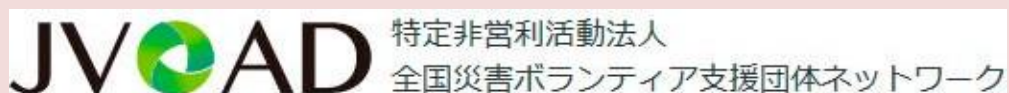
NPO activities at the evacuation center

Column: Coordinating organization

A “coordinating organization” is a volunteer organization which functions to coordinate activities of individual volunteer organizations, and to provide rear-area support for their smooth operation. It also works as a “bridge” among affected people and NPOs, companies and government agencies.

They are mainly tasked with the comprehensive coordination of collaborative activities between NPOs in the affected areas and providing environments for their activities.

For the 2016 Kumamoto Earthquake and July 2017 Northern Kyushu Torrential Rain, the JVOAD held an Information Sharing Conference Meeting in collaboration with the local NPOs and actively worked for coordination. Besides, it also hosts nationwide forums to present reports of their activities and advocacy.



“July 2017 Northern Kyushu Torrential Rain Supporters Information Sharing Meeting”
(Asakura City Hall (Asakura Branch), Fukuoka Prefecture)”

Column: State of art science and technology for disasters (Information Sharing systems and drones)

Initiatives to assess the extent of damage in affected areas using a compact unmanned aircraft (drone) have started, in case when helicopters cannot fly due to bad weather. When July 2017 Northern Kyushu Torrential Rain occurred, the researchers of the National Research Institute for Earth Science and Disaster Resilience (NIED), the main research entity of the Sharing Information for Disaster (SIP4D) management system (Cabinet Office's Strategic Innovation Promotion Program (SIP)) and those of the main research entity of the All-weather Drone (Tadokoro Program of Cabinet Office's Impulsing PARadigm Change through disruptive Technologies (ImPACT)) went to the affected areas with officers of the Cabinet Office to introduce state of art science and technologies at these sites. The disaster sites in Toho Village of Asakura-gun, Fukuoka Prefecture, where people were not able to visit, were photographed and videotaped from the air, and the information thus acquired was promptly uploaded to SIP4D. In addition, traffic control and location of evacuation centers were updated on an electronic map in real time. The information was used by the Police, Fire Department, Self Defense Force and other related organizations, and was also shared with the Disaster Management Headquarters to expedite the search for missing persons from July 8, 2017, thus helping appropriate disaster response in the affected areas. The Technical Emergency Control Force (TEC-FORCE) of the Ministry of Land, Infrastructure, Transport and Tourism used drones as an effective means to promptly search disaster situations in affected areas where direct access was dangerous or ground-based searches took time to assess the overall damage. Drones are increasingly used for disasters and the Fire and Disaster Management Agency also plans to deploy them for all ordinance-designated municipalities to be used during disasters.

Private business entities also used drones actively. For example, casualty insurance companies used drones to determine damage in northern Kyushu and accelerated insurance payments by completing the assessment for payment of insurance claims in several days, although it would normally take two weeks (see 2-7 (2) of Section 2, Chapter 1, Part 1) Public and private sectors have just started using state of art science and technology such as drones for disaster responses and intend to install IT tools for prompt lifesaving and understanding damage.



Meeting of officers from related ministries and agencies at the Fukuoka Disaster Management Headquarters (SIP4D related)

Source: Cabinet Office website
(Reference: <http://www8.cao.go.jp/cstp/stmain/20170712kyushuhokubu.html>)



Damage assessment on river channels using a drone
 (Ono District of Hita City, Oita Pre. at July 2017 Northern Kyushu Torrential Rain)

Source: Ministry of Land, Infrastructure, Transport and Tourism

Schematic diagram of SIP4D

SIP4D is a system for **sharing disaster-related information** and **collects, integrates and provides** wide-ranging disaster information on a **digital map**.



Section 3 Future Challenges

In response to damage from the July 2017 Northern Kyushu Torrential Rain, the Cabinet Office formulated the “Task Force on Evacuation based on Lessons from the July 2017 Northern Kyushu Torrential Rain” (Chairman: Atsushi Tanaka (Professor, University of Tokyo), members: experts and related ministries and agencies), provided a report in December 2017 on the “Future Initiatives for Evacuation based on Lessons from the July 2017 Northern Kyushu Torrential Rain” concerning the evacuation activities of local citizens and the disaster management system of municipalities, based on the information acquired from field investigations and interviews (reference: http://www.bousai.go.jp/fusuigai/kyusyu_hinan/index.html).

Residents in these areas experienced heavy rain in northern Kyushu in July 2012 and were highly aware of disaster risks. They had already developed disaster management maps voluntarily and lists of persons requiring special care and supporters for evacuation, and conducted evacuation drills. Such preparation contributed to reducing disaster risks. The report identified measures required for disaster management based on four perspectives, namely improvement of “local disaster resilience” by publicizing these examples to other local public bodies for reference, “provision and collection of information,” “issuing and communicating evacuation recommendations” and strengthening “disaster management system” based on lessons from this disaster.

<Necessary actions>

[Local disaster resilience]

- Promote self-help and mutual support activities by encouraging residents to develop a guidance notes by themselves for protecting themselves against flood and sediment disasters, and develop a Community Disaster Management Plan through workshops with local residents, government bodies and experts, etc. Such a guidance note needs to include initiatives of the relevant local government to enhance self-help and mutual support obtained from field investigations and interviews as reference and emphasize the importance of initiatives in normal time to increase awareness regarding the risk of local disasters.
- Promote information sharing regarding areas where the flooding risk is high with small- and medium-sized rivers in mountainous areas using terrain information, etc. for enhancing understanding of flooding disaster risks and promoting efforts for evacuation.
- Promote initiatives in normal times such as information dissemination for further understanding and utilization of new information such as real-time risk maps which are strongly related to disaster occurrence.
- Promote disaster drills according to local circumstances and advice from experts so that proper evacuation activities during flood and sediment disasters can be taken.

Overview of field investigations and interviews

Purpose of investigation

Based on the disaster of the July 2017 Northern Kyushu Torrential Rain, collect cases where advance preparations contributed to proper evacuation of residents, etc. and identify the responses of related government bodies (e.g. evacuation of residents) to avoid casualties from flooding and sediment disasters.

Outline

Schedule: September 20-21 (Wed. – Thu.), 2017

Members: Related ministries and agencies (Cabinet Office (Director General for Disaster Management), Cabinet Secretariat (Assistant Chief Cabinet Secretary: Situation response and crisis management), Fire and Disaster Management Agency, Ministry of Land, Infrastructure, Transport and Tourism, Japan Meteorological Agency),
Involved parties (Fukuoka and Oita Prefectures) Experts

Range of investigation: Asakura City, Fukuoka Pref.: City, Masue District Community Council
Toho Village, Fukuoka Pref.: Village, Yashii, Nishifukui Districts
Hita City, Oita Pref.: City, Suzuren Town Community Association, Jogu Town
Community Association

Investigation method: Interview

Source: Future Initiatives for Evacuation based on Lessons from the July 2017 Northern Kyushu Torrential Rain (Notice)
(Reference: http://www.bousai.go.jp/fusuigai/kyusyu_hinan/index.html)

[Provision and collection of information]

- Promote information sharing regarding areas where the flooding risk is high with small- and medium-sized rivers in mountainous areas using terrain information, etc. for enhancing understanding of flooding disaster risks and promoting efforts for evacuation.
- Install water gauges and monitoring cameras to obtain water level information promptly for expediting the issuing of evacuation recommendations, study the way to forecast water levels of small- and medium-sized rivers and conduct trainings for using forecasted values of the watershed rainfall index (real-time flood risk map).
- Provide advice directly via hotlines.
- Disseminate the Guidelines for Evacuation Recommendations based on lessons learned from this disaster through training, etc.

[Issue and communication of evacuation recommendations]

- Encourage developing criteria for issuing evacuation recommendations by municipalities regarding rivers other than those for whose flooding forecast or water-level information will be provided.
- Promote expediting announcement of sediment disaster alert information, issuing more accurate forecast of intense heavy rain, and issuing evacuation recommendations properly using this alert information.
- Encourage using multiple ways for distributing information.
- Disseminate the Guidelines for Evacuation Recommendations based on lessons learned from this disaster through training, etc.

[Disaster management system]

- Strengthen capacity of the disaster management headquarters.
- Establish a reliable disaster management system by providing and confirming the timeline for flooding disaster.
- Disseminate the Guidelines for Evacuation Recommendations based on lessons learned from this disaster through training, etc.

Accordingly, the related ministries and agencies have conducted specific sequential initiatives to accelerate disaster management and mitigation measures against flood and sediment disasters working in cooperation. The

Cabinet Office issued the Future Initiatives for Evacuation based on Lessons from the July 2017 Northern Kyushu Torrential Rain (Notice) (reference: http://www.bousai.go.jp/fusuigai/kyusyu_hinan/index.html), which was distributed to all local governments nationwide in collaboration with the Fire and Disaster Management Agency.

This notice urged local governments to improve their local disaster resilience by (i) providing evacuation sites and announcing them to local citizens, supporting those who require assistance for evacuation and conducting evacuation drills before the flooding season, (ii) setting water gauges and monitoring cameras to collect and sort information to issue evacuation recommendations, (iii) providing criteria for issuing and distributing evacuation recommendations concerning rivers other than those for whose flooding forecast or water-level information will be provided, (iv) ensuring the continuation of operation for the disaster management system, including the assignment of staff and assurance of emergency power sources and (v) promoting initiatives to improve awareness among citizens regarding the flooding risk of small- and medium-sized rivers in mountainous areas.

Voluntary disaster management map developed by community (Asakura City)



Joint initiatives made by a local government and residents (Asakura City)

- o Formulation of a voluntary disaster management map jointly by the local government and residents in each community and distribution of copies to all households (residents participating in formulating the map can confirm dangerous areas in the community).
- o Evacuation drills jointly conducted by the local government and residents to improve the capability of residents to take proper evacuation action.
- o Formulation of a list of persons requiring special care in each community to provide support (matching between the supported and supporters is made in some communities).


Creation of voluntary disaster management maps

- Asakura City started **formulating a voluntary disaster management map** for each community in 2011. Maps for all communities were completed by 2014.
- **A workshop in cooperation between residents and local government developed disaster management maps. They were distributed to all households. Local representatives join in and express their opinion during the workshops.**
- The map was used for disaster management in households and communities to confirm the **evacuation centers and routes and contact information for family members and neighbors** to avoid panic at critical periods.

* Excerpts from the Asakura City website and field investigations

Workshop



Dangerous areas

*** Opinions in the workshop:**

- Areas particularly vulnerable to immersion
- Areas particularly vulnerable to sediment disaster
- ✕ Areas along the river particularly vulnerable to overspill

*** Mainly areas affected by heavy rain in northern Kyushu in July 2012**

Source: Future Initiatives for Evacuation based on Lessons from the July 2017 Northern Kyushu Torrential Rain (Notice)” (reference: http://www.bousai.go.jp/fusuigai/kyusyu_hinan/index.html)

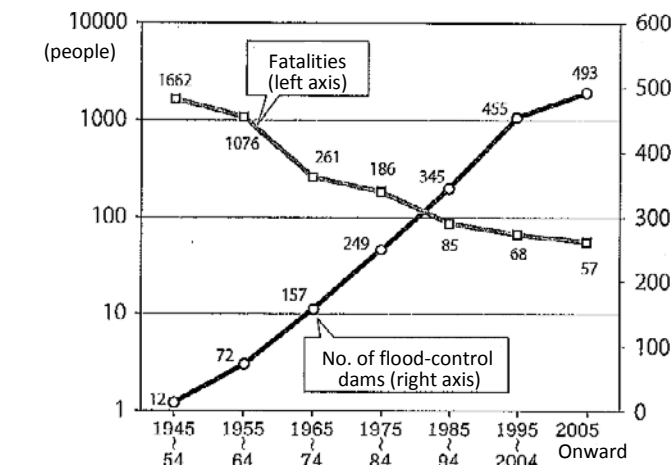
Chapter 3 Future Approach

Section 1 Investment for Disaster Risk Reduction

To respond to the increasing intensity of disasters, it is an important mitigation measure to develop infrastructure steadily and prevent occurrence of damage against external forces (“hazards”), which occur with a relatively high frequency. Moreover, for hazards which exceed the capacity of infrastructure, all possible measures have to be mobilized collectively so as to reduce risks as much as possible by improving operation, structure and maintenance procedures. Non-structural measures need to be promoted to prevent catastrophic damage from hazards exceeding capacity of infrastructure.

The importance of investment for disaster risk reduction has been recognized in the Sendai Framework for Disaster Risk Reduction 2015 - 2030, adopted in the 3rd UN World Conference on Disaster Risk Reduction in March 2015, one of the guiding principles says “Addressing underlying disaster risk factors through disaster risk-informed public and private investments is more cost-effective than primary reliance on post-disaster response and recovery and contributes to sustainable development,” while one of the four priorities for action indicates “investment in disaster risk reduction.” Accordingly, international understanding is confirmed regarding the emphasis of disaster risk reduction by investment.

Annual average death toll from storm and flood disasters after WWII and cumulative number of flood-control dams in Japan



Source: “Nihon Suibotsu” (Submersion of Japan) Yoshiaki Kawata (Author)

“Self-help and mutual support” for preparedness (see Section 1 of Chapter 1, Part 1) and insurance have been increasing their attention recently as non-structural measures. In particular, the post-disaster effect of financial damage is also serious in the affected areas. When houses were damaged by the disaster, the financial burden of repairing or rebuilding them is heavy. In reality, public funding and donation on a bona fide basis are insufficient for recovering all houses or livelihoods. Active preparations in normal time by their own will, such as enrolling in insurance or mutual insurance, are keys to recovering houses and livelihoods smoothly for an emergency situation.

When residents enroll in insurance or mutual insurance to compensate for storms, flood and sediment disasters and earthquakes, insurance or mutual insurance money is paid out according to the degree of damage. Insurance or mutual insurance may be added to the fire insurance (mutual relief) or included in the basic compensation and various types of coverage and contract terms exist for compensation. Households with earthquake insurance contracts, comprise 30 percent of all households (see A-77 of Appendix 59). It is combined with fire insurance, in principle, however, independent earthquake insurance products have also come onto the market recently. However, the amount of money covered by the earthquake insurance is limited, normally 30 to 50 percent of the fire insurance and depending on the contract amount or terms, the full amount of cost for restoring the house may not be paid. Therefore, the disaster risk of the house must always be confirmed, even though it is covered by earthquake insurance policies. It is also important to review the contracted compensation amount and contract terms in normal time, as well as to conduct sufficient seismic reinforcement of the house in advance. Apart from

damage to the house, furniture and electric apparatus may need to be replaced if damaged due to tsunami immersion. It is preferable that compensation will be made both for the house and assets (compensation for damage due to tsunami is included in the earthquake insurance, while damage due to storm and flood disaster (flooding, etc.) is subject to the flood disaster compensation of the fire insurance).

The major players engaging in preparation measures, namely, local governments, private companies and residents, must recognize “how much damage” will be inflicted at “what frequency of occurrence” to promote investment in disaster risk reduction. Easy-to-understand and detailed disaster risk information must be shared for the major players. This is also suggested in Priority 1: Understanding disaster risk in four priorities for action in the Sendai Framework for Disaster Risk Reduction 2015-2030.

Four priorities for action in the Sendai Framework for Disaster Risk Reduction 2015-2030

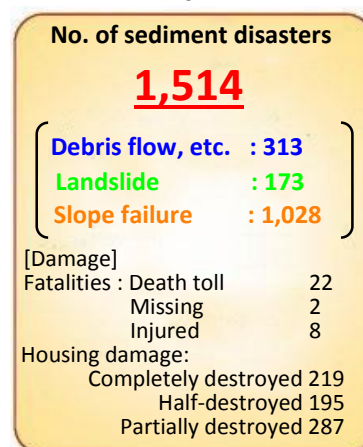
1. Understanding the disaster risk
2. Strengthening disaster risk governance to manage disaster risk
3. Investing in disaster risk reduction for resilience
4. Enhancing disaster readiness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction

Section 2 Initiatives by the Government based on Lessons from Past Disasters

Japan is a country prone to storm, flood and sediment disasters due to its natural environment. It has made various initiatives to reduce damage from these disasters, ranging from the enactment of the Flood Control Act in 1949, stimulated by Typhoon Kathleen which took almost 2,000 lives, to the Basic Act on Disaster Management in 1961; based on the experience of Typhoon Ise-wan, which claimed more than 5,000 lives. Recent years, meanwhile, have seen frequent storm, flood and sediment disasters such as Hiroshima Sediment Disaster in August 2014, Torrential Rain of September 2015 in the Kanto and Tohoku Regions, Typhoon 10 in 2016 and July 2017 Northern Kyushu Torrential Rain. It should be noted that the number of sediment disasters in 2017 reached 1,514 (an increase of 1.4% from the previous year), the highest number for the past decade (701 damaged houses was also the highest number) (see (A-36) of Appendix 21) and sediment disasters occurred in all 47 prefectures in Japan for the first time in four years.

<2017>

	Prefecture	No.	Average of the past decade	Ranking in the past decade
1	Fukuoka	244	18	1
2	Niigata	195	77	2
3	Kanagawa	134	68	1
4	Oita	90	26	1
5	Akita	57	8	1



Source: Excerpts from the Ministry of Land, Infrastructure, Transport and Tourism website
(Reference:

As for these disasters to date, the coping capacity of national and local governments for storm, flood and sediment disasters has been improved due to measures taken by related ministries and agencies, including revision of legislation based on the assessment results. The enactment (implementation) and amendment of disaster risk management related acts, regulations and guidelines, based on lessons from past disasters, are outlined in this

section.

<Revision of the Sediment Disaster Prevention Act>

The Act on Promotion of Sediment Disaster Countermeasures in Sediment Disaster Hazard Areas (No. 57 of 2000) (“Sediment Disaster Prevention Act”) was enacted in 2000 after the sediment disaster in Hiroshima in 1999 and revised in November 2014 when the Hiroshima Sediment Disaster recurred again in August 2014, causing huge damage in a limited area close to the areas affected by the disaster in 1999, with a death toll that reached 74, far exceeding the figure in the previous disaster.

Many cases of failure to designate sediment disaster hazard zones, or the lack of basic research on these areas were found, and residents in such areas were not fully aware of the danger of sediment disasters. The revised act makes it mandatory for the prefecture to announce the results of basic research so that residents are aware of the danger of sediment disasters in advance. The goal for completing basic research in all prefectures was set as by the end of 2019 according to the Basic Policy on Sediment Disaster Countermeasures in the amended Sediment Disaster Prevention Act. Furthermore, sediment disaster alert information was formally stipulated in the act, and the obligation of prefecture was established so that it must distribute this information to mayors of municipalities and general citizens to ensure information essential for timely issue of evacuation recommendations is provided. When the sediment disaster hazard zones are designated, the evacuation sites and routes, etc. must also be defined in the Municipal Disaster Management Plan in the relevant areas to improve the evacuation system.

The flood disaster by Typhoon 10 in 2016 caused critical damage in many areas in the Tohoku and Hokkaido regions, with 27 dead and missing. A particularly serious case occurred at a nursing home in Iwaizumi Town, Iwate Prefecture that nine all senior residents were dead due to flooding because of the delay of taking timely evacuation activities. Based on lessons learned from these cases, the Sediment Disaster Prevention Act was revised in May 2017 to improve the evacuation system for facilities used by persons requiring special care. According to the revised act, the owner or manager of such facilities within the sediment disaster hazard zone is obliged to make an evacuation operation/implementation plan and conduct evacuation drills to ensure smooth and prompt evacuation of facility users.

<Revision of the Flood Control Act>

The Flood Control Act (No. 193 of 1949) was revised in May 2015 to take into consideration frequent, unexpected flooding damage due to floods, inland waters and storm surges in recent years. In the revised act, the existing statutory system was expanded and a new system required the announcement of the largest expected inundation areas caused by floods, internal waters or storm surges, and non-binding obligations were stipulated to include facilities scheduled to be constructed or under construction at the basement and potentially used by an indefinite number of people in underground malls specified in the Municipal Disaster Management Plan. It also stipulated consultation of owners and managers of connecting buildings in the course of formulating evacuation operation/implementation and inundation prevention plans

As flood hazards have become more frequent and catastrophic nationwide, the Ministry of Land, Infrastructure, Transport and Tourism, noting that “catastrophic floods that cannot be prevented by infrastructure will happen anyway,” launched a project using structural and non-structural measures, regarding the “Vision for Restructuring Society Sharing the Risk of Water Disasters” mainly focusing on the rivers controlled by the state to respond to severe water hazards throughout society following the torrential rain of September 2015 in the Kanto and Tohoku Regions. However, in the process, small- and medium-sized rivers, including those controlled by prefectures, flooded due to a series of typhoons such as Typhoon 10 in August 2016, causing many fatalities among those who could not escape and extensive financial losses.

Under these circumstances, the Flood Control Act was revised in May 2017, additionally stipulating obligations to develop a system for providing a council for mitigating large scale flooding, a system of announcing water hazard risk information by the mayor of municipalities and creation of evacuation operation/implementation plans at the facilities used by persons requiring special care pursuant to the Municipal Disaster Management Plan, as well as the facilitation of flood-prevention activities involving private sectors and formulation of a system to designate zones to mitigate inundation damage to achieve “No failure to escape” and “Minimization of damage on socioeconomic.”

Column: Emergency call 110 for sediment disasters

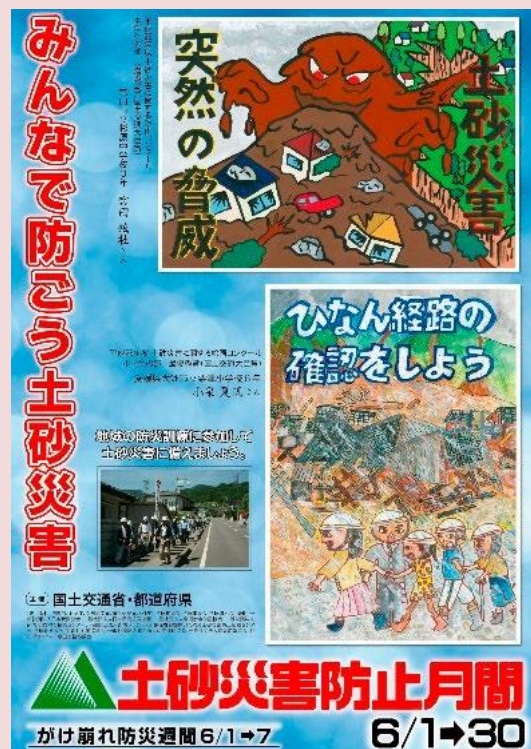
The information required for disaster management activities is obtained from “physical sensors” such as hyetometers and seismometers, but “social sensors,” which will provide information by human recognition, have also been spotlighted.

Tropical cyclones have been intensified as climate change proceeds alongside global warming, and the frequency of heavy rains is also likely to increase. Accordingly, concern arises over increasingly frequent and intensifying sediment disasters.

The “emergency call 110 for sediment disasters,” operated by disaster management sections in the civil engineering office nationwide, accepts calls from citizens concerning the information on the warning or risk of sediment disasters. Preliminary inquiries or reports from local residents about the possibility of debris flow, slope failure or landslides, etc. caused by heavy rains or earthquake are valuable for taking prompt actions by the local government and relevant parties so that they are able to get information which cannot otherwise be obtained from physical sensors.

In the wake of the heavy rain disaster in Nagasaki Prefecture in 1982, the Sediment Disaster Prevention Month (June 1 to 30) has been established annually from 1983 to deepen understanding and awareness among citizens about prevention of sediment disasters.

The Ministry of Land, Infrastructure, Transport and Tourism has also striven to take various initiatives such as nationwide emergency drills and national forum to reduce damage and protect lives and assets against sediment disasters by conducting various movements for disseminating knowledge of disaster risk reduction and developing alert and evacuation system.



Source: Ministry of Land, Infrastructure, Transport and Tourism website
(Reference: http://www.mlit.go.jp/mizukokudo/sabo/doshasaigai_boushigekkan.html)

<Guidelines for Evacuation Recommendations>

In the event of a disaster or when disaster may occur, the mayor of the municipality issues a notice to “Prepare to evacuate and start evacuating elderly and other persons requiring special care,” “Evacuation recommendations” and “Evacuation instruction (emergency)” (“Evacuation recommendations, etc.”) pursuant to the Basic Act on Disaster Management. The Cabinet Office published the Guidelines for Producing a Handbook on Decision and Dissemination for Evacuation Recommendations in 2005 to help municipalities review the criteria for issuing evacuation recommendations, etc. and the method of delivery and disaster-management systems, etc., which have since been revised several times based on new systems introduced and lessons learned from the Great East Japan Earthquake and other disasters. Particularly in recent years, revisions were made based on lessons learned from storm, flood and sediment disasters. The history of revision is described below.

(i) Revision in April 2014

Taking into consideration the start of operating disaster prevention information, including sediment disaster alert information, and lessons learned from the sediment disasters in Izu-Oshima in October 2013, the Guidelines for Producing a Handbook on Decision and Dissemination for Evacuation Recommendations were revised in April 2014. The revision aimed to make the contents easy to understand by using actual precipitation and water levels as criteria to determine the issue of evacuation recommendations, etc. and encouraging municipalities to issue evacuation recommendations, etc. at an early stage, although they end up in “a swing and a miss.”

(ii) Revision in August 2015

In the wake of the Hiroshima Sediment Disaster in August 2014, the Sediment Disasters Prevention Act was revised in November the same year. Based on this revision and the June 2015 report issued by the Working Group for Studying Comprehensive Countermeasures against Sediment Disasters, introduced under the Disaster Management Implementation Committee of the National Disaster Management Council, the following were added: Additional utilization of evacuation preparation information (encouragement of unprompted evacuation, early issue of recommendations, etc. to avoid night evacuation), evacuation according to the factors such as the intensity of wind and rain, issue of evacuation recommendations, etc. using multiple means of communication by combining push- and pull-based information deliveries and announcement of the opening of designated emergency evacuation sites to residents while opening such sites as early as the stage of distributing evacuation preparation information.

In addition, the following were added according to the contents of revision on the Flood Control Act in May 2015: Issue of evacuation recommendations, etc. to anticipated inundation areas according to the scale of disaster, a more detailed description of evacuation in underground malls, etc., additional utilization of rainfall inundation risk information when taking into consideration rainfall inundation from the sewage line for which water-level information is known to issue evacuation recommendations, additional utilization of storm surge flooding risk information to issue evacuation recommendations against storm surges on the beach where the water-level information is known.

(iii) Revision in January 2017

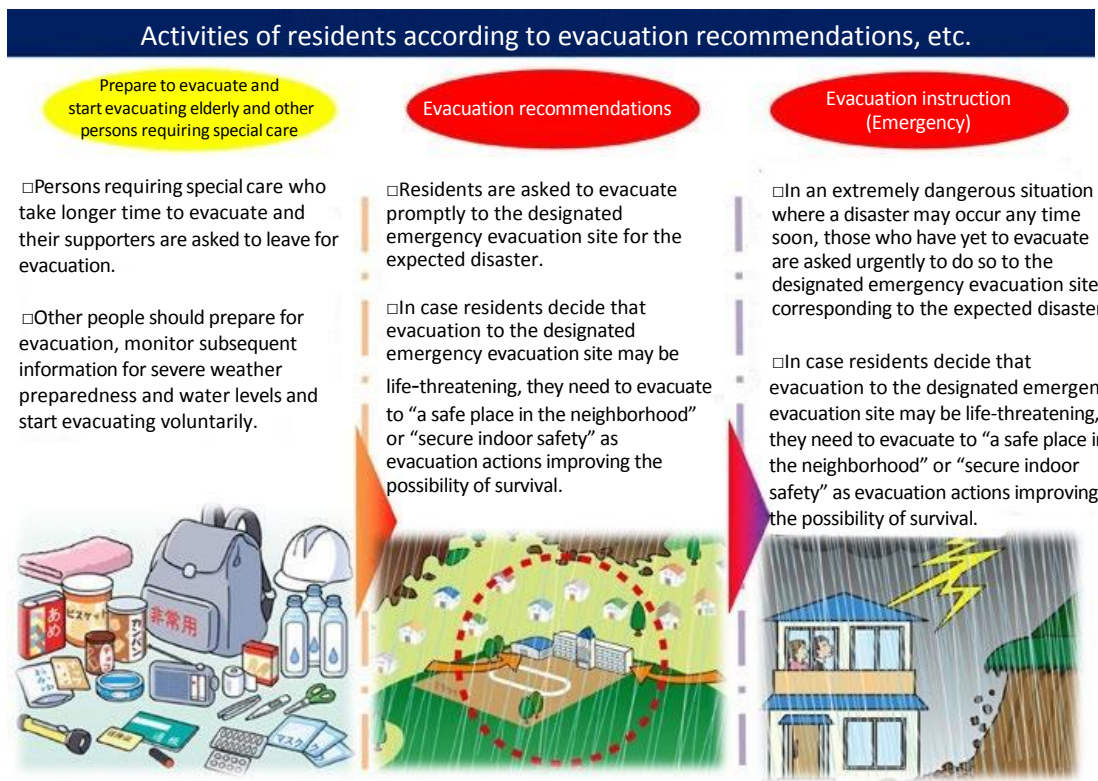
The flood disaster caused by Typhoon 10 in 2016 took its toll on many areas in the Tohoku and Hokkaido regions, with 27 dead and missing. Particularly serious was the death of nine people at a nursing home in Iwaizumi Town, Iwate Prefecture after flooding, due to failure to take suitable evacuation activities.

Based on lessons from these cases, the Cabinet Office launched the Study Group on Guidelines for Producing a Handbook on Decision and Dissemination for Evacuation Recommendations comprising related ministries and agencies and experts in disaster management and welfare to consider ways to improve the dissemination of evacuation information, and submitted a report in December 2016 (reference: http://www.bousai.go.jp/oukyu/hinankankoku/h28_hinankankoku_guideline/index.html).

The report pointed out the problems of nursing home staff failing to understand the meaning of evacuation preparation information and not engaging in suitable evacuation activities. Taking this seriously, the Cabinet Office changed the “evacuation preparation information” to an notification to “Prepare to evacuate and start evacuating elderly and other persons requiring special care” to clarify the stage at which the elderly must start evacuating and “Evacuation order” to “Evacuation instruction (emergency)” to clarify the difference between evacuation recommendations and instructions respectively.

Based on this report, the Cabinet Office revised the Guidelines for Producing a Handbook on Decision and

Dissemination for Evacuation Recommendations in January 2017 for the residents and directors of nursing homes to take suitable evacuation activities and change the name of guidelines to the “Guidelines for Evacuation Recommendations, etc.” Major changes in the guidelines include a more detailed explanation of “the dissemination of information from the perspective of those who receive it,” “methods of evacuating persons requiring special care more effectively” and “building a system in municipalities to issue evacuation recommendations, etc. without hesitating,” and introduction various reference cases in addition to renaming the evacuation information as mentioned above.



*Not necessarily issued step by step (in this order).

Source: Cabinet Office

<Study on cross-regional evacuation>

Amid progressive climate change in recent years due to global warming, it is important to be prepared for catastrophic flood disasters far exceeding conventional expectation. Flood disasters have caused wide range of damage many other places in the world. For example, Hurricane Katrina in 2005 in the U.S. compelled numerous New Orleans residents to evacuate, Cyclone Nargis in 2008 caused more than 130,000 fatalities in Myanmar, the 2011 Southern Thailand floods spread over 6 million ha (hectares) in the Chao Phraya river basins, inflicting tremendous economic damage and the Hurricane Harvey in 2017 in the U.S. caused flooding in Texas and neighboring states. In Japan, large scale flooding due to burst levees in zero-meter areas over a wide space encompassing three major metropolitan areas may cause terrible congestion by numerous residents trying to escape and leave numerous isolated people behind who fail to escape. A report, consolidated by the Working Group on Study on Evacuation and Emergency Response Measures for Flood Disasters, established under the Disaster Management Implementation Committee of the National Disaster Management Council, indicated the need to study specific cross-regional evacuation operation as one of the issues to address as part of measures to manage large scale flood disasters (March 2016) in the wake of the Torrential Rain of September 2015 in the Kanto and Tohoku Regions.

Taking these situations into consideration, the Cabinet Office studied a desirable form of regional large scale, evacuation from flooding and storm surges in three major metropolitan areas in the Working Group for Studying Large-scale, Cross-regional Evacuation from Flooding and Storm Surge Inundation, established in June 2016 under the Disaster Management Implementation Committee of the National Disaster Management Council and

submitted a report titled "Basic Approaches for Large-scale, Extensive Evacuation from Flooding and Storm Surge Inundation (report)" in March 2018. The report covers specific study procedures for regional large scale, evacuation, studies on making a viable region-wide evacuation plan and implementation of suitable evacuation activities based on the region-wide evacuation plan, among others (see 3-3 of Section 3, Chapter 1, Part 1).

Section 3 Community-based Initiatives

Finally, noteworthy activities focusing on "community-based initiatives" are discussed in this chapter as one of the lessons from the July 2017 Northern Kyushu Torrential Rain. There were evacuees who started evacuating by their own will after calls from neighbors during the disaster, without waiting information from the local government.

In Asakura City, Fukuoka Prefecture, a disaster management map was created jointly by the local government and residents in all districts/communities and was distributed to all households by 2014. Residents who had confirmed dangerous places in the district/community and evacuation sites with this map started evacuation to the evacuation sites.

In Toho Village, Fukuoka Prefecture, a plan to support persons requiring assistance for evacuation was created in each community in normal time based on the list of those who require assistance for evacuation, which had been distributed by the municipality. This plan was used in this disaster to support evacuation. Additionally, evacuation drills for villagers have been conducted once a year since 2015 (each June from 2016), in which about half of villagers have participated. The evacuation drill just before the disaster may have contributed to the smooth and prompt evacuation of residents.

In Hita City, Oita Prefecture, river monitoring cameras were installed based on past disaster cases, allowing the city to confirm the situations at monitoring sites and issue timely evacuation recommendations, etc. Based on lessons from the heavy rain disaster in northern Kyushu in July 2012, the city has developed organizations and leaders focusing on local disaster preparation, such as voluntary disaster management organizations, to improve the local disaster resilience. During this disaster, these organizations and leaders called for residents in relevant communities to evacuate without awaiting information from the municipality, resulting in the evacuation of residents.

Unexpected disasters may occur anywhere nationwide and may cause damage far more serious than before by citizens in recent years. Residents should be accustomed (keep their eyes wide open) to self-help and mutual support in normal time. Efforts to create community disaster management plans may become increasingly important in the future. Residents themselves must work to share knowledge for disaster management, create voluntary disaster management maps for communities in cooperation with administrative authorities, determine disaster risk areas in communities by confirming hazard maps and by walking through their town and participate in regular disaster drills and workshops comprising residents, administrative authorities and experts. Refer to "A Guide to Voluntary Disaster Management Organizations - Community and Safe and Secure Community Development - (Fire and Disaster Management Agency)," "Guidelines for Community Disaster Management Plan (Cabinet Office)" and "Report on Community Disaster Management Plan Model Projects - Outcomes and Issues of 2014 to 2016 - (Cabinet Office)"

(reference: <http://www.bousai.go.jp/kyoiku/chikubousai/index.html>) (see 1-5 of Section 1, Chapter 1, Part 1).

Administrative authorities should ensure that evacuation sites and routes are widely known, educate residents in the process of creating and distributing voluntary disaster management maps, so as to be prepared in case where they are not able to have information from the government. It is also very necessary to enhance awareness among residents about the importance and need for early evacuation at their discretion using these maps and disaster management tools and according to the status of the evacuation sites and routes.

Part I

Current Disaster Management Measures in Japan

Chapter 1 Current Disaster Management Policies

Chapter 2 Measures for Nuclear Disasters

Part I Current Disaster Management Measures in Japan

Its natural conditions render Japan prone to various natural disasters, some of which, such as the July 2017 Northern Kyushu Heavy Rain, also struck Japan in 2017. Part I focused on the recent disaster management policies, particularly initiatives intensively taken for implementing related measures in FY2017.

Chapter 1 Current Disaster Management Policies

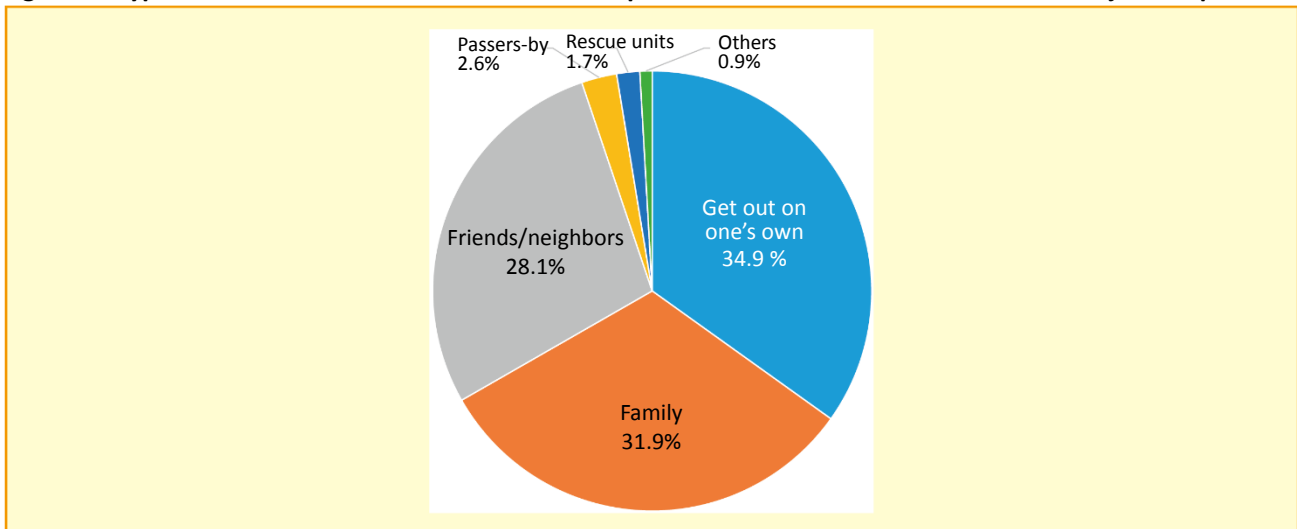
Section 1: Reducing Disaster Risk in Advance through Self-help and Mutual Support and Promotion of Disaster Risk Reduction Activities in Cooperation with Various Stakeholders

1-1 Raising Awareness of Disaster Risk Reduction among the Public

As Japan is a disaster prone country, the government has constantly strived to undertake initiatives that constitute “public support,” including the development of embankments and other hard infrastructure, as well as non-structural measures such as preparation of hazard maps before disaster occurs. In the event of a disaster, this public support extends to emergency rescue operations, push-mode material supplies, support for human resources by dispatching supporting officials to the affected areas, and financial support through the designation of an Extremely Severe Disaster and pursuant to the Act on Support for Reconstructing Livelihoods of Disaster Victims as was done following the April 2016 Kumamoto Earthquake.

However, there are concerns about the limits of public support in the event of a major disaster such as the Nankai Trough Earthquake, which is anticipated to occur in due course. In fact, a study showed that when the Great Hanshin-Awaji Earthquake struck, just under 70% of people were rescued as a result of self-help, including their families, while approximately 30% were rescued through mutual support, such as the assistance of their neighbors. Only a few people were rescued by public support such as public rescue squads (Fig. 1-1-1). Amid a depleting population, resulting in the depopulation of towns and villages and declining membership of voluntary disaster management organizations and volunteer fire corps, it is vital to raise awareness of each individual of disaster mitigation and spur them on to take specific steps to address it.

Fig. 1-1-1 Types of Rescuers of Buried or Confined People at the Time of the Great Hanshin-Awaji Earthquake

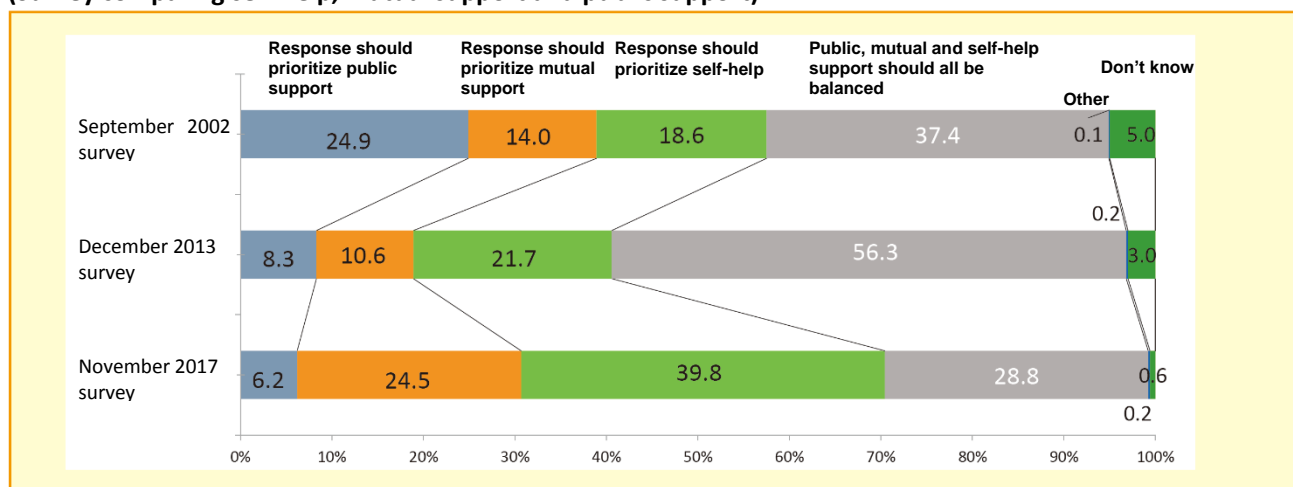


Sample survey: See Japan Association for Fire Science and Engineering (1996) “Survey Report Concerning Fires at the Time of the Southern Hyogo Prefecture Earthquake in 1995.”

Specific activities to mitigate disaster may include preparedness against disasters by understanding the disaster risk in communities, securing furniture, stockpiling food and participating in evacuation drills when possible to take appropriate evacuation activities. Once disaster occurs, self-help and mutual support with neighbors are also essential for mitigating disaster and damage.

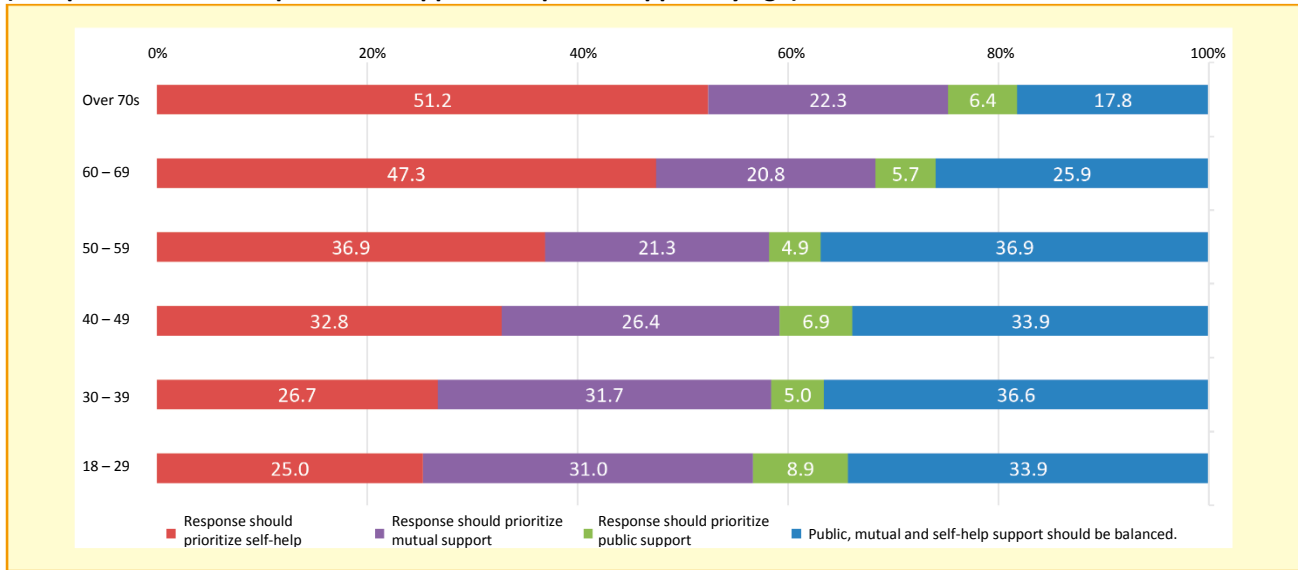
The importance of self-help and mutual support has been widely recognized by the public, particularly after the Great East Japan Earthquake. According to the result of a poll conducted by the Cabinet Office in 2002, 24.9% of respondents emphasized public support for disaster management, but in the 2017 poll, public support had declined to 6.2% while self-help and mutual support increased to 39.8 and 24.5% from 14.0 and 24.5% in the previous poll in 2002, respectively. The respondents prioritized self-help and mutual support over public support (Fig. 1-1-2). Examined the poll in 2017 by age, respondents aged 18 to 29 favored self-help (25.0%) and mutual support (31.0), while respondents aged over 70s favored self-help (51.2%) and mutual support (22.3%). The older the individuals concerned, the more they favored self-help over mutual support (Fig. 1-1-3).

Fig. 1-1-2 Prioritized Disaster Risk Reduction Measures
(Survey comparing self-help, mutual support and public support)



Source: Formulated by the Cabinet Office based on “Public Opinion Poll regarding Disaster Risk Reduction” conducted by the Cabinet Public Relations Office in (September 2002; valid responses: 2,155), (December 2013; valid responses: 3,110) and (November 2017; valid responses: 1,839)

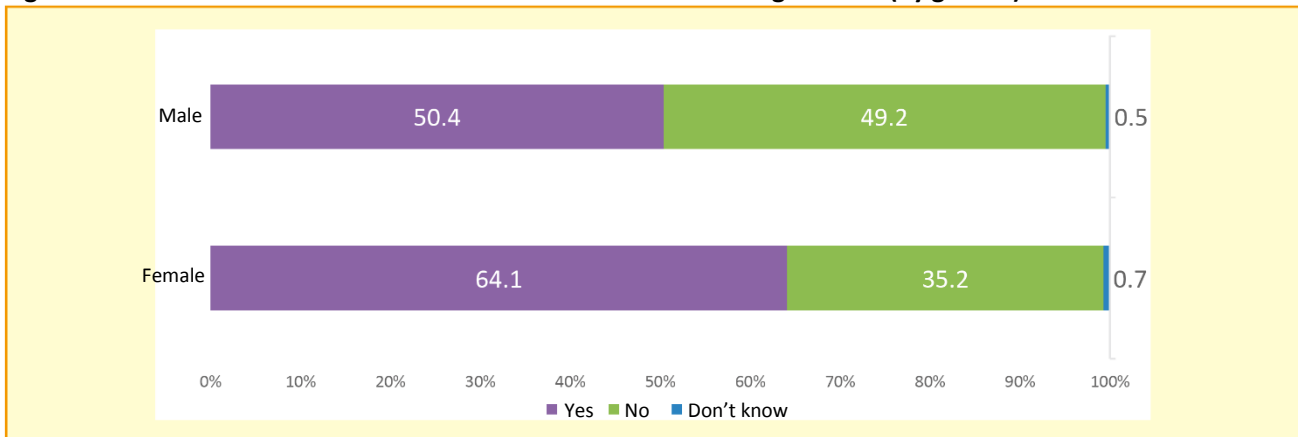
**Fig. 1-1-3 Prioritized Disaster Risk Reduction Measures
(Comparison of self-help, mutual support and public support by age)**



Source: Formulated by the Cabinet Office based on “Public Opinion Poll regarding Disaster Risk Reduction” conducted by the Cabinet Public Relations Office in (November 2017; valid responses: 1,839)

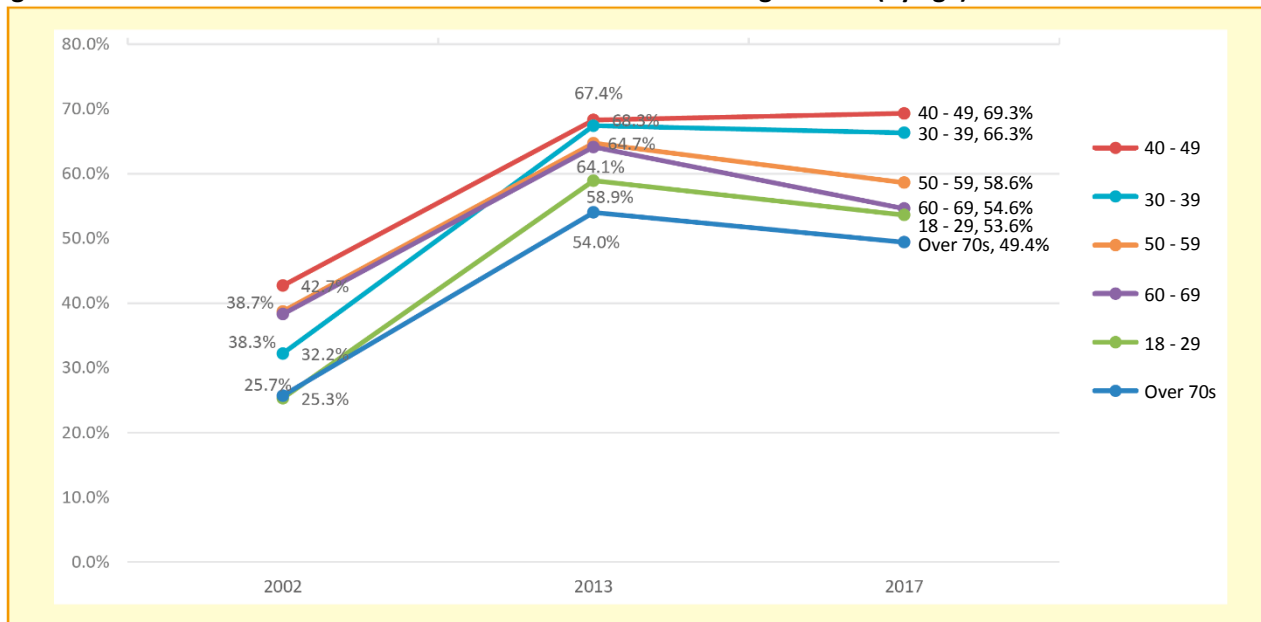
Discussions with families and people around are also important for self-help and mutual support approaches. In the 2017 survey, more than half the respondents or 57.7% answered “yes” for having discussions about what to do in the event of disaster with their families and people around in the past couple of years. This is a significant increase from 34.9% in the 2002 survey, but a slight decrease from 62.8% in the 2013 survey, which was not long after the Great East Japan Earthquake. A comparison by gender showed that 50.4% of male respondents and 64.1% of female respondents answered “yes” for having discussions with their families and people around in the 2017 survey (Fig. 1-1-4). Examined by age group, the group aged 40 to 49 supported this most strongly at 69.3%, followed by the group aged 30 to 39 (66.3%). Only around half of over 70s (49.4%) agreed, the lowest of all and the second-lowest, at 53.6%, was the group aged 19 to 29. People in their 30s and 40s, the so-called child-rearing generations, tended to favor discussions with their families (Fig. 1-1-5).

Fig. 1-1-4 Discussions about Disaster with Families and Surrounding Persons (by gender)



Source: Formulated by the Cabinet Office based on “Public Opinion Poll regarding Disaster Risk Reduction” conducted by the Cabinet Public Relations Office in (November 2017; valid responses: 1,839)

Fig. 1-1-5 Discussions about Disaster with Families and Surrounding Persons (by age)

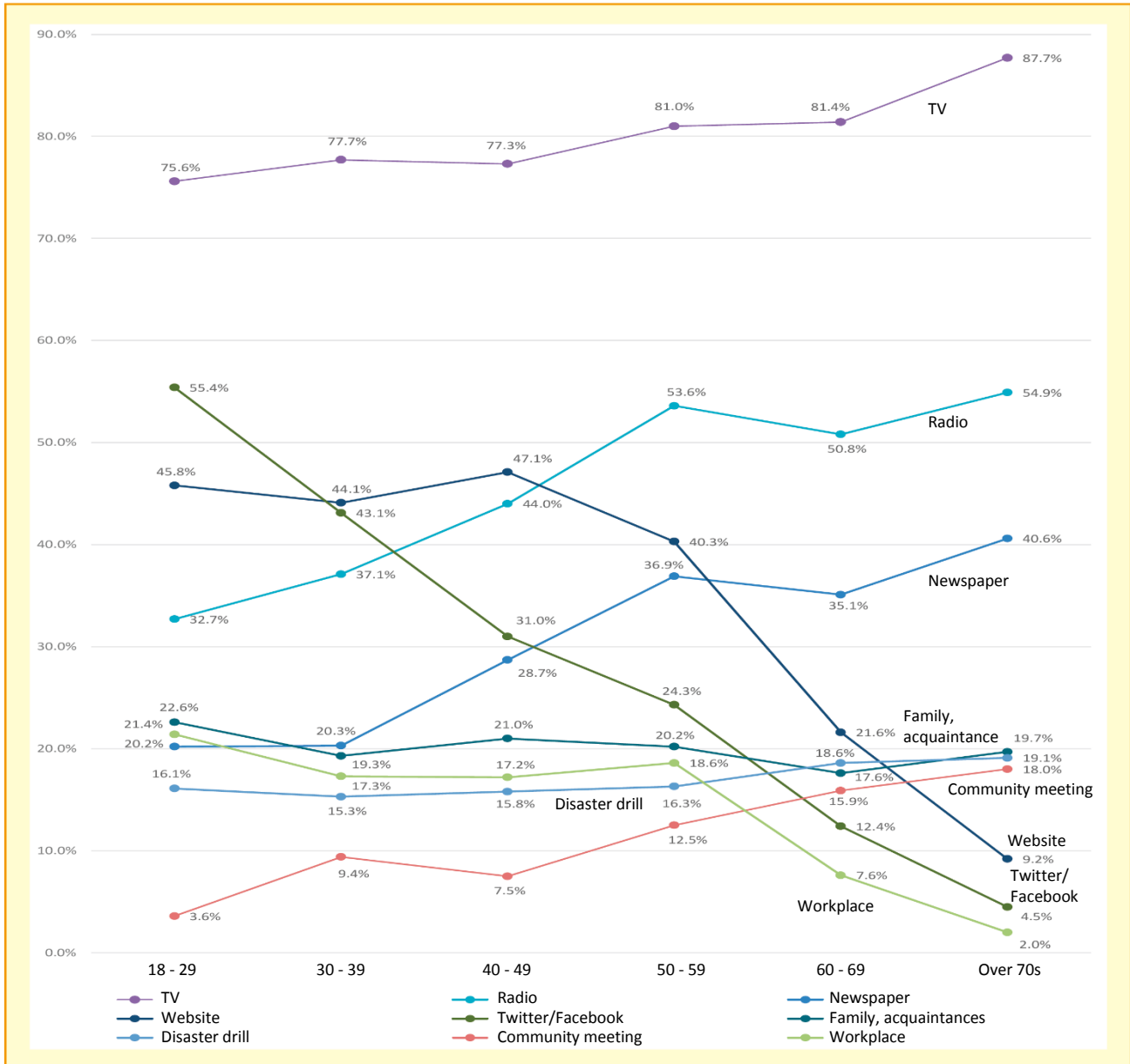


Source: Formulated by the Cabinet Office based on “Public Opinion Poll regarding Disaster Risk Reduction” conducted by the Cabinet Public Relations Office in (September 2002; valid responses: 2,155), (December 2013; valid responses: 3,110) and (November 2017; valid responses: 1,839)

For self-help and mutual support in the disaster risk reduction initiatives, it is important for individuals to be able to obtain required information. According to a survey on methods of acquiring information useful for disaster management, television is the most popular information source (81.3%), followed by radio (47.9%), newspaper (32.6%), disaster management websites and applications (30.5%) and Twitter and Facebook (22.8%). According to a comparison by age, television was the most popular information source in all ages, while the second popular method clearly differed depending on age groups (Fig. 1-1-6). Young age groups under 29 use Twitter and Facebook to obtain information while the older generations over 60s prefer radio and newspaper. Although the favorite media differ depending on age groups, they obviously tried various means to obtain information on disaster management.

The Cabinet Office and related ministries and agencies need to consider awareness raising campaigns and measures which may connect “awareness” to “preparedness” (specific actions) in future based on the survey results. This section introduces various measures through collaboration with various stakeholders by focusing on “pre-disaster precautions” out of self-help and mutual support approaches.

Fig. 1-1-6 Ways to Obtain Desired Disaster Management Information



Source: Formulated by the Cabinet Office based on a “Public Opinion Poll regarding Disaster Risk Reduction” conducted by the Cabinet Public Relations Office in (November 2017; valid responses: 1,839)

Column: Special corps for large scale disaster

The Act on Enhancement of Community Disaster Risk Reduction Capability around Fire Corps was enacted in 2013, since which time various initiatives have been taken to enhance the fire corps pursuant to the same. Considering large scale disasters anticipated in future, such as the Tokyo Inland Earthquake, the Fire and Disaster-Management Agency investigated the fire corps required to ensure manpower in the event of a large scale disaster in various aspects as well as the recruitment of various human resources and published the Report of Task Force on Securing Fire Corps in January 2018.

This report defined the special corps for large scale disaster as being called out only when a new operation is required or a labor shortage occurs during a large scale disaster. Its specific activities include disaster information gathering, evacuation guidance and confirmation of the safety of residents. Retired firefighters and officers and members of voluntary disaster management organizations are assumed to join this squad.

As part of the special corps for large scale disaster, branch office employees of major construction companies may also operate heavy machines for road clearance and business establishments, while organizations owning drones and/or motorbikes may also help collect information.

Based on this report, the Fire and Disaster Management Agency issued a notification and a Letter from the Minister for Internal Affairs and Communications concerning the initiative of recruiting fire corps, including a promotion to introduce special corps for large scale disasters to the prefectural governors and municipal mayors on January 19, FY2018. It will continue to strive to reinforce fire corps by taking all opportunities to issue recommendations on this matter to local governments.

Example activities of members of special corps for large scale disaster

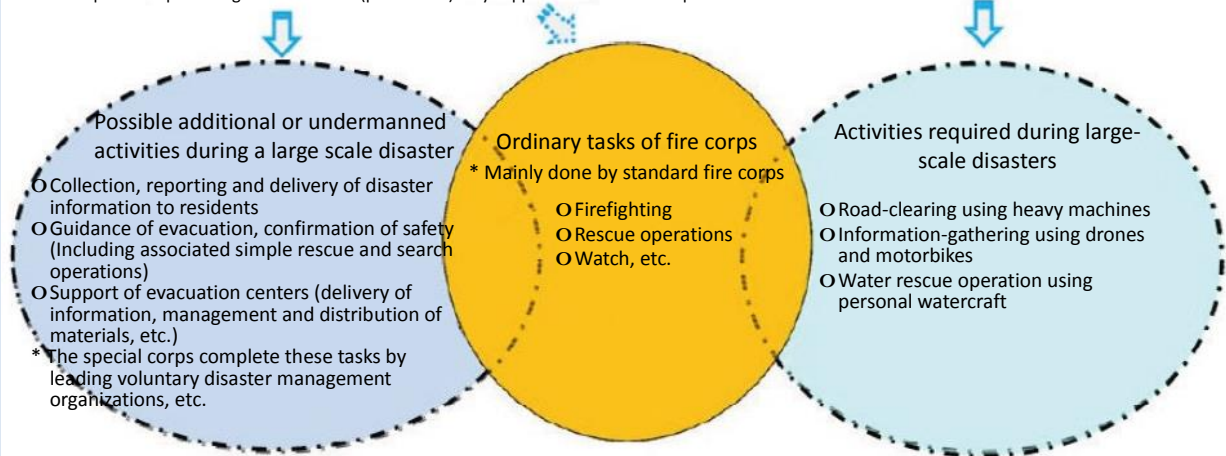
[Example 1]

The special corps for large scale disaster (provisional) oversee the additional activities required during a large scale disaster

*When the damage from disasters is extensive or rescue operations are prolonged, the special corps for large scale disaster (provisional) may support standard fire corps.

[Example 2]

The special corps for large scale disaster (provisional) operates heavy construction machines owned by private companies.



Source: Report of the Task Force on Securing Fire Corps, Fire and Disaster Management Agency
(Reference: http://www.fdma.go.jp/neuter/about/shingi_kento/h29/danin_kakuho/index.html)

1-2 National Council for Promoting Disaster Risk Reduction and the National Conference on Promoting Disaster Risk Reduction

As well as concerns about potential large scale disasters, natural disasters such as heavy rains and volcanic eruptions have occurred annually in Japan and public awareness of disaster risk reduction has become imperative. The Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR), adopted at the Third UN World Conference on Disaster Risk Reduction in Sendai in March 2015, prescribed that all stakeholders, including society, companies, volunteers, community groups and academia of member states, should be encouraged to take disaster risk reduction (DRR) initiatives. In response, the National Council for Promoting Disaster Risk Reduction, comprising leaders of groups in all sections of society, was set up in September 2015 under the leadership of Prime Minister Abe, who chairs the National Disaster Management Council.

Since then, the preparedness for large scale disasters and activities to raise public awareness regarding disaster management, including self-help and mutual support, have been promoted with this council as the hub.

(1) 2017 National Conference on Promoting Disaster Risk Reduction

While focusing on the National Council for Promoting Disaster Risk Reduction, and the Council for Promoting Disaster Risk Reduction mainly comprising disaster management related industrial groups, the Cabinet Office also sponsored the 2017 National Conference on Promoting Disaster Risk Reduction at the Sendai International Center in Sendai, Miyagi Prefecture on November 26 (Sun.) and 27 (Mon.), 2017 on the theme of Preparing for Large-scale Disasters - Collaboration is the Power for DRR – targeting initiatives to promote self-help and mutual support as well as the collaboration between diverse stakeholders to improve disaster management awareness.

Minister of State for Disaster Management Okonogi kicked off proceedings with the opening declaration, in which he stressed the importance of self-help and mutual support, the need for collaboration among all stakeholders and the importance of sharing these ideas in and out of Japan. At the subsequent High-Level Panel Discussion, opinions were exchanged on the importance of collaboration between stakeholders beyond organizational barriers and “building of face-to-face relationships within the community” before disaster occurs.

A total of 27 sessions were held during the conference, including theme sessions (e.g. “If we had prepared for a community disaster management plan at that time,” “Tohoku Special Session ‘Build Back Better’ in collaboration with the Cabinet Office and groups at various levels in various sectors, and group sessions (e.g. “Satellite Information, Geographical Information and Disaster Management Innovation,” “Relay Talk: ‘How to Prepare Stockpiles?’”) by individual groups, including lectures and symposiums on specific themes. There were also many other events such as the “Sendai Bosai Pavilion” sponsored by the host city of Sendai, exhibition of fire engines and earthquake generating cars, as well as a meal service.

The “Sendai Bosai Kokutai Charter” was declared at the clothing session. It describes why collaboration is useful for anticipated large-disasters and collaborative activities for self-help and mutual support by stakeholders.

10,000 visitors visited the conference, while around 1,000 watched the videoed live coverage. The conference was also reported on TV and by newspapers. This may have promoted the importance of self-help, mutual support and collaboration between diverse stakeholders to many citizens. In particular, questionnaires issued to visitors showed that 97% had improved their disaster management awareness, which was one of the significant outcomes of this conference. Considering the fact that 84% of visitors are not engaged in disaster management jobs or studies, the conference could give them a chance to consider disaster management.



Minister of State for Disaster Management Okonogi makes the opening declaration



High-Level Panel Discussion



Sendai Bosai Pavilion (Disaster Management Science Show)



Closing session

(2) The 3rd National Council for Promoting Disaster Risk Reduction

The 3rd National Council for Promoting Disaster Risk Reduction was held at the Large Hall of the Prime Minister's Office on December 8, 2017. In his greetings to open the conference, Prime Minister Abe thanked the participating groups as the host of this convention and explained his hope for this conference because of the importance of "raising the general awareness of the public about disaster management by sharing various knowledge of disaster management extensively among the public" and "improving the capability of all citizens to take action for protecting their lives" to overcome disasters in Japan, which is a disaster-prone country.

Next, the President of the Japanese Red Cross Society and Chair of this council, Tadateru Konoe, reported on activities centering on the previously mentioned 2017 National Conference on Promoting Disaster Risk Reduction, and introduced the "Sendai Bosai Kokutai Charter." This clarified how various groups have strived to raise disaster risk reduction awareness.



The 3rd National Council for Promoting Disaster Risk Reduction (Prime Minister Abe)

1-3 Initiatives for Disaster Drills

In the event of a natural disaster, national government institutions, local governments, designated public corporations, and other institutions involved in disaster management must work as one in cooperation with local residents to respond appropriately to that disaster. Accordingly, it is vital to implement disaster risk reduction initiatives before disaster occurs, such as drills involving collaboration between relevant organizations. For this reason, institutions involved in disaster management implement disaster management drills based on the Basic Act on Disaster Management, Basic Plan for Disaster Risk Reduction, and other regulations to verify and confirm the emergency measures to be taken when a natural disaster occurs and to enhance residents' awareness of disasters.

In FY2017, the following drills were conducted in accordance with the 2017 Comprehensive Disaster Management Drill Framework, which prescribed the basic policy on conducting disaster management drills and details of the government's comprehensive disaster management drills.

(1) Comprehensive disaster management drills on "Disaster Preparedness Day"

On September 1, 2017, which is Disaster Preparedness Day in Japan, a drill was conducted based on the scenario of the situation immediately after the Tokyo Inland Earthquake. First, Prime Minister Abe and the rest of the Cabinet Office made their way on foot to the Prime Minister's Office. They then held a meeting of the Extreme Disaster Management Headquarters (a Disaster Response Headquarters set up in the event of an especially unusual and catastrophic major disaster, such as the Great East Japan Earthquake), which is attended by the whole Cabinet Office. This included video-conferences with Governor Kuroiwa of Kanagawa Prefecture to ascertain the extent of the damage and the support requested, as well as reports by members of the Cabinet Office about the damage and the response to the disaster. Participants worked with local governments and other bodies to confirm response guidelines that assigned the highest priority to saving human lives, dispatch a governmental investigation team, and establish an On-site Disaster Management Headquarters. Throughout this process, they sought to ensure that the systems required for implementing emergency measures in the immediate aftermath of an earthquake were in place, as well as checking the procedures. In addition, part of the meeting was opened up to the media. Afterwards, Prime Minister Abe held a press conference and made a televised appeal to the public via NHK to request their cooperation and inform them of the government's initial response measures.

The same day, a joint emergency drill involving nine prefectures and cities was held in a number of locations; primarily Odawara City of Kanagawa Prefecture. Prime Minister Abe traveled by helicopter from the Prime Minister's Office to the drill venue, where he joined in water-discharge exercises using the indoor fire hydrant involving the students of a local nursing school. He then inspected drills to install and operate a local aid station in collaboration with the Self Defense Force (SDF), American troops stationed in Japan, American Red Cross, DMAT (Disaster Medical Assistance Team) and rescue and relief drills participated in by convoys dispatched from fire stations, police stations, SDF, Ministry of Land, Infrastructure, Transport and Tourism Kanto Regional Development Bureau and neighboring prefectures and cities.



Video conference to determine damage in drills to operate the government headquarters



Prime Minister Abe joining in water-discharge exercises

(2) Government Tabletop Exercises

In June and November 2017 and January 2018, tabletop exercises based on the scenario of the Nankai Trough Earthquake and Tokyo Inland Earthquake, respectively, were held to improve the knowledge and proficiency of officials from relevant ministries and agencies. Using simulations that replicated near real life disaster situations, participants tackled practical exercises without having been informed of the drill scenarios in advance. The drills were followed by a review of the effectiveness of emergency measures prescribed in plans and manuals.



Section leader meeting at the secretariat of the extreme disaster management headquarters (Drill based on a Nankai Trough Earthquake scenario)



Work instruction from section leaders (Drill based on a Tokyo Inland Earthquake scenario)

The government held regional drills for running on-site extreme disaster management headquarters in the event of the Nankai Trough Earthquake in collaboration with prefectures anticipated to be prone to damage, specifically in the Chubu region (Aichi Prefecture) in June, Kinki region (Osaka Prefecture) in July and Shikoku region (Kagawa Prefecture) in November 2017. It also held a drill for the operation of the on-site extreme disaster management headquarters in Tokyo in January 2018 based on a Tokyo Inland Earthquake scenario.



Drills of the operations of an on-site extreme disaster management headquarters



State Minister of the Cabinet Office Akama takes command as Chief of the Tokyo Extreme Disaster Management Headquarters

1-4 Tsunami Preparedness Initiatives

Loss of life in the event of a tsunami can be reduced to some extent if people take swift, appropriate actions. Based on the Act on the Promotion of Measures for Tsunami, revised according to the designation of November 5 as World Tsunami Awareness Day, the Cabinet Office, relevant ministries and agencies, local governments and private companies, among others, undertake nationwide initiatives to raise awareness of tsunami preparedness.

(1) Tsunami Evacuation Drills

In FY2017, the national government (14 ministries and agencies), local governments (155 government bodies) and private companies (93 organizations) held earthquake and tsunami preparedness drills nationwide, in which approximately 800,000 people took part.

These included drills for residents held by the Cabinet Office in partnership with local governments in nine locations nationwide (Atsuma Town in Hokkaido, Akita City in Akita Prefecture, Futtso City in Chiba Prefecture, Hachijo Tonw in Tokyo, Taketoyo Town in Aichi Prefecture, Izumisano City in Osaka Prefecture, Yukuhashi City in Fukuoka Prefecture, Shibushi City in Kagoshima Prefecture and Uruma City in Okinawa Prefecture). Approximately 44,000 citizens took part; learning how to protect themselves if an earthquake were to hit the area (ShakeOut drill) and evacuate to the nearest evacuation site once tremors subsided (evacuation drill). In some areas, various other drills were also held to practice skills such as setting up an evacuation center, installing disaster management headquarters, preparing and serving food to evacuees and first aid.



Opening of an evacuation center
(Akita City, Akita Prefecture)



Evacuation guidance drill for persons requiring special care
(Izumisano City, Osaka Prefecture)



ShakeOut drill
(Shibushi City, Kagoshima Prefecture)



Tsunami evacuation drill for primary schoolchildren
(Uruma City, Okinawa Prefecture)

(2) Public Awareness Campaigns

(i) Public Awareness Campaign on Tsunami Preparedness Day and World Tsunami Awareness Day

The campaign was deployed nationwide to boost public awareness of appropriate emergency evacuation activities in the event of a tsunami. These included displaying public awareness posters in companies and local governments and on customer-facing cash registers at major convenience stores and supermarkets nationwide.



FY2017 public awareness poster



FY2017 tsunami preparedness awareness image

(ii) FY2017 public awareness event on Tsunami Preparedness Day

Every year on November 5, the Tsunami Preparedness Day, the Cabinet Office, National Council for Promoting Disaster Risk Reduction and Council for Promoting Disaster Risk Reduction jointly hold an event to promote awareness of tsunami preparedness. The event in FY2017 was held at the Ito Hall in the Hongo Campus of the University of Tokyo to improve understanding of tsunami and countermeasures based on scientific insight. The event titled “Tsunami Preparedness Special Seminar In Hongo: Learning about Tsunami” included lectures about the fundamental mechanism of tsunami generation, building of a disaster-resilient community and better recovery from damage (build back better) by experts in tsunami preparedness as well as presentations by student groups, including those from the areas affected by tsunami disasters and those studying tsunami disaster management, on themes of how to improve local disaster resilience capability with the cooperation of all residents in the community, etc. The importance of self-help of individuals and mutual support in communities in preparation for disasters was shared by participants through these lectures and presentations.



Presentation by student groups

Column:
**High School Students Islands Summit
on World Tsunami Awareness Day 2017 in Okinawa**

The summit was held in Ginowan City, Okinawa Prefecture for two days from November 7 to 8, 2017. This was the second such summit following the first in 2016, held in Kuroshio Town, Kochi Prefecture.

255 high school students from 26 countries, including Japan, participated in the summit, on the theme of “We want to protect people’s lives - Let’s do what we can now upon learning and preparing for the threat of tsunami - Send the message of “Yui Maaru” spirit from the island of Bankoku Shinryo -,” approaches taken in various countries were presented and opinions were exchanged in three areas, namely, “Prior incidents and lessons learned from the past,” “Preparedness against disaster” and “Responses immediately after the occurrence of disaster.” Knowledge of natural disasters, disaster risk reduction and mitigation was deepened by practical activities such as tsunami evacuation drills in which they escaped to the hills.

Based on these active cross-border discussions and in light of the Kuroshio Declaration adopted at the first high school students’ summit held last year at Kuroshio Town in Kochi Prefecture, an action plan for the participating students to practice in their relevant countries and regions was declared at this summit as the Young Tsunami Prevention Ambassadors’ Note. The declaration represents the resolution of participants to do what they can now upon learning and preparing for the threat of tsunami in sincere hope worldwide to protect and save the lives of our loved ones and people in our communities. High school students who participated in this summit gained valuable experience and widened their global perspective by interacting with students from various countries and regions and sharing of disaster risk reduction and mitigation approaches with them. They are expected as young tsunami disaster ambassadors (disaster management leaders) to actively contributing to building a disaster resilient country as well as implementing cross-border networks in future.



High School Students Island Summit on World Tsunami Awareness Day 2017 in Okinawa

1-5 Citizen-led Initiatives (Promoting Widespread Adoption and Awareness of Community Disaster Management Planning System)

Citizens must understand the regional attributes and risks of the areas in which they live and build relationships of trust with their neighbors before disaster occurs to ensure that self-help and mutual support function effectively in coordination with public support in the event of a disaster. To promote these voluntary activities of residents, the Cabinet Office revised the Basic Act on Disaster Management to commence the Community Disaster Management Planning System in April 2014 for allowing community residents (including business operators with offices there) to draft a community disaster management plan and present it in the municipal council for disaster management to be reflected in the municipal disaster management plan.

(1) Promoting initiatives in communities

The Cabinet Office implemented model projects in 44 districts over three fiscal years through to FY2016 to promote the Community Disaster Management Planning System and encourage residents to make a community disaster management plan. In this three-year model projects, 27 of the 44 districts, or roughly 60%, drafted their community disaster management plans, of which 16 districts successfully revised the municipal disaster management plan and reflect their drafted plans in the community disaster management plan. 984 community disaster management plans, as stipulated in the Municipal Disaster Management Plan, were created nationwide as of April 1, 2017 (data of the Fire and Disaster Management Agency).

In FY2017, awareness activities were continued in presentation meetings throughout Japan and sessions such as “if we had prepared for the community disaster management plan at this time” in the 2017 National Conference on Promoting Disaster Risk Reduction based on the Report on Community Disaster Management Plan Model Projects - Outcomes and Issues (published in the end of 2016), which identified the outcomes and issues of model projects and detailed insights of procedures up to the creation of a community disaster management plan, (Reference: <http://www.bousai.go.jp/kyoiku/chikubousai/index.html>).

(2) 2018 Community Disaster Management Plan Forum

On March 24, 2018, the Cabinet Office held the 2018 Community Disaster Management Plan Forum - Community Disaster Management Keeps on Evolving - in Chiyoda Ward (Hotel Le Port Kojimachi) in Tokyo to consider the future vision of community disaster management plans based on the characteristics of recent disasters and contemporary trends. The latest cases of community disaster management plan across Japan were presented in the forum to promote the formulation of community disaster management plans, and various techniques available for making such plans including the plans themselves, processes and contents, etc. were introduced. In particular, examples of disaster management initiatives in high rise apartment buildings (Sendai and Metropolitan Area (Minato Ward and Nihonbashi, Chuo Ward)) were introduced with some recommended cases of home evacuation in highly quake-resistant buildings where residents can stay home with stockpiles for the family provided in advance as well as the effectiveness of creating a community disaster management plan, spearheaded by companies. The present activities of the model areas designated by the Cabinet Office before were also reported for use as reference for the continuity of initiatives.



Community Disaster Management Plan Forum



Ichihara Disaster Management 100 Members Meeting

(3) Initiatives of municipalities to formulate community disaster management plans

Municipalities have also made good progress with their own initiatives to raise awareness among local residents based on the model projects of the Cabinet Office. For example, Ichihara City of Chiba Prefecture started the Ichihara Disaster Management 100 Members Meeting in February 2018. It comprises 60 residents recommended by voluntary disaster management organizations and randomly selected 2,000 citizens and holds workshops for formulating a community disaster management plan once every month as a place for residents to consider local disaster management.

Based on the experience of providing support for the northern district of Yahagi (FY2015) and the western part of Fujikawa (FY2016), both of which were designated as model districts by the Cabinet Office, Okazaki City of Aichi Prefecture launched independent model projects to create community disaster management plans elsewhere. Consequently, eight districts have already drafted the plan. The City published the Implementation Manual reflecting local characteristics based on the Community Disaster-Management Plan Guidelines provided by the Cabinet Office in FY2014 (reference: <http://www.bousai.go.jp/kyoiku/chikubousai/index.html>) to supply specific instructions such as a method of opening workshops to help residents understand the system (Reference: <http://www.city.okazaki.lg.jp/1550/1555/262000/p019718.html>).



Community Disaster Management Plan Guidelines
(Cabinet Office)



Implementation Manual (Okazaki City)

Municipalities hold awareness seminars, etc. for residents to raise their disaster risk reduction awareness. To foster disaster management awareness underpinning the community disaster management plan, the Cabinet Office has collaborated with municipalities in this approach to showcase effective ways of raising the interest of residents who may not otherwise be aware.

Designated as the demonstrating district in FY2016, Naka Ward of Hamamatsu City in Shizuoka Prefecture launched the Hamamatsu Citizens' Disaster Preparedness Council, comprising subcommittees participated in by randomly selected residents. The Cabinet Office published the Guide to Initiatives to Increase Awareness of Disaster Preparedness among Local Citizens via Random Sampling in March 2017 based on the outcomes of this demonstration project. (Reference: <http://www.bousai.go.jp/kaigirep/kenkyu/miraikousou/index.html>)

While the residents participating in the Citizens' Disaster Preparedness Council were highly satisfied, opinions included comments like "it was difficult to make remarks because of too many people in the subcommittee" and "it may feel more personal if there are chances to hear evacuees' experiences." Based on these opinions, the method used in the previous year was revised to holding small group discussions in FY2017.

In FY2017, the Ninomiya Town Disaster Management Workshops were held at Ninomiya in Naka-gun, Kanagawa Prefecture, and as usual, featured randomly selected residents in their 20s to 70s, including 14 first-timers (30 males and females in all) taking part. The demonstrations in the workshop were suitable for local residents who would not normally have many chances to deal with disaster management otherwise, such as hearing evacuees' experiences and playing crossroad games. Remarks in the follow-up questionnaire include "I want to share what I have learned

with my family and friends,” “I want to confirm stockpiles in my house” and “I want to check evacuation sites with my family.”

As mentioned above, there are various methods to formulate community disaster management plans, which municipalities strive to disseminate to make a suitable plan in collaboration with each other while nurturing reliable relationships with local residents. Disaster mitigation and prevention awareness may be fostered and propagated from one community to another when municipalities provide rear area support for communities, and prefectures and municipalities spread information horizontally in and out of communities through seminars, etc. It is preferable for each of these communities to start planning voluntarily; based on the model projects of the Cabinet Office and initiatives taken by local governments.

The Cabinet Office will also strive continuously to increase public awareness by disseminating this system of formulating community disaster management plans as best it can.

1-6 Development of an Environment for Volunteer Activities

The year 1995, in which the Great Hanshin-Awaji Earthquake occurred, is known as the beginning year of volunteerism, since which time volunteer activities in disaster affected areas have proliferated and increasingly played a vital role in emergency response and reconstruction assistance. The Cabinet Office has developed an environment for volunteers to facilitate support for disaster affected people. Accordingly, volunteer activities were firmly in place and evolving at the Kumamoto Earthquake in 2016 and 2017 Northern Kyushu Heavy Rain.

(1) Study Group on Developing an Environment for DRR Volunteer Activities

The Cabinet Office held a Study Group on Promoting Volunteer Activities Contributing Generally to Disaster Risk Reduction from FY2015 to FY2016, and summarized the issues in promoting volunteer activities and proposals on these issues, upon which the Study Group on Developing an Environment for DRR Volunteer Activities was held in 2017.

The study group issued Guidebooks for the Government in Collaboration and Coordination with NPOs and Volunteers; mainly covering tasks assigned to administrative officers to promote collaboration and coordination with NPOs and volunteers. It deals with basic government policies to collaborate with NPOs and volunteers and specific initiatives for promoting collaboration, by dividing circumstances between normal times and disasters accordingly.

Guidebook Overview

The guidebook is designed to allow administrative officers to identify community based disaster management and mitigation measures in collaboration with as many stakeholders as possible by presenting basic policies of collaboration with NPOs and volunteers, typical cases of collaboration during normal times and disasters and desirable collaboration approaches.

It describes the importance of building collaborative structures and face-to-face relationships with stakeholders in consideration of the importance of collaboration between stakeholders, because as well as government, disaster volunteer centers, private support organizations, intermediate supporting organization and various other stakeholders also provide support in the event of a disaster.

- While the government is responsible for supporting disaster affected people, collaboration and coordination with various supporting organizations such as NPOs and volunteers are essential to reduce the administrative load and support disaster victims adequately.
- Support by various supporting organizations is provided by disaster volunteer centers installed by local councils of social welfare and through diversified routes.
- As the scale of disaster increases, the need for support from external areas (other than those affected) intensifies as well as support within the community (affected areas).
- It is important to identify the bigger picture of support activities by a number of supporting organizations through various routes and allocate suitable support activities comprehensively and across the board, by sharing information and adjusting activities between these organizations. In this context, intermediate supporting organizations play a critical role.
- There are increasing cases of Wye collaboration among government, social welfare councils (disaster volunteer centers) and NPOs, etc. (intermediate supporting organizations) through the Information Sharing Meeting for sharing information and adjusting activities by various supporting organizations (Kumamoto Earthquake, Northern Kyushu Heavy Rain). It is important to encourage these initiatives.
- Accordingly, there should be opportunities for local governments, social welfare councils and NPOs, etc. to collaborate, build face-to-face relationships and establish a system for accepting external support regularly.
- Collaboration of departments relating to disaster and risk management regularly, welfare, NPOs and civic activities and community development, etc. should collaborate with each other within the agency regularly. There is also a need for pre-disaster inter-agent initiatives for regional support and collaboration.

<The Guidebook is available at the following URL:>

(Reference: http://www.bousai.go.jp/kaigirep/kentokai/bousai_volunteer_kankyoseibi/index.html)

(2) Drills in collaboration with government and volunteers

Mutual communication and understanding between the government and volunteers are required through drills and workshops held regularly to facilitate collaboration and coordination in the event of disaster. The Cabinet Office holds drills and workshops in an attempt to let the government and volunteer coordinators directly see each other to discuss various issues on collaboration and coordination and deepen mutual understanding.

In FY2017, the Cabinet Office and Hiroshima Liaison and Coordination Committee for Disaster Volunteer Activities jointly held a workshop in collaboration between the government and volunteers. Hiroshima City issued the Hiroshima Disaster Volunteer Headquarter Operation Manual, which stipulates the installation of disaster volunteer headquarters to facilitate and streamline volunteer activities in the event of a large scale disaster. The workshop in FY2017 aimed to share images of the role and specific activities of the disaster volunteer headquarters installed in the event of disaster based on the provisions specified in the above-mentioned manual. The participants commented that the simulation according to the manual had revealed the shortage of the manual and the workshop provided good opportunities for considering how to respond to external support.



Workshop featuring collaboration between the government and volunteers

Column: Volunteer tours

The term “volunteer tour” was first used in a travel plan made by a travel company to provide voluntary support during the Golden Week holidays in May, two months after the Great East Japan Earthquake. Until then, tours to provide voluntary activities were restricted under the Travel Agency Act and it was pointed out that planning such a tour by a social welfare council or NPO was difficult.

In July 2017, the Japan Tourism Agency announced a procedure to provide transportation and accommodation services without infringing the present Travel Agency Act, to streamline and expedite volunteer tours with high emergency and public interest while ensuring the safety and convenience of tourists for which the Travel Agency Act was established. According to this announcement: The organizer of a volunteer tour may be a volunteer organization structured if a disaster occurs, or an NPO, local government or university, etc., which recruits volunteers if a disaster occurs; the organizing NPO or university, etc. shall submit a list of participants to the social welfare council via the affected or sending local government; the organizing local government or quasi-official organization shall also take hold of the participants; and if measures to apply for and assign the responsible person are provided, the deed by the organizer to recruit volunteers or collect fees may be approved as an exceptional case in the Travel Agency Act (activities in a group) in addition to usually approved “the person who is mutually in contact on a day-to-day basis.” The Japan Tourism Agency will indicate the applicable disaster and period as needed.

(Reference: http://www.mlit.go.jp/kankocho/topics06_000108.html)

1-7 Development of Business Continuity Systems

(1) Development of Business Continuity Systems by National Government's Ministries and Agencies

The national government's ministries and agencies have reviewed their business continuity plans (BCPs) as required according to the Business Continuity Plan of the National Government (Measures for the Tokyo Inland Earthquake) decided by the Cabinet in March 2014. Based on this plan, the Cabinet Office assessed its BCP with experts. It also held a fuel-supply simulation training session in the national government building in September and a training session to prepare for and install disaster management headquarters of the national government's ministries and agencies in the vicinity of the Tachikawa Regional Disaster Management Base in October 2017. The government service continuity system will also be implemented in the event of a potential Metropolitan Inland Earthquake through these initiatives to continue administrative operations smoothly.

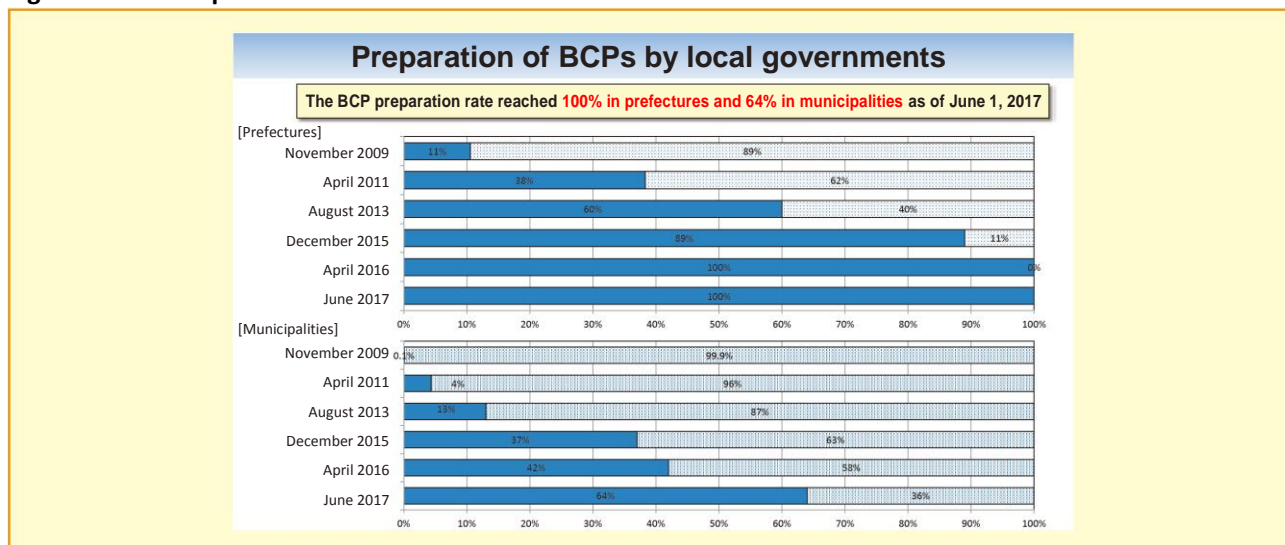
(2) Development of Business Continuity Systems by Local Governments

The local government must ensure its administrative function works for ongoing operations required, even when a disaster occurs, hence the importance of the local government providing its own BCP. The BCP preparation rate of local governments had reached 100% by the end of last fiscal year. In terms of municipalities, this ratio increased from the previous survey by 22 points to 64% in June 2017 (Fig. 1-7-1).

The Cabinet Office published the Business Continuity Plan Formulation Guidelines for Municipalities in FY2015, aiming to make it easier for small municipalities to prepare a BCP. In addition, it amended the Business Continuity Manual for Local Governments During Earthquake Disasters (April 2010) to take account of past disasters, published the revised version under the title Business Continuity Manual for Local Governments During Major Disasters and distributed it to local governments. Moreover, since FY2015, the Cabinet Office has been holding workshops (co-organized by the Cabinet Office and the Fire and Disaster Management Agency) to train relevant municipal employees in preparing BCPs. Through such initiatives, the Cabinet Office will continue to support local governments in strengthening and enhancing their business continuity systems.

Should a major disaster occur, it will be difficult for the affected municipalities to carry out an extensive range of disaster response operations singlehandedly. Accordingly, the Cabinet Office published the Guidelines on Local Government Aid Acceptance Systems in Case of Disaster in March 2017. In addition to the business continuity system, the local government also needs to develop an aid acceptance system to accept assistance from the national government, other local governments, private companies and volunteer organizations, etc. smoothly and effectively.

Fig. 1-7-1 BCP Preparation Rate in Local Governments



Source: November 2009 Survey of Business Continuity Plans Based on an Earthquake Disaster (Cabinet Office and Fire and Disaster Management Agency Survey)

April 2011 Local Government Information Management Report (March 2012) Ministry of Internal Affairs and Communications Local Administration Bureau Regional Information Policy Office Survey

August 2013 BCP Preparation Rate for Large-Scale Earthquakes and Other Natural Disasters (preliminary figures) (Fire and Disaster Management Agency Survey)

December 2015 Survey of the Preparation of Business Continuity Plans and the Formulation of Specific Criteria for the Issuance of Evacuation Recommendations by Local Governments (Fire and Disaster Management Agency Survey)

April 2016 Survey of the Current Status of the Preparation of Business Continuity Plans by Local Governments (Fire and Disaster Management Agency Survey)

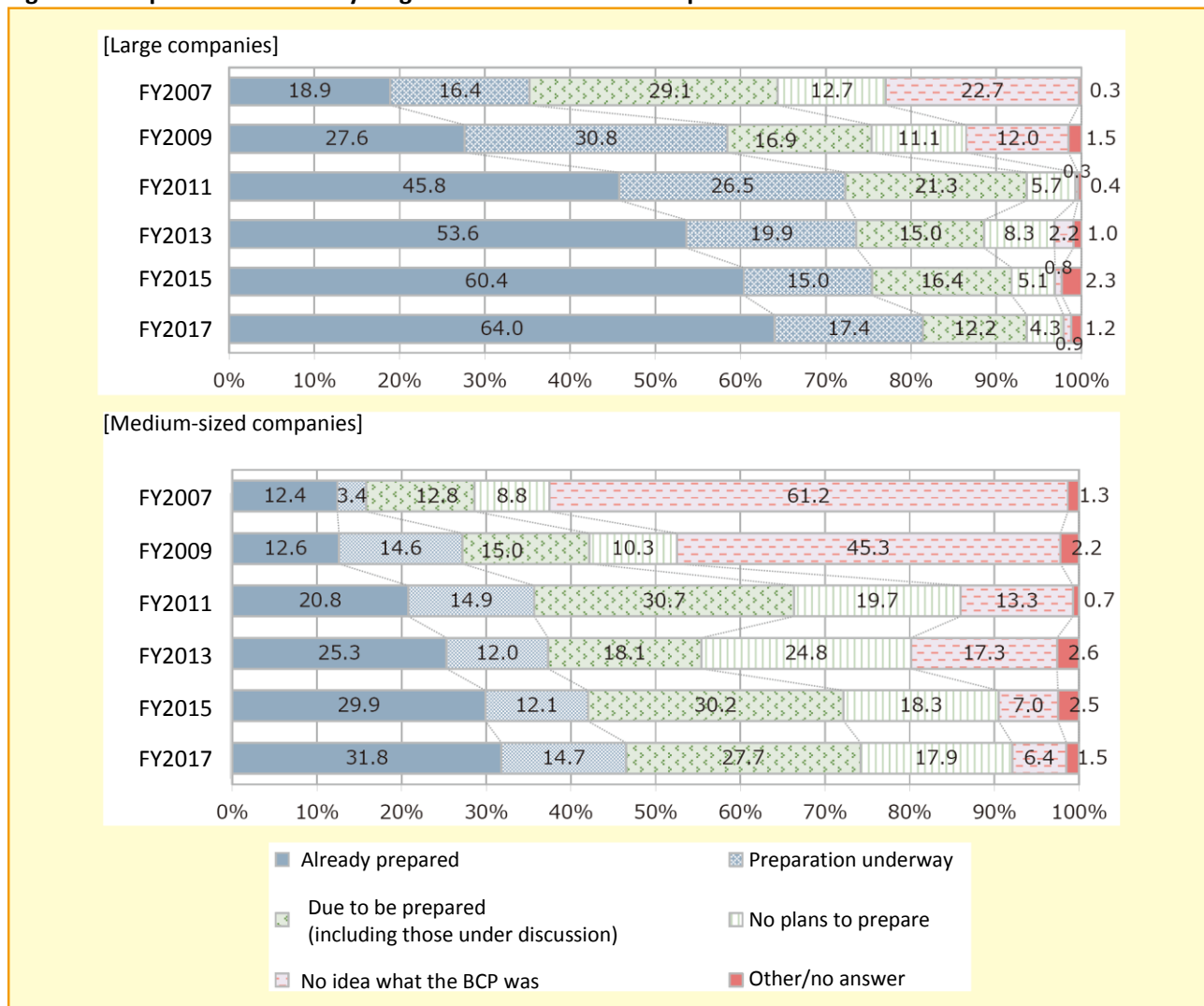
June 2017 Survey of the Current Status of the Preparation of Business Continuity Plans by Local Governments (Fire and Disaster Management Agency Survey)

(3) Development of Business Continuity Systems by private sector companies

The Great East Japan Earthquake in 2011 clearly highlighted the importance of incorporating business continuity management (BCM) into the routine management strategy of companies. As such, in 2013, the Cabinet Office revised the guidelines to incorporate the concept of BCM and published them under the title Business Continuity Guidelines (Third Edition) - Strategies and Responses for Surviving Critical Incidents -. This edition is being disseminated at present, while new Business Continuity Guidelines are being edited along the third edition.

In terms of specific government targets, the Action Plan for National Resilience 2017 sets a goal of ensuring that more or less 100% (nationwide) of large companies and 50% (nationwide) of medium-sized companies have prepared BCPs by 2020. As such, the Cabinet Office conducts a fact-finding survey every second fiscal year, to ascertain what proportion of private sector companies have prepared a BCP and investigate their disaster preparedness initiatives. The results of the FY2017 Fact-finding Survey on Company Business Continuity and Disaster Preparedness Initiatives (No. of companies: 1,985), which was conducted in March 2018, showed that preparation of BCPs was on the rise, with 64.0% of large companies (60.4% in the previous survey) and 31.8% of medium-sized companies (29.9% in the previous survey) having already prepared a BCP. When companies currently in the process of preparing a BCP are also included, these figures rise to just over 80% and just under 50%, respectively (Figs. 1-7-2, 1-7-3).

Fig. 1-7-2 Preparation of BCPs by Large and Medium-sized Companies



Source: Formulated by the Cabinet Office based on "FY2017 Fact-finding Survey on Company Business Continuity and Disaster Preparedness Initiatives"

Fig. 1-7-3 Collection Rate of Questionnaires in FY2017 Company Survey (Large and Medium-sized Companies)

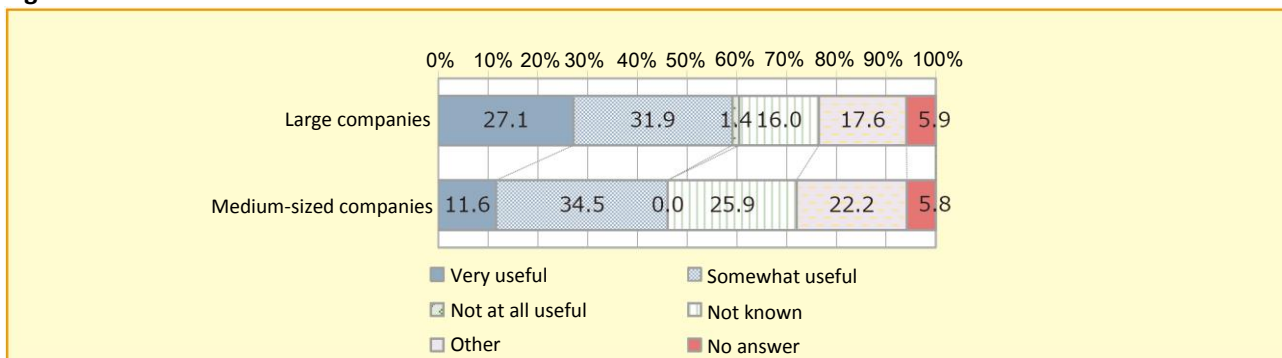
		Total	Large company (Capital: Over 1 billion yen, Regular employees: 50 or more, etc.)	Medium-sized company (Capital: Under 1 billion yen, Regular employees: 50 or more, etc.)	Other company (Capital: Over 100 million yen, other than large- and medium-sized companies)	
Total (No. of companies)		1,985	724	582	679	
BCP rate (%)		38.2	64.0	31.8	34.7	
Damage by disaster	Yes	No. of companies	494	330	254	
		BCP rate (%)	41.7	64.9	29.5	40.2
	No	No. of companies	907	230	252	425
		BCP rate (%)	34.9	62.0	34.8	31.5

Source: Formulated by the Cabinet Office based on "FY2017 Fact-finding Survey on Company Business Continuity and Disaster Preparedness Initiatives"

With regard to the question about “the largest reason for preparing (planning to prepare) the BCP” in this survey, “In preparedness for frequent occurrence in recent years” was the most common answer, rather than “Previous experience of damage due to disasters,” by both large- and medium-sized companies (a total of 1,306), suggesting that these companies may have been motivated to provide or concerned about “preparedness.” 38% of large companies and 23.8% of medium-sized companies chose “Review the BCP every year,” and 36.1% of large companies and 37.6% of medium-sized companies chose “Review the BCP not every year but regularly.” This revealed that even medium-sized companies, around 60% of them reviewed their BCPs regularly.

When affected large- and medium-sized companies (824 companies) were questioned about the usefulness of BCPs at the time of natural disaster (Fig. 1-7-4), 59.0% of large companies and 46.1% of medium-sized companies answered “Very useful” while 1.4% of large companies and no medium-sized companies answered “Not at all useful,” suggesting that the usefulness of BCPs is recognized.

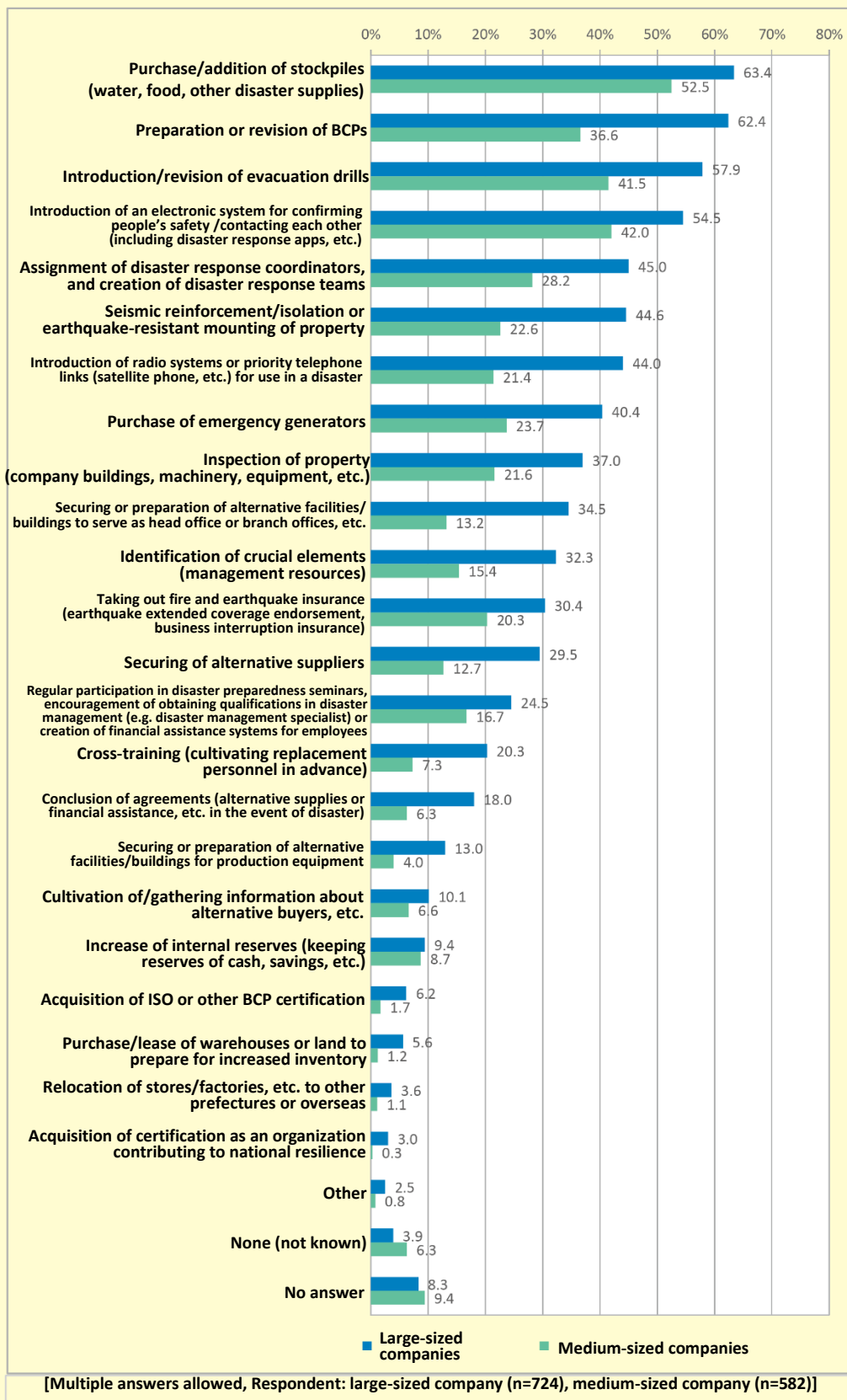
Fig. 1-7-4 Usefulness of BCPs at the Time of Natural Disaster



When asked about targeted initiatives for disaster responses in future (Fig. 1-7-5), “Purchase/addition of stockpiles (water, food and other disaster supplies)” was the top priority for both large- and medium-sized companies (63.4% of large companies, 52.5% of medium-sized companies). “Formulation or revision of BCPs” was placed second by large companies (62.4%), while “Introduction of an electronic system for confirming people’s safety/contacting each other (including disaster-response apps, etc.)” was placed second by medium-sized companies (42.0%). “Formulation or revision of BCPs” was placed fourth by medium-sized companies (36.6%). Other than this item, BCP-related items (e.g. “Assignment of disaster-response coordinators and creation of disaster-response teams,” “Securing or preparation of alternative facilities/buildings to serve as head office or branch offices, etc.” and “Identification of crucial elements (management resources)”) were supported by many companies.

The Cabinet Office will continue to undertake initiatives to popularize and raise awareness of BCP preparation based on the outcomes of surveys, with the aim of encouraging companies to formulate a BCP and engage in BCM.

Fig. 1-7-5 Targeted Initiatives for Disaster Responses in the Future (n = 1,306)



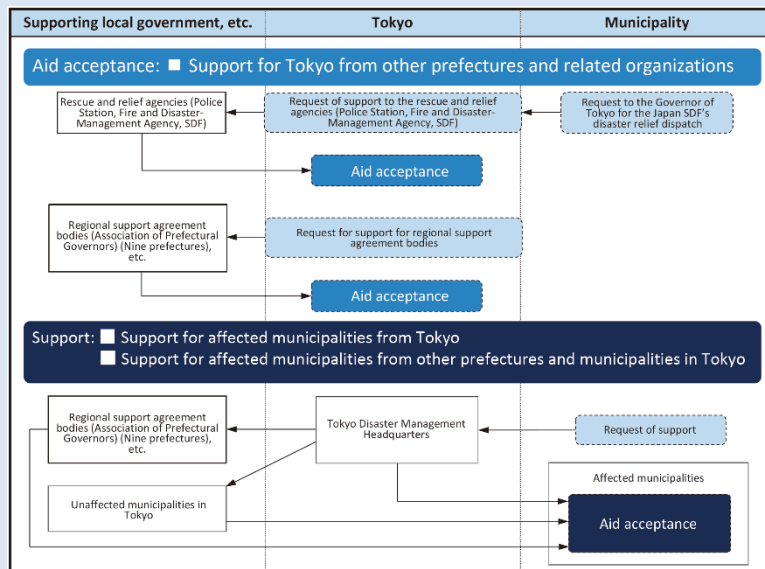
Source: Formulated by the Cabinet Office based on "FY2017 Fact-finding Survey on Company Business Continuity and Disaster Preparedness Initiatives"

Column: Mutual Aid Management Plan of Tokyo

Should a major disaster occur, it will be difficult for the affected municipalities to carry out an extensive range of disaster response operations singlehandedly. Accordingly, it is absolutely crucial for local governments to make preparations under normal circumstances by thinking about how to ensure the smooth acceptance of personnel and physical support from national and local governments, private companies, and volunteer groups, so that these resources can be effectively utilized in responding to disaster. It is also vital for local governments to put in place an aid acceptance system to this end.

The Tokyo Metropolitan Government announced the Tokyo Disaster Aid Acceptance and Support Plan in January 2018 based on the Record of Support to the Kumamoto Earthquake (November 2016) summarized through interviews with the affected local governments and officers dispatched from Tokyo to the affected areas at the Kumamoto Earthquake in 2016. When a large scale disaster such as the Tokyo Inland Earthquake occurs in Tokyo, disaster response operations will be required to an unprecedented extent, beyond all comparison with past disasters. When an earthquake exceeding the intensity of 6 lower (excluding the islands) takes place, the Tokyo Disaster Management Headquarters will be installed automatically. This plan clearly stipulates the establishment of a framework of mutual assistance with the National Governors' Association, nine prefectures and 21 major cities with which a regional cooperation agreement has been concluded, as well as aid acceptance and support procedures taken by the responsible departments.

The Tokyo Metropolitan Government will verify the content of this plan via tabletop exercises, etc. and make revisions as required by exchanging opinions with municipal bodies to further reinforce the Aid Acceptance and Support System of Tokyo launched in the event of the Tokyo Inland Earthquake.



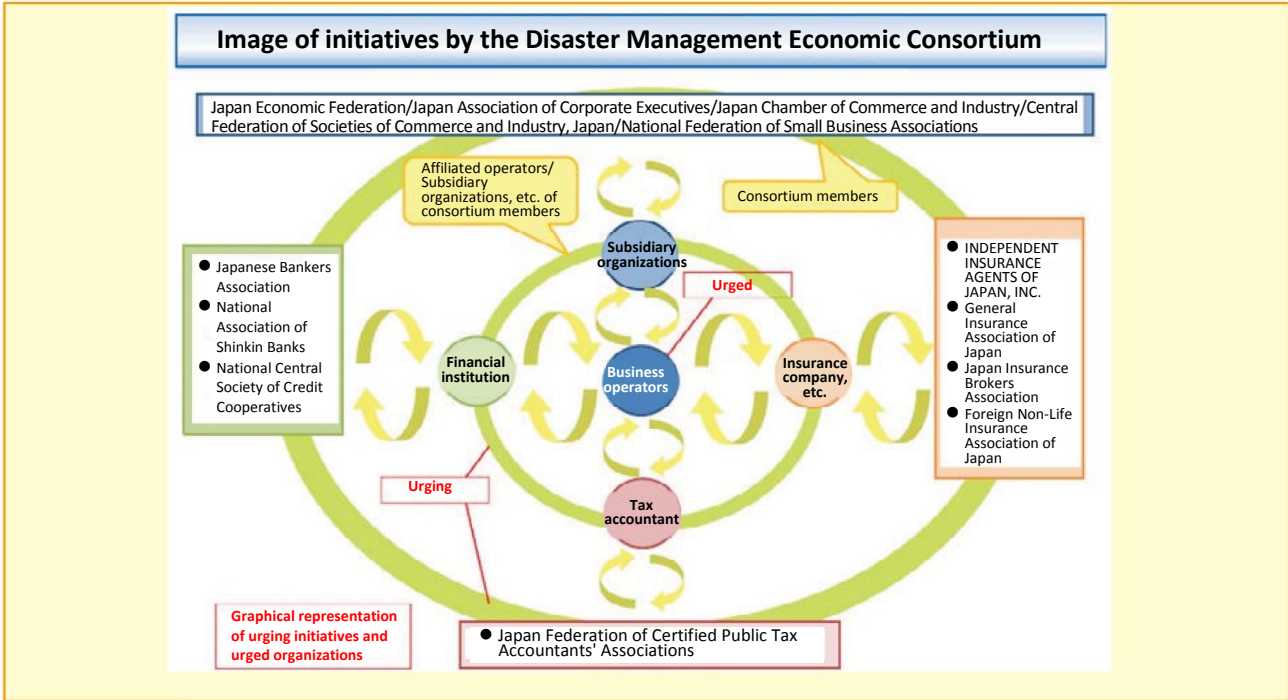
Source: Tokyo Metropolitan Government Disaster Prevention Website

(Reference: <http://www.bousai.metro.tokyo.jp/bousai/1000019/1003738/1005637.html>)

1-8 Partnerships with Industrial Sector

To improve the capability of disaster risk management in the entire society, private business operators must also improve their preparations for large scale natural disasters. In this context, the Disaster Management Economic Consortium was launched by 13 economic groups on March 23, 2018 to provide a venue for exchanging opinions and communicating with each other (Fig. 1-8-1). This consortium helps business operators manage disaster risk effectively disaster risk management through risk control and risk finance.

Fig. 1-8-1 Disaster Management Economic Consortium



Source: Cabinet Office website (reference: <http://www.bousai.go.jp/kyoiku/consortium/index.html>)

Soon after the launch, the Disaster Management Economic Consortium issued the Principles of Disaster Management Economic Action on March 23 as the common concept of business operators on preparations for disasters (Fig. 1-8-2).

The awareness and education of business operators with regard to these principles will be promoted mainly by voluntary industry groups in future. A real and continuous promotion of disaster risk management practices of business operators by various organizations but disseminating principles will increase disaster resilience across the whole of society. The Cabinet Office will support these industry initiatives as a new framework of government-private sector joint activities.

Fig. 1-8-2 Principles of Disaster Management Economic Action

[Preface]

Since Japan is prone to natural disasters, it is important for business operators to make decisions aware that disaster risk management is what underpins business management. For large scale disasters in particular, it is critical for business operators to make preparations as described in (1) to (4) below based on self-help and mutual support approaches because of the limitations of public support.

- (1) Business operators adequately recognize and determine disaster risks on their own.
- (2) Business operators take measures against disasters using effective disaster risk management by combining risk control (seismic retrofitting, BCP measures, etc.) and risk finance (purchase of insurance, loans, cash holding, etc.) depending on the recognized disaster risks.
- (3) Business operators raise awareness among their executives and employees on disaster management through disaster management education to make proactive activities possible.
- (4) Business operators ensure collaboration and communication with their business partners essential for their business management such as financial institutions, employers' associations and other related organizations, and take self-help and mutual support-based disaster management measures.

The Principles of Disaster Management Economic Action must be respected in the activities of consortium members to boost disaster risk management capability across society by making self-help and mutual support-based preparations.

[Principles of Disaster Management Economic Action]

1. The members of the Disaster Management Economic Consortium must strive to achieve the preparations (1) to (4) as described in the Preface.
2. The members of the Disaster Management Economic Consortium must strive to improve disaster risk management capability across the entire society by sharing as much insight as possible and distributing information to business operators.
3. The members of the Disaster Management Economic Consortium must strive to promote public awareness and education to improve the disaster risk management capability of business operators by employing ingenuity, according to the characteristics of the industries to which the members belong.

End.

Source: Cabinet Office website (Reference: <http://www.bousai.go.jp/kyoiku/consortium/index.html>)

1-9 Initiatives by Academic Communities

A wide range of research is being conducted in Japan on the subject of disaster management, covering a variety of fields, including natural phenomena such as earthquakes, tsunamis, volcanoes, and meteorological phenomena; civil engineering; buildings; earthquake-resistant structures; emergency medical care; environmental health and other medical care and hygiene issues; geography; history and other aspects of human life; information; and energy. The Great East Japan Earthquake led to an awareness that disaster management and mitigation research from a comprehensive perspective that integrated all these fields is essential, giving rise to a need for interdisciplinary collaboration through information sharing and interaction with other fields across the boundaries of different specialisms. Accordingly, following discussions with the Science Council of Japan and various other relevant academic societies, the Japan Academic Network for Disaster Reduction was established to serve as a network of academic societies involved in disaster management, mitigation, and reconstruction. The network counted 47 academic societies among its membership at the time of its launch in January 2016, but this figure had grown to 56 by the end of March 2018.

The network held the International Conference on Science and Technology for Sustainability 2017 - Global Forum on Science and Technology for Disaster Resilience 2017 - on November 23 to 25, 2017 to determine specific activities for implementing four priority areas in the Sendai Framework for Disaster Risk Reduction 2015-2030, and the outcomes of which were summarized in the Tokyo Statement 2017. On December 20, 2017, it held a public symposium titled "2017 Northern Kyushu Heavy Rain and Countermeasures" jointly with the Science Council of

Japan to extensively present the outcomes of field investigations and studies by a number of academic societies after the disaster in northern Kyushu.

The network mainly targets collaboration for sharing and distributing information, but also intends to increase the substantial effects of disaster management by extending activities such as investigations and studies by member academic societies reciprocally.



International Conference on Science and Technology for Sustainability 2017
– Global Forum on Science and Technology for Disaster Resilience 2017 –

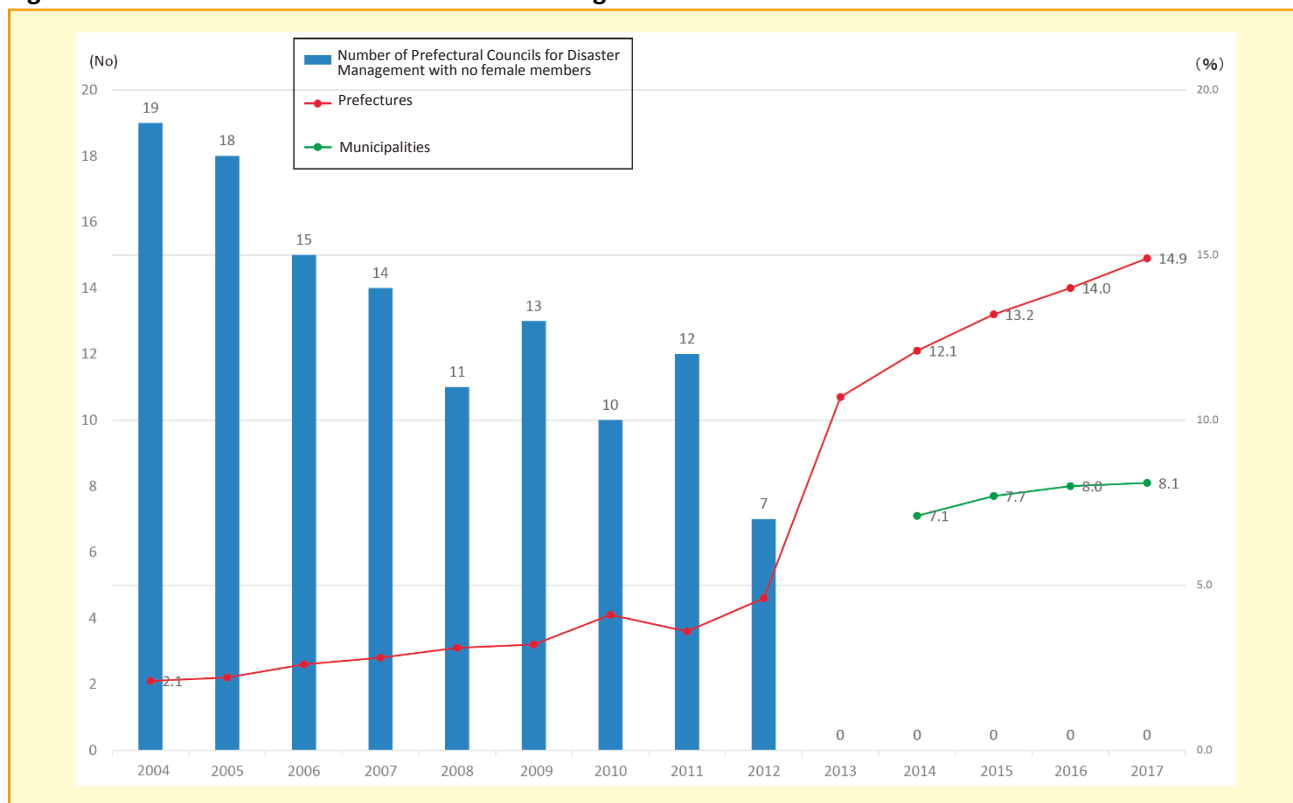
1-10 Initiatives from the Perspective of Gender Equality

In the Fourth Basic Plan for Gender Equality (approved by the Cabinet on December 25, 2015) and the Basic Plan for Disaster Risk Reduction (approved by the National Disaster Management Council on February 16, 2016), the Cabinet Office has specified that consideration must be given to the differing needs of men and women in all aspects of disaster management, including pre-disaster prevention, emergency response, and recovery and reconstruction. Moreover, these plans require efforts to be made to promote women's participation in decision-making forums relating to both disaster management and reconstruction (Figs. 1-10-1 to 1-10-3).

In addition, the Cabinet Office consolidated the Guidelines for Disaster Planning, Response, and Reconstruction from a Gender-Equality Perspective (2013), based on lessons from the Great East Japan Earthquake and responses to other past disasters. Serving as a basic set of guidelines for local governments to follow from a gender equality perspective when implementing the necessary measures and responses, these have been shared with local governments, as well as relevant groups and organizations. Various problems emerged in the Great East Japan Earthquake due to failure to sufficiently consider the stockpiling and provision of supplies and the operation of evacuation centers. Among the issues raised were the lack of specific supplies for women and a failure to provide breastfeeding or changing places for women.

Using these guidelines, the Cabinet Office has sought to encourage local governments to take action before disaster occurs, for example, by increasing the number of female representatives in the Local Disaster Management Council and undertaking initiatives aiming to reflect gender equality perspectives when preparing and revising the Local Plans for Disaster Risk Reduction. When the Kumamoto Earthquake occurred, the Cabinet Office made an initial request to both Kumamoto Prefecture and Kumamoto City for adopting a gender equality perspective based on these guidelines, especially in the operation of evacuation centers. The Cabinet Office has continued to liaise with both prefectural and the municipal governments ever since, working to ascertain the status of local initiatives and providing advice where required.

Fig. 1-10-1 Female Member in Local Disaster Management Councils



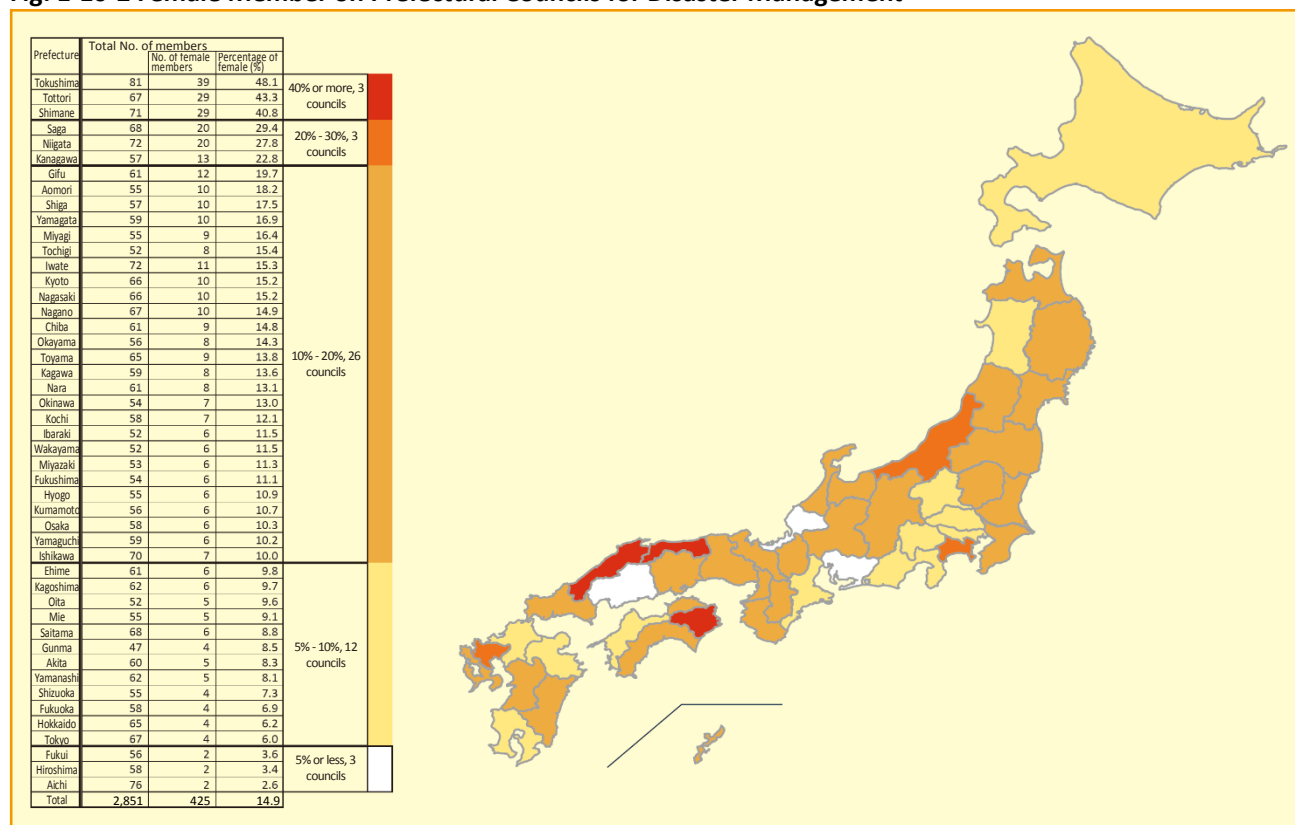
Note: Following its revision in June 2012, the Basic Act on Disaster Management specified that members of voluntary disaster management organizations and/or individuals with a relevant academic background should be added to the membership of the Local Disaster Management Council in addition to the staff of disaster management organizations who are already ex officio members, to reflect the views of a more diverse range of bodies in preparing the Local Plans for Disaster Risk Reduction and similar.

Notes: 1. Figures for April 1 each year, in principle.

2. Due to the impact of the Great East Japan Earthquake, figures for 2011 do not include parts of Iwate Prefecture (Hanamaki City, Rikuzentakata City, Kamaishi City, Otsuchi Town), Miyagi Prefecture (Onagawa Town, Minamisanriku Town) and Fukushima Prefecture (Minamisoma City, Shimogo Town, Hirono Town, Naraha Town, Tomioka Town, Okuma Town, Futaba Town, Namie Town, Iitate Village), while figures for 2012 do not include parts of Fukushima Prefecture (Kawauchi Village, Katsurao Village and Iitate Village).

Source: Compiled from Cabinet Office, Progress of Local Government Measures Focused on Women or the Promotion of a Gender-Equal Society

Fig. 1-10-2 Female Member on Prefectural Councils for Disaster Management



Source: Formulated from the Progress of Local Government Measures Focused on Women or the Promotion of a Gender-Equal Society (2017) by the Cabinet Office

Fig. 1-10-3 Target Outcomes for Prefectural Councils for Disaster Management and Municipal Councils for Disaster Management in the Fourth Basic Plan for Gender Equality

Item	Current	Target (Deadline)
Female Representation on Prefectural Councils for Disaster Management	13.2% (2015)	30% (2020)
Female Representation on Municipal Councils for Disaster Management	<ul style="list-style-type: none"> Number of bodies with no women appointed as members: 515 (2014) Women as a proportion of the membership: 7.7% (2015) 	<ul style="list-style-type: none"> Number of bodies with no women appointed as members: 0 (2020) Women as a proportion of the membership: 10% (ASAP), aiming for 30% in due course (2020)

Source: Formulated by the Cabinet Office from the Fourth Basic Plan for Gender Equality

Numerous disaster management related initiatives have been conducted in Japan, which is prone to flood disasters caused by earthquakes and typhoons from old times, but because of a large gender gap in social and economic participation in normal time compared with other countries, vulnerability may be distinctive in the event of disaster. Need for initiatives in consideration of the participation of women in the process of deciding policies and objectives for disaster management, and different needs between men and women has been understood even better after the Great East Japan Earthquake, and deemed as an important factor for planning and implementing policies and projects to reduce disaster risks in terms of effective disaster risk management and gender equality in the Sendai Framework for Disaster Risk Reduction 2015-2030.

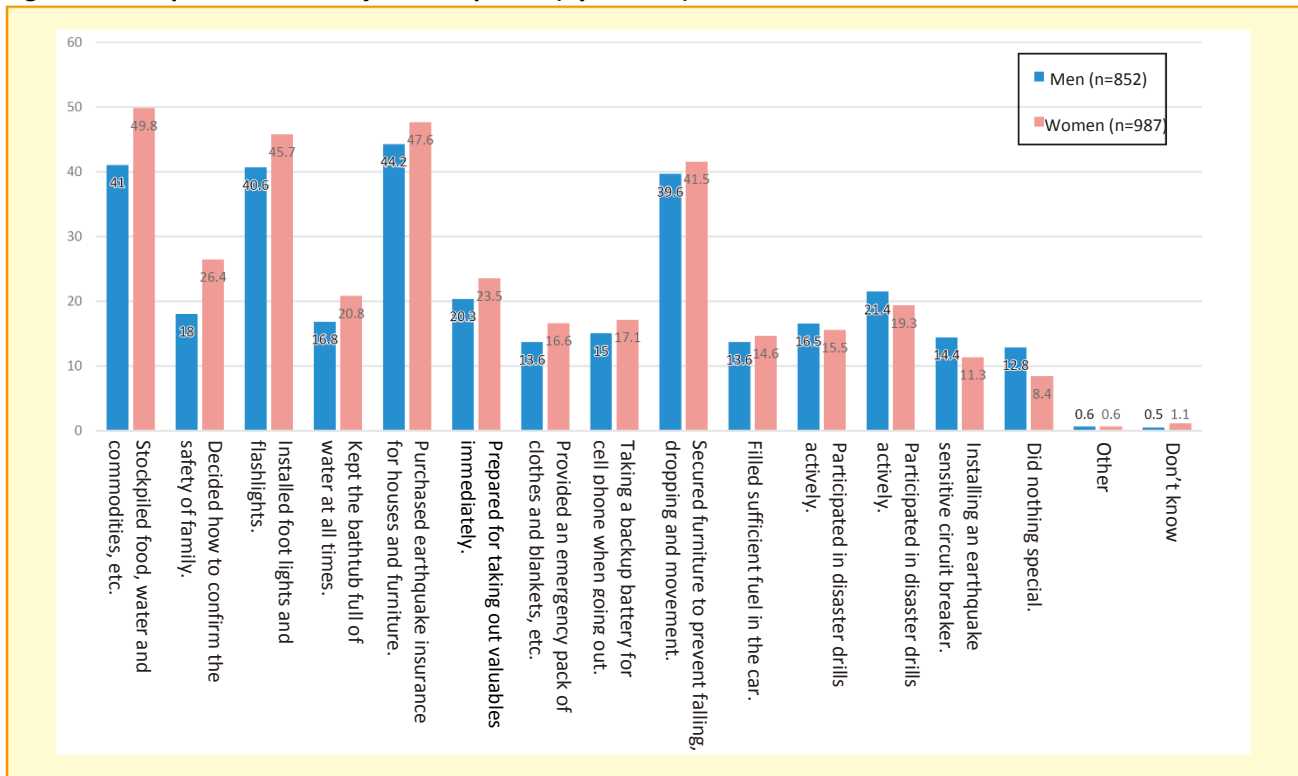
Accordingly, the Cabinet Office has held the Advisory Panel on Gender Equality in Disaster Management since May 2017 to verify whether gender equality in disaster management contributes to increasing diversified community disaster resilience by pursuing gender equality in disaster management.



Advisory Panel on Gender equality in Disaster Management

The advisory panel has addressed various issues, including the current status of gender equality in local disaster resilience and the participation of various stakeholders to improve community disaster resilience, made proposals on social images in disaster management should gender equality be achieved, and analyzed different needs and damages depending on genders, and effects of the elimination of gender bias on the community disaster resilience using analytical data and the results of questionnaires, etc. (Fig. 1-10-4).

Fig. 1-10-4 Preparations for Major Earthquakes (by Gender)



Source: Formulated by the Cabinet Office from "Public Opinion Poll regarding Disaster Risk Reduction (November 2017, Valid response: 1,839)," Cabinet Public Relations Office

Column: Disaster Readiness Guide from the Viewpoint of Women

The Tokyo Metropolitan Government has compiled a manual called “Disaster Readiness Guide” edited from viewpoint of women for encouraging women to take part in disaster management and helping households get fully prepared for an earthquake directly hitting Tokyo and other various disasters. It started delivering the manual free of charge on March 1, 2018 at 9,000 sites across the city including libraries, post offices and other municipal facilities, as well as beauty salons where most customers are women.

This is the second book following the first manual called “Tokyo Bousai: Let’s Get Prepared!” in 2015, which was also distributed to all households in Tokyo. This disaster preparation book was edited based on the opinions of six female members of an exploratory committee and mainly comprises (i) measures that can be taken on a daily basis, (ii) methods of evacuation and confirming personal safety when a disaster occurs, and (iii) ideas and devices in evacuation life. The book provides disaster management measures citizens can take in their daily life reasonably and naturally as well as solutions to various problems such as breastfeeding and guarding against thieves at evacuation centers.

It is important to implement disaster management measures from the perspective of disaster affected people. There are many needs specific to women, such as the areas to change clothes and breastfeed at evacuation centers. The Tokyo metropolitan government decided to foster female human resources for disaster management who can take a central role in disaster management activities by communities and private companies. It has held the “review conference for training disaster prevention personnel from the viewpoint of women” since May 2017 for discussing the curricula to develop female leaders who can reflect women’s perspective in disaster management as well as female human resources responsible for disaster management activities. In FY2017, it also held the basic version, “bousai woman seminar” and the application version, “training workshop for fostering disaster management coordinators.”



Source: Tokyo Metropolitan Government Disaster management Website
(Reference: <http://www.bousai.metro.tokyo.jp/1005427/index.html>)

Section 2: Disaster Management Frameworks, Disaster Response, and Preparation

2-1 Revision of the Basic Plan for Disaster Risk Reduction

The Basic Plan for Disaster Risk Reduction is a basic plan for disaster management in Japan, which is decided by the National Disaster Management Council in accordance with Article 34 of the Basic Act on Disaster Management. It is reviewed annually and revised when deemed necessary, to take account of the findings from scientific research concerning disasters and their prevention, as well as disasters that have occurred and the effects of emergency disaster control measures implemented in response. Local governments are required to develop Local Plans for Disaster Risk Reduction, while Designated Administrative Organizations and Designated Public Corporations are required to develop Disaster Management Operations Plans, which must be based on the Basic Plan for Disaster Risk Reduction.

In FY2017, the Basic Plan for Disaster Risk Reduction was revised in April 2017 (Fig. 2-1-1).
(Reference: <http://www.bousai.go.jp/taisaku/keikaku/kihon.html>)

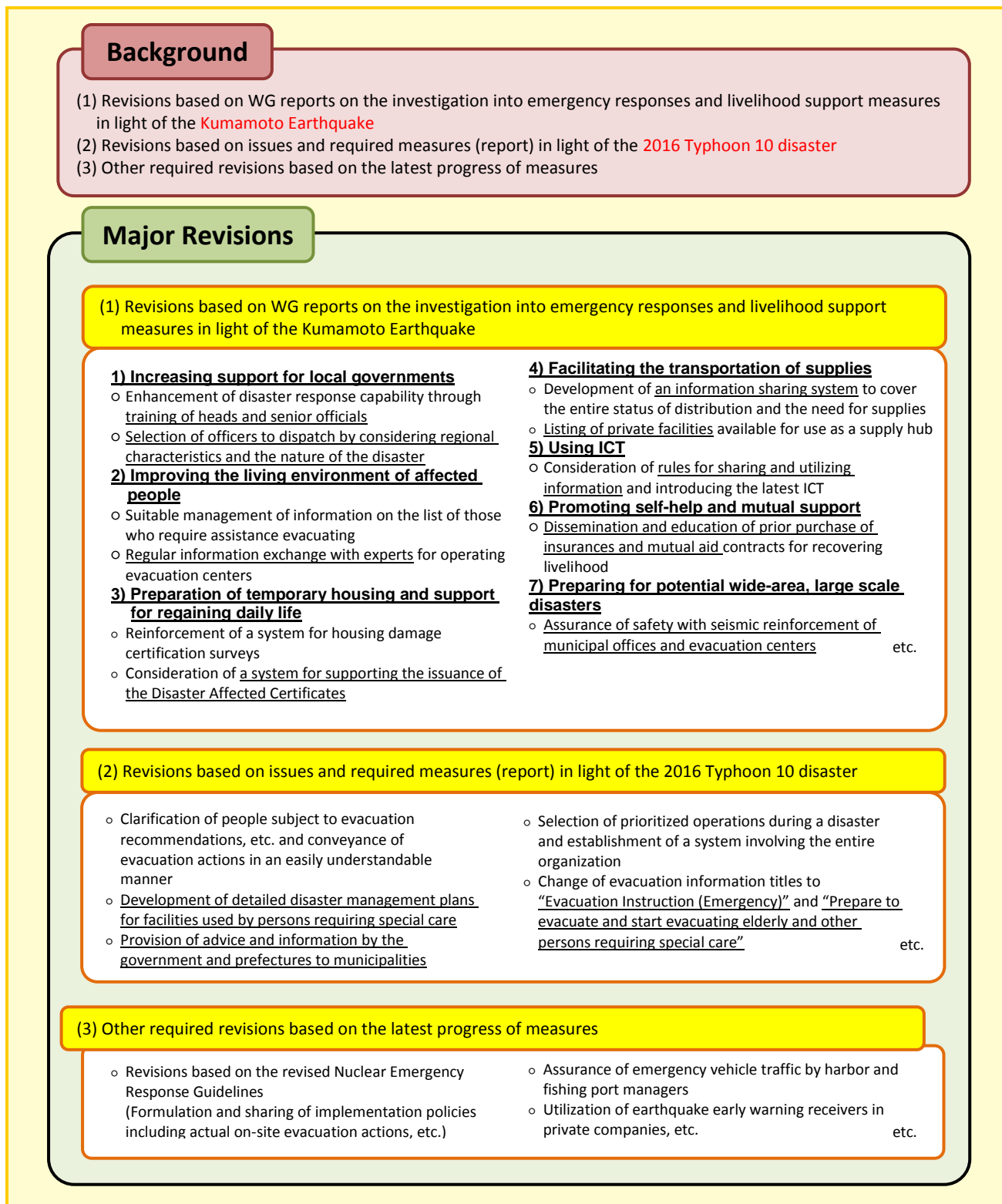
In this revision, descriptions were added as responses to the issues that emerged at the Kumamoto Earthquake and Typhoon 10 in 2016.

Specifically, an increasing support of local governments was emphasized, including training courses for heads and senior officials of prefectural governments, and the utilization of ICT based on lessons learned from the Kumamoto Earthquake.

The revised plan also clearly describes the clarification of people subject to evacuation recommendations, etc., changes in the evacuation information titles and the development of specific plans for emergency disasters concerning the facilities used by persons requiring special care based on lessons from 2016 Typhoon 10 disaster.

Fig. 2-1-1 Overview of Revisions to the Basic Plan for Disaster Risk Reduction (April 2017)

Source: Cabinet Office

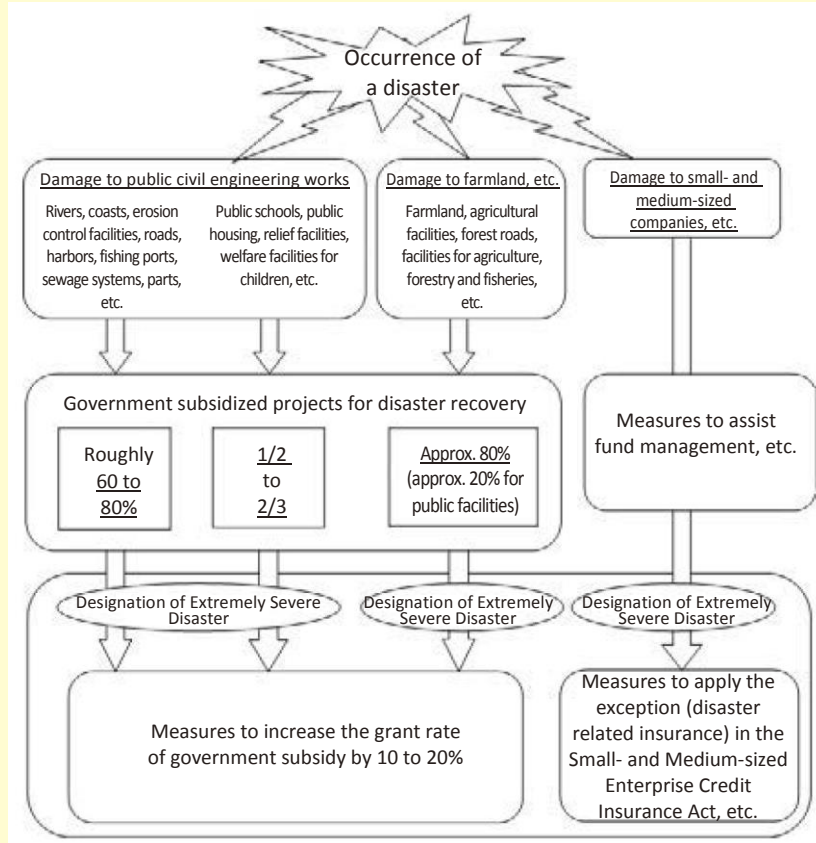


2-2 Improvement of Operations for Early Designation of Extremely Severe Disasters

The extremely severe disaster system designates a disaster as “extremely severe” pursuant to the Act on Special Financial Support to Deal with Extremely Severe Disasters (No. 150 of 1962) and applies special measures to allocate government subsidies to relevant disaster recovery projects, etc. to reduce the financial burden on local governments (Fig. 2-2-1).

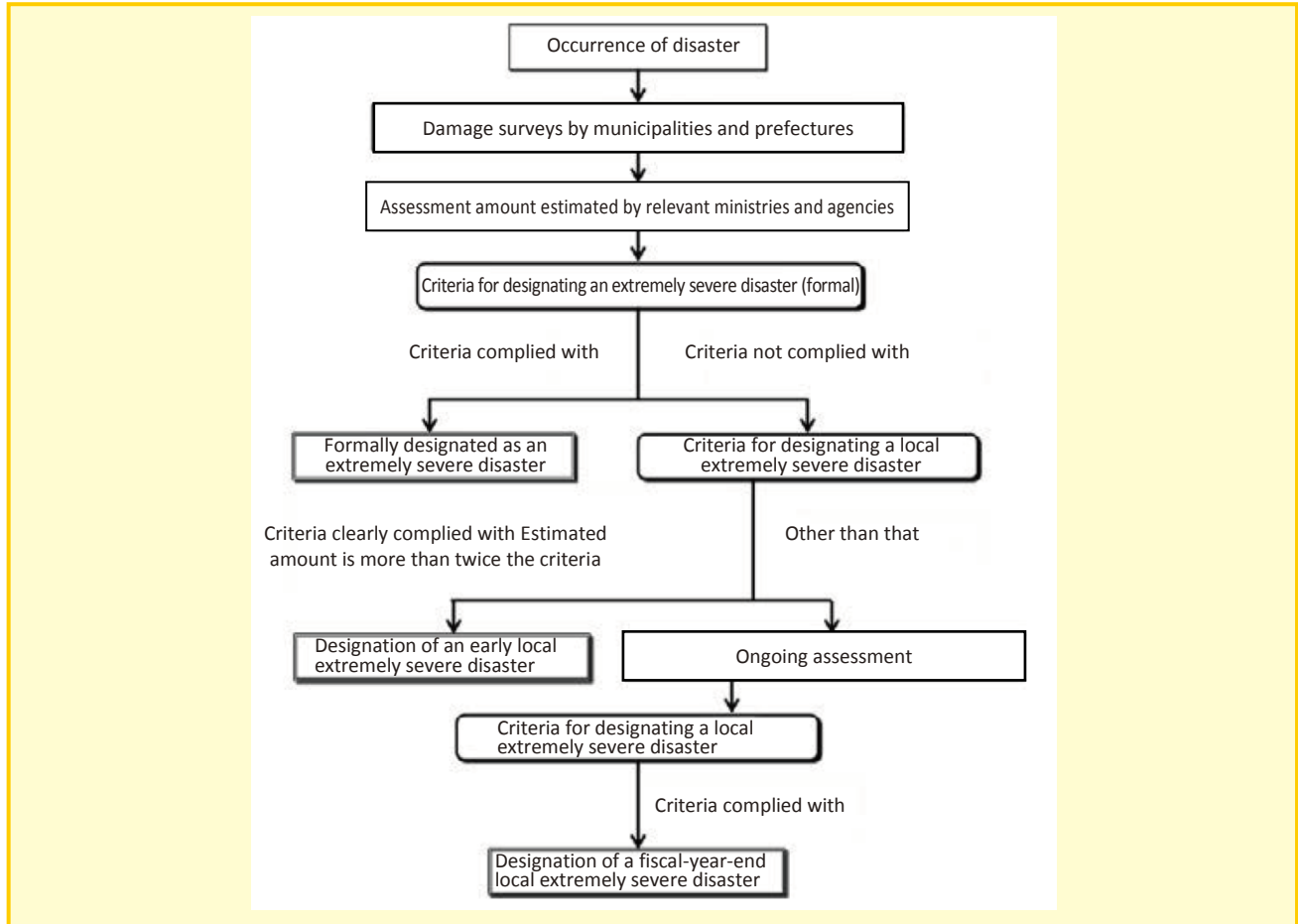
To designate a disaster as an extremely severe disaster, the disaster affected local government surveys damage caused by the disaster, and reports the survey result to the national government which in turn checks it whether to meet the criteria for designation, and if it does, makes a decision by the Cabinet for the enactment of the relevant Cabinet Order (Fig. 2-2-2).

Fig. 2-2-1 Extremely Severe Disaster System



Source: Cabinet Office

Fig. 2-2-2 Flow to Designate Extremely Severe Disaster



Source: Cabinet Office

Various areas of Japan have frequently sustained damage in recent years due to large scale earthquake and flood disasters. The affected local government is keen to ensure prompt designation of an extremely severe disaster so that recovery and reconstruction can start as early as possible.

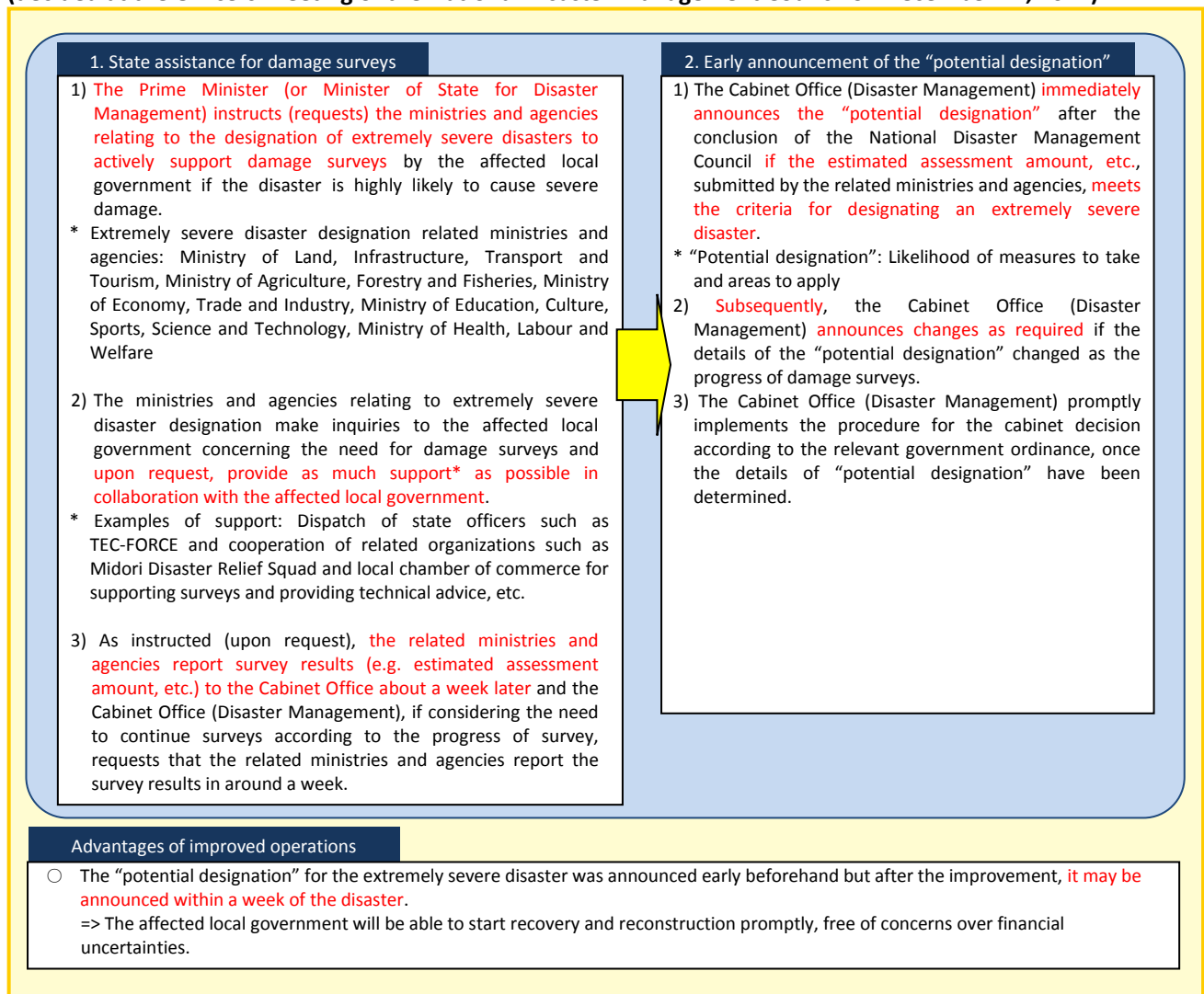
The government had made various efforts before making a decision by the Cabinet for the enactment of the relevant Cabinet Order to designate extremely severe disasters, for example, by officially announcing the potential designation of an extremely severe disaster (“potential designation”) and providing state assistance for damage surveys. To expedite such designation, the government determined amendments to procedural operations at the Officers Meeting of the National Disaster Management Council on December 21, 2017.

Specifically, for disasters likely to cause serious damage:

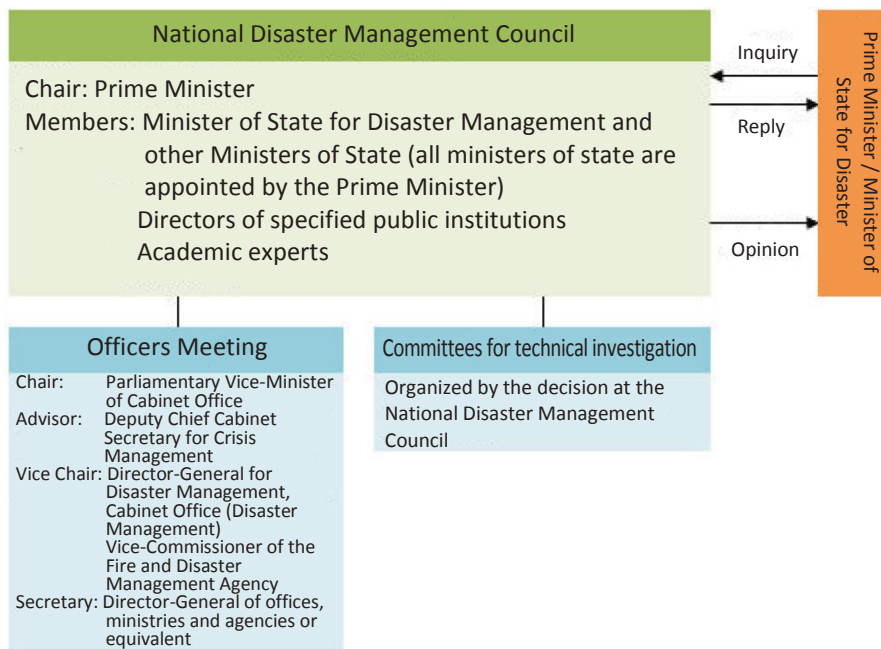
- The Prime Minister or Minister of State for Disaster Management instructs the related ministries and agencies to actively support damage surveys conducted by the affected local government, required to designate an extremely severe disaster.
- Upon request, the related ministries and agencies actively support damage surveys by the affected local government and provide a summary report of survey results to the Cabinet Office roughly once a week.
- The Cabinet Office conducts a set of procedures such as announcing the “potential designation” sequentially from municipalities having met the designation criteria.

Accordingly, the “potential designation” can be announced as early as about a week after the termination of the disaster, allowing the affected local government to start recovery and reconstruction promptly without concerns over financial uncertainties (Fig. 2-2-3).

Fig. 2-2-3 Overview of the Improvement of Operations for Early Designation of Extremely Severe Disasters (decided at the Officers Meeting of the National Disaster Management Council on December 21, 2017)



Source: Cabinet Office



National Disaster Management Council (Officers Meeting)
 Parliamentary Vice-Minister of Cabinet Office Yamashita makes a statement, as chair of the Officers Meeting

2-3 Large-Scale Earthquake and Tsunami Disaster Emergency Operations Policy

The Large-Scale Earthquake and Tsunami Disaster Emergency Operations Policy (“Response Policy”), which is the government policy for an emergency response in the event of a large-scale earthquake and tsunami, was decided at the Officers Meeting of the National Disaster Management Council on December 21, 2017. (Reference: http://www.bousai.go.jp/jishin/oukyu_taisaku.html)

Stemming from the Basic Plan for Disaster Risk Reduction, the Response Policy stipulates the actions to be taken by the relevant government agencies in the event of a large scale earthquake and/or tsunami, such as Tokyo Inland Earthquake, Nankai Trough Earthquake and Trench-type Earthquakes in the Vicinity of the Japan and Chishima Trenches (Fig. 2-3-1). The guidelines for emergency countermeasures, individually provided for the Tohankai and Nankai Earthquake, Tokyo Inland Earthquake and Trench-type Earthquakes in the Vicinity of the Japan and Chishima Trenches, were thoroughly reexamined based on lessons from the Great East Japan Earthquake and Kumamoto Earthquake and integrated into the Response Policy.

There are three major points in the Response Policy:

- 1) A timeline of emergency response for a month after a disaster, subject to the Response Policy, occurs (time-dependent action plan) is set up (Fig. 2-3-2) and based on which, emergency response measures of the government, including traffic control to secure emergency transportation, rescue and first-aid operations, fire-fighting, medical activities, commodity procurement and fuel supply and the roles of disaster-related agencies are clearly identified.

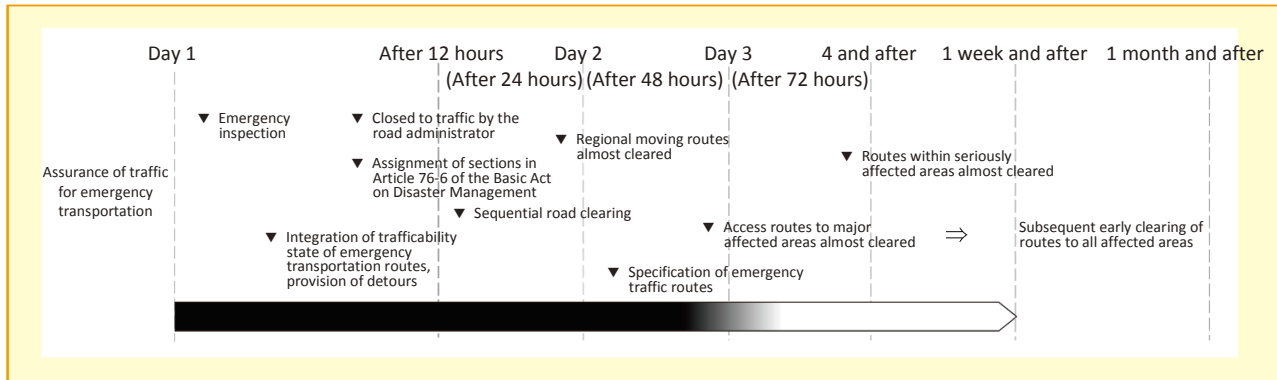
- 2) The roles of disaster-related agencies are clarified. Specifically, in addition to the rescue and first-aid operations conducted by the National Police Agency, Fire and Disaster Management Agency and/or Self-Defense Forces, supporting actions of the TEC-FORCE of the Ministry of Land, Infrastructure, Transport and Tourism are clearly defined in rescue, first-aid and fire-fighting measures; the supplies via push-mode support, the roles of related ministries and agencies and the policy of ensuring regional supply hubs including facility criteria are clarified in goods procurement; and facilities subject to focused and continuous supply and the proceedings of preferential supply of fuel to critical facilities are specified in fuel supply.
- 3) Procedures for the acceptance of international support are clarified, including the publicity of the availability of financial support and the accepting criteria and material support which is accepted when needed in affected areas, whereupon transportation procedures are clarified. It is clearly set forth that foreign rescue and lifesaving teams, ranked “Heavy” in the INSARAG External Classification are accepted when the requirement in affected areas is confirmed and foreign medical teams, approved by the WHO as Emergency Medical Teams, are accepted when the requirement in affected areas is confirmed.

Fig. 2-3-1 Outline of the Large-Scale Earthquake and Tsunami Disaster Emergency Operations Policy

1. **Decision of initial responses** → Policies of installing extreme disaster management headquarters and on-site disaster management headquarters and their roles
2. **Handling of damage information, etc.** → Swift collection and accurate sorting, analysis and sharing of damage information, etc.
3. **Assurance of emergency transportation** → Inspection and clearing of emergency transportation routes and assurance of marine and air traffic
4. **Rescue, first-aid and fire-fighting, etc.** → Rescue and first-aid operations by the National Police Agency, Fire and Disaster Management Agency and Self-Defense Forces and supporting actions of the TEC-FORCE by the Ministry of Land, Infrastructure, Transport and Tourism
5. **Medical care** → Dispatch of DMAT, regional medical evacuation, local medical evacuation
6. **Procurement** → Push-mode support, role allotment in transportation of supplies, opening of regional supply hubs
7. **Fuel supply** → Early establishment of petroleum supply based on the Affiliated BCP, focused and continuous supply, priority supply
8. **Recovery of lifeline utilities** → Implementation of prioritized recovery policy and emergency recovery
9. **Support of evacuees** → Opening of evacuation centers, wide-area temporary stays, temporary housing services
10. **Measures for persons having difficulties getting home** → Control of unified return home, opening of temporary accommodation facilities, support for persons walking home
11. **Health-related activities, disaster waste disposal** → Activities relating to health, epidemic prevention, handling of bodies and disposal of disaster waste
12. **Maintenance and stabilization of social order** → Stabilization of prices and supply systems, maintenance of security and continuity of core metropolitan functions
13. **Prevention of secondary disasters** → Prompt warning, survey and inspection, emergency measures, evacuation guidance
14. **Mutual support system for disaster-related organizations** → Establishment of a regional support system based on role allotment of the government and prefectures
15. **Acceptance of domestic and international support** → Procedures for accepting physical and human support from abroad, acceptance of volunteers and NPOs

Source: Cabinet Office

Fig. 2-3-2 Timeline for Emergency Response in the Event of Large-scale Earthquakes and/or Tsunamis (excerpts)



Source: Excerpts from the Large-Scale Earthquake and Tsunami Disaster Emergency Operations Policy

2-4 Government Responses to Volcanic Eruption and Evacuation Plans

A number of volcanic eruptions occurred in Japan in FY2017. These included the eruption around Kagami-ike of Motoshiranesan in Kusatsu-Shiranesan on January 23, 2018. The Japan Meteorological Agency raised the volcanic alert level from 1 (Potential for increased activity) to 3 (Do not approach the crater). Volcanic cinders scattered around the Kusatsu International Ski Resort during the eruption caused fatalities, including one dead, three seriously injured and eight with minor injuries. Volcanic cinders also stopped the ropeway and left 81 people stranded at the ropeway station at the top of the mountain (Fire and Disaster Management Agency, March 31, 2018).

At the time of the incident, the related ministries and agencies strove to collect information using helicopters for disaster safety and drones, etc., while the prefectural police department and fire services conducted rescue and search operations. The Cabinet Office alerted the public to the danger of the volcanic eruption.

The eruption of Kusatsu-Shiranesan occurred in the vicinity of Motoshiranesan, which had never previously erupted in recorded history, not in the vicinity of Shiranesan (Yugama) which had been active in recent years, without any specific prior changes in volcanic activity such as volcanic earthquake or crustal movements, which could have heralded the eruption. The Japan Meteorological Agency, universities and other related institutions installed additional monitoring cameras, seismographs and infrasound meters to reinforce the observation system on Kusatsu-Shiranesan immediately after the eruption. Observation data obtained from these instruments are used by the Japan Meteorological Agency to monitor Kusatsu-Shiranesan. The volcanic alert level used to be determined for the entire Kusatsu-Shiranesan, but has been separately specified for Kusatsu-Shiranesan (Motoshiranesan) and Kusatsu-Shiranesan (Shiranesan (Yugama area)) since March 16, 2017 following discussions by the Japan Meteorological Agency and local government, etc. at the Volcanic Disaster Management Council for Kusatsu-Shiranesan.

The Japan Meteorological Agency decided to inspect volcano observation systems nationwide to eliminate blind spots in observation and monitoring of volcanoes based on lessons learned from this eruption incident. Specifically, past eruptions were investigated in detail and the present observation systems, including monitoring cameras, were inspected for 50 volcanoes subject to constant monitoring (see Appendix 4 (A-4)), as well as discussing requirements for future observation within the Coordinating Committee for Prediction of Volcanic Eruptions. The Ministry of Education, Culture, Sports, Science and Technology subsidizes researchers at the Tokyo Institute of Technology, etc. with Grants-in-Aid for Scientific Research -KAKENHI- (Grant-in-Aid for Special Purposes) to promote comprehensive research including “Clarification of the process of phreatic eruption without significant premonitory activity,” “Prediction of changes in volcanic activities in future” and “Evaluation of the risk of developing snowmelt mudflows.”

In addition, the Cabinet Office plans to reinforce or improve nationwide volcano alert systems by promoting the development of evacuation plans in the event of volcanic eruption, which must be included in Local Plans for Disaster Risk Reduction provided by local governments (23 prefectures and 140 municipalities) specified as volcanic eruption hazard zones pursuant to Act on Special Measures for Active Volcanoes revised in 2015 based on

lessons from the Ontakesan Eruption Disaster (September 2014), etc. Specifically, the Guide to Developing Concrete and Practical Evacuation Plans for Volcanic Eruption was revised in December 2016 based on lessons from Ontakesan Eruption Disaster to promptly distribute information, reinforce measures for climbers and tourists such as evacuation guidance and describe responses by municipalities, prefectures and the organizations under the Volcanic Disaster Management Councils by clearly assigning the main player; not only in the event that the volcanic alert level is raised but also in cases of sudden eruption. An additional material for the guide that summarizes insights that go into creating evacuation plans is under development.

The Japan Meteorological Agency issues a volcanic warning according to the volcanic alert level by integrating activities of volcanoes to which volcanic alert levels are applied (Fig. 2-4-1). There are five volcanic alert levels based on the target area and the action to be taken by the residents according to the state of volcanic activity. As of March 31, 2018, volcanic alert level 3 (Do not approach the volcano) was issued for three volcanoes, Kirishimayama (Shinmoedake), Sakurajima and Kuchinoerabujima, as the highest level of alert.

(Reference: <http://www.jma.go.jp/jp/volcano/>)

Fig. 2-4-1 Volcanoes where Volcanic Alert Levels are Applied and Volcanic Alert Levels



Classification	Abbreviated Term	Target area	Levels & Keyword
Emergency Warning	Volcanic Warning (Residential area)	Residential areas and non-residential areas nearer the crater	Level 5 Evacuate
	Or Volcanic Warning		Level 4 Prepare to evacuate
Warning	Volcanic Warning (Near the crater)	Non-residential areas near the crater	Level 3 Do not approach the volcano
	Or Near-crater Warning	Around the crater	Level 2 Do not approach the crater
Forecast	Forecast	Inside the crater	Level 1 Potential for increased activity

Source: Japan Meteorological Agency website
 (Reference: http://www.data.jma.go.jp/svd/vois/data/tokyo/STOCK/kaisetsu/level_toha/level_toha.htm)

Column: Supporting the development of evacuation plans in the event of volcanic eruption based on the guide to develop plans

The local government, which is obliged to provide an alert and evacuation system, must develop the same based on the guide to develop plans, but often struggles to develop such plans unaided, because only a few officers in charge may have experienced volcanic eruptions and the scale and characteristics of eruptions differ depending on the volcanoes involved.

For these reasons, the Cabinet Office provided joint investigations with relevant local governments concerning evacuation plans in response to the specific issues of individual volcanic regions. Investigations were conducted for 17 volcanoes in 2016 and 12 volcanoes in FY2017.

The Cabinet Office dispatched its officers to volcanic regions to confirm potentially affected areas and give practical consideration using maps, etc., for issues the local government officers had to solve, such as the criteria for restricting approach in hiking trails, procedures for evacuating numerous residents in widespread urban areas and evacuation guidance for numerous tourists, including foreign tourists.

This initiative may be useful for developing a disaster management system in volcanic regions.

FY2016		FY2017	
Issue	Volcano name	Issue	Volcano name
<u>1) Development of plans to evacuate climbers and tourists near the crater</u>	Kuttara Hakkoudasan Akita-Yakeyama Yakedake Unzendake	<u>1) Development of plans to evacuate climbers and tourists near the crater</u>	Iwakisan Chokaisan Tsurumidake, Garandake Azumayama Bandaisan Adatarayama Norikuradake
<u>2) Development of practical evacuation plans including urban areas (and persons requiring nursing care)</u>	Iwakisan Iwatesan Asamayama Tsurumidake, Garandake	<u>2) Development of practical evacuation plans including urban areas (including persons requiring assistance evacuating)</u>	Tarumaesan Hakkoudasan Akita-Yakeyama
<u>3) Development of evacuation plans with various assumptions (craters/scenarios)</u>	Atosanupuri Meakandake Usuzan Chokaisan Kirishimayama	<u>3) Consideration of evacuation plans for numerous tourists including inbounds</u>	Fujisan Izu-Tobu Volcanoes
<u>4) Development of evacuation plans of isolated islands to escape to outside</u>	Satsuma-Iojima Kuchinoerabujima Suwanosejima		



2-5 Warning for Heavy Snowfall and Government Responses

Japan has also frequently suffered from damage due to heavy snow. In recent years, the total number of fatalities due to snow storms was 152 in FY2005, 131 in FY2010, 133 in FY2011 and 104 in FY2012 respectively. In FY2017, 116 people died and 624 people were seriously injured nationwide (information from the Fire and Disaster Management Agency), as well as damage to housing, lifeline utilities such as electricity and water, traffic hazards and agriculture, forestry and fisheries.

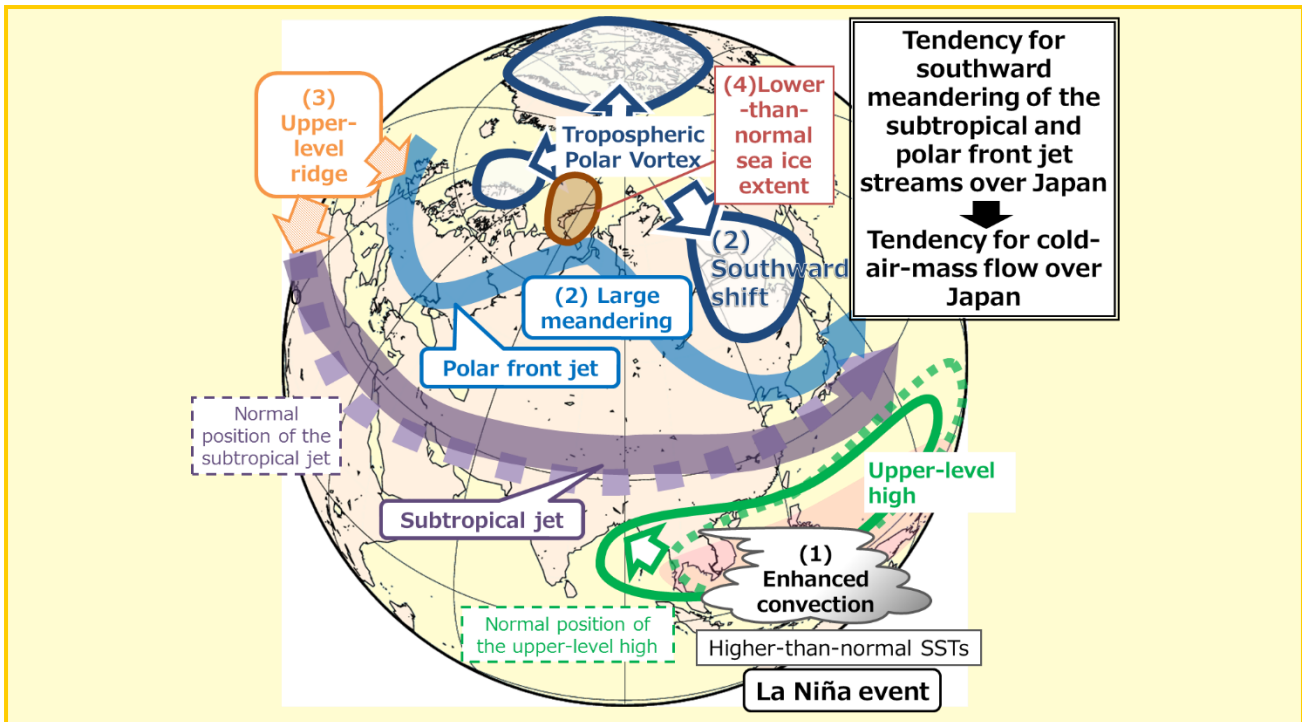
The Cabinet Office has issued a notice calling for warnings to related organizations including designated administrative organizations and public corporations (“Enhancement of Readiness for Disasters in Snow Season” (“Notice from the National Disaster Management Council”)) every year before the snow season under the name of the Chair (Prime Minister) of the National Disaster Management Council to improve heavy snowfall warning systems. In FY2017, it issued the Notice from the National Disaster Management Council on November 21 warning of heavy snowfall and taking various measures in advance nationwide and held an Inter-Agency Disaster Alert Meeting before the snowfall became serious in an attempt to ensure readiness.

In the winter of 2018 (December 2017 to February 2018), dense masses of cold air often flew into the vicinity of Japan due to the subtropical and polar front jet streams propelled by southbound wind and strong wintry pressure patterns (Fig. 2-5-1).

On January 22-23, 2018, an atmospheric depression rapidly developed and moved along the south sea of Honshu in an east-northeast direction while intensifying, causing heavy snowfall over a wide metropolitan area. The snow depth in Tokyo peaked at 23 cm. On February 4, snow started falling intermittently from the northern region through to the western regions of Japan, mainly on the Sea of Japan side. Snow over 140 cm deep was recorded in Fukui City of Fukui Prefecture for the first time in 37 years since 1981 and many regions on the Sea of Japan side, specifically Hokuriku District, experienced record snowfalls. Fatalities in Hokuriku District included 18 deaths and 103 serious injuries in snow-shoveling accidents (information by the Fire and Disaster Management Agency, as of February 15, 2018), as well as physical damage, including the collapse of agricultural housing.

Following these deaths and injuries and given the potential for additional casualties, Fukui Prefecture decided to apply the Disaster Relief Act to six cities and two towns on February 6th (one city was added on 13th). Niigata Prefecture applied the same act to four cities and one town on February 14th. The Cabinet Office held an Inter-Agency Disaster Alert Meeting as required to collect information and requested a prompt response from related ministries and agencies. The Ministry of Internal Affairs and Communications brought forward the payment of special local allocation tax scheduled to be paid in March 2018 to February 26, part of which was paid (21,870 million yen in total) in cash to 163 municipalities affected by heavy snowfall during winter.

Fig. 2-5-1 Primary factors contributing to climate conditions in Japan in winter 2017/18



Source: Japan Meteorological Agency website
 (Reference: http://ds.data.jma.go.jp/tcc/tcc/news/press_20180320.pdf)

The Ministry of Land, Infrastructure, Transport and Tourism allocated national expenditure of approximately 13,300 million yen to 258 municipalities as additional funds for removing snow from municipal roads with the heavy snowfall that winter in mind, and approximately 18 billion yen to 27 prefectures and ordinance designated municipalities for auxiliary national and prefectural roads.

Approximately 230 kilometers of the Metropolitan Expressway was closed to traffic due to heavy snowfall from January 22, 2018. It took four days to clear the complete stretch. Heavy snowfall stranded up to 1,500 vehicles for an extended period from February 6 onward on Route 8 near the border of Fukui Prefecture. Following a request from the governor of Fukui Prefecture, the government sent SDF disaster response units for lifesaving and other purposes such as assistance with snow blowers and food deliveries to vehicles stranded for an extended period. On February 24, a government investigation team headed by the Minister of State for Disaster Management Okonogi was sent to Fukui Prefecture to check the damage caused by the heavy snowfall and disaster responses in the affected areas. The team reviewed the affected site and exchanged opinions with mayors of the affected municipalities to confirm damage.

The Ministry of Land, Infrastructure, Transport and Tourism organized an Exploratory Committee for Measures Assuring Winter Road Traffic in the end of February 2018 to discuss specific measures for reducing damage to road traffic caused by heavy snowfall.



SDF is digging out a vehicle buried in snow
(Route 8 near Ushinoya in Awara City)



Minister of State for Disaster Management Okonogi
receiving an explanation at the Kumasaka base for snow
removal on Route 8

Column: Taking care in removing snow - Yukioro-Signal (snow removal signal)

Snow often causes fatalities during removal, amounting to more than half of related deaths every year (about 90% of fatalities due to heavy snowfall in FY2017). Accidents mainly take place on the roofs of residential houses or when snow shoveling around the house and are characterized by the high proportion of elderly.

FY2017 Breakdown of heavy snowfall caused deaths


Cause of death	Under 65	65 and above	Total
Avalanche	1		1
Snow-removal work (e.g. snow on roof)	16	86	102
Small snowslide	1	4	5
Buried under a collapsed house		2	2
Other	5	1	6
Total	23	93	116

Source: Fire and Disaster Management Agency (April 13, 2018)

Follow the Rules!

10 rules for preventing accidents during snow removal

- Do not work alone. Only work with your family or neighbor!
- Remain alert even if the roof is low!
- Leave snow around the house when you climb on the roof!
- Take special care just after starting work or when you get tired!
- Take more care clearing on days when the snow on the roof is getting loose!
- Don't forget to wear a safety rope and helmet!
- Be sure to secure the ladder!
- Maintain and inspect snow-removing tools frequently!
- Turn off the engine of the snow plow before removing snow from it!
- Always carry your cell phone!



- 1 Life rope with a hook and safety belt.
- 2 Safety belt for supporting the body. The full harness type is also available.
- 3 Wear the helmet properly.
- 4 Wear comfortable outfits, in striking colors if possible.
- 5 Rubber boots with slip-resistant treads.
- 6 Waterproof slip-resistant gloves.
- 7 Ladder with clippers.

Measures to prevent accidents during snow removal

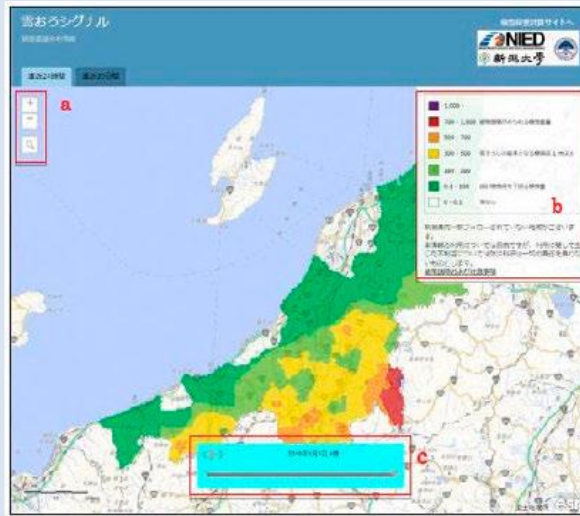
Source: Ministry of Land, Infrastructure, Transport and Tourism website

(Reference: http://www.mlit.go.jp/kokudoseisaku/chisei/kokudoseisaku_chisei_tk_000064.html)

Because of labor scarcity in sparsely-populated areas, houses are prone to collapse due to heavy snowfall piled on the roof. The national R&D agency 'The National Research Institute for Earth Science and Disaster Resilience' developed a snow load calculation system in collaboration with Niigata University and Kyoto University and named the snow weight distribution information estimated by this system as a "Yukioro-Signal (snow removal signal)" which has been used from January 2018 and is available on the Niigata Prefecture website.

(Reference: <http://www.pref.niigata.lg.jp/kikitaisaku/1356885093295.html>)

The "Yukioro-Signal (snow removal signal)" is a map indicating the risk of snow load, which cannot be estimated by the height of snow alone and when to remove snow, based on the distribution colors on the map. This can be used to prevent houses collapsing and this information should be extensively used to facilitate early countermeasures.



Min. value (kg/m ²)	Max. value (kg/m ²)		Color	Remarks
1000	∞	Purple		
700	1000	Red		Snow weight causing buildings to collapse
500	700	Orange		
300	500	Yellow		Snow depth of 1 m or more as the criterion for snow removal
100	300	Yellow-green		
0.1	100	Green		Snow depth under the design snow depth
0	0.1	Colorless		No snow

Snow load calculation system
"Yukioro-Signal (snow removal signal)"

Source: Niigata Prefecture website

(Reference: <http://www.pref.niigata.lg.jp/kikitaisaku/1356885093295.html>)

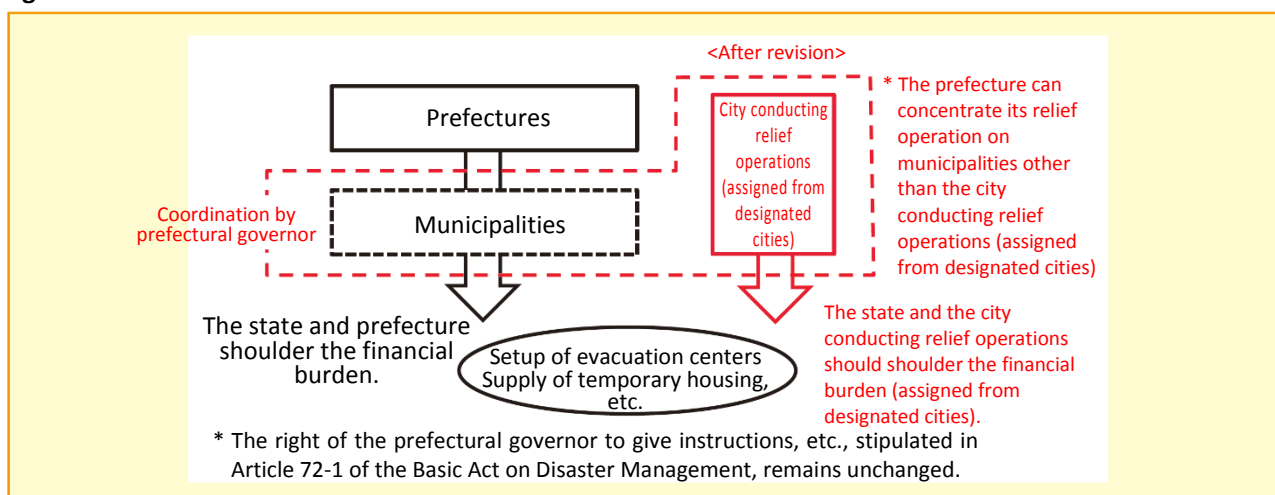
2-6 Consideration of a Disaster Relief Implementation System and Revision of the Disaster Relief Act

Even before the revision, the Disaster Relief Act stipulated that the governor of a prefecture is responsible for setting up evacuation centers and supplying temporary housing to streamline and expedite relief operations in the event of disaster on a certain scale and that the prefectural governor with residents requiring rescue shall conduct the rescue operation with the state shouldering part of the expenditure required for the rescue operation. The report from the Working Group for Studying Emergency Responses and Livelihood Support Measures, provided based on damage in the Kumamoto Earthquake in 2016, with the aim of discussing tactics to improve responses to earthquake disaster nationwide, indicated that practical systems of implementing rescue operation and suitability of regional coordination pursuant to the current laws must be taken into consideration with faster and more accurate rescue operations and smooth clerical work for the rescue operation in mind. In readiness for upcoming large-scale disasters, the Cabinet Office has held the Task Force on Practical Procedures for Rescue Operation since December 2016 to study a practical system of implementing rescue operation and the suitability of regional coordination from the perspective of smooth clerical rescue operation. Following a number of discussions, the task force issued the final report in December 2017 suggesting that “in preparation for large-scale, widespread disasters, a designated city capable of coordinating with the prefecture to which it belong may be assigned as the new main body of relief operation as a disaster response option in line with local circumstances, alongside the current commissioning system, to expedite and streamline clerical work,” and “to settle various concerns of prefectures, adequate functioning of the right of each prefecture to regional coordination must be clearly described in the law.” It also suggested that suitable measures must be taken in future to bring the designation criteria into shape.

(Reference: <http://www.bousai.go.jp/kaigirep/saigaikyujou/index.html>)

For further discussions, the Cabinet Office started discussion involving representatives from Miyagi, Aichi and Hyogo Prefectures from February 2018, targeting strengthened collaboration in disaster relief clerical work during large-scale and widespread disaster and the Cabinet approved the revision of the Disaster Relief Act (e.g. cities conducting relief operations, designated by the Prime Minister in advance, liaison and coordination between the prefectural governor, the mayor of the city conducting relief operations and producers of supplies, etc. and the obligation of the cities conducting relief operations to maintain disaster relief fund) to facilitate a procurement and distribution system through regional coordination within the prefecture and means of collaboration with supply related industries and allowing the designated city for conducting relief operations to save affected people of its own accord (decision by the Cabinet on May 8, 2018).

Fig. 2-6-1 Draft Revision of the Disaster Relief Act



Source: Cabinet Office

2-7 Considerations on Securing Housing for Affected People and Housing Damage Certification

(1) Study Group on Measures to Secure Housing for Affected People in a Large-scale Disaster

In the event of a large scale disaster such as the Tokyo Inland Earthquake or Nankai Trough Earthquake, evacuees may be forced to stay in emergency or temporary housing for an extended period due to an overwhelming shortage of houses and wide-area evacuation and the fact that the disaster-affected local government will be inundated with clerical work.

To respond adequately under such circumstances, by promptly providing housing for people made homeless and promoting efforts to rebuild homes and restore livelihoods, the Cabinet Office set up a Study Group on Measures to Secure Housing for Affected People in a Large-scale Disaster in November 2016 and summarized issues on securing housing for affected peoples during emergency and recovery phases as well as future approaches in August 2017.

Specifically, the presumed number of emergency temporary housing units required (including those leased and constructed) was determined based on the estimated damage incurred in such large scale disaster (Fig. 2-7-1) and topics such as “utilizing existing housing stocks effectively and collaborating with private organizations,” “preparing for prompt construction and supply of emergency housing” and “securing housing for affected people during a wide-area evacuation” in the emergency phase and “support for promoting the rebuilding of houses and restoring livelihoods” and “coordinating with the reconstruction and community development” during the recovery phase were discussed, whereupon initiatives taken by the government, prefectures and municipalities were identified for each of these topics.

Fig. 2-7-1 Presumed Number of Emergency Temporary Housing Units Estimated from Potential Damage due to Major Disasters

Presumed number of emergency temporary housing units (including those leased and constructed)*¹ estimated from potential damage due to major disasters

	Tokyo Inland Earthquake	Nankai Trough Megathrust Earthquake (M9.0)
No. of buildings completely destroyed* ²	Approx. 240,000 - 610,000 bldgs.	Approx. 940,000 – 2,390,000 bldgs.
No. of buildings half destroyed* ²	Approx. 670,000 bldgs.	Approx. 1,690,000 – 2,760,000 bldgs.
No. of buildings completely and half destroyed* ²	Approx. 910,000 - 1,280,000 bldgs.	Approx. 2,700,000 – 5,000,000 bldgs.
No. of completely and half destroyed houses* ³	Approx. 2,210,000 - 3,140,000 houses	Approx. 3,510,000 – 6,840,000 houses
Presumed No.* ⁴ of emergency temporary housing units required* ¹	Approx. 660,000 - 940,000 houses	Approx. 1,050,000 – 2,050,000 houses
No. of leased emergency housing units available* ^{1*5}	Approx. 860,000 houses	Approx. 1,210,000 houses
No. of constructed emergency housing units required* ^{1*6}	Approx. 80,000 houses or fewer	Approx. 840,000 houses or fewer

Following the Nankai Trough Earthquake, some pointed out that measures for zero damage should be taken at the onset of an M8.7 class earthquake, which is a more realistic figure assumed in 2003 as the largest existing earthquake magnitude, not the theoretical largest M9.0 and measures to ensure the minimum required number of housing units for an earthquake of this magnitude should be considered (when a largest M8.7 earthquake occurs, it is estimated that approximately 490,000 to 960,000 buildings would be completely destroyed*⁷).

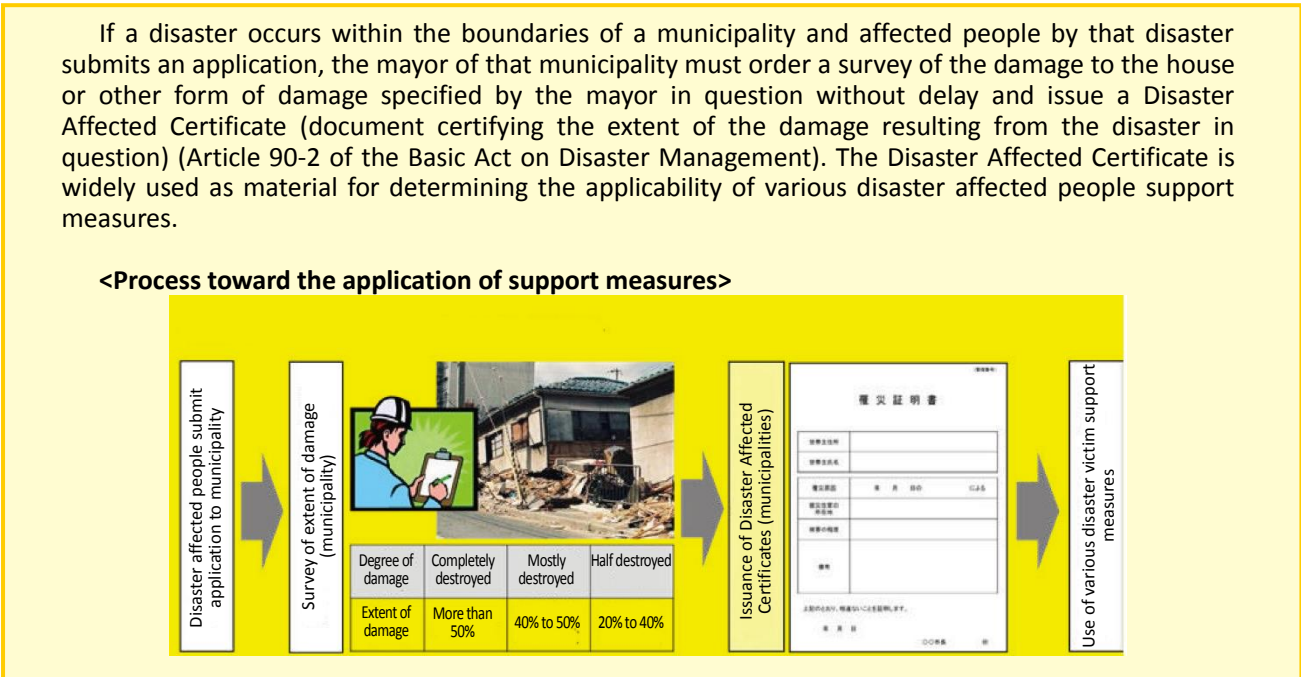
- *1: Emergency temporary housing stipulated in the “Criteria for the Degree, Methodology and Period of Relief and Reimbursement of Actual Expenses pursuant to the Disaster Relief Act” (Cabinet Office Notification No. 228 of 2013), was provided for those having lost their homes (e.g. completely destroyed, burnt down or swept away) and unable to afford to pay for new houses by constructing housing units (“constructed emergency housing”), leasing private rented housing units (“leased emergency housing”), or supplying houses by other adequate means.
- *2: According to the Final Report by the Working Group to Investigate Tokyo Inland Earthquake Measures (December 2013, National Disaster Management Council) and the 2nd Report by the Working Group on Measures to Deal with a Nankai Trough Megathrust Earthquake (March 2013, National Disaster Management Council), etc. The figures in the damage estimation may vary depending on the assumed conditions (e.g. time of occurrence, wind speed).
- *3: The No. of buildings is converted to the No. of houses based on a Record pertaining to the Description of Property Tax (January 2013, Ministry of Internal Affairs and Communications) and 2013 Housing and Land Statistical Survey (Ministry of Internal Affairs and Communications).
- *4: About 30% of all completely and half destroyed houses is estimated as the number of emergency temporary housing units required, based on the estimation methodology used in the Interim Report on the Emergency Temporary Housing Construction Handbooks (May 2012, Ministry of Land, Infrastructure, Transport and Tourism)
- *5: As many vacant rented houses as possible out of rented housing not subject to “decay and/or breakage” in the disaster-affected prefecture according to the 2013 Housing and Land Survey (Ministry of Internal Affairs and Communications). However, not all of vacant rented houses can be used as leased emergency temporary housing because such vacant houses may also be damaged by the disaster and there are problems in matching affected people to houses.
- *6: No. of houses after subtracting the number of leased emergency temporary housing units available from the estimated number of emergency temporary housing units required. However, the number of available leased houses may decrease depending on the damage to vacant houses as mentioned in *5, which means more constructed emergency temporary housing units than estimated will be needed.
- *7: “Damage Estimation for the Simultaneous Destruction of Focal Regions of Possible Tokai Earthquake, Tonankai Earthquake and Nankai Earthquake” in the “Damage Estimation for Tonankai and Nankai Earthquake” (September 17, 2003) issued by the Committee for Technical Investigation on Tonankai and Nankai Earthquake of the National Disaster Management Council

Source: Cabinet Office “Study Group on Measures to Secure Housing for Affected People in a Large-scale Disaster” (Summary of Discussions)

(2) Study Group on Disaster-related Housing Damage Certification

The Disaster Affected Certificate certifies the extent of disaster-caused damage to an individual’s house by damage surveys, and widely used as basic documentation in the application of support measures, including the provision of livelihood recovery support payments for affected people, emergency repairs of houses, and the allocation of donations, etc. It plays an important role in facilitating the smooth and appropriate provision for support for affected people (Fig. 2-7-2).

Fig. 2-7-2 Damage Certification Surveys and Disaster Affected Certificate Issuance Process



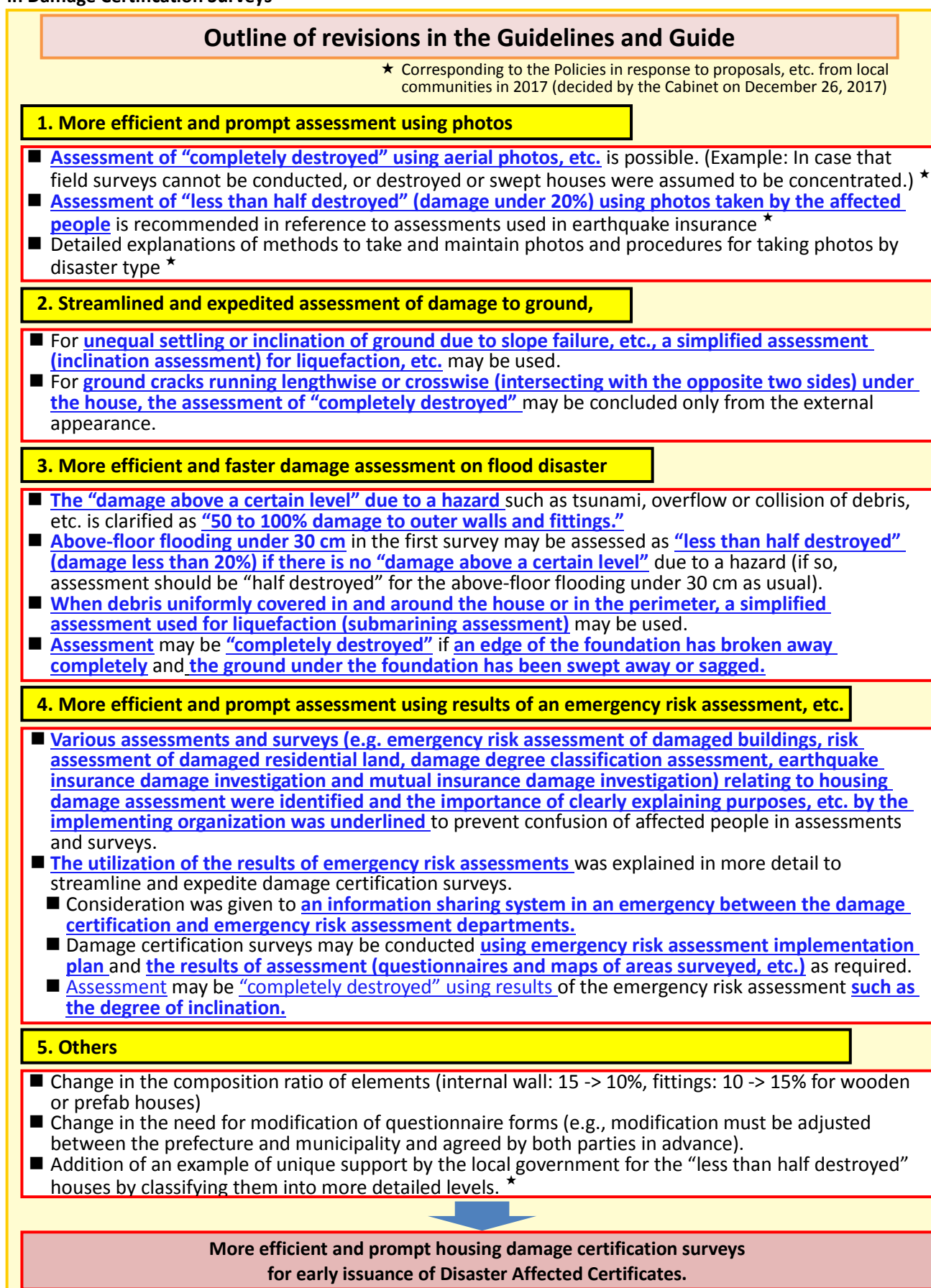
Source: Cabinet Office

The Cabinet Office set up a Study Group on Disaster-related Housing Damage Certification in October 2017 to discuss measures to improve and find solutions to problems relating to damage certification surveys for various disasters wreaking enormous damage such as the Kumamoto Earthquake in 2016 and the July 2017 Northern Kyushu Heavy Rain.

Specifically, the Guidelines for Operating Housing Damage Certification Criteria relating to Disasters (“Guidelines”) and the Guide to Housing Damage Certification Implementation System relating to Disasters (“Guide”) were revised to streamline and expedite damage certification surveys by adding new assessment methods using aerial photos and simplified assessment of damage to ground, etc. and flood disaster (Fig. 2-7-3) and the revision was announced to local governments in March 2018.

(Reference: <http://www.bousai.go.jp/taisaku/unyou.html>)

Fig. 2-7-3 Outline of Revisions of Guidelines and Guide with Examples of More Efficient and Prompt Assessment in Damage Certification Surveys



Examples of approaches for streamlining and expediting damage certification surveys

1. Assessment using photos

- Assessment of “completely destroyed” using aerial photos, etc. is possible. (Example: In case field surveys cannot be conducted, or destroyed or swept houses were assumed to be concentrated.)

[Assessment image]
Comparison of photos taken by the Geospatial Information Authority of Japan before and after the Kumamoto Earthquake in 2016 suggests that the roof axes of these houses were misaligned or deformed and part of the floors or the entire house collapsed, which could render them as “completely destroyed.”



<Before the 2016 Kumamoto Earthquake (taken in 2008)>



<After the 2016 Kumamoto Earthquake (taken on April 16, 2016)>

2. Simplified assessment of damage to ground, etc.

- For unequal settling or inclination of the ground due to slope failure, etc., a simplified assessment (inclination assessment) for liquefaction, etc. may be used.

[Assessment image]
“Completely destroyed” with an inclination of 1/20 or more (damage ratio exceeding 50%), “mostly destroyed” with an inclination between over 1/60 and under 1/20 (damage ratio exceeding 40%) and “half destroyed” with an inclination between over 1/100 and under 1/60 (damage ratio exceeding 20%)



<An example of housing damage caused by slope failure in 2016 Kumamoto Earthquake>

- For longitudinal or crosswise ground cracks (intersecting with the opposite two sides) under the house, the assessment is “completely destroyed.”



<Examples of housing damage caused by cracks and an image of a crack causing a “completely destroyed” assessment in the 2016 Kumamoto Earthquake>

3. Simplified assessment of flood disaster

- When debris uniformly covered in and around the house or in the perimeter, a simplified assessment (submerging assessment) used for liquefaction may be used.

[Assessment image]
“Completely destroyed” with sediment deposition in and around the entire house up to 1 m above floor level (damage ratio exceeding 50%), “mostly destroyed” with sediment deposition in and around the entire house including the floor (damage ratio exceeding 40%), or “half destroyed” with sediment deposition in and around the entire house up to 25 cm under the levee crown of the foundation (damage ratio exceeding 20%).



<Examples of housing damage due to sediment deposition in the 2017 Northern Kyushu Heavy Rain>

- Assessment is “completely destroyed” if an edge of the foundation has broken away completely and the ground under the foundation has been swept away or sagged.



<Examples of housing damage caused by foundation and ground collapse mainly by Typhoon 18 in 2017>

2-8 Activities of the Disaster Information Hub

As seen at the Kumamoto Earthquake in 2016, many of affected people would stay in their cars or elsewhere but not in evacuation centers. This may hinder efforts to integrate information, including understanding the action of these people, the needs of evacuees at evacuation centers and the distribution of supplies. In response, the national government, local governments and private companies and organizations must share information through public-private partnership at ordinal times and respond to disasters promptly.

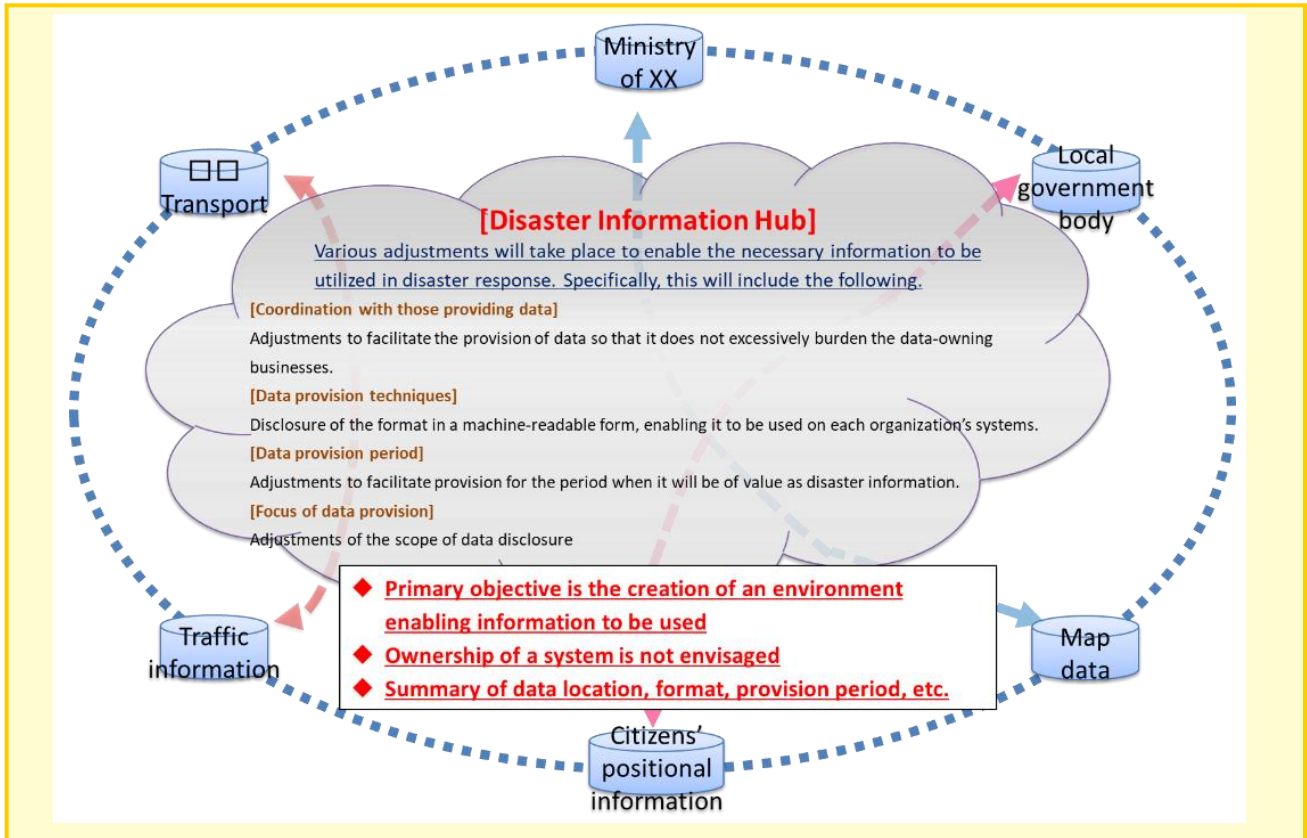
For this reason, the Cabinet Office organized the National and Local Government Public-Private Disaster Information Hub Promotion Team under the Working Group for the Promotion of Standardization of Disaster Measures of the Disaster Management Implementation Committee, the National Disaster Management Council to utilize information and communication technology (ICT), which may be an effective means of sharing information, and promote rules for the methods and periods of sharing information between related agencies and the distribution of information according to these rules (“disaster information hub” (Fig. 2-8-1)). The team has convened four times to date.

In FY2017, 1) to 5) below were selected for review in an attempt to determine the future promotion of disaster information hubs.

- 1) Understanding the evacuation activities of affected people: Demonstration experiments were conducted in 23 wards of Tokyo and two areas in Mie Prefecture to study the methodologies to understand the action of affected people using big data obtained from positional information of cell phones.
- 2) Integration of information on facilities such as designated evacuation centers and supply hubs: Information on the facilities required for itemization and understanding at ordinal times was identified.
- 3) Integration of damage to lifeline utilities: Locations of information on damage to lifeline utilities, including water, electricity and gas, were confirmed. The Study Group on Disaster Information Hubs (information on supplies and lifeline utilities) was held five times at the Ministry of Economy, Trade and Industry to facilitate the transfer of information between the parties concerned.
- 4) Integration of damage to infrastructure: Whereabouts of information on damage to roads, railways, airports, harbors and ports and rivers, as well as their traffic performance and operation, were confirmed.
- 5) Sharing of supply information: Items of information and supply units to procure and transport supplies were consolidated. In addition, locations of information including that other than the above and the conditions for sharing and utilizing this information were summarized in the lists (catalogs).

This public-private partnership will be continued to further promote initiatives dealing with critical themes 1) to 5) regarding the disaster information hub, and integrate information itemized in catalogs to a single system as much as possible in an attempt for visualization. Furthermore, a joint public-private team is planned to be dispatched to the disaster affected local government for gathering and consolidating information using SIP4D, a disaster information sharing system (see Column: Leading-edge science and technology for disasters (information sharing systems and drones) in Section 2, Chapter 2 of Special Feature), to establish a system for reducing the burden of the local government in the event of a disaster and implementing effective and efficient disaster management.

Fig. 2-8-1 Image of a Disaster Information Hub



Source: Cabinet Office

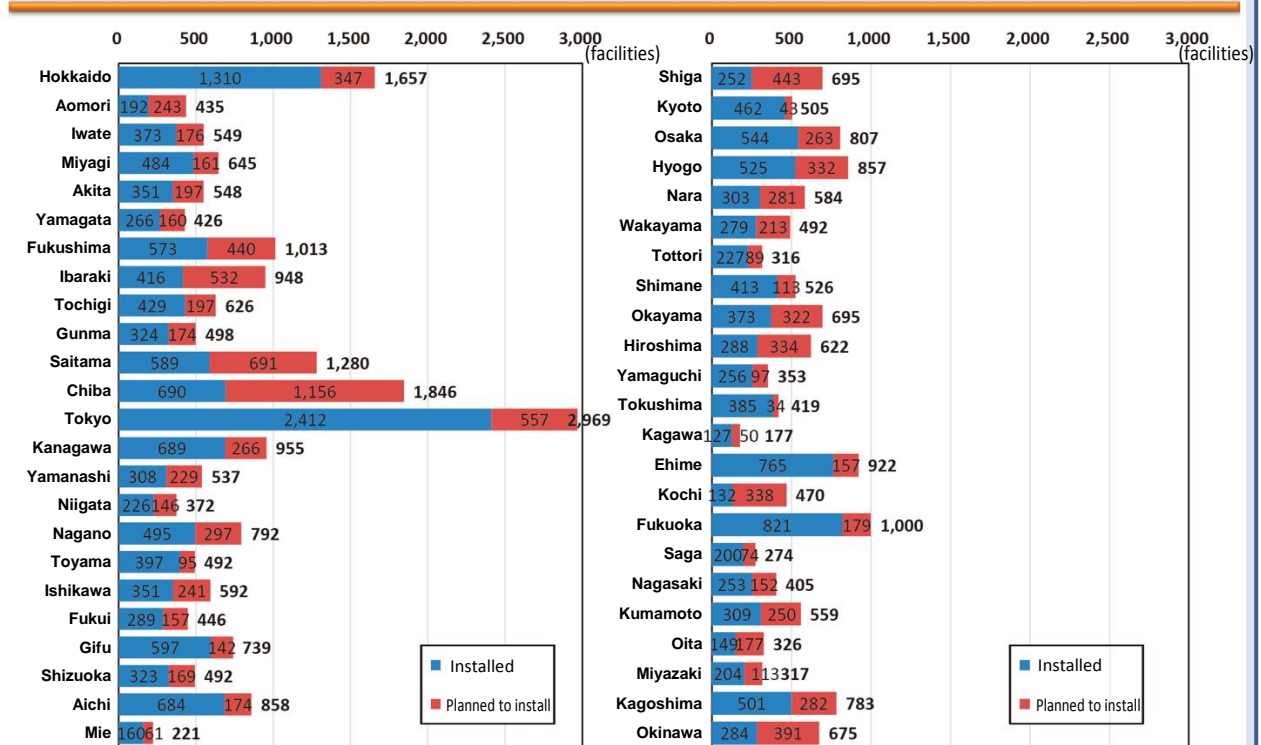
Column: Wi-Fi Installation at Disaster Response Centers

The Disaster-related Wi-Fi Environment Development Plan, launched in December 2016 according to the Japan Revitalization Strategy 2016 (decided by the Cabinet on June 2, 2016) and the Declaration to be the World's Most Advanced IT Nation (decided by the Cabinet on May 20, 2016), is in progress. The Ministry of Internal Affairs and Communications aims to secure information transmission means necessary for disasters by installing Wi-Fi facilities at the public places such as 1) evacuation centers and evacuation sites where people stay at the onset of a disaster and live as evacuees until the disaster risk is gone and 2) museums, cultural assets, natural and urban parks, where assumed to be affected by disasters and to be desired to enforce measures to the disaster based on the development plan. The Wi-Fi facilities are intended to be used for collecting tourism-related information and education on a daily basis.

The Ministry of Internal Affairs and Communications set a goal to develop about 30,000 such facilities (including those already installed) as the target number by FY2019. Approximately 21,000 Wi-Fi facilities have completed at present (as of January 2018).



No. of Locations Installed and Planned to Be Installed by Prefecture (Chart)



*1 As of October 2017 *2 Locations planned to be installed in FY2017 are included in "Installed."

Source: Ministry of Internal Affairs and Communications

(Reference: http://www.soumu.go.jp/menu_news/s-news/01ryutsu06_02000131.html)

2-9 Enhancement of the Content of Training for Local Government Heads and Officials

The ability to respond swiftly and accurately to a disaster largely relies on the knowledge and experience of the head of a local government and officials in charge of disaster management.

Accordingly, in FY2013, the Cabinet Office began offering Disaster Management Specialist Training Courses for national and local government employees, to cultivate personnel capable of responding swiftly and accurately to crises and personnel able to develop networks of national and local government organizations.

One of these, the Training Course at the Ariake no Oka Core Wide-area Disaster Prevention Base in FY2017 features lectures provided in collaboration with relevant ministries and agencies on such topics as “Government’s Support in the Emergency Phase,” “Mutual Support between Local Governments and Aid Acceptance Plans” and “Review of a Large-scale Disaster.” Efforts have been made to enhance the content of these courses to cultivate human resources for disaster management in the officers of local governments.

The Cabinet Office and Fire and Disaster Management Agency jointly held a National Seminar on Disaster Prevention and Crisis Management for Heads of Local Government to improve the ability of mayors who would spearhead the municipality in the event of a disaster to make decisions faster and more accurately. In the seminar held in FY2017, which specifically encouraged those newly in office, 226 new mayors joined and learned about the proper initial responses to take as the head of a municipality and actual examples of initial responses taken by the disaster-affected local governments.

In addition, the Cabinet Secretariat, Cabinet Office and Fire and Disaster Management Agency co-sponsored a Special Training Course on Disaster Prevention and Crisis Management for persons overseeing disaster and crisis management at related ministries and agencies, prefectural governments and ordinance-designated cities for two days in April 2018 at the Local Autonomy College.

These training courses and seminars should be further enhanced to improve the national capability of disaster management and response now and in future.



A lecture at the Training Course at the Ariake no Oka Core Wide-area Disaster Prevention Base in FY2017



A lecture at the National Seminar on Disaster Prevention and Crisis Management for Heads of Local Government in FY2017

2-10 Securing Designated Emergency Evacuation Sites and Designated Evacuation Centers

Designated emergency evacuation sites are positioned as facilities or places to which local citizens and others should evacuate urgently to safeguard their lives in the event of imminent danger from a tsunami, flood, or other such hazard. Designated evacuation sites are facilities for accommodating people who have evacuated until the danger posed by a disaster has passed or for accommodating them temporarily when a disaster prevents their returning home.

The distinction between evacuation sites and evacuation centers was not entirely clear at the time of the Great East Japan Earthquake, which was a factor that contributed to increasing the resultant harm. Accordingly, the Cabinet Office revised the Basic Act on Disaster Management in 2013 to require mayors of municipalities to designate both kinds of evacuation facility in advance, making a distinction between designated emergency evacuation sites and designated evacuation centers, and issue a public notice to notify citizens of details of these facilities. Fig. 2-10-1 shows the designation status of designated emergency evacuation sites as of April 1, 2017.

Fig. 2-10-1 Designated Emergency Evacuation Sites

	Flood	Sediment disaster	Storm surge	Earthquake	Tsunami	Widespread fire	Rain inundation	Volcanic phenomena	Total
Number of designated evacuation sites (sites)	59,528	63,377	16,795	71,906	32,031	33,143	69,057	8,221	99,813
Expected capacity (10,000 people)	10,713	10,701	4,362	18,894	6,740	12,673	5,754	2,108	

Source: Formulated by the Cabinet Office based on the Fire and Disaster Management Agency report “Status of Regional Disaster Management Administration” (multiple responses permitted for each category)

Along with the Fire and Disaster Management Agency, the Cabinet Office is encouraging local governments to specify their designated emergency evacuation sites without delay. As local governments are required to specify designated emergency evacuation sites for each type of disaster, the Cabinet Office is calling on local governments nationwide to lose no time in starting to install signs that comply with the Hazard Specific Evacuation Guidance Sign System (JIS Z 9098), which was instituted to enable evacuees to clearly identify such facilities (Fig. 2-10-2). (Reference: <http://www.bousai.go.jp/kyoiku/zukigo/index.html>).



Example of a sign compliant with the Hazard Specific Evacuation Guidance Sign System

Fig. 2-10-2 Standardization of graphic symbols for evacuation sites, etc.

Disaster type in Basic Act	JIS symbol by disaster type	
Tsunami	Tsunami/storm surge (Old symbols are also used, symbols for general maps are created)	
Storm surge		
Flood	Flood	
Rain inundation	Rain inundation	
Slope failure	Slope failure	
Debris flow	Debris flow	
Landslide	Landslide	
Fire disaster	Fire disaster	
Earthquake	Indicated by a disaster (tsunami, widespread fire, etc.)	
Volcanic eruption	A dissemination campaign is conducted for evacuation to designated sites.	

- Evacuation sites need to be specified for each disaster type by the revised Basic Act on Disaster Management.
- Related ministries and agencies decided to launch a liaison conference to standardize graphic symbols for evacuation sites, etc.
- The JIS Drafting Committee creates draft symbols for standardization by JIS, which are then reported to the Minister of Economy, Trade and Industry.
→The graphic symbols were standardized by JIS on March 22, 2016.

(Reference: Graphic symbols specified by JIS)

Evacuation Site
JISZ8210

Evacuation Center
JISZ8210

Tsunami Evacuation Site/Building
JISZ8210

Tsunami Evacuation Site/Building
JISZ8210

Source: Cabinet Office

Fig. 2-10-3 lists the designated evacuation centers specified pursuant to Article 49-7 of the Basic Act on Disaster Management as of April 1, 2017.

Fig. 2-10-3 Designated Evacuation Centers

Number of designated evacuation centers	70,947
Expected capacity (10,000 people)	3,669

Source: Formulated by the Cabinet Office based on the Fire and Disaster Management Agency report “Status of Regional Disaster Management Administration” (multiple answers allowed in different divisions).

Following situations that have arisen in recent disasters, various problems have been pointed out in relation to efforts to provide an appropriate living environment at evacuation centers, including the need to improve toilet facilities there. Even in the event of a disaster, when evacuees are compelled to lead their lives amid the inconvenient conditions of an evacuation center, it is important to improve the quality of life in centers and seek to ensure a good living environment. Accordingly, since July 2015, the Cabinet Office has been holding meetings of the Study Group on Securing Evacuation Centers and Improving their Quality, to consider and take the necessary steps to deal with a wide range of issues, including encouraging municipalities to designate evacuation centers and welfare evacuation centers, improving toilet facilities at evacuation centers, and developing support and consultation systems for persons requiring special care.

Based on discussions by this committee, the Guidelines for Ensuring Satisfactory Living Conditions at Evacuation Centers (published by the Cabinet Office in August 2013) were partially revised the day after the main Kumamoto Earthquake. At the same time, based on these revised guidelines, the Cabinet Office published three other sets of guidelines: the Evacuation Center Management Guidelines; the Guidelines for Securing and Managing Toilets at Evacuation Centers; and the Guidelines for Securing and Managing Welfare Evacuation Centers (Fig. 2-10-4).

However, it was pointed out that evacuation centers were not always adequately managed at the Kumamoto Earthquake in April 14, 2016. Accordingly, the FY2016 Report on Case Examples of Support for Affected People at Evacuation Centers was compiled and published in FY2017 as a supplementary document to the Evacuation Center Management Guidelines and other related documents to manage evacuation centers more effectively (Fig. 2-10-4).

(Reference: <http://www.bousai.go.jp/taisaku/hinanjo/>)

Fig. 2-10-4 Guidelines on Evacuation Centers

Evacuation Center Management Guidelines (April 2016)

The guidelines emphasize the establishment of systems for internal and external partnership and cooperation before disaster occurs, as well as attaching importance to maintaining the health of evacuees. In addition, they provide a specific checklist of 19 tasks that should be carried out at each stage of disaster response (preparation, initial response, emergency response, and recovery), specifying detailed tasks that tend to be overlooked, such as arrangements for toilets, beds, baths, and pets.

Guidelines for Securing and Managing Toilets at Evacuation Centers (April 2016)

The guidelines stress the importance of securing and managing toilets. This is because a growing number of affected people experience discomfort due to the unhygienic state of toilets in times of disaster, which leads them to refrain from using the toilet by restricting food and/or water intake to reduce the need to use the toilet, running the risk of adverse impacts on their health or even their lives in a worst-case scenario.

Guidelines for Securing and Managing Welfare Evacuation Centers (April 2016)

The guidelines have a particular focus on matters that should be addressed before disaster occurs, in relation to the designation of welfare evacuation centers. In addition, they cover such matters as consideration for the lessons of the Great East Japan Earthquake, systems for supporting persons requiring special care, securing means of transport, and devising ways to guide evacuees to appropriate evacuation centers.

FY2016 Report on Case Examples of Support for Affected People at Evacuation Centers (April, 2017)

The report covered advanced examples of countermeasures promoted in various areas in addition to actual support activities for affected people at evacuation centers and elsewhere such as in cars and relevant issues.

Source: Cabinet Office

Column: L-Alert (Disaster Information Sharing System)

Preparation of an environment to promptly and accurately provide residents with information required during disasters by combining various means has been important based on the experience of the Great East Japan Earthquake. Therefore, the Ministry of Internal Affairs and Communications has promoted the nationwide dissemination and enhancement of “L-Alert (Disaster Information Sharing System)” that enables local governments and lifeline utilities companies to convey disaster information quickly and accurately to residents through diverse media outlets.

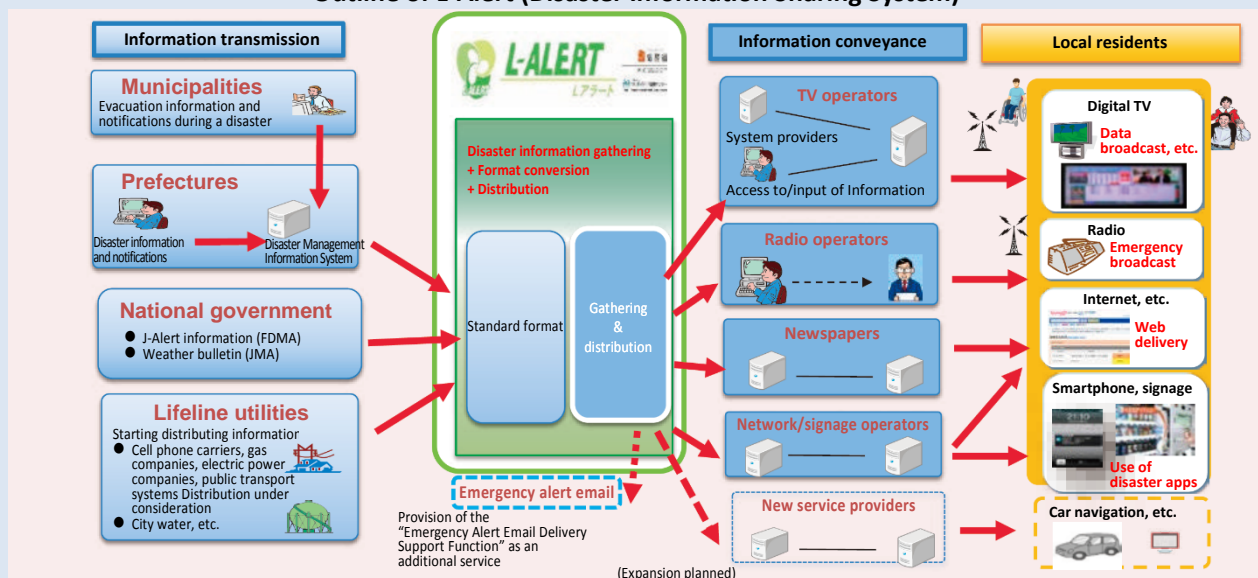
(1) Dissemination of L-Alert

In order to enlighten significance and correct operation procedures of L-Alert, a liaison meeting, training, and exercises are provided in each community for uses of L-Alert, mainly the officers of local governments.

(2) Enhancement of L-Alert

To enable even those unfamiliar with the area to understand disaster information and take evacuation action promptly, the Ministry of Internal Affairs and Communications has implements pilot projects to standardize a system to map evacuation recommendations and instructions issued by the local government via L-Alert and the linkage between L-Alert and the car navigation system and digital signage (a system to transmit information using electronic display units).

Outline of L-Alert (Disaster Information Sharing System)



Source: Ministry of Internal Affairs and Communications

Section 3 Responding to Disasters Anticipated to Occur

3-1 Disaster Management Based on Seismic Observation and Evaluation along Nankai Trough

The Act on Special Measures Concerning Countermeasures for Large-Scale Earthquakes (“Act on Special Measures”), which was enacted in 1978, mainly stipulates that the national government as well as the local governments and relating business operators in the areas under intensified measures against earthquake disaster must conduct emergency responses adequately, based on individual plans formulated in advance to reduce damage when a warning declaration is issued, according to the reception of earthquake prediction information and targets only the Tokai Earthquake since its enactment.

However, the Study Group on the Predictability of a Major Earthquake along Nankai Trough, a panel established in 2013 under the National Disaster Management Council (reference: <http://www.bousai.go.jp/jishin/nankai/yosoku/index.html>) reported that it was difficult to make highly accurate earthquake predictions based on current scientific knowledge. Meanwhile, a dense observation network along the Nankai Trough makes it possible to determine various anomalous phenomena relating to earthquakes. In addition, more than 70 years have passed since the Showa Tohnankai Earthquake and Showa Nankai Earthquake and the potential for large-scale earthquakes along the Nankai Trough is ever-increasing.

Against this background, the Cabinet Office launched the Working Group on Disaster Response Based on Seismic Observation and Evaluation along Nankai Trough under the National Disaster Management Council’s Disaster Management Implementation Committee in June 2016. The predictability of large-scale earthquakes was studied anew based on the latest scientific insights at the Study Group on the Predictability of a Major Earthquake along Nankai Trough, a panel installed under the working group. According to the report from this study group, the working group discussed desired disaster management based on the current insight of earthquake seismology and compiled a report suggesting the basic policy in September 2017.

(Reference: http://www.bousai.go.jp/jishin/nankai/taio_wg/taio_wg.html)

The current emergency measures for earthquake disaster responses pursuant to the Act on Special Measures require evacuation and various control regulations achieved before the earthquake hits the designated areas, based on the premise a warning declaration is issued based on the earthquake prediction information for the possibility of the Tokai Earthquake within a few days. The report, however, indicated that the current emergency measures for earthquake disasters responses pursuant to the Act on Special Measures must be modified considering the current level of large-scale earthquake prediction and based on the current scientific knowledge.

The report also emphasized the continued importance of utilizing the current scientific knowledge for disaster management and accordingly suggested the need to discuss adequate disaster management while ensuring consensus with local governments and private companies when an anomalous phenomenon was observed along the Nankai Trough and presented an example of tsunami evacuation as a reference indicating the direction of future discussions (Fig. 3-1-1).

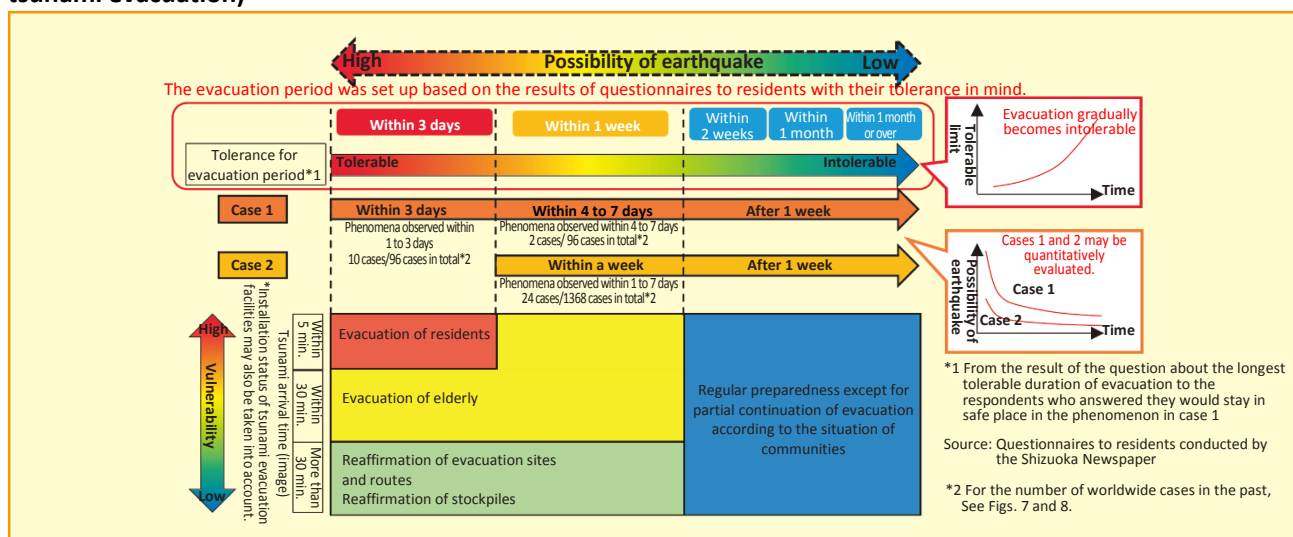
In this example, the duration of disaster management is set up by taking into account the possibility of earthquakes and the patience of residents and the details are determined according to the vulnerabilities of the community such as the time the tsunami arrives. The report pointed out the need for national and local governments to provide interim disaster management systems in preparation for anomalous phenomena observed along the Nankai Trough until new measures are determined.

After receiving this report, the Cabinet Office decided to review how to respond to anomalous phenomena observed along the Nankai Trough and issues arising from the implementation of these responses while taking into account the circumstances of local communities in collaboration with Shizuoka and Kochi Prefectures and the Chubu Economic Federation. Specifically, the evacuation of residents in the event of a tsunami was studied in Shizuoka and Numazu Cities in Shizuoka Prefecture and Muroto City and Kuroshio Town in Kochi Prefecture, as well as investigating corporate disaster management at the Chubu Study Group on New Corporate Disaster Management based on Earthquake Observation along Nankai Trough launched in November 2017.

Based on the results of studies in these areas, the Cabinet Office set up the Working Group on Disaster Management for Anomalous Phenomena along Nankai Trough under the National Disaster Management Council's Disaster Management Implementation Committee in March 2018 to study desired disaster management for anomalous phenomena observed along the Nankai Trough and social mechanisms to conduct disaster management.

In addition, interim measures taken by the national government pending the introduction of new disaster management for the Nankai Trough Earthquake were determined (decision made at the Officers Meeting of the National Disaster Management Council on September 26, 2017 and applied on November 1, 2017). According to the measures, the Japan Meteorological Agency will announce the Nankai Trough Earthquake Information when anomalous phenomena are observed along the Nankai Trough or the assessment results in a relatively high possibility of such earthquakes and when this information is announced, the Cabinet Office will summon an Inter-Agency Disaster Alert Meeting, and call on residents of the areas potentially affected by the Nankai Trough Earthquake to reaffirm their preparedness, which should be regularly checked and the related ministries and agencies should collect information, confirm liaison organizations, inspect facilities under their control if applicable and ensure the implementation of disaster emergency measures in response to major earthquakes (Fig. 3-1-2).

Fig. 3-1-1 Basic Idea of Disaster Management Based on the Short-term Possibility of Earthquake (example tsunami evacuation)



Note: The vertical axis represents the vulnerability (with the image of tsunami arrival time) and the horizontal axis indicates the possibility of an earthquake. The latter peaks just after the evacuation, then decreases over time. The tolerance of evacuees also declines. Disaster management needs to be discussed by considering the balance of these factors.

Source: Implementation of Disaster Management Based on the Observation and Evaluation of Earthquakes along the Nankai Trough (Report)

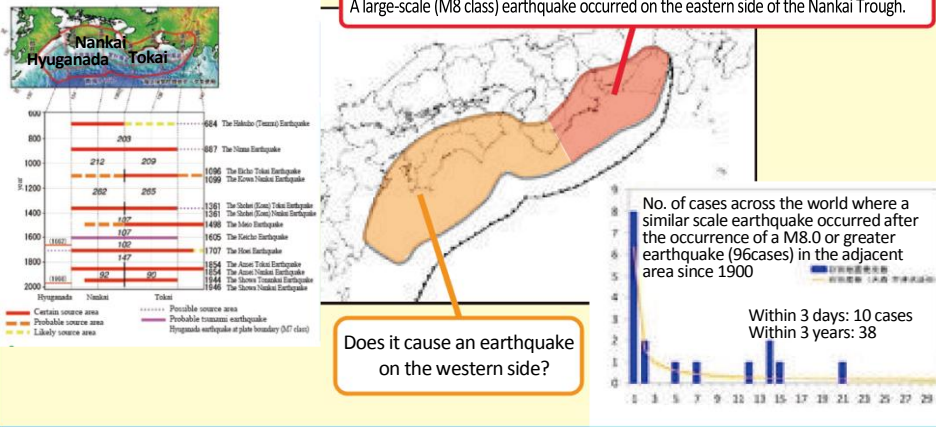
(Reference: http://www.bousai.go.jp/jishin/nankai/taio_wg/taio_wg.html)

(Reference) Typical Anomalous Phenomena Observed along the Nankai Trough

Case 1

Occurrence of a large-scale earthquake only on the eastern side of the Nankai Trough (no ruptures on the western side)

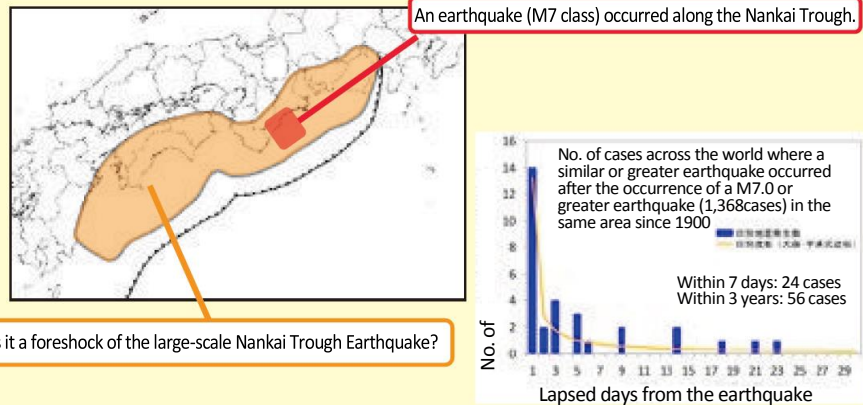
* In the latest two cases, a large-scale earthquake occurred on the eastern side of the Nankai Trough accompanied a large-scale earthquake on the western side.



Case 2

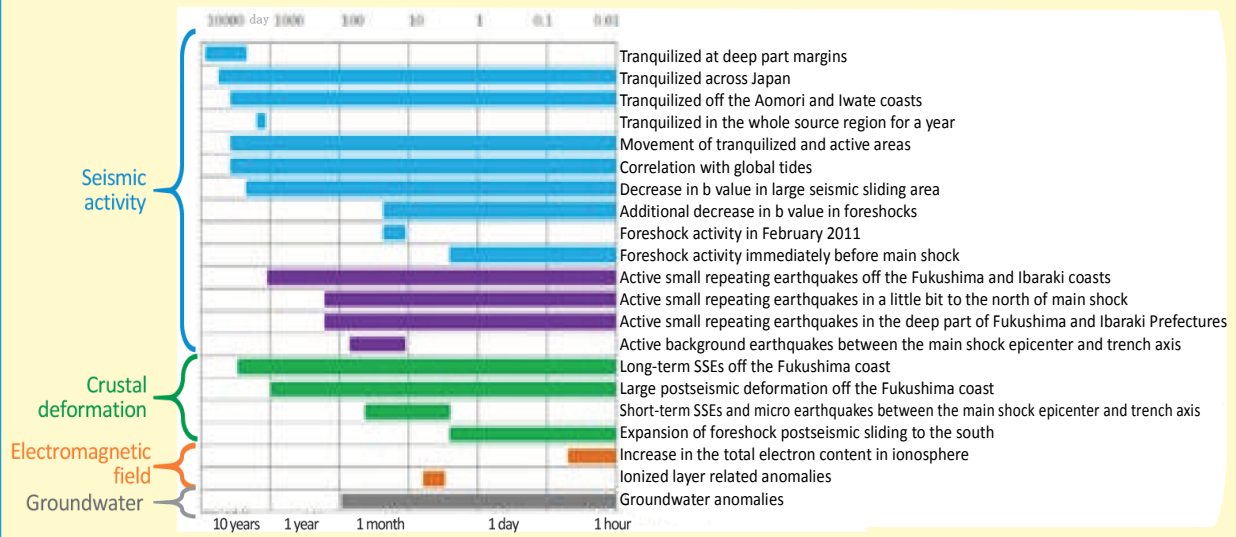
Occurrence of an earthquake (M7 class) a little smaller than large-scale (M8 to M9) earthquakes

* Though not confirmed along the Nankai Trough, there were cases worldwide where a M8.0 class earthquake occurred after the occurrence of a M7.0 or greater earthquake.



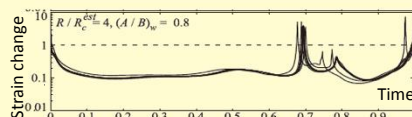
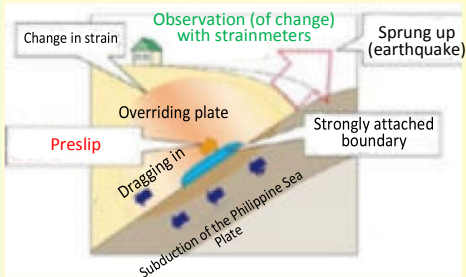
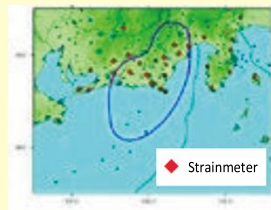
Case 3

Observation of many phenomena similar to those observed before the 2011 Tohoku Earthquake and Tsunami (the Great East Japan Earthquake)



Case 4

Slipping at the plate boundary which may clear the criteria for the Tokai Earthquake
 * The Japan Meteorological Agency regularly observes in the Tokai region.



The simulation showed diversified courses of the occurrence of a large-scale earthquake such as accompanying slow slippage before the tremor or none at all.

Note: Case 3 is considered not to be in the phase that can be used for disaster management.

Source: Implementation of Disaster Management Based on the Observation and Evaluation of Earthquakes along the Nankai Trough (Report)

(Reference: http://www.bousai.go.jp/jishin/nankai/taio_wg/taio_wg.html)

Fig. 3-1-2 Nankai Trough Earthquake Information Announced by the Japan Meteorological Agency and Conditions of Announcement

The Japan Meteorological Agency announces the Nankai Trough Earthquake Information when anomalies are detected or the assessment indicates a relatively high possibility of earthquakes around the whole Nankai Trough region.

Information issued by JMA	Conditions of announcement
Nankai Trough Earthquake Information (Extra)	<ul style="list-style-type: none"> • When an anomalous phenomenon is observed along the Nankai Trough (*1) and investigation is started or continued to check the correlation of the phenomenon with large-scale earthquakes in this region. • When the investigation of the observed phenomenon results in the assessment of a relatively high possibility of large-scale earthquakes along the Nankai Trough compared with the normal time. • When the investigation of the observed phenomenon no longer elicits the finding of a relatively high possibility of large-scale earthquakes along the Nankai Trough.
Nankai Trough Earthquake Information (Regular)	<ul style="list-style-type: none"> • After a monthly meeting of the of the Nankai Trough Earthquake Assessment Committee (results of investigation)

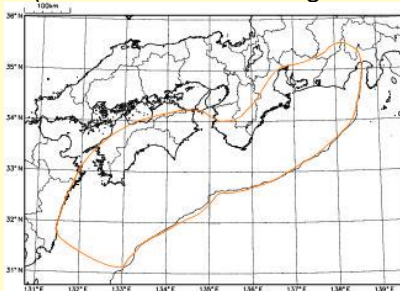
- With the commencement of operating this information, information focusing solely on the Tokai Earthquake (Information on the Tokai Earthquake) is not announced.
- Large-scale earthquakes may occur even when this information is not announced.

*1: The phenomena observed by the Japan Meteorological Agency including those relating to earthquakes of M7.0 or greater along the Nankai Trough and significant changes on the strainmeters installed in the Tokai region. Specific examples are shown below.

Phenomena signaling the JMA to start investigation

- M7.0 or greater earthquakes having occurred in the probable source region of the Tohankai and Nankai Earthquakes (*2).
- M6.0 or greater earthquakes occurred (or the intensity of 5 or lower observed) in the probable source region of the Tohankai and Nankai Earthquakes (*2), and strainmeters (*3) showing anomalous changes, not ordinary stepped changes (*4)
- Changes on strainmeters (*3) were observed and the correlation of these changes with large-scale earthquakes must be investigated. For example, one or more strainmeters (*3) indicated significant changes and at the same time, changes which may be linked to these changes were observed in other observation points.
- Phenomena showing changes in the firmly fixed plates at the plate boundary were observed in the probable source region of the Tohankai and Nankai Earthquakes (*2) and there is a need to investigate correlation of these phenomena with large-scale earthquakes along the Nankai Trough.

*2: The probable source region of the Tohankai and Nankai Earthquakes is shown in the map below (National Disaster Management Council, 2013)



*3: Strainmeters installed in the Tokai region are currently used.

*4: Stepped changes are usually observed when an earthquake occurs.

The above descriptions may be changed according to the investigation in future.

Source: Japan Meteorological Agency website

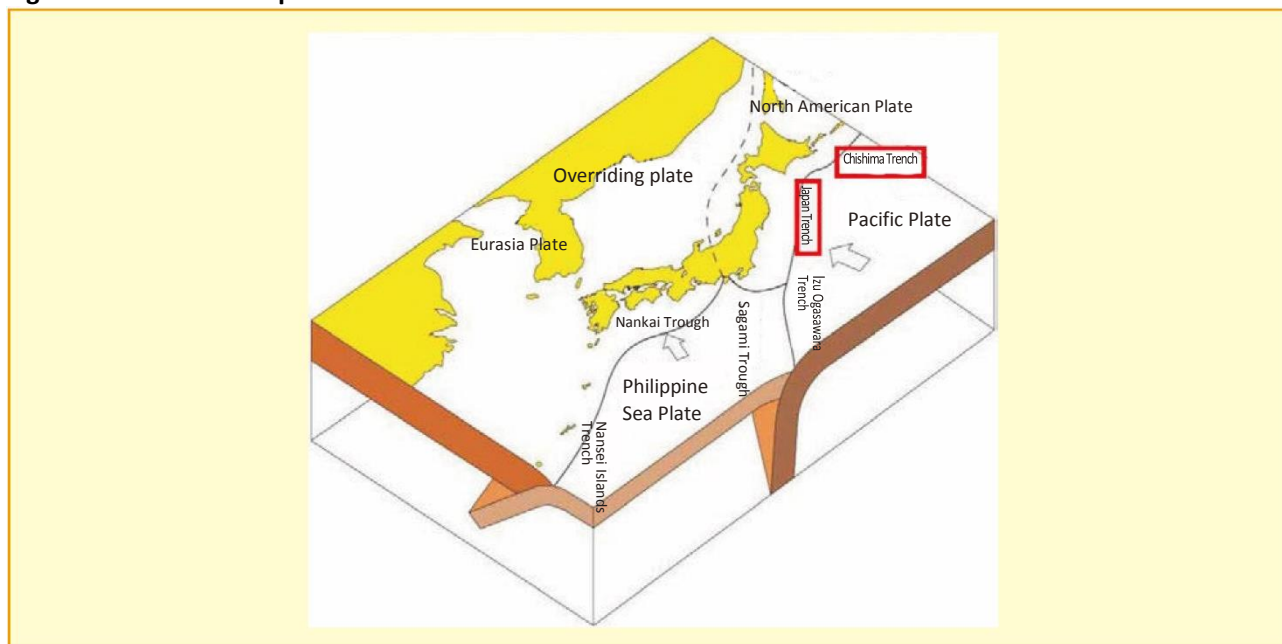
3-2 Investigation of Disaster Management Measures for Japan and Chishima Trenches

In regard to subduction zone earthquakes in the Japan and Chishima Trenches (Fig. 3-2-1), the whole government has focused on disaster management measures in consideration of issues specific to snowy, cold areas, including difficulty in evacuation due to frozen land and snow cover when an earthquake occurs in winter. Revisions of the existing measures to those assuming the largest class earthquake and tsunami are currently underway based on lessons learned from the 2011 Tohoku Earthquake and Tsunami (the Great East Japan Earthquake).

Specifically, the largest class earthquake and tsunami to be assumed must be determined first to discuss the disaster management for giant earthquakes. For this purpose, the Study Group on Giant Earthquake Models along the Japan and Chishima Trenches, organized in February 2015 by science and engineering researchers, has extensively consolidated and analyzed the results of various investigations based on scientific insights on subduction zone earthquakes in the past along the Japan and Chishima Trenches in terms of disaster management to determine the assumed largest class earthquake and tsunami.

(Reference: http://www.bousai.go.jp/jishin/nihonkaiko_chishima/model/index.html)

Fig. 3-2-1 Location of Japan and Chishima Trenches



Source: Cabinet Office website

(Reference: http://www.bousai.go.jp/jishin/nihonkaiko_chishima/index.html)

3-3 Deliberations on Large-scale, Extensive Evacuation from Flooding or Storm Surge Inundation in the Tokyo Metropolitan Area

Climate change caused by global warming in recent years makes it necessary to be prepared for increasingly catastrophic flooding beyond existing assumptions. Extensive portions of Japan's three major metropolitan areas are located below sea level. As such, large-scale flooding caused by the collapse of river embankments is expected to result in huge crowds as large numbers of residents seek to evacuate, as well as many people being left stranded after failing to escape in time.

Accordingly, approaches to large-scale, extensive evacuation from flooding or storm surge inundation were examined in Japan's three major metropolitan areas at the Working Group for Studying Large-scale, Extensive Evacuation from Flooding or Storm Surge Inundation established under the National Disaster Management Council's Disaster Management Implementation Committee in June 2016. The working group submitted a report

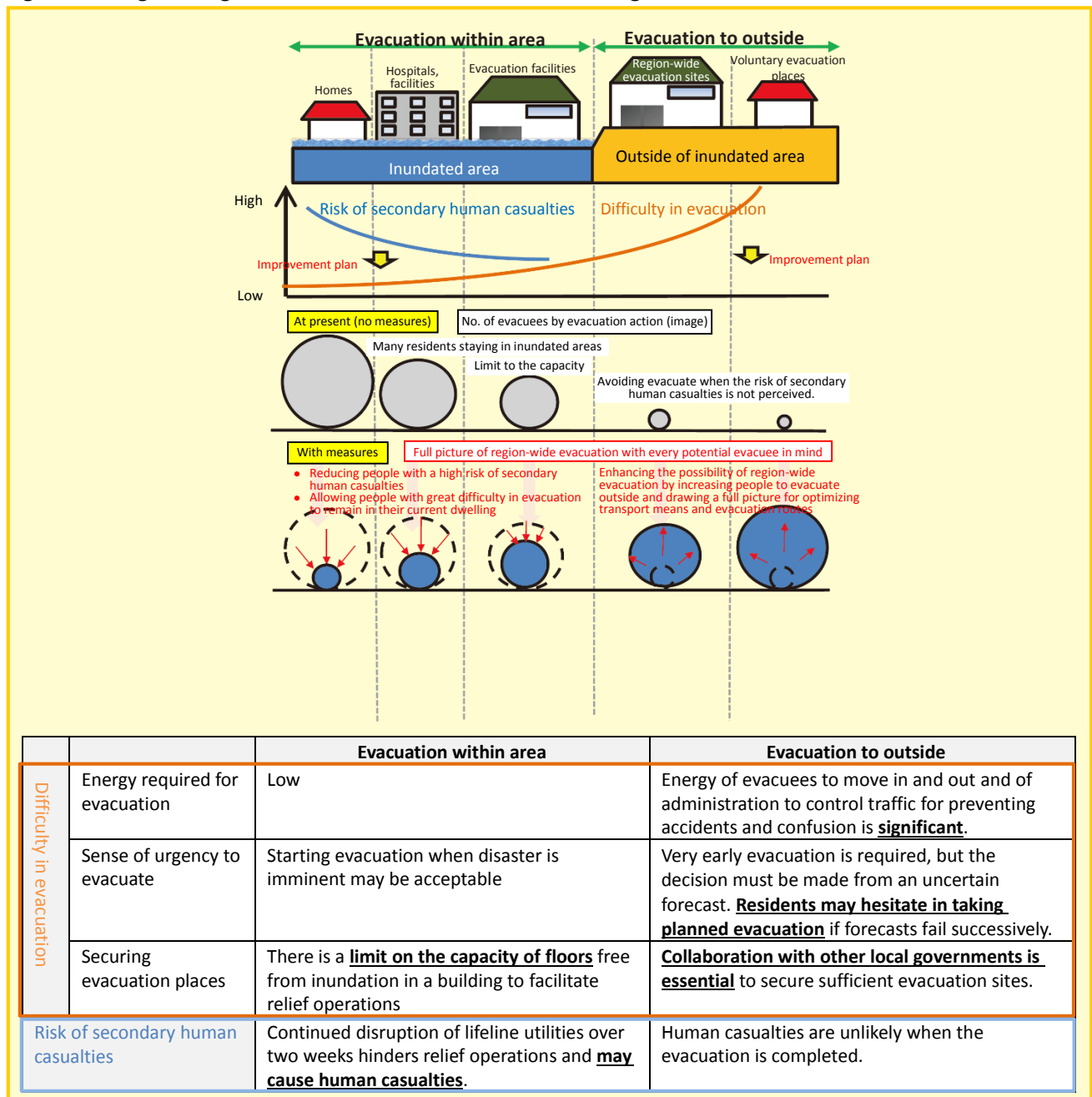
titled “Basic Approaches for Large-scale, Extensive Evacuation from Flooding or Storm Surge Inundation” in March 2018.

(Reference: <http://www.bousai.go.jp/fusuigai/kozuiworking/index.html>)

The report cited enormous human casualties with many residents remaining in submerged areas if none of predetermined measures were provided for on a large-scale and extensive evacuation and proposed to compile a full picture of large-scale and extensive evacuation for providing procedures to sort out complicated issues of evacuees as a whole and make a plan to mitigate the risk of harm to evacuees as well as issues to be examined to ensure the effectiveness of the plan (Fig. 3-3-1).

The Cabinet Office will offer opportunities for discussion with relating agencies in collaboration with the Tokyo Metropolitan Government to implement large-scale and extensive evacuation.

Fig. 3-3-1 Image of Large-scale and Extensive Evacuation Involving All Evacuees



Source: Basic Approaches for Large-scale, Extensive Evacuation from Flooding or Storm Surge Inundation
 (Reference: <http://www.bousai.go.jp/fusuigai/kozuiworking/index.html>)

Section 4: International Cooperation on Disaster Risk Reduction

Japan has accumulated a great deal of experience and knowledge concerning disasters, along with numerous policies on disaster risk reduction. By sharing these with other countries, it is driving global discussions in the field of disaster risk reduction and contributing to initiatives in this field in countries worldwide. In particular, the international communities expect Japan to play a leading role in the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR), which was concluded at the Third UN World Conference on Disaster Risk Reduction, hosted by Japan in Sendai City in March 2015. Accordingly, the Cabinet Office Disaster Management Bureau is proactively promoting cooperation in disaster risk reduction through the UN and other international organizations, as well as bilateral disaster risk reduction cooperation.

4-1 Disaster Risk Reduction Cooperation through the UN and Other International Organizations

(1) Disaster Risk Reduction Cooperation through the United Nations Office for Disaster Risk Reduction (UNISDR)

The United Nations Office for Disaster Risk Reduction (UNISDR) is undertaking intensive activities focused on the following three strategic objectives, to promote the SFDRR.

Strategic objective 1: Strengthen global monitoring, analysis and coordination of Sendai Framework implementation

Strategic objective 2: Support to regional and national Sendai Framework implementation

Strategic objective 3: Catalyse action through Member States and Partners

As well as playing a leading role in the activities of UNISDR, Japan provides financial support for those activities, contributing a total of approximately \$5.12 million (approximately ¥563.37 million) through the Ministry of Foreign Affairs and the Cabinet Office in FY2017.

The establishment of an Open-Ended Intergovernmental Expert Working Group (OEIWG) to formulate indicators to measure progress toward the global targets and relevant terminology was approved by the UN General Assembly in June 2015 and the OEIWG began its deliberations that September. In this process, Japan made a substantial contribution to the OEIWG's discussions, conducting a prior survey to ascertain whether countries held any data concerning indicators that were tabled for consideration. As a result of these deliberations, the Recommendations of the Open-ended Intergovernmental Expert Working Group on Global Indicators for the Global Targets of the Sendai Framework for Disaster Risk Reduction 2015-2030 and on the Follow-up to and Operationalization of the Indicators were adopted at the UN General Assembly in February 2017. The member countries will be requested to submit the indicators of their own.

Robert Glasser, Special Representative of the UN Secretary-General for Disaster Risk Reduction (SRSG) for Disaster Management, visited the Cabinet Office on April 10, 2017 and held talks with the State Minister of the Cabinet Office Matsumoto. The SRSG expressed his gratitude to Japan for its international contribution and leadership in disaster management and established a shared understanding of closer collaboration between the Government of Japan (Cabinet Office) and UNISDR in promoting the SFDRR. Following the talks, the SRSG and the disaster management departments of the related ministries and agencies, including the Cabinet Office and Ministry of Land, Infrastructure, Transport and Tourism, held policy consultations to present the initiatives of the UNISDR and Japan and exchange opinions about disaster management.

(2) The 5th Global Platform for Disaster Risk Reduction

The 5th session of the Global Platform for Disaster Risk Reduction was held during May 24-26, 2017 at Cancun, Mexico under the joint auspices of the Government of Mexico and UNISDR. It has been held every other year since 2007 (except in 2015 when the 3rd UN World Conference on Disaster Risk Reduction was held in Sendai City) and attended by international organizations, governments of various countries and private organizations; targeting the effective promotion of the Hyogo Framework for Action 2005-2015 as adopted at the 2nd UN World Conference on Disaster Risk Reduction (January 2005 under the auspices of Kobe City, Hyogo).

The 5th session is the first opportunity to confirm the implementation status of promotional initiatives in countries since the adoption of the SFDRR and 4,180 people from 179 countries joined the session (announced by the UNISDR).

The Vice-Minister for Policy Coordination represented the Government of Japan and co-chaired a special session focusing on “Enhancing Disaster Preparedness for Effective Response and to ‘Build Back Better’ in Recovery, Rehabilitation and Reconstruction.” At the same time, former Minister of State for Disaster Management Hirano, who also participated, gave a speech at a special session.



Vice-Minister for Policy Coordination serving as the co-chair of the special session
(Second from the right and on screen)

(3) International Recovery Platform (IRP)

The Hyogo Framework for Action was adopted in 2005 at the Second UN World Conference on Disaster Risk Reduction, which was held in the city of Kobe, Hyogo Prefecture. In response to this, the IRP was established in the city the same year, to enhance networks and frameworks for supporting smoother post-disaster reconstruction, disseminate lessons concerning reconstruction and develop common techniques and mechanisms to facilitate reconstruction and provide advice and support to those formulating reconstruction plans and visions following a disaster. The IRP’s activities include holding the International Recovery Forum, preparing guidance notes on recovery and organizing workshops for human resource development. The SFDRR advocates that the IRP should be enhanced, as an international mechanism for promoting the “build back better” approach, which is positioned in the SFDRR as the fourth priority area for action. The Government of Japan (Cabinet Office) supports the activities of the IRP, as well as contributing to enhancing the infrastructure for its development, as Co-Chair of the IRP Steering Committee.

The International Recovery Forum in FY2017 was held in Kobe on January 24, 2018 focusing on the theme “Build Back Better in Urban Resilience.” It was attended by 119 people from 23 countries and 19 international organizations, including Vice-Minister for Policy Coordination, Deputy Governor of Hyogo Kanazawa and former UN Assistant Secretary General Nigel Fisher. At the forum, recovery cases of past disasters were presented as well as sharing lessons learned from the same and methods for evaluating the results of “Build Back Better” in recovery, rehabilitation and reconstruction were discussed.



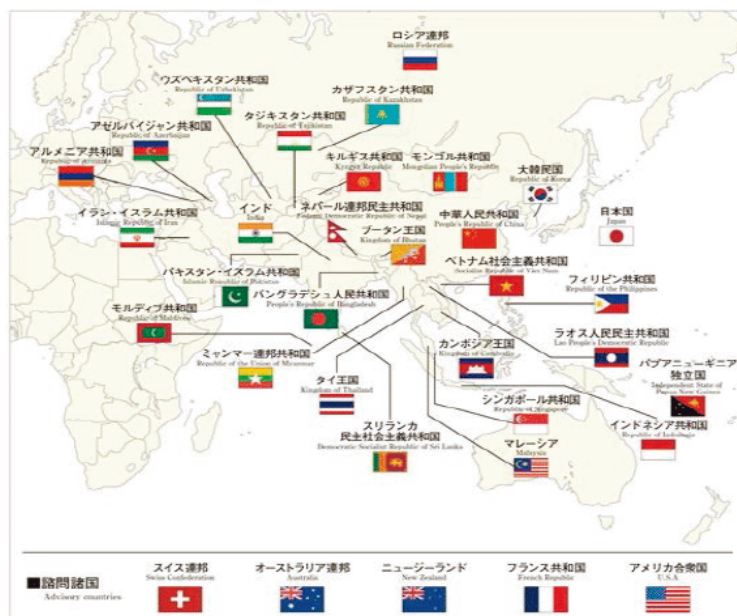
The International Recovery Forum

(4) Asia-Pacific Economic Cooperation (APEC) Senior Disaster Management Officials Forum

The 11th Asia-Pacific Economic Cooperation (APEC) Senior Disaster Management Officials Forum (SDMOF) was held in Vietnam (Vinh) on September 21-22, 2017. The Deputy Director General attended the forum from Japan and presented recent Japanese initiatives for information technology in relation to natural disasters in a session focusing on the theme “Recent Initiatives on Information Technology for Responding to Natural Disaster and Regional Cooperation.”

(5) Disaster Risk Reduction Cooperation through the Activities of the Asian Disaster Reduction Center (ARRC)

The Asian Disaster Reduction Center (ADRC) was established in Kobe City, Hyogo Prefecture in 1998 to share the lessons of the 1995 Great Hanshin-Awaji Earthquake and other disasters in Japan with the rest of Asia. The ADRC currently has 30 member countries and its activities center on four key areas: sharing information about disasters, human resource development in member countries, improving the disaster management capabilities of communities and promoting partnerships with member countries, international organizations, local organizations and NGOs. It also hosts visiting researchers from member countries each year: as of March 2018, the ADRC had hosted a total of 105 such researchers, thereby helping to cultivate personnel who contribute to policymaking in the field of disaster risk reduction in member countries. The ADRC also gathers information about disaster management systems and the latest disasters in each country and publishes this on its website, as well as providing information obtained from satellite observation of the extent of the damage when a disaster occurs.



Asian Disaster Reduction Center member countries and advisory countries

The ADRC convenes the Asian Conference on Disaster Reduction (ACDR) jointly by the Cabinet Office every year and invited persons in charge of disaster management from member countries and international organizations to share information on disaster management and mitigation, exchange opinions and strengthen collaboration in Asia, which is prone to frequent disasters. The 13th conference was held on October 2-3, 2017 at Baku, the capital of Azerbaijan, under the joint auspices of the Azerbaijan Ministry of Emergency Situations focusing on the “Implementation of Sendai Framework, Emergency Response and Advanced Technologies.” Around 50 people attended the conference from member countries (18 out of 30 countries) and international organizations such as UNISDR and UNICEF and disaster management representatives shared information on strategies and systems for reducing the disaster risk in individual countries as well as the progress of initiatives concerning SFDRR.



Asian Conference on Disaster Reduction

4-2 Bilateral Disaster Risk Reduction Cooperation

Alongside the initiatives through international organization, Japan also strengthened its collaboration with disaster management agencies in the governments of various countries by sharing experiences of disaster management policies through various opportunities such as visits from ministerial level personnel overseeing disaster management from abroad. In particular, bilateral cooperation with the United States and India as well as Japan-China-ROK trilateral cooperation are explained below.

(1) Partnership between the Cabinet Office and the U.S. Federal Emergency Management Agency (FEMA) / Ministry of Home Affairs in India

The Cabinet Office enters into an action plan every year based on the Memorandum of Cooperation (MOC) concluded with the U.S. Federal Emergency Management Agency (FEMA) in December 2014 for sharing information in mutual interaction and international meetings. In September 2017, it concluded an MOC with the Ministry of Home Affairs in India; aiming to develop and extend bilateral cooperation and relationships in disaster management. Based on this MOC, the Cabinet Office and the Indian Ministry of Home Affairs jointly held the Japan-India Workshop on Disaster Risk Reduction 2018 in India (New Delhi) on March 19-20, 2018. At the workshop, which was attended by more than 100 people, including the Vice-Minister for Policy Coordination, Junior Home Minister Kiren Rijiju as well as officers from government agencies, experts and private companies in both countries, strengthening of bilateral cooperation was discussed through sessions concerning technical cooperation to improve early warning systems and develop the seismic risk management capability.



Japan-India Workshop on Disaster Risk Reduction 2018

(2) Japan-China-ROK trilateral cooperation for disaster risk reduction cooperation

The Japan-China-ROK Trilateral Summit Meeting was held in Fukuoka in December 2008 and based on the joint statement issued, the Trilateral Ministerial Meeting on Disaster Management has been held every other year since 2009 by one of three countries in turn. The 5th meeting was held in China (Tangshan) on September 7, 2017 and was attended by the then State-Minister of Cabinet Office Fukuda as a representative of Japan. At the meeting,

each of the three countries presented reports on disasters and responses in recent years as well as exchanging opinions about trilateral cooperation in future. The three countries then signed a joint statement concerning the continued promotion of SFDRR and cooperation for capability development at the end of the meeting.

Section 5: Initiatives to Promote National Resilience

5-1 Approval of the Action Plan for National Resilience 2017

On June 6, 2017, the Action Plan for National Resilience 2017 (“Action Plan 2017” in this section) was approved by the National Resilience Promotion Office.

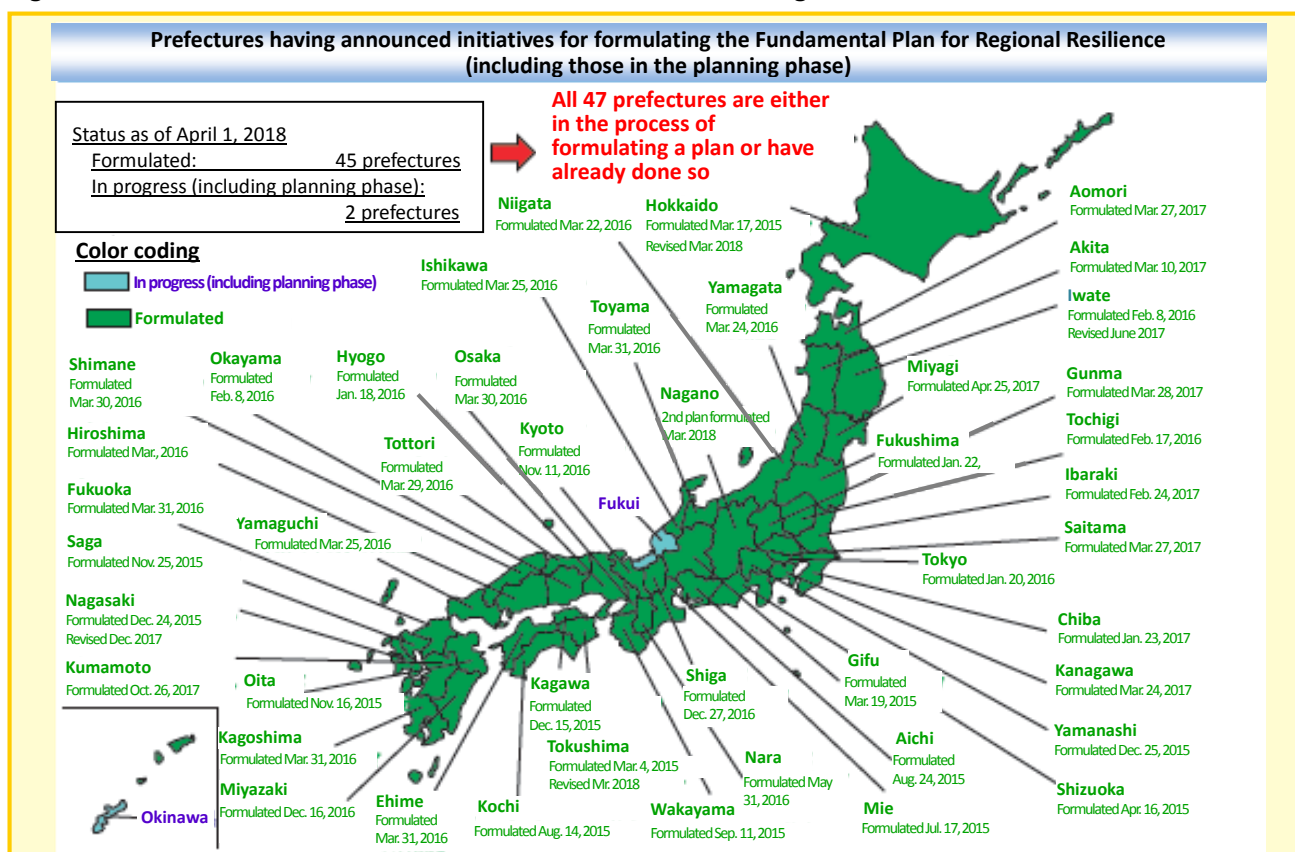
The Action Plan 2017 sought to make relevant measures more effective in response to the Kumamoto Earthquake in April 2016 and a series of typhoons in August and September and boost initiatives to broaden the base of national resilience by encouraging local governments and the private sector to implement initiatives and raising awareness; both within Japan and overseas.

With regard to the Kumamoto Earthquake in 2016, existing measures were inspected against 45 “worst cases that should not occur,” and after reviewing approaches for a necessary response to the issues identified, the results of the inspection were reflected in the Action Plan 2017. Moreover, a PDCA cycle based on a newly emerging large-scale natural disaster in future will be added to the periodic review and evaluation of the program for the current PDCA cycle used to date to promote the action plan for further sophistication in a planned and steady manner.

5-2 Support for the Formulation of Fundamental Plans for Regional Resilience

Local governments are in the process of formulating their relevant Fundamental Plan for Regional Resilience (“Regional Plan” in this section). As of April 1, 2018, 45 prefectures and 74 municipalities had already formulated the Regional Plan while two prefectures and 52 municipalities were in the process of doing so (Fig. 5-2-1). Government officials held briefings to support local governments in formulating the Regional Plan. In addition, 29 grants and subsidies under the jurisdiction of relevant ministries and agencies are made available to help fund initiatives undertaken by local governments based on their Regional Plan. Follow-up surveys are also conducted to ascertain the implementation status of support provided via these ministries and agencies, and the results are informed to local governments.

Fig. 5-2-1 The Formulation Situation of the Fundamental Plan for Regional Resilience in Prefectures



Source: National Resilience Promotion Office, Cabinet Secretariat

5-3 Initiatives for Revising the Fundamental Plan for National Resilience

The Fundamental Plan for National Resilience is unhindered by time based on the concept of “a far-sighted national policy with an eye on the distant future (Chapter 1 of the Fundamental Plan),” but at the same time, stipulates that “and reviewing the content once around every five years in consideration of the changes in social and economic circumstances and the progress of the respective measures” (Chapter 4). The present Fundamental Plan was formulated in June 2014 and in FY2017, part of which was in the fourth year since the formulation of the latest plan and initiatives for revising the Fundamental Plan were well underway by providing a working group for each of the programs showing similar features in the main area of measures to evaluate vulnerabilities (exploratory) using flowchart analysis techniques, while discussions have also started in the Advisory Committee on National Resilience (reference: https://www.cas.go.jp/jp/seisaku/kokudo_kyoujinka/index_en.html).

5-4 Promotion of Private Sector Initiatives Contributing to National Resilience

In FY2016, the government launched a system under which companies and organizations actively implementing business continuity initiatives are certified by third-parties as an Organization Contributing to National Resilience. The objective is to encourage private sector initiatives contributing to national resilience. A total of 115 organizations were certified in six certification sessions under this system as of the end of March 2018.

In July 2017, a guidebook to collect insights on the spread of BCPs, which integrated issues common to formulating business continuity plans (BCPs) required for small- and medium-sized companies to promote business continuity initiatives and knowhow to solve these issues, was announced to support private sector initiatives.

Chapter 2 Measures for Nuclear Disasters

Section 1: Nuclear Emergency Preparedness Systems

1-1 Nuclear Emergency Preparedness System under Non-Emergency Conditions

In the case of a nuclear emergency, the resultant damage would be immense and extensive, so the whole government must work together cohesively to develop and promote nuclear emergency response measures. Accordingly, the Nuclear Emergency Preparedness Council has been established within the Cabinet Office to promote nuclear emergency preparedness measures by the government as a whole under non-emergency conditions.

The main role of this Council, whose members include representatives of the Cabinet Office and other related ministries and agencies and local governments, is to take national responsibility for verifying the effectiveness of the emergency response plans drawn up by each region and grant approval for those that meet the necessary standard. The Nuclear Emergency Preparedness Council is chaired by the Prime Minister, with the Chief Cabinet Secretary, Minister of the Environment, Cabinet Office Minister of State for Nuclear Emergency Preparedness, and the Chairman of the NRA as vice-chairs, and all Ministers of State and the Deputy Chief Cabinet Secretary for Crisis Management, and others, serving as commissioners (Fig. 1-1-1).

1-2 Nuclear Emergency Preparedness System in an Emergency

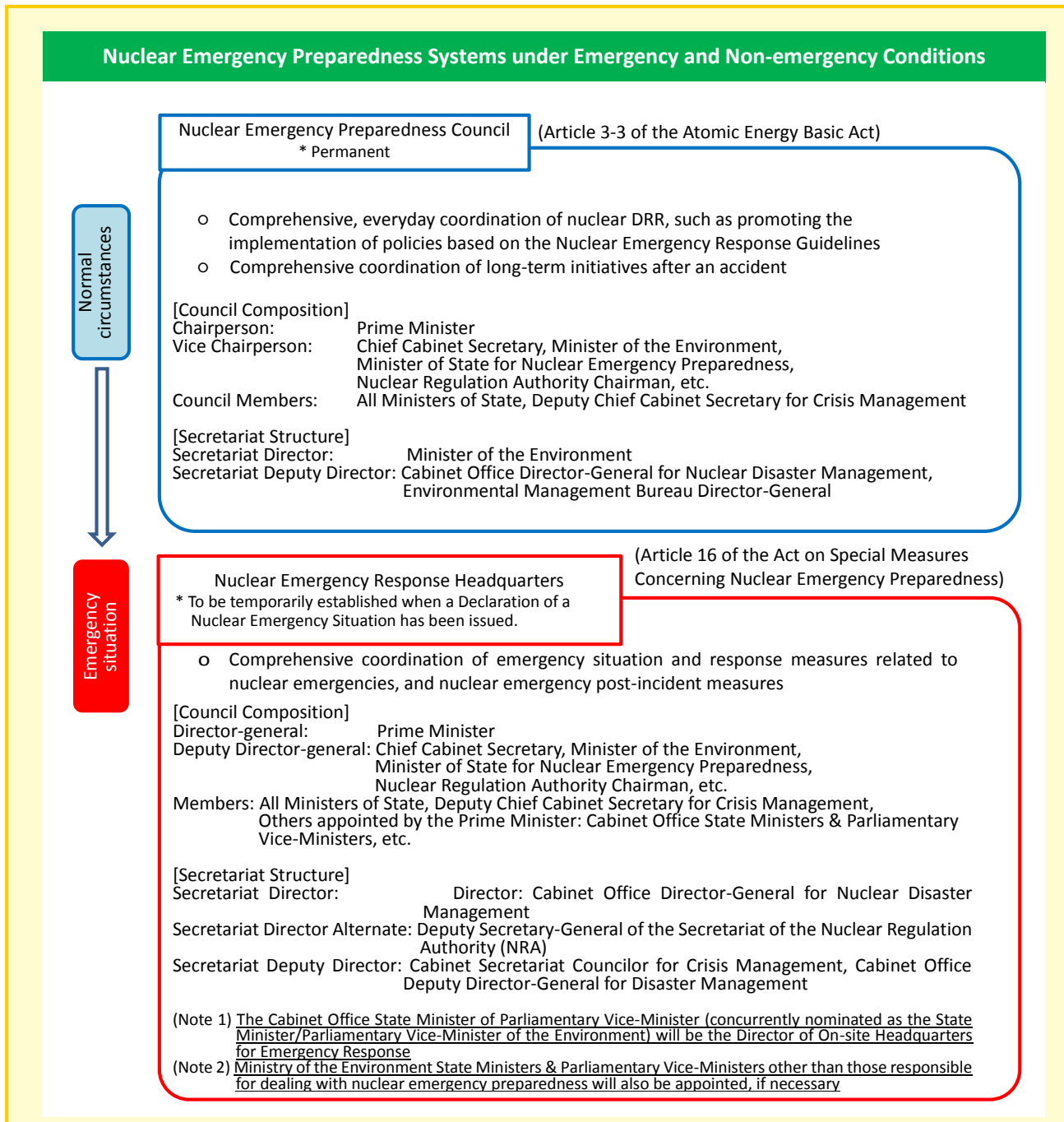
In the event of a nuclear emergency involving the release of a large quantity of radioactive material, a Nuclear Emergency Response Headquarters will be established. The main role of this headquarters will be to ascertain the actual situation on the field and the extent of the damage and to take overall charge of coordinating related national government organizations and local government bodies to ensure that emergency response measures suited to the situation are implemented swiftly and accurately. The Prime Minister will serve as Director-General of the Nuclear Emergency Response Headquarters, with the Chief Cabinet Secretary, Minister of the Environment, Cabinet Office Minister of State for Nuclear Emergency Preparedness, and the Chairman of the NRA as deputy directors-general, and all Ministers of State and the Deputy Chief Cabinet Secretary for Crisis Management, among others, serving as regular members (Fig. 1-1-1).

In the Headquarters, the NRA holds primary responsibility for decisions on technical and specialized matters (urgent area), while matters relating to the procurement of equipment and supplies required to deal with the nuclear facilities and all matters associated with the response outside the facilities (off-site) are handled by the related ministries and agencies, based on the directions of the director-general (the Prime Minister). The organization headed by the Cabinet Office Director-General for Nuclear Disaster Management that was launched on October 14, 2014, will serve as the Secretariat of the Nuclear Emergency Response Headquarters.

Moreover, the Basic Plan for Disaster Risk Reduction was revised in July 2015 to enhance the system for dealing with a complex disaster. This revision put in place a cooperation framework that will, in the event of a complex disaster, enable the Extreme Disaster Management Headquarters (which deals with natural disasters) and the Nuclear Emergency Response Headquarters (which deals with nuclear emergencies) to undertake integrated information gathering, decision-making, and direction and coordination (Figs. 1-2-1 and 1-2-2).

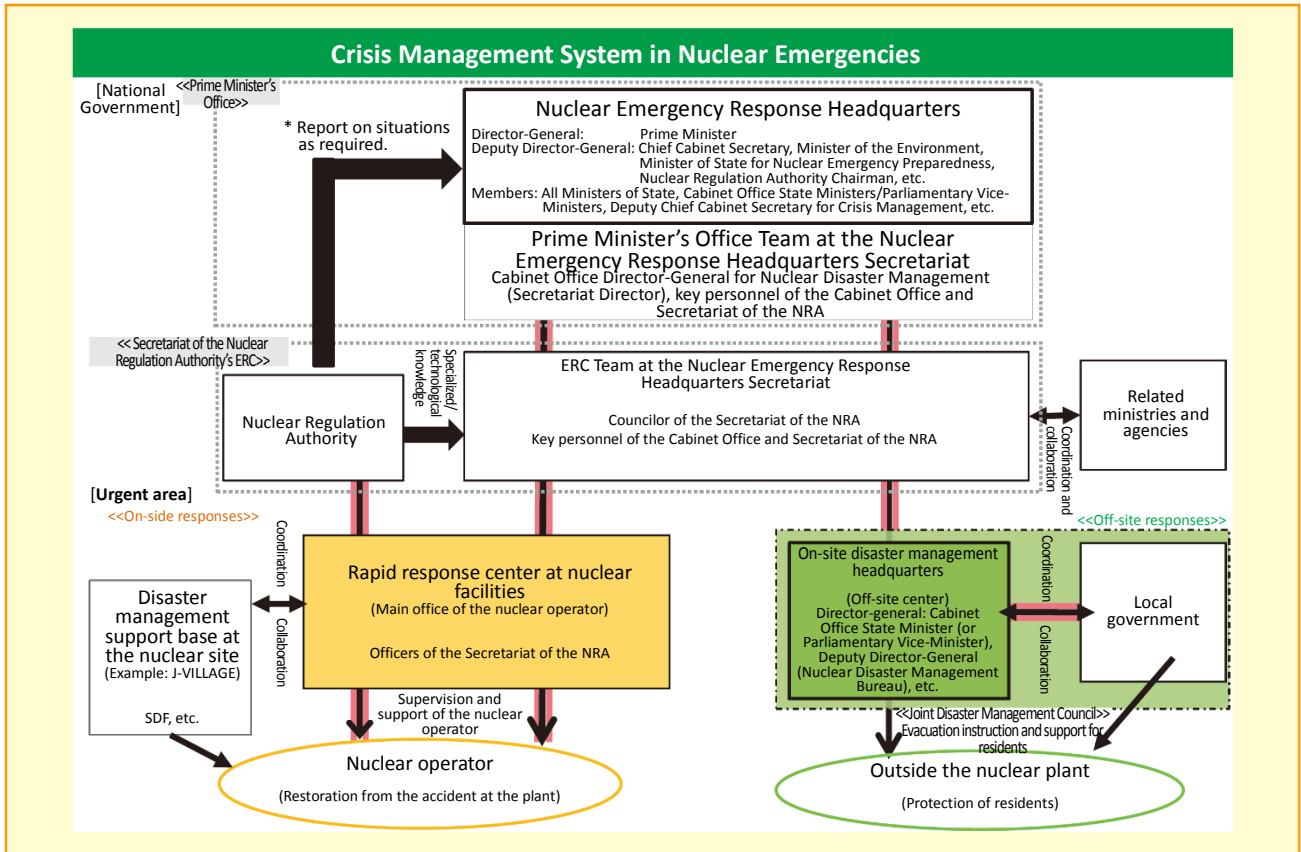
In addition, the 2017 Comprehensive Nuclear Emergency Response Exercise, which was held on September 3 and 4, 2017, was based on the scenario of a complex disaster involving an earthquake, tsunami and a nuclear disaster, and included decision making processes for the evacuation of residents in the progress of the situations, and actual activities.

Fig. 1-1-1 Nuclear Emergency Preparedness Systems under Emergency and Non-emergency Conditions



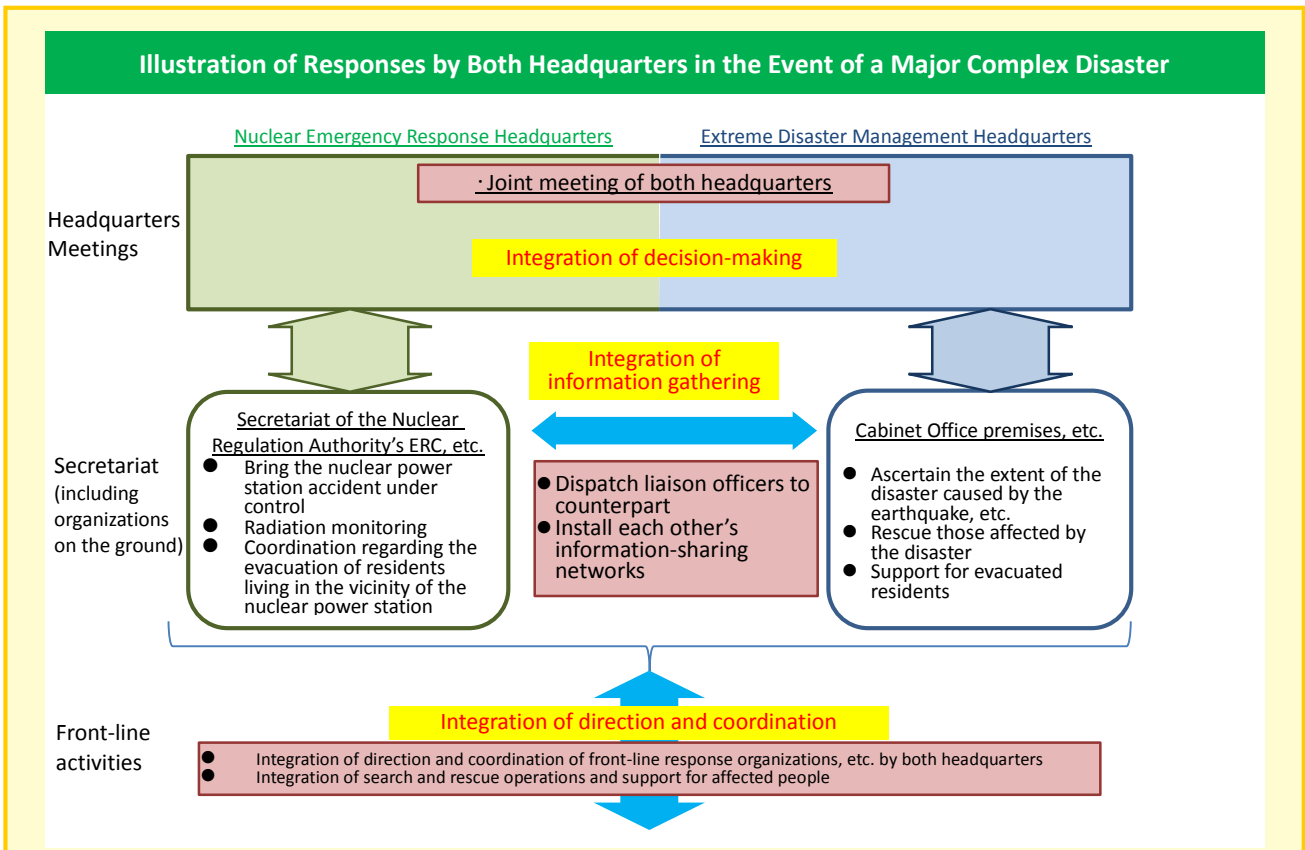
Source: Cabinet Office

Fig. 1-2-1 Crisis Management System in Nuclear Emergencies



Source: Cabinet Office

Fig. 1-2-2 Illustration of Responses by Both Headquarters in the Event of a Major Complex Disaster



Source: Cabinet Office

Section 2: Bolstering Nuclear Disaster Management and Radiation Monitoring Under the NRA

It is absolutely vital to implement ongoing initiatives to ensure trust in the administration of nuclear energy regulation, taking into account the lessons from the accident at Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Station.

The Nuclear Regulation Authority (NRA) is tackling various policy challenges, based on its guiding principles of independent decision making, effective actions, open and transparent organization, improvement and commitment, and emergency response, in order to fulfill its mission of protecting the general public and the environment through rigorous and reliable regulation for nuclear power.

2-1 Initiatives in Nuclear Disaster Management

The NRA strives to enhance the Nuclear Emergency Response Guidelines by actively incorporating the latest international knowledge, in order to ensure that the optimal judgment criteria are used in formulating disaster management plans at all times. It revised the Nuclear Emergency Response Guidelines concerning the nuclear fuel facilities, etc. on March 22, 2017. In relation to this revision, the Order for Enforcement of the Act on Special Measures Concerning Nuclear Emergency Preparedness was revised (announced and enforced) on July 7 that year regarding the requirements of the governors of the neighboring prefectures with whom consultation is required to formulate or change the Nuclear Operator Emergency Action Plan, and based on the revised provisions, an announcement to designate the related prefectures was enforced.

The revision of the Emergency Action Level (EALs) for commercial power reactor facilities and setting of EALs for nuclear fuel facilities, etc. were also discussed in three sessions of the Meeting concerning the Revision of Emergency Action Level and based on the results, the Nuclear Emergency Response Guidelines and relating regulations, etc. were revised on July 5, 2017, announced on August 1, and enforced on October 30. (Reference: <http://www.nsr.go.jp/disclosure/committee/kisei/00000250.html>)

Steady progress is being made in developing a medical care system for use in the event of a nuclear emergency, with support being provided to promote the designation of nuclear disaster base hospitals.

2-2 Emergency Response Initiatives

The NRA modified the NRA's Disaster Management Operational Plans and Initial Response Manual based on the revised Nuclear Emergency Response Guidelines, etc. as part of crisis management initiatives and also cooperated in the revision of the Manual for the Nuclear Disaster Countermeasures, thereby improving the platform for the NRA to respond effectively and accurately in the event of an emergency.

Continued from FY2016, the NRA participated in disaster management drills held by nuclear operators to improve its emergency response capabilities with a focus on such areas as approaches for effective sharing of information between the Secretariat of the NRA's Emergency Response Center (ERC) and rapid response centers at nuclear facilities.

In addition, the NRA estimated the need for continuous improvement of information sharing and difficulty levels and diversifications of scenarios based on the findings from evaluations of disaster management drills presented at the debriefing on disaster management drills held by nuclear operators in FY2017 and decided to make experimental evaluations of nuclear fuel facilities, etc. similar to those for commercial nuclear power reactor facilities from FY2017. It also strived to conduct experimental training by creating training scenarios to improve the ability of the leader to judge situations at the plant and the responses of the workers on site in an emergency and conducting drills based on these scenarios and evaluation and improvements to enhance flexible responses depending on the circumstances of the accident.

2-3 Emergency Radiation Monitoring Initiatives

To conduct effective emergency monitoring in accordance with the Nuclear Emergency Response Guidelines, the NRA installed equipment and supplied materials required for emergency monitoring centers at all nuclear power reactor facilities by FY2016 and also managed these centers as required in FY2017 to ensure normal functioning in the event of a nuclear disaster.

It also intends to improve the emergency monitoring systems by increasing the personnel in charge of radioactive monitoring at the Secretariat of the NRA.

2-4 Accidents and Problems

The Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material, and Reactors requires a licensee of nuclear energy activity, etc. to report accidents that occur at nuclear power facilities to the NRA, while the Act on Prevention of Radiation Hazards due to Radioisotopes, etc. requires that permission or notification users, etc. do the same. Of the reports received in FY2017, five came from licensee of nuclear energy activity, etc. and two from permission or notification users, etc.

Section 3: Enhancing and Strengthening Local Nuclear Emergency Preparedness Systems

3-1 Formulating and Supporting Local Plans for Disaster Risk Reduction / Evacuation Plans

Under the Basic Act on Disaster Management, local governments must prepare Local Plans for Disaster Risk Reduction with Nuclear Emergency Response Measures (hereinafter “Local Plans for Disaster Risk Reduction”) that set out the basic response to be adopted by prefectures and municipalities in dealing with a nuclear emergency.

Currently, related local governments within a radius of around 30km of a nuclear power plant are preparing Local Plans for Disaster Risk Reduction based on the Basic Plan for Disaster Risk Reduction and the Nuclear Emergency Response Guidelines (Fig. 3-1-1). Ensuring that the content of Local Plans for Disaster Risk Reduction is highly specific and effective is crucial, so the government provides proactive support regarding measures to tackle issues that are difficult for local governments alone to resolve in developing more specific Evacuation Plans and measures to assist persons requiring special care.

Fig. 3-1-1 Status of Local Plans for Disaster Risk Reduction / Evacuation Plans (as of March 31, 2018)

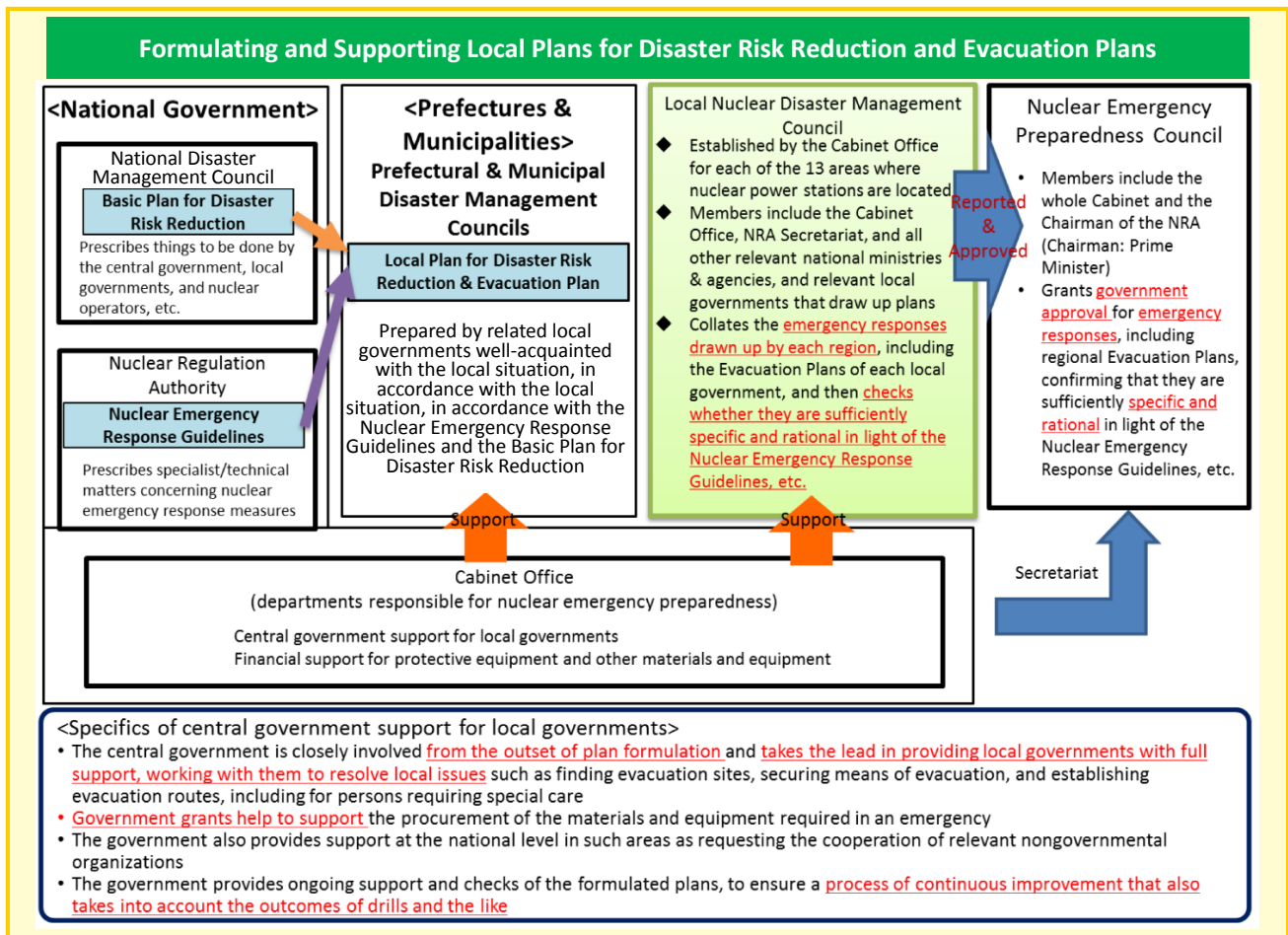
	Municipalities Concerned	Number of Local Plans for Disaster Risk Reduction Formulated	Number of Evacuation Plans Formulated	Remarks
Tomari region	13	13	13	
Higashidori region	5	5	5	
Onagawa region	7	7	7	
Fukushima region*	13	11	9	In December 2016, Fukushima Prefecture revised the Fukushima Prefecture Region-wide Evacuation Plan in Case of Nuclear Emergency.
Kashiwazaki-Kariwa region	9	9	9	
Tokai region	14	13	3	In March 2015, Ibaraki Prefecture formulated the Plan for Region-wide Evacuation in Ibaraki Prefecture in Case of a Nuclear Emergency.
Hamaoka region	11	11	4	In March 2017, Shizuoka Prefecture revised the Plan for Region-wide Evacuation in Case of a Nuclear Emergency in the Hamaoka region.
Shika region	9	9	9	
Fukui area	23	23	23	
Shimane region	6	6	6	
Ikata region	8	8	8	
Genkai region	8	8	8	
Sendai region	9	9	9	
Total for the 13 regions	135	132	113	
Note: * Readers should be aware that Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Station, which is a Specified Nuclear Facility, is located in the Fukushima region and that the area around it is an evacuation instruction area.				

Source: Cabinet Office

In March 2015, the Cabinet Office established Local Nuclear Disaster Management Councils (hereinafter “Management Councils”) to serve as working teams for resolving issues in areas where nuclear power plants are located. Its aim in doing so was to support efforts to flesh out and enhance the content of the Local Plans for Disaster Risk Reduction and Evacuation Plans formulated by prefectures and municipalities in accordance with “Future Responses to Enhancing Local Plans for Disaster Risk Reduction” (approved by the Nuclear Emergency Preparedness Council in September 2013). The Cabinet Office also established working groups reporting to these Management Councils. The working groups in each region are considering support and region-wide coordination in the formulation of Evacuation Plans, and the assistance provided by national frontline response organizations, while the national government and related local governments are working together to develop more specific, enhanced Local Plans for Disaster Risk Reduction and Evacuation Plans (Fig. 3-1-2).

Areas where more specific, enhanced Local Plans for Disaster Risk Reduction and Evacuation Plans have been developed must summarize their emergency response including evacuation plans and have it confirmed by the Management Councils, to ensure that it is specific and rational. The Cabinet Office then reports the councils' findings to the Nuclear Emergency Preparedness Council, to seek the Council's approval. A PDCA review cycle is introduced for regions whose emergency response has been confirmed: in addition to support for enhancing the emergency response and making it more specific, followed by confirmed of the emergency response (Plan), a drill is carried out by the Management Council based on the confirmed emergency response (Do), areas for improvement are identified from the outcomes of the drill (Confirm), and the emergency response of the region in question is improved on the basis of those areas for improvement (Action). Thus, the local nuclear emergency preparedness system goes through an ongoing process of enhancement and strengthening.

Fig. 3-1-2 Formulating and Supporting Local Plans for Disaster Risk Reduction and Evacuation Plans



Source: Cabinet Office

In FY2017, the Fukui Local Nuclear Disaster Management Council confirmed the Ohi Region Emergency Response (the 3rd meeting), with the Nuclear Emergency Preparedness Council approving the findings of the Council (Fig. 3-1-3). Earlier, the Fukui Local Nuclear Disaster Management Council revised the Takahama Region Emergency Response (the 2nd meeting). Also, the Tomari Local Nuclear Disaster Management Council revised the Tomari Region Emergency Response, and the Sendai Local Nuclear Disaster Management Council revised the Sendai Region Emergency Response (Fig. 3-1-4).

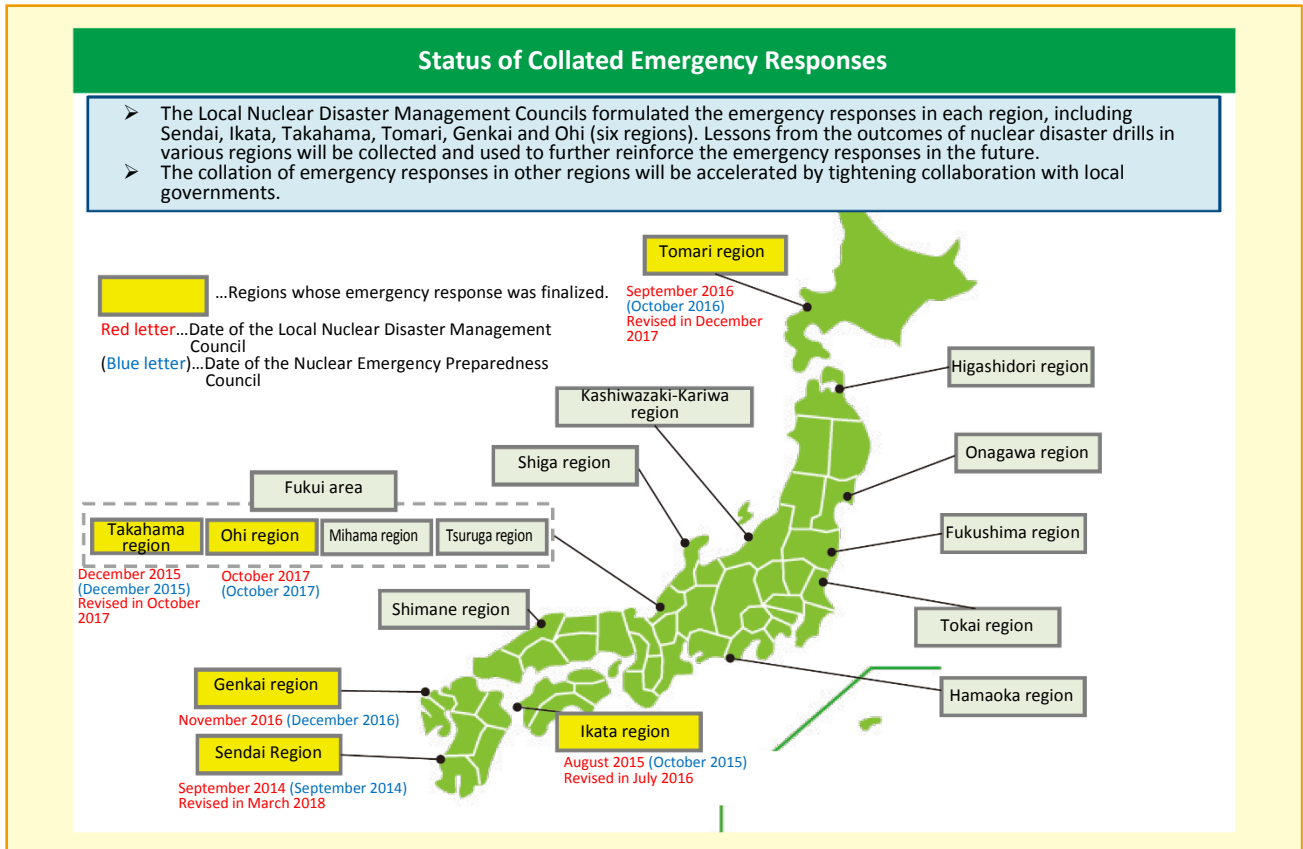
Fig. 3-1-3 List of Regions Whose Emergency Response Has Been Approved by the Nuclear Emergency Preparedness Council in FY2017

		Ohi region
Related Local Governments	Prefecture	Fukui Prefecture, Kyoto Prefecture, Shiga Prefecture, Gifu Prefecture, Union of Kansai Governments
	Municipality	Oi Town, Obama City, Takahama Town, Wakasa Town, Mihama Town, Maizuru City, Ayabe City, Nantan City, Kyotamba Town, Kyoto City, Takashima City
Nuclear Emergency Preparedness Council Date Held		October 27, 2017
Local Nuclear Disaster Management Council Date Held		October 25, 2017
Ohi Region Subcommittee Meetings Held		<ul style="list-style-type: none"> ○ FY2015 January 25 and February 15 ○ FY2016 April 18, June 23, October 6, November 2, December 22, February 1, March 1 and March 29 ○ FY2017 April 27, June 1, June 15 and September 14

*The representatives of related local governments participated as members of Local Nuclear Disaster Management Councils or observers

Source: Cabinet Office

Fig. 3-1-4 Status of Collated Emergency Response



Source: Cabinet Office

A subcommittee will be set up in each of the Tsuruga, Mihama, Ohi and Takahama regions in the Fukui area to discuss how best to solve issues specific to the each region.

(1) Ohi region

The Ohi Region Subcommittee, set up under the Working Group of the Fukui Local Nuclear Disaster Management Council, held 14 meetings from January 2016 to September 2017 to discuss the emergency response in the event of a nuclear disaster. The Ohi Region Emergency Response was put together at the October 25, 2017 meeting of the Fukui Local Nuclear Disaster Management Council.

(Reference: http://www8.cao.go.jp/genshiryoku_bousai/keikaku/02_fukui.html)

The three key points of the Ohi Region Emergency Response are as follows:

- (1) If the peninsula or intermediate and mountainous areas are isolated due to a natural disaster, the residents will be temporarily relocated by air or sea using contingent heliports or fishery harbors. Indoor sheltering facilities, including those equipped with radiation protection, will be used until preparations for evacuation are completed.
- (2) The residents in the PAZ (Precautionary Action Zone within a radius of around 5 km of the power plant, encompassing around 1,000 people) will have to evacuate immediately in the event of a General Emergency. Evacuation sites have been provided in two cities in Hyogo Prefecture as well as two cities in Fukui Prefecture in case evacuation within the prefecture is not possible. Three facilities equipped with radiation protection have been provided for those who may be at greater health risk and require assistance in the PAZ.
- (3) The residents in the UPZ (Urgent Protective Action Planning Zone within a radius of around 5 - 30 km from the power plant, encompassing around 158,000 people) will have to shelter indoors in the event of a General Emergency. Temporary relocation will be conducted within about a week for those living in areas where emergency monitoring shows the radiation dose above a certain level. Evacuation sites have been provided in 37 towns and cities in other prefectures in addition to those in 14 towns and cities in Fukui Prefecture in case that evacuation within the prefecture should not be possible.

The Ohi Region Emergency Response was formulated partly based on lessons from a drill jointly conducted by the national and related local governments in the Takahama region in August 2016. (For details of the drill, refer to the key points of the revision made to the Takahama Region Emergency Response described later.)

The governments of Fukui, Kyoto and Shiga Prefectures informed the Fukui Local Nuclear Disaster Management Council (the 3rd meeting) that they will continue to enhance nuclear emergency preparedness measures through regional drills. In addition, the national government stated that it will continue to provide support via the Fukui Local Nuclear Disaster Management Council, while four front-line response organizations -- the police, firefighters, Japan Coast Guard and Self Defenses Forces -- announced that they will provide support as required based on the needs and requests of related local governments in the event of unforeseen circumstances. Moreover, Kansai Electric Power Company stated that it will steadily address the matter that it should deal with as a nuclear operator, such as ensuring the availability of vehicles for people with disabilities, and the provision of personnel and instruments required for inspections of evacuation and relocation areas. Accordingly, the responses of Fukui, Kyoto and Shiga Prefectures, and of related ministries and agencies were deemed to be specific and confirmed to be sufficiently specific and rational in light of the Nuclear Emergency Response Guidelines, etc.

(2) Takahama region

In the Takahama region, the Fukui Local Nuclear Disaster Management Council finalized the Takahama Region Emergency Response in December 2015; the report confirming the final outcome was submitted to and approved by the Nuclear Emergency Preparedness Council in the same month. In August 2016, a drill was held jointly by the national and related local governments to verify the effectiveness of the response in an emergency. In light of the lessons from the drill, which was detailed in the February 2017 Report on the Findings from the Drill, the Fukui Local Nuclear Disaster Management Council revised the Takahama Region Emergency Response on October 25 that year to further flesh out and enhance the region's emergency response.

(Reference: http://www8.cao.go.jp/genshiryoku_bousai/keikaku/02_fukui.html)

The five key points of the revisions made to the Takahama Region Emergency Response are as follows:

- (1) Specific description of the response to a situation where sheltering indoors is difficult due to a complex disaster including an earthquake.
- (2) Specific description of how and when to deliver information to visitors, including tourists (visitors are recommended to return home during the alert phase).
- (3) Use of indoor sheltering facilities other than those equipped with radiation protection in case the peninsula is isolated due to a natural disaster.
- (4) Specific description of how to ensure the availability of vehicles for people with disabilities for temporary relocation in the UPZ.
- (5) Specific description of protective actions taken in the event of severe snowstorm or heavy snowfall.

The revision also included an increase in the number of facilities with radiation protection allowing residents to shelter indoors (five such facilities to be added), and improvement of measures to eliminate congestion and determine the evacuation status (guidance using images taken and transmitted by helicopters).

Fukui, Kyoto and Shiga Prefectures informed the Fukui Local Nuclear Disaster Management Council (the 2nd meeting) that, based on their awareness that developing nuclear emergency preparedness measures is an ongoing process without an end point, they will strive to further enhance evacuation measures by revising their region-wide evacuation plans and conducting exercises that take into account revisions to the emergency response. The national government expressed its intention to continue providing support via the Fukui Local Nuclear Disaster Management Council, while four front-line response organizations -- the police, firefighters, Japan Coast Guard and Self Defenses Forces -- announced that they will provide support as required in response to requests from local government in the event of unforeseen circumstances. Moreover, Kansai Electric Power Company stated that it will address the matter that it should deal with as a nuclear operator, such as ensuring the availability of vehicles for people with disabilities, and the provision of personnel and instruments required for inspections of evacuation and relocation areas. Accordingly, the responses were deemed to be further specific based on lessons from the drill conducted jointly by the national and related local governments in FY2016.

(3) Tomari region

In the Tomari region, the Tomari Local Nuclear Disaster Management Council finalized the Tomari Region Emergency Response in September 2016; the report confirming the final outcome was submitted to and approved by the Nuclear Emergency Preparedness Council in October that year. In November 2016 and February 2017, a National Comprehensive Nuclear Emergency Response Exercise was held to verify the effectiveness of the response in an emergency. In light of the lessons from the exercise, which were detailed in the May 2017 Report on the Findings from the Comprehensive Nuclear Emergency Response Exercise, the Tomari Local Nuclear Disaster Management Council revised the Tomari Region Emergency Response on December 21 that year to further flesh out and enhance the region's emergency response.

(Reference: http://www8.cao.go.jp/genshiryoku_bousai/keikaku/02_tomari.html)

The four key points in the revision made to the Tomari Region Emergency Response based on the above-mentioned exercise are as follows:

- (1) Clarification of protection measures in the event of a complex disaster, including a tsunami (tsunami evacuation prioritized when tsunami warnings are issued).
- (2) Specific description of the response to a situation where sheltering indoors is difficult due to a complex disaster including an earthquake.
- (3) Effective guidance for evacuation using buses.
- (4) Information sharing for safe and effective evacuation of residents.

The revision also extended to ensuring availability of vehicles for people with disabilities and reinforcing the emergency environmental radiation monitoring systems in the UPZ.

Hokkaido Prefecture informed that, based on its awareness that developing nuclear emergency preparedness measures is an ongoing process without an end point, it will enhance its emergency responses in collaboration with related municipalities and disaster management agencies. In addition, the national government expressed its intention to collaborate with local governments via the Tomari Local Nuclear Disaster Management Council for conducting disaster drills and enhancing emergency responses based on the outcomes of exercise. Accordingly, the emergency responses were deemed to be further specific based on lessons from the Comprehensive Nuclear Emergency Response Exercise in FY2016.

(4) Sendai region

In the Sendai region, a working team in the Sendai region finalized the Sendai Region Emergency Response in September 2014, and the report confirming the final outcome was submitted to and approved by the Nuclear Emergency Preparedness Council in the same month. On March 26, 2018, the Sendai Local Nuclear Disaster Management Council revised the Sendai Region Emergency Response to make emergency responses further specific and enhanced in light of lessons from nuclear emergency preparedness drills conducted by Kagoshima Prefecture to date. (Reference: http://www8.cao.go.jp/genshiryoku_bousai/keikaku/02_sendai.html)

The five key points in the revision made to the Sendai Region Emergency Response are as follows:

- (1) Specific description of the response to a situation where sheltering indoors is difficult due to a complex disaster including an earthquake.
- (2) Clarification of protection measures in the event of a complex disaster, including a typhoon (avoiding evacuation is prioritized, unless necessary and sheltering indoors when storm warnings are issued).
- (3) Specific description of how and when to deliver information to visitors, including tourists (visitors are recommended to return home during the alert phase).
- (4) Clarification of main evacuation routes in municipalities in the UPZ.
- (5) Clear indication of potential checkpoints along evacuation routes.

The revision also included an increase in evacuation routes from one location, facilities equipped with radiation protection for residents to shelter indoors (nine such facilities to be added), and clarification of protection measures such as evacuation from an isolated island (Koshiki Islands).

Kagoshima Prefecture informed the Sendai Local Nuclear Disaster Management Council that it would constantly review evacuation plans and disaster drills to ensure the safety and security of residents and collaborate with the related municipalities and disaster management agencies to enhance the disaster management responses. In addition, the national government expressed its intention to collaborate with the local government via the Sendai

Local Nuclear Disaster Management Council for conducting disaster drills and enhancing emergency responses based on the outcomes of exercise. Accordingly, the emergency response was deemed to be further specific and improved based on lessons from the Kagoshima Prefecture Nuclear Emergency Response Exercise.

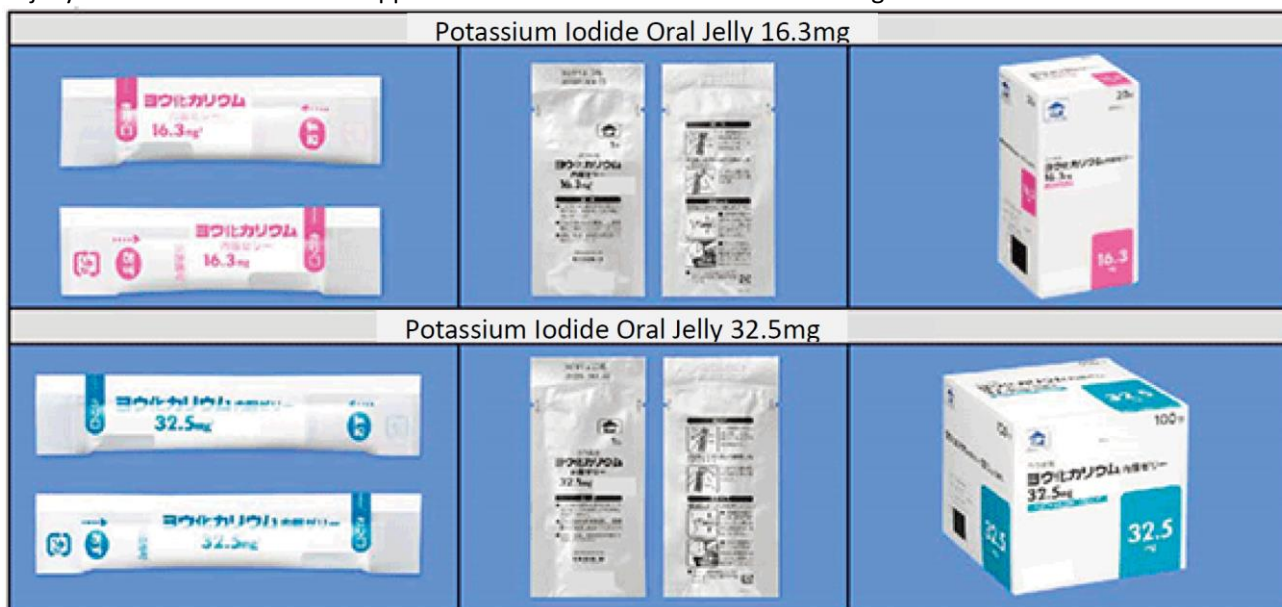
3-2 Support and Initiatives for Other Prefectures

(1) Stockpiling and Distribution of a Stable Iodine Agent in Jelly Form

Stable iodine agents in pill form are not suitable for infants and young children (aged under three) because their swallowing ability is not fully developed by that stage. In an emergency, a pharmacist or other trained person has to administer a powdered stable iodine agent dissolved in syrup, so agents suitable for such children cannot be distributed in advance, which is a major issue.

In March 2016, the manufacturer of the pills developed a prepackaged product consisting of the active ingredient (potassium iodide) dissolved in a jelly. Accordingly, local governments in the PAZ and UPZ have stockpiled stable iodine agents in jelly form and distributed them to residents in advance with financial support by the national government. These local governments have stockpiled stable iodine tablets for advance distribution to residents outside the UPZ since FY2016 and started stockpiling stable iodine agents in jelly form from FY2017.

The jelly form product was originally developed for infants, not for those who had deglutition disorder and could not take tablets. In FY2017, based on the expertise of pediatric doctors, the procedure of taking stable iodine agents in jelly form for those who are supposed to take tablets was notified to local governments.



[Usage and dosage]

Potassium iodide should be administered orally. The usual dosage is 100 mg/time for individuals aged 13 or over; 50 mg/time for children aged at least 3 but under 13; 32.5 mg/time for infants aged at least 1 month but under 3; and 16.3 mg for newborn infants.

Stable iodine agent in jelly form

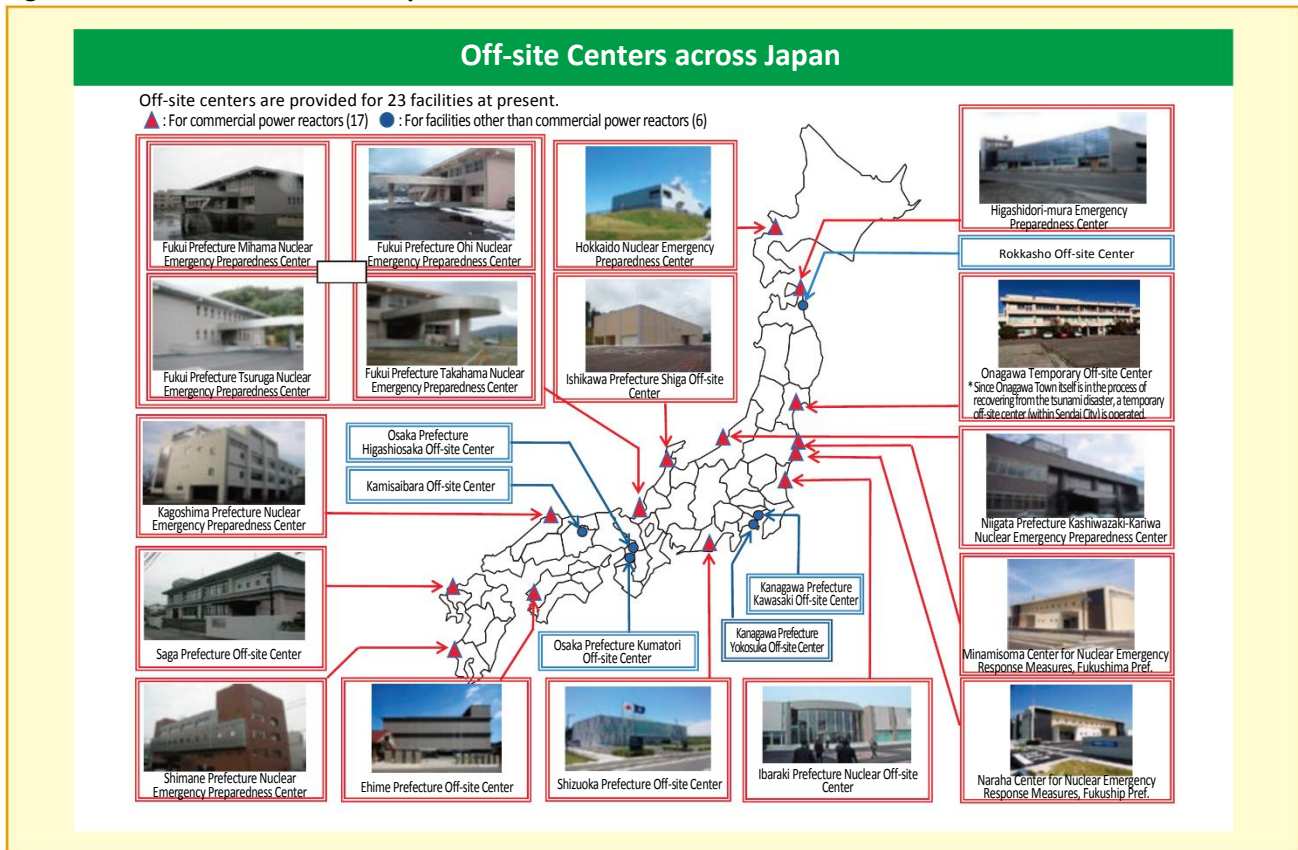
(2) Designation of Off-site Centers

Under Article 12 (1) of the Act on Special Measures Concerning Nuclear Emergency Preparedness, the Prime Minister is required to designate an emergency response base facility (known as “an off-site center”) for each nuclear site, for the coordination of emergency response measures (Fig. 3-2-1).

The requirements that off-site centers must satisfy are prescribed in the Cabinet Office Ordinance on Off-site Centers Pursuant to the Act on Special Measures Concerning Nuclear Emergency Preparedness. Based on the lessons from the accident at Fukushima Daiichi Nuclear Power Station, the siting requirements for the off-site centers of commercial power reactors were revised in September 2012 to be within a radius of 5 - 30 km from the power station in principle (i.e. within the Urgent Protective action planning Zone (UPZ)).

Since the former Onagawa Off-site Center had been damaged by tsunamis in the Great East Japan Earthquake, a Fire Academy in Sendai City had been designated as a temporary off-site center for the Onagawa region, but a new site was decided in Onagawa Town and construction of a new off-site center started in FY2017.

Fig. 3-2-1 Off-site Centers across Japan

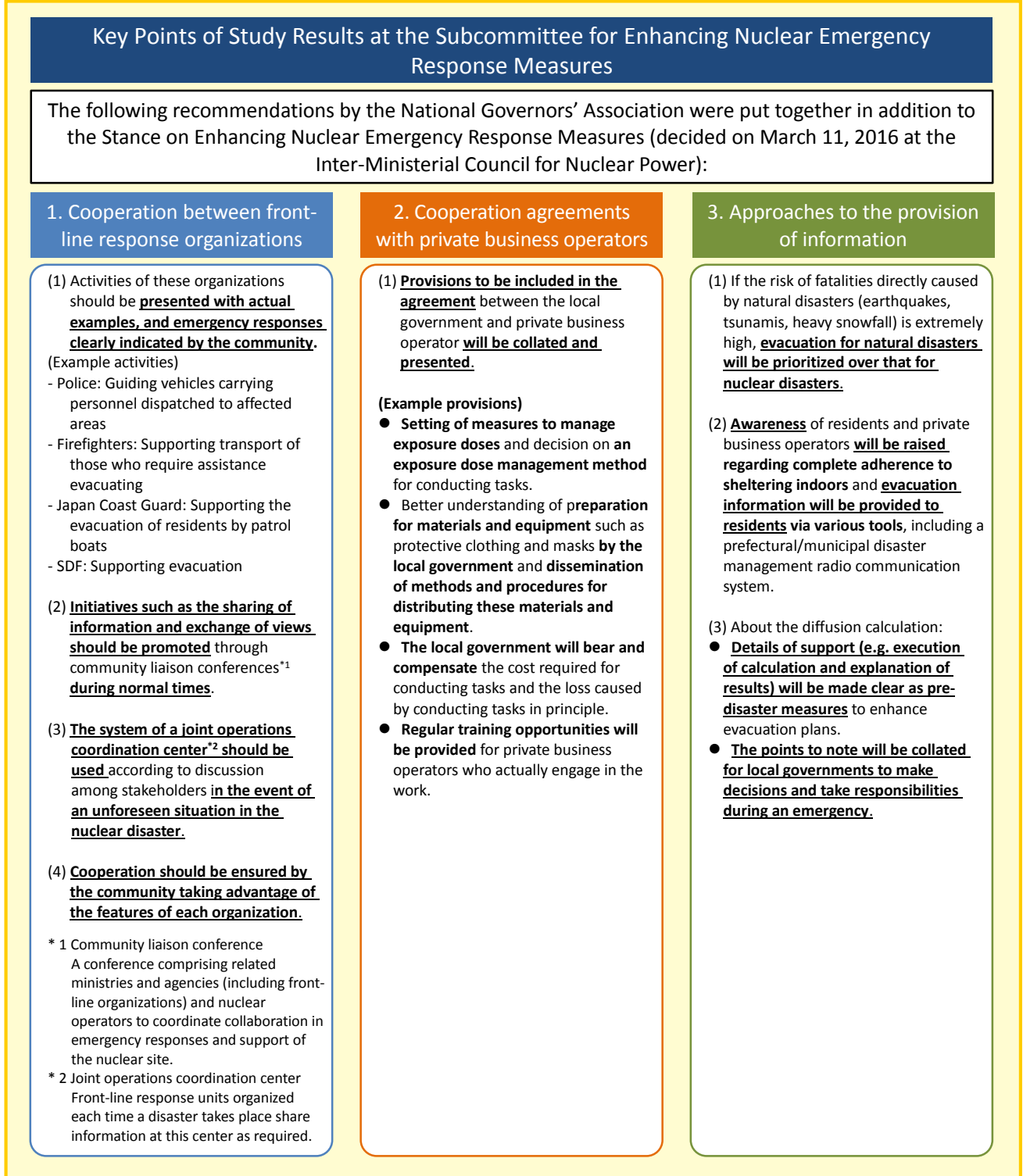


Source: Cabinet Office

(3) Enhancing Nuclear Emergency Response Measures

At a meeting of the Inter-Ministerial Council for Nuclear Power in March 2016, a document concerning nuclear energy policy, entitled the “Stance on Enhancing Nuclear Emergency Response Measures,” was put together at the request of the National Governors’ Association, in response to calls from local governments in charge of local disaster management. The Committee of Related Ministries and Agencies on Nuclear Emergency Response Measures was convened in April 2016 to facilitate a government-wide effort to enhance nuclear emergency response measures in light of this stance. At this meeting, committee members decided to establish subcommittees focused on three themes: cooperation between front-line response units (No. 1 Subcommittee), cooperation between private sector business operators (No. 2 Subcommittee), and approaches to the provision of information, including diffusion calculations (No. 3 Subcommittee). Each subcommittee was engaged in professional and practical deliberations that take into account the views of local governments while cooperating with related ministries and agencies. The outcomes were reported at the Inter-Ministerial Council for Nuclear Power, etc. (Fig. 3-2-2)

Fig. 3-2-2 Key Points of Study Results at the Subcommittee for Enhancing Nuclear Emergency Response Measures



Source: Cabinet Office

3-3 Disaster Management Drill and Training Initiatives by Local Governments and Nuclear Operators

(1) Support for Nuclear Emergency Preparedness Drills Conducted by Local Governments

Under the Basic Act on Disaster Management, etc., local governments are required to hold a nuclear emergency preparedness drill on a regular basis. Drills organized by related prefectural governments are carried out with the participation of prefectural governors and local governments, as well as national and regional front-line response organizations, namely the police, firefighters, the Japan Coast Guard, and the Self-Defense Forces. They include exercises in evacuating local citizens and conducting inspections when evacuating each area (Fig. 3-3-1).

In regions where the Local Plan for Disaster Risk Reduction and Evacuation Plan have been enhanced and made more specific, the Local Nuclear Disaster Management Council provides the necessary support in such areas as planning and implementing the drills, promoting the widespread use of evaluation methods, and operating the PDCA cycle via the drills, with the goal of verifying and enhancing the specificity and effectiveness of the Local Plans for Disaster Risk Reduction and Evacuation Plan.

The Cabinet Office formulated the Guidance for Planning, Implementing and Evaluating Emergency Preparedness Drills on March 20, 2018 as basic guidance for the prefectures which operate the entire drills from planning, implementation to evaluation.

(Reference: http://www8.cao.go.jp/genshiryoku_bousai/kunren/kunren.html)

Fig. 3-3-1 Nuclear Emergency Response Exercises Held by Local Governments in FY2017

Region	Name of Drill	Date
Tomari	Hokkaido Nuclear Emergency Response Exercise	February 5 and 8, 2018
Higashidori	Aomori Prefecture Nuclear Emergency Response Exercise	October 25 and 30, 2017
Onagawa	Miyagi Prefecture Nuclear Emergency Response Exercise	November 14 and 23, 2017
Fukushima	Fukushima Prefecture Nuclear Emergency Response Exercise	October 16 and 28, 2017
Shika	Ishikawa Prefecture Nuclear Emergency Response Exercise Toyama Prefecture Nuclear Emergency Response Exercise	November 26, 2017
Fukui	(i) Kyoto Prefecture Nuclear Emergency Response Exercise (ii) Shiga Prefecture Nuclear Emergency Response Exercise (iii) Gifu Prefecture Nuclear Emergency Response Exercise	(i) November 12, 2017 (ii) November 19, 2017 (iii) November 26, 2017
Hamaoka	Shizuoka Prefecture Nuclear Emergency Response Exercise	February 15 and 16, 2018
Shimane	Shimane Prefecture Nuclear Emergency Response Exercise Tottori Prefecture Nuclear Emergency Response Exercise	November 17 and 19, 2017
Ikata	Ehime Prefecture Nuclear Emergency Response Exercise Yamaguchi Prefecture Nuclear Emergency Response Exercise	November 14, 2017
Genkai	Saga Prefecture Nuclear Emergency Response Exercise Nagasaki Prefecture Nuclear Emergency Response Exercise Fukuoka Prefecture Nuclear Emergency Response Exercise	September 3 and 4, 2017
Sendai	Kagoshima Prefecture Nuclear Emergency Response Exercise	February 3, 2018

Source: Cabinet Office

(2) Training for Staff of Local Governments and Front-line Response Organizations

The Cabinet Office has organized training for disaster response personnel, basic training in nuclear emergency preparedness, training of key nuclear emergency response personnel, and tabletop exercises for Nuclear Emergency Response Headquarters. The objective of these initiatives was to provide local governments and other disaster response personnel with an understanding of approaches to protection measures in the Nuclear Emergency Response Guidelines and to improve their ability to respond in the event of a nuclear emergency.

(i) Training for disaster response personnel

Training is provided for disaster response personnel including the employees of private business operators who carry out activities to protect local citizens from radiation in the event of a nuclear emergency. As well as providing them with the basic knowledge required for radiation protection, this course teaches them about the basic approach to protecting citizens from radiation and the sequence of protective activities. These training sessions were held on 33 occasions in FY2017. The main topics covered in the training are as follows.

- Basic knowledge concerning radiation
- Handling of radiation meters and how to put on and take off protective clothing, etc.
- Basic approach to the protection of citizens in accordance with the Nuclear Emergency Response Guidelines, etc.

(ii) Basic training in nuclear emergency preparedness

Basic training in nuclear emergency preparedness is provided to key disaster response personnel at local governments who deal with nuclear emergency preparedness, to teach them the basic knowledge required for radiation protection. These training sessions were held on 45 occasions in FY2017. The main topics covered in the training are as follows.

- Basic knowledge concerning radiation
- Handling of radiation meters and how to put on and take off protective clothing, etc.

(iii) Training of key nuclear emergency response personnel

Training is provided to key disaster response personnel at local governments who deal with nuclear emergency preparedness, to teach them basic knowledge required for nuclear emergency management. The course covers legislation concerning nuclear emergency preparedness, the Nuclear Emergency Response Guidelines, and lessons from the accident at Fukushima Nuclear Power Station. These training sessions were held on 36 occasions in FY2017. The main topics covered in the training are as follows.

- Legislation concerning nuclear emergency preparedness
- Approaches to radiation protection in accordance with the Nuclear Emergency Response Guidelines
- Lessons from the accident at Fukushima Nuclear Power Station, etc.

(iv) Tabletop Exercises for Nuclear Emergency Response Headquarters

Tabletop Exercises for Nuclear Emergency Response Headquarters are organized for key disaster response personnel at local governments who deal with nuclear emergency preparedness, to provide them with the ability to respond in the event of an emergency and also to review and improve the Local Plans for Disaster Risk Reduction and Evacuation Plans formulated by local governments. These exercises were held on 10 occasions in FY2017. The main topics covered in the training are as follows.

- Activities at off-site centers (classroom learning and practical training)
- Exercises focused on challenges specific to each functional team
- Tabletop exercise based on scenarios, etc.



Lecture
(Basic knowledge concerning radiation)



Practical training
(How to put on and take off protective clothing, etc.)

3-4 Strengthening International Partnerships

International organizations such as the International Atomic Energy Agency (IAEA) and various countries undertake initiatives concerning off-site nuclear emergency preparedness. Such advanced knowledge is required to raise the standard of Japan's own nuclear emergency preparedness.

Accordingly, the government has sought to share its knowledge and experience of nuclear emergency preparedness with other countries by such means as strengthening cooperative frameworks with authorities responsible for nuclear emergency preparedness in other countries, conducting regular exchanges of opinions with them, and participating in multilateral exercises. In addition, Japan conducts surveys of the IAEA's standards regarding off-site nuclear emergency preparedness and the systems/management of major countries engaging in nuclear power generation.

(1) Cooperation Focused on Nuclear Emergency Preparedness Systems

(i) Cooperation with the U.S.

Japan is deepening its partnership with the U.S. in the area of nuclear emergency management systems via reciprocal invitations to exercises and regular exchanges of opinions with such bodies as the Department of Energy (DOE), the Federal Emergency Management Agency (FEMA), and the Nuclear Regulatory Commission (NRC), based on the U.S.-Japan Bilateral Commission on Civil Nuclear Cooperation framework established in 2012 under the Emergency Management Working Group (EMWG).

More specifically, in FY2017, Japan and the U.S. held four exchanges of opinions and issued two reciprocal invitations to exercises, etc. under this framework, exchanging opinions regarding such matters as both countries' experiences and lessons regarding the accident at Fukushima Daiichi Nuclear Power Station and other nuclear emergencies, as well as their on-site emergency organizations, and human resource development and training programs. First, in May 2017, Japan participated in a Japan-U.S. workshop held in California, the U.S. to exchange views for how to best make decision on protection measures in the event of a nuclear emergency. Then, in February 2018, Japan joined a Japan-U.S. workshop for an airplane monitoring system released in Nevada, the U.S. to exchange views for the operation of the system.

In September 2017, Japan invited officials from the U.S. to observe the Comprehensive Nuclear Emergency Response Exercise held to verify systems for responding to a nuclear emergency at Kyushu Electric Power Company's Genkai Nuclear Power Station. After the exercise, representatives of the two countries held an exchange of views.

With the aims of strengthening international cooperation between Japan and the U.S., then Cabinet Office Minister of State for Nuclear Emergency Preparedness Tadahiko Ito visited FEMA, the NRC, and the DOE in May that year, where he exchanged views with representatives of those organizations concerning the division of responsibilities among ministries, agencies and local governments in the event of a nuclear disaster, and methods of providing information to residents and decision makers.



Inspection of an airplane monitoring system

(ii) Other international cooperation

Japan has also engaged in exchanges of opinions with and issued reciprocal invitations to observe exercises to international organizations such as the IAEA and the Nuclear Energy Agency of the Organization for Economic Co-operation and Development (OECD/NEA), as well as countries including the UK, France, China, the Republic of Korea, and Taiwan.

In September 2017, Japan invited 17 representatives of international organizations and nuclear emergency preparedness organizations in various countries to observe the Comprehensive Nuclear Emergency Response Exercise held to verify systems for responding to a nuclear emergency at Kyushu Electric Power Company's Genkai Nuclear Power Station. Members of the delegations spent three days in the area, where they observed the evacuation of residents and the Declaration of a Nuclear Emergency Situation from Prime Minister.

(2) Surveys of International Standards, etc.

December 2015 saw the first meeting of the IAEA's new Emergency Preparedness and Response Standards Committee (EPReSC), which has been held on a regular basis since then to examine the IAEA's standards regarding off-site nuclear emergency preparedness and the systems/management of major countries engaging in nuclear power generation. Japan attended the meeting (the 4th meeting from June 6 to 8, 2017 and the 5th meeting from November 7 to 9, 2017), and participated in discussions with experts from the IAEA and other member countries.

Section 4: 2017 Comprehensive Nuclear Emergency Response Exercise

4-1 Overview of Exercise

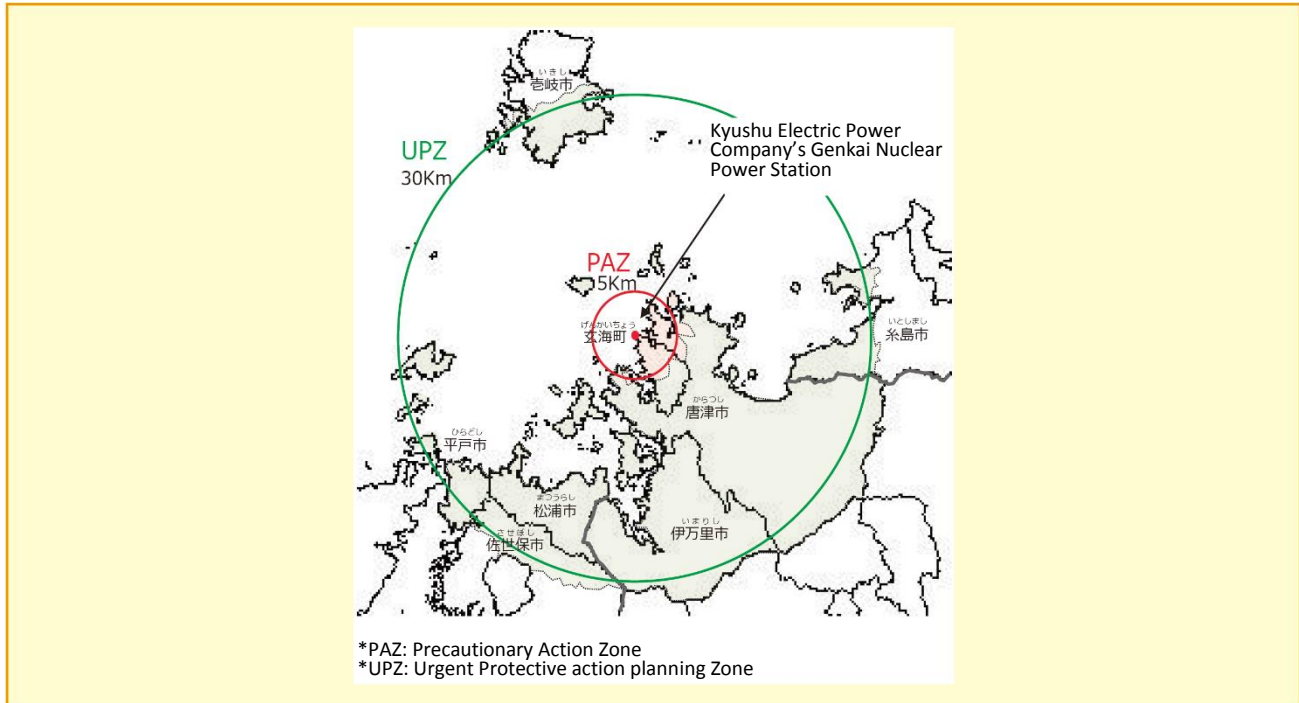
(1) Positioning and Objectives

The Comprehensive Nuclear Emergency Response Exercise is a joint exercise involving the national government, local governments, and nuclear operators, in accordance with the Act on Special Measures Concerning Nuclear Emergency Preparedness. Based on the scenario of a nuclear emergency, it aims to verify systems for responding to such an emergency. The 2017 Comprehensive Nuclear Emergency Response Exercise was held at the Genkai region with the objectives as listed below. (Reference: http://www8.cao.go.jp/genshiryoku_bousai/kunren/h29sg.html)

- To confirm the effectiveness of the disaster preparedness systems of the national government, local governments, and nuclear operators, and the cooperative frameworks of related organizations
- To confirm national and local systems and procedures specified in manuals for responding to a nuclear emergency

- To verify the Evacuation Plan based on the Genkai Region Emergency Response (Fig. 4-1-1)
- To identify lessons from the outcomes of the exercise and improve emergency responses
- To enhance the skills of key personnel involved in nuclear emergency response measures and promote public understanding of nuclear emergency preparedness

Fig. 4-1-1 Genkai Region Priority Zones for Nuclear Emergency Response



Source: Cabinet Office

(2) Timing and Power Plant

The exercise was held on September 3 and 4, 2017 at Genkai Nuclear Power Station.

(3) Participants, etc.

(Number of participating organizations: approximately 367; number of participants, including local citizens: approximately 7,000)

- Governmental organizations: Cabinet Secretariat, Cabinet Office, NRA, and other related ministries and agencies
- Local governments: Saga Prefecture, Nagasaki Prefecture, Fukuoka Prefecture, Genkai Town, Karatsu City, six cities within the UPZ and related cities and towns
- Nuclear operator: Kyushu Electric Power Co., Inc.
 - Related organizations: National Institutes for Quantum and Radiological Science and Technology, Japan Atomic Energy Agency, etc.

(4) Accident Scenario

In this scenario, an earthquake with a hypocenter located at the northern part of Saga Prefecture causes the leakage of reactor coolant and subsequently escalates into a General Emergency due to the loss of function in the reactor water injection system, resulting in the release of radioactive material.

(5) Content of Exercise

This exercise was held with the aim of further improving the effectiveness of the Evacuation Plan based on the Genkai Region Emergency Response. It involved decision-making and operational drills relating to the evacuation of residents, tailored to the escalation of the situation in a complex disaster scenario based on an earthquake, high waves and nuclear emergency.

4-2 Overview of Performance

(1) Exercise in Rapid Establishment of an Initial Response System

The national government, local governments, and nuclear operator mobilized key personnel to set up an initial response system at their respective operational bases following an earthquake and gathered information about the status of the natural disaster and the power station. In addition, they used teleconferencing and other systems to strengthen communication between related organizations and prepare for an escalation of the situation.



Key personnel gather information (Off-site Center)

(2) Exercise in Making Decisions Concerning the Evacuation Policies, etc. Based on Collaboration between National and Local Bodies

Following an escalation of the situation, the Prime Minister's Office and the other bases worked together to formulate and decide on protection measures, including the evacuation of local citizens. At the Prime Minister's Office, the Prime Minister carried out a Declaration of a Nuclear Emergency Situation in response to the General Emergency, and held the meeting of the Nuclear Emergency Response Headquarters. During this meeting, the members of the meeting confirmed initiatives relating to protection measures, including the evacuation of local citizens, and approved the government's basic guidelines on emergency response measures.



Prime Minister carrying out a Declaration of a Nuclear Emergency Situation
(the NRA's Emergency Response Center)

Note) The exercise at the Prime Minister's Office was conducted with partial changes in the site and participants in FY2017 to prioritize the situation in North Korea. The Declaration of a Nuclear Emergency Situation and meeting of the Nuclear Emergency Response Headquarters, usually conducted at the Prime Minister's Office, were performed at the NRA's Emergency Response Center, and the Cabinet Office Minister of State for Nuclear Emergency Preparedness Masaharu Nakagawa acted as a substitute for the Prime Minister Abe.

(3) Field training exercise including evacuation of residents

Following the site area emergency and general emergency, evacuation sites were arranged and transportation means provided for residents within the areas where protection measures similar to those for the PAZ and PAZ are taken based on the extent of the damage caused by earthquakes and high waves, and residents who cannot evacuate by sea due to high waves evacuation indoors after having taken stable iodine agents. As the scenario envisaged radioactive releases, residents of the UPZ sheltering (evacuation indoors) and stable iodine agents were urgently distributed. This was followed by temporary relocation and inspections when evacuating each area. For each evacuation, video footage transmitted by Japan Ground Self-Defense Forces and Fukuoka Prefectural Police helicopters was used to gain an understanding of the situation on the ground.



Evacuation by sea (Karatsu City)



Distribution of stable iodine agents (Sasebo City)

4-3 Post-exercise Initiatives

Following the 2017 Comprehensive Nuclear Emergency Response Exercise, areas for improvement were identified from views expressed by experts and responses to a questionnaire distributed to local citizens who participated in the drill. These are summarized in the Report on the Findings from the 2017 Comprehensive Nuclear Emergency Response Exercise in March 2018 (Reference: http://www8.cao.go.jp/genshiryoku_bousai/kunren/h29sg.html). Going forward, the Genkai Local Nuclear Disaster Management Council will make improvements to the Genkai Region Emergency Response and various manuals, following deliberations informed by the lessons and response guidelines described in this report. Moreover, the government will seek to further enhance the methods used for conducting the Comprehensive Nuclear Emergency Response Exercise, as well as the menu of scenarios and exercises, constantly reviewing the exercise to make it more realistic.

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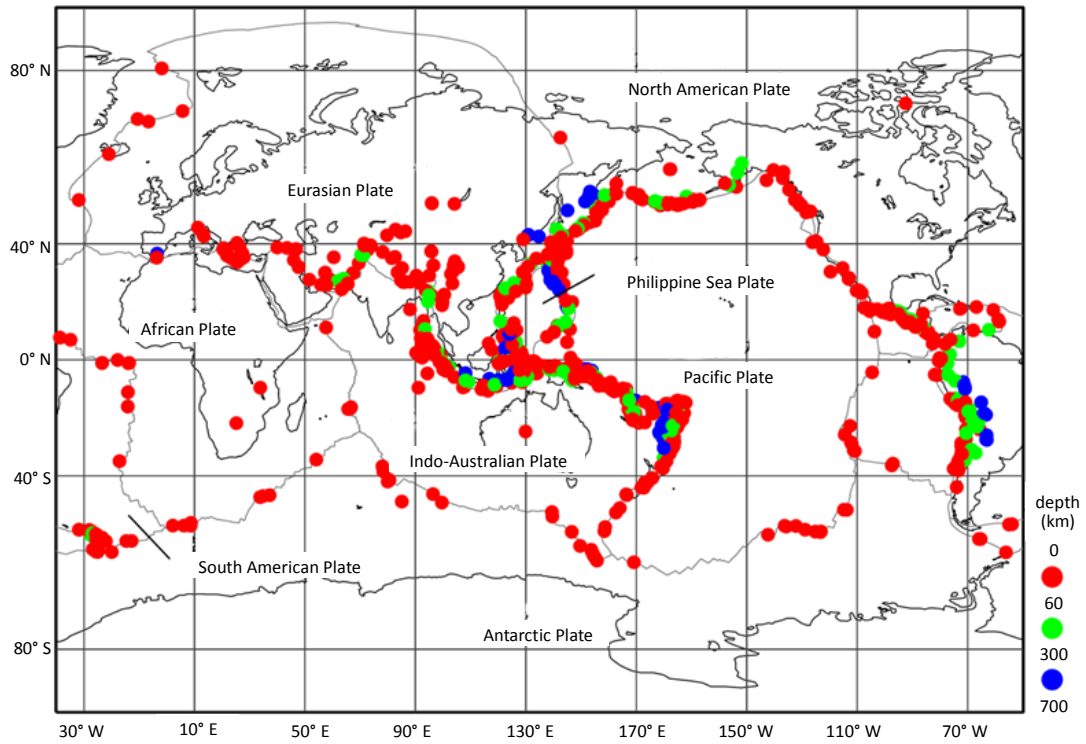
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1. Overview of Japan's National Land

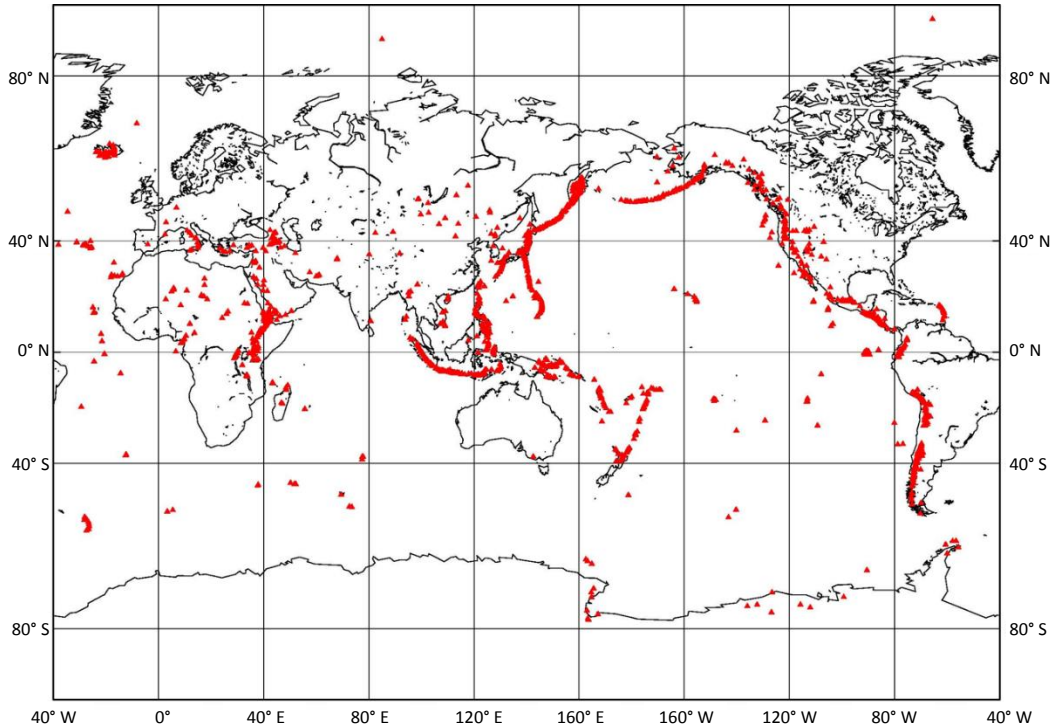
Fig. A-1 Worldwide Hypocenter Distribution (for Magnitude 6 and Higher Earthquakes) and Plate Boundaries



Note: 2008–2017

Source: Formulated by the Japan Meteorological Agency based on earthquake data from the U.S. Geological Survey

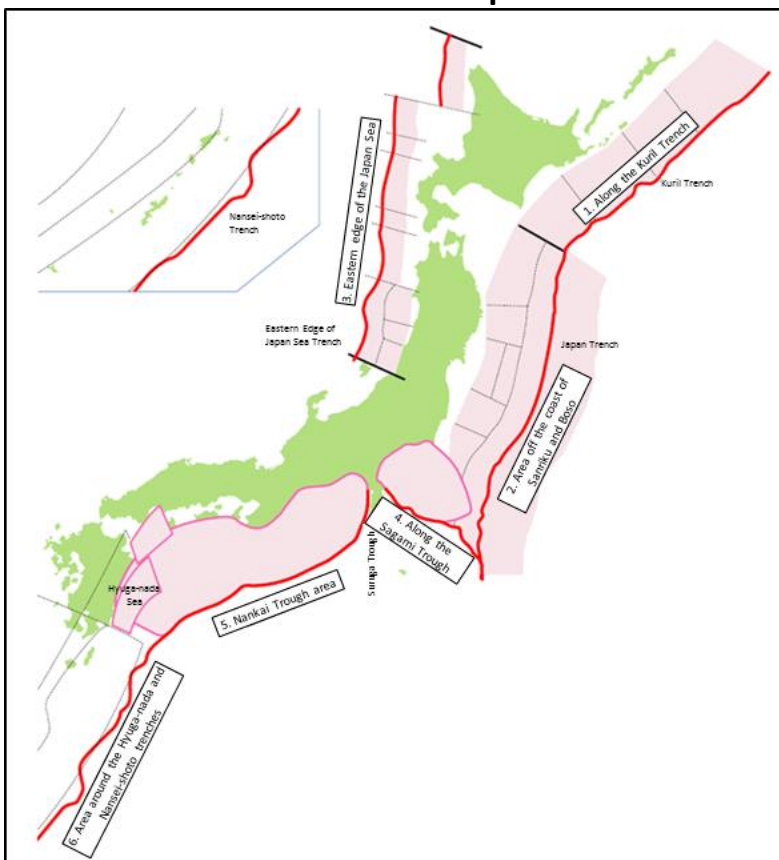
Fig. A-2 Distribution of Volcanoes Worldwide



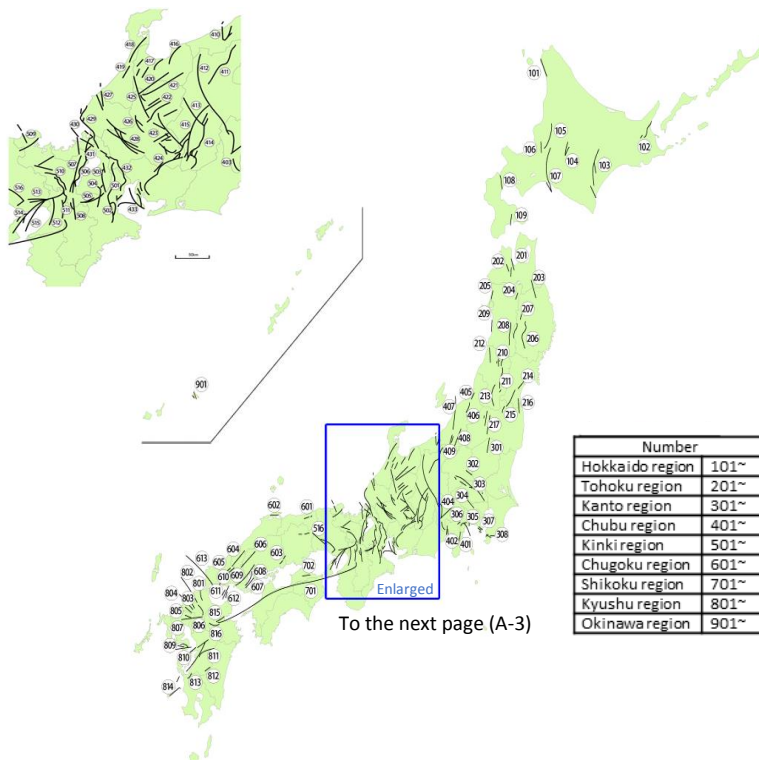
Source: Japan Meteorological Agency

Fig. A-3 Subduction Zone Earthquake Areas and Major Active Faults in Japan

Subduction Zone Earthquake Areas



Major Active Faults

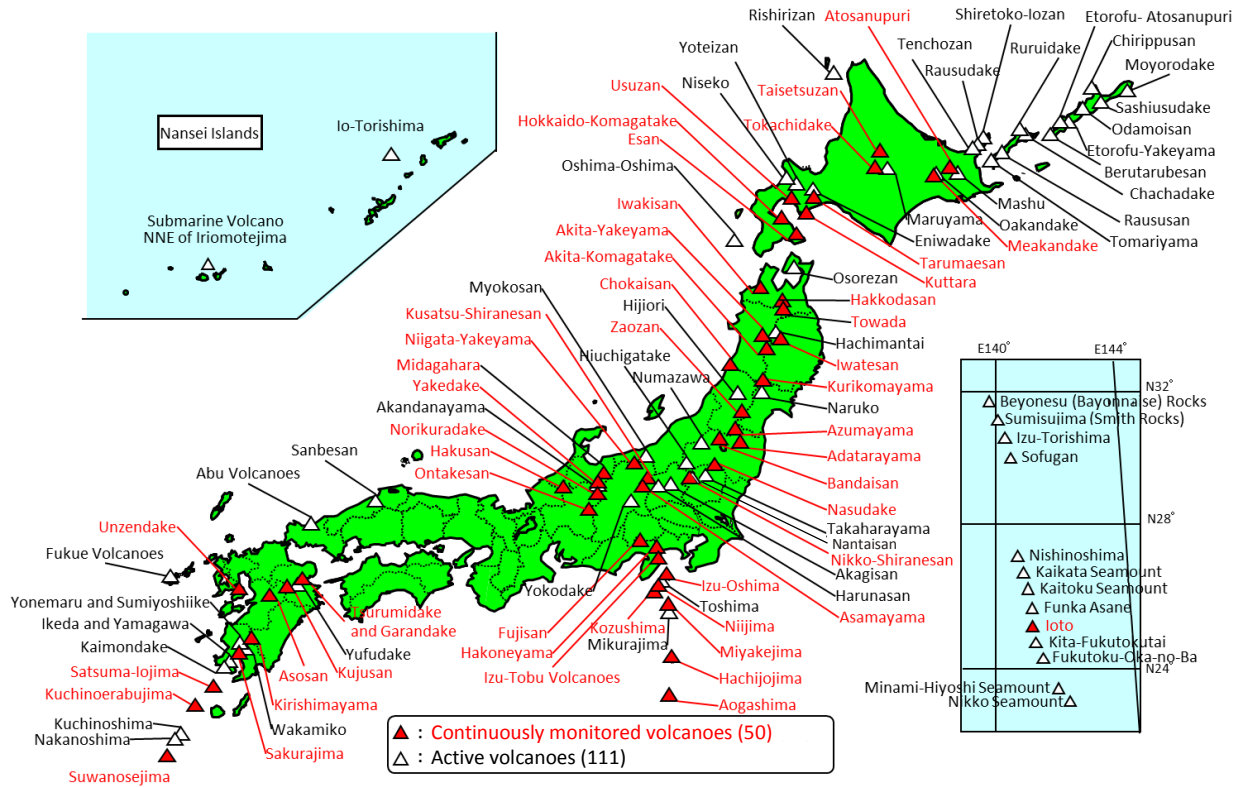


Source: Ministry of Education, Culture, Sports, Science and Technology

No.	Name of Fault	No.	Name of Fault
101	Sarobetsu fault zone	424	Byoubuyama Enasan fault zone & Sanageyama fault zone
102	Shibetsu fault zone	425	Shokawa fault zone
103	Tokachi-heiya fault zone	426	Nagaragawa-joryu fault zone
104	Furano fault zone	427	Fukui-heiya-toen fault zone
105	Mashike-sanchi-toen fault zone · Numata-Sunagawa fault zone	428	Noubi fault zone
106	Toubetsu fault	429	Yanagase Sekigahara fault zone
107	Ishikari-teichi-toen fault zone	430	Nosaka Shufukuji fault zone
108	Kuromatsunai-teichi fault zone	431	Kohoku-sanchi fault zone
109	Hakodate-teiya-seien fault zone	432	Yoro-Kuwana-Yokkaichi
201	Aomori-wan-seigan fault zone	433	Isewan fault zone
202	Tsugaru-sanchi-seien fault zone	501	Suzuka-toen fault zone
203	Oritsume fault	502	Nunobiki-sanchi-toen fault zone
204	Hanawa-higashi fault zone	503	Suzuka-seien fault zone
205	Noshiro fault zone	504	Tongu fault
206	Kitakami-teichi-seien fault zone	505	Kizugawa fault zone
207	Shizukuishi-bonchi-seien - Mahiru-sanchi-toen fault zone	506	Biwako-seigan fault zone
208	Yokote-bonchi-toen fault zone	507	Mikata Hanaore fault zone
209	Kitayuri fault	508	Southern fault zone of Kyoto-bonchi-Nara-bonchi (Nara-bonchi-toen fault zone)
210	Shinjo-bonchi fault zone	509	Yamada fault zone
211	Yamagata-bonchi fault zone	510	Mitoke Kyoto Nishiyama fault zone
212	Shonai-heiya-toen fault zone	511	Ikoma fault zone
213	Nagai-bonchi-seien fault zone	512	Uemachi fault zone
214	Nagamachi-Rifu Line fault zone	513	Arima-Takatsuki fault zone
215	Fukushima-bonchi-seien fault zone	514	Rokko Awajishima fault zone
216	Futaba fault	515	Osaka-wan fault zone
217	Aizu-bonchi-seien-toen fault zone	516	Yamasaki fault zone
301	Sekiya fault	601	Shikano-Yoshioka fault
302	Okubo fault	602	Shinji (Kashima) fault
303	Fukaya Fault Zone and the Ayasegawa Fault (Kanto-heiya hokuseien fault zone and Motoarakawa fault zone)	603	Chojagahara-Yoshii fault
304	Tachikawa fault zone	604	Yasaka fault
305	Isehara fault	605	Jifuku fault
306	Shiozawa fault zone, Hirayama-Matsuda-kita fault zone and Kouzu-Matsuda fault zone (Kannawa Kouzu-Matsuda fault zone)	606	Tsutsuga fault
307	Miura-hanto fault group	607	Hiroshima-wan-Iwakuni-oki fault zone
308	Kamogawa-teichi fault zone	608	Akinada fault zone
401	Kitaizu fault zone	609	Iwakuni-Itsukaichi fault zone
402	Fujikawa-kako fault zone	610	Oharako fault
403	Minobu fault	611	Ogori fault
404	Sone-kyuryo fault zone	612	Suounada fault zone
405	Kushigata-sanmyaku fault zone	613	Kikugawa fault zone
406	Tsukioka fault zone	701	Chuo-kozosen fault zone (Kongo-sanchi-toen – Iyonada)
407	Nagaoka-heiya-seien fault zone	702	Nagao fault zone
408	Muikamachi fault zone	801	Fukuchiyama fault zone
409	Tokamachi fault zone	802	Nishiyama fault zone
410	Takada-heiya fault zone	803	Umi fault
411	Nagano-bonchi-seien fault zone (Shinanogawa fault zone)	804	Kego fault zone
412	Itoigawa-Shizuoka-kozosen fault zone	805	Hinata-toge-Okasagi-toge fault zone
413	Sakaitoge Kamiya fault zone	806	Minoh fault zone
414	Inadani fault zone	807	Saga-heiya-hokuen fault zone
415	Kiso-sanmyaku-seien fault zone	809	Unzen fault group
416	Uozu fault zone	810	Futagawa-Hinagu fault zone
417	Tonami-heiya fault zone · Kurehayama fault zone	811	Midorikawa fault zone
418	Ouchigata fault zone	812	Hitoyoshi-bonchi-nanen fault
419	Morimoto Togashi fault zone	813	Izumi fault zone
420	Ushikubi fault zone	814	Koshiki fault zone
421	Atotsugawa fault zone	815	Hijiu fault zone
422	Takayama Oppara fault zone	816	Haneyama – Kuenohirayama fault zone
423	Atera fault zone	901	Miyakojima fault zone

Source: Ministry of Education, Culture, Sports, Science and Technology

Fig. A-4 Distribution of Active Volcanoes in Japan



Source: Formulated by the Cabinet Office from the Japan Meteorological Agency website (As of March 2018)

2. Disasters in Japan

Fig. A-5 Major Earthquake Damage in Japan (Since the Meiji Period)

Disaster		Date	Number of Fatalities and Missing Persons
Nobi Earthquake	(M8.0)	October 28, 1891	7,273
Meiji Sanriku Earthquake and Tsunami	(M8.25)	June 15, 1896	Approx. 22,000
Great Kanto Earthquake	(M7.9)	September 1, 1923	Approx. 105,000
1927 Kita Tango Earthquake	(M7.3)	March 7, 1927	2,925
Showa Sanriku Earthquake Tsunami	(M8.1)	March 3, 1933	3,064
1943 Tottori Earthquake	(M7.2)	September 10, 1943	1,083
Tonankai Earthquake	(M7.9)	December 7, 1944	1,251
Mikawa Earthquake	(M6.8)	January 13, 1945	2,306
Nankai Earthquake	(M8.0)	December 21, 1946	1,443
Fukui Earthquake	(M7.1)	June 28, 1948	3,769
Tokachi-oki Earthquake	(M8.2)	March 4, 1952	33
1960 Chile Earthquake and Tsunami	* (Mw9.5)	May 23, 1960	142
1964 Niigata Earthquake	(M7.5)	June 16, 1964	26
1968 Tokachi-oki Earthquake	(M7.9)	May 16, 1968	52
1974 Izu-hanto-oki Earthquake	(M6.9)	May 9, 1974	30
1978 Izu-Oshima-kinkai Earthquake	(M7.0)	January 14, 1978	25
1978 Miyagi-ken-oki Earthquake	(M7.4)	June 12, 1978	28
Nihon-kai-chubu Earthquake	(M7.7)	May 26, 1983	104
Nagano-ken-seibu Earthquake	(M6.8)	September 14, 1984	29
Hokkaido-nansei-oki Earthquake	(M7.8)	July 12, 1993	230
Great Hanshin-Awaji Earthquake	(M7.3)	January 17, 1995	6,437
Mid Niigata Prefecture Earthquake	(M6.8)	October 23, 2004	68
Iwate–Miyagi Nairiku Earthquake	(M7.2)	June 14, 2008	23
Great East Japan Earthquake	* (Mw9.0)	March 11, 2011	22,119
The 2016 Kumamoto Earthquake	(M6.5)	April 14, 2016	267
	(M7.3)	April 16	

*Mw: Moment magnitude

Notes:

1. The earthquakes listed before World War II are those with more than 1,000 fatalities and missing persons, while the earthquakes listed after World War II are those with more than 20 fatalities and missing persons.
2. The number of fatalities and missing persons from the Great Kanto Earthquake are based on the revised Chronological Scientific Table (2006), which changed the number from approximately 142,000 to approximately 105,000.
3. The number of fatalities and missing persons from the Southern Hyogo Prefecture Earthquake (Great Hanshin-Awaji Earthquake) is the current figure as of December 22, 2005. The number of fatalities directly caused by structures collapsing, fire, and other factors caused by seismic shaking on the day of the earthquake, excluding so-called "related deaths," is 5,515.
4. The number of fatalities (including disaster-related fatalities) and missing persons from the 2011 Tohoku Earthquake and Tsunami (Great East Japan Earthquake) is the current figure as of March 1, 2018.
5. The details given for the 2016 Kumamoto Earthquake is the current figure as of April 13, 2018 (including disaster-related fatalities).

Source: Chronological Scientific Tables, Fire and Disaster Management Agency materials, National Police Agency materials, Comprehensive List of Destructive Earthquakes in Japan, Extreme Disaster Management Headquarters materials, Major Disaster Management Headquarters materials

Fig. A-6 Major Natural Disaster in Japan Since 1945

Date	Disaster	Main Affected Areas	Number of Dead and Missing
January 13, 1945	Mikawa Earthquake (M6.8)	Southern Aichi	2,306
September 17-18, 1945	Typhoon Makurazaki	Western Japan (Especially in Hiroshima)	3,756
December 21, 1946	Nankai Earthquake (M8.0)	Various Places in West of Chubu	1,443
August 14, 1947	Mt. Asama Eruption	Around Mt. Asama	11
September 14-15, 1947	Typhoon Kathleen	North of Tokai	1,930
June 28, 1948	Fukui Earthquake (M7.1)	Around the Fukui Plains	3,769
September 15-17, 1948	Typhoon lone	From Shikoku into Tohoku (Especially in Iwate)	838
September 2-4, 1950	Typhoon Jane	North of Shikoku (Especially in Osaka)	539
October 13-15, 1951	Typhoon Ruth	Nationwide (Especially in Yamaguchi)	943
March 4, 1952	Tokachi-oki Earthquake (M8.2)	Southern Hokkaido, Northern Tohoku	33
June 25-29, 1953	Heavy Rains	Kyushu, Shikoku, Chugoku (Especially Kitakyushu)	1,013
July 16-24, 1953	Torrential Rains	West of Tohoku (Especially in Wakayama)	1,124
May 8-12, 1954	Storm Disaster	Northern Japan, Kinki	670
September 25-27, 1954	Typhoon Toyamaru	Nationwide (Especially in Hokkaido and Shikoku)	1,761
July 25-28, 1957	Torrential Rains	Kyushu (Especially around Isahaya)	722
June 24, 1958	Mt. Aso Eruption	Around Mt. Aso	12
September 26-28, 1958	Typhoon Kanogawa	East of Kinki (Especially in Shizuoka)	1,269
September 26-27, 1959	Typhoon Ise-wan	Nationwide (Except for Kyushu, especially in Aichi)	5,098
May 23, 1960	Chile Earthquake Tsunami	Southern Coast of Hokkaido, Sanriku Coast, Shima Coast	142
January 1963	Heavy snowfall	Hokuriku, Sanin, Yamagata, Shiga, Gifu	231
June 16, 1964	Niigata Earthquake (M7.5)	Niigata, Akita, Yamagata	26
September 10-18, 1965	Typhoons 23, 24, 25	Nationwide (Especially in Tokushima, Hyogo, Fukui)	181
September 23-25, 1966	Typhoons 24, 26	Chubu, Kanto, Tohoku (Especially in Shizuoka, Yamanashi)	317
July to August 1967	Torrential Rains	West of Chubu, Southern Tohoku	256
May 16, 1968	Tokachi-oki Earthquake (M7.9)	Southern Hokkaido and Tohoku Area centering around Aomori	52
July 3-15, 1972	Typhoons 6, 7, 9 and Torrential Rains	Nationwide (Especially in Kitakyushu, Shimane, Hiroshima)	447
May 9, 1974	Izu-hanto-oki Earthquake (M6.9)	Southern Tip of Izu-hanto	30
September 8-14, 1976	Typhoon 17 and Torrential Rains	Nationwide (Especially in Kagawa, Okayama)	171
January 1977	Snow Disasters	Tohoku, Northern Kinki, Hokuriku	101
August 7, 1977- October 1978	Mt. Usu Eruption	Hokkaido	3
January 14, 1978	Izu-Oshima-kinkai Earthquake (M7.0)	Izu-hanto	25
June 12, 1978	Miyagi-ken-oki Earthquake (M7.4)	Miyagi	28
October 17-20, 1979	Typhoon 20	Nationwide (Especially Tokai, Kanto, Tohoku)	115
December 1980 - March 1981	Snow Disasters	Tohoku, Hokuriku	152
July to August 1982	Torrential Rains and Typhoon 10	Nationwide (Especially in Nagasaki, Kumamoto, Mie)	439
May 26, 1983	Nihon-kai-chubu Earthquake (M7.7)	Akita, Aomori	104
July 20-29, 1983	Torrential Rains	East of Sanin (Especially in Shimane)	117
October 3, 1983	Miyake Is. Eruption	Around Miyake-jima Island	—
December 1983 - March 1984	Snow Disasters	Tohoku, Hokuriku (Especially in Niigata, Toyama)	131
September 14, 1984	Nagano-ken-seibu Earthquake (M6.8)	Western Nagano	29
November 15 - December 18, 1986	Izu-Oshima Eruption	Izu Oshima Island	—
November 17, 1990 – June 3, 1995	Mr. Unzen Eruption	Nagasaki	44
July 12, 1993	Hokkaido-nansei-oki Earthquake (M7.8)	Hokkaido	230
July 31 - August7, 1993	Torrential Rains	Nationwide	79
January 17, 1995	1995 Southern Hyogo Prefecture Earthquake (Great Hanshin-Awaji Earthquake) (M7.3)	Hyogo	6,437
March 31, 2000 - June 28, 2001	Mt. Usu Eruption	Hokkaido	—
June 25, 2001 - March 31, 2005	Miyake Is. Eruption and Niijima and Kozushima Is. Earthquake (M6.5)	Tokyo	1
October 20-21, 2004	Typhoon 23	Nationwide	98
October 23, 2004	Mid Niigata Prefecture Earthquake (M6.8)	Niigata	68
December 2005 - March 2006	Heavy Snowfall	Japan Sea Coast centering around Hokuriku Area	152
July 16, 2007	Niigataken Chuetsu-oki Earthquake (M6.8)	Niigata	15
June 14, 2008	Iwate-Miyagi Nairiku Earthquake (M7.2)	Tohoku (Especially in Miyagi, Iwate)	23
November 2010 - March 2011	Heavy Snowfall from November 2010	From Northern Japan through into West Japan on the Japan Sea Coast	131
March 11, 2011	2011 Tohoku Earthquake and Tsunami (Great East Japan Earthquake) (Mw9.0)	Eastern Japan (Especially in Miyagi, Iwate, Fukushima)	22,199
August 30 - September 5, 2011	Typhoon 12	Kinki, Shikoku	98
November 2011 - March 2012	Heavy Snowfall in 2011	From Northern Japan through into West Japan on the Japan Sea Coast	133
November 2012 - March 2013	Heavy Snowfall fin 2012	From Northern Japan through into West Japan on the Japan Sea Coast	104
November 2013 - May 2014	Heavy Snowfall in 2013	From Northern Japan through into Kanto-Koshinetsu Area (Especially in Yamanashi)	95
August 20, 2014	Torrential Rains of August 2014 (Hiroshima Sediment Disaster)	Hiroshima	77
September 27, 2014	2014 Eruption of Mt. Ontake	Nagano, Gifu	63
April 14 and 16, 2014	The 2016 Kumamoto Earthquake (M7.3)	Kyushu Area	267

Notes:

1. The disasters listed resulted in fatalities and missing persons as follows: 500 or more for storm and flood disasters, 100 or more for snow disasters, and 10 or more for earthquakes, tsunamis, and volcanic eruptions. It also includes disasters for which governmental Major Disaster Management Headquarters were established based on the Basic Act on Disaster Management.
2. The number of fatalities and missing persons for the 1995 Southern Hyogo Prefecture Earthquake (Great Hanshin-Awaji Earthquake) is the current figure as of December 22, 2005. The number of fatalities directly caused by structures collapsing, fire, and other factors caused by seismic shaking on the day of the earthquake, excluding so-called "related deaths," is 5,515.
3. The numbers of fatalities from the Miyake Is. Eruption and Niijima and Kozushima Is. Earthquake are from the earthquake of July 1, 2000.
4. The number of fatalities (including disaster-related fatalities) and missing persons resulting from the 2011 Tohoku Earthquake and Tsunami (Great East Japan Earthquake) is the current figure as of March 1, 2018.
5. The details given for the 2016 Kumamoto Earthquake show the toll as of April 13, 2018 (including disaster-related fatalities).

Source: Formulated by the Cabinet Office based on the meteorological almanac of Japan, Chronological Scientific Tables, National Police Agency materials, Fire and Disaster Management Agency materials, Extreme Disaster Management Headquarters materials, Major Disaster Management Headquarters materials, and Hyogo Prefecture materials

Fig. A-7 Major Natural Disasters in Japan in Recent Years

Date	Disaster	Main Affected Areas	Number of Dead and Missing
March 24, 2001	Geiyo Earthquake (M6.7)	Hiroshima, Ehime, Yamaguchi	2
April 3, 2001	Earthquake (M5.3) epicentered in central Shizuoka	Shizuoka	0
July 11-13, 2001	Heavy rains in northern Kyushu Region	Fukuoka, Saga, Kumamoto, Nagasaki, Yamaguchi	0
August 20-23, 2001	Typhoon 11	Nationwide centering around Western Japan	7
September 6-13, 2001	Typhoon 16	Okinawa, Western Japan	0
September 8-12, 2001	Typhoon 15	Nationwide centering around Eastern Japan	8
July 9-11, 2002	Typhoon 6	Nationwide centering around Tohoku	7
July 13-16, 2002	Typhoon 7	Nationwide centering around Kagoshima	0
October 1-2, 2002	Typhoon 21	Hokkaido, Tohoku, Kanto, Chubu	4
May 26, 2003	Earthquake (M7.1) epicentered off coast of Miyagi Prefecture	Tohoku	0
July 18-21, 2003	Torrential rains from seasonal rain front	Kyushu	23
July 26, 2003	Earthquake (M6.4) epicentered in northern Miyagi Prefecture	Miyagi	0
August 7-10, 2003	Typhoon 10	Nationwide centering around Hokkaido	19
September 11-14, 2003	Typhoon 14	Nationwide centering around Okinawa	3
September 26, 2003	Tokachi-oki Earthquake (M8.0)	Hokkaido	2
July 12-13, 2004	Torrential rains in Niigata and Fukushima in July 2004	Niigata, Fukushima	16
July 17-18, 2004	Torrential rains in Fukui in July 2004	Fukui	5
July 29 - August 6, 2004	Heavy rains from and related to Typhoons 10 and 11	Chugoku, Shikoku	3
August 17-20, 2004	Heavy rains from and related to Typhoon 15	Tohoku, Shikoku	10
August 27-31, 2004	Typhoon 16	Nationwide centering around Western Japan	17
September 5, 2004	Earthquakes (M7.1, M7.4) epicentered off coast of Kii Peninsula/off the coast of Tokaido	Aichi, Mie, Wakayama	0
September 4-8, 2004	Typhoon 18	Nationwide centering around Chugoku	46
September 26-30, 2004	Typhoon 21	Nationwide centering around Western Japan	27
October 8-10, 2004	Typhoon 22	East Japan on the Pacific Ocean side	9
October 18-21, 2004	Typhoon 23	Nationwide centering around Kinki and Shikoku	98
October 23, 2004	2004 Mid Niigata Prefecture Earthquake (M6.8)	Niigata	68
December 2004- March 2005	Snow disasters	Hokkaido, Tohoku, and Hokuriku Regions	88
March 20, 2005	Fukuoka-ken-Seihou-oki Earthquake (M7.0)	Fukuoka	1
June 27 - July 25, 2005	Heavy rains due to the seasonal rain front	From the southern Tohoku Region to the Kyushu Region	12
July 23, 2005	Earthquake (M6.0) epicentered in northwestern Chiba Prefecture	Tokyo, Saitama, Kanagawa and Chiba	0
August 16, 2005	Earthquake (M7.2) epicentered off coast of Miyagi Prefecture	Tohoku Region	0
August 25-26, 2005	Typhoon 11	Kanto and Tokai Regions	0
September 4-8, 2005	Typhoon 14	Nationwide centering around Chugoku, Shikoku, and Kyushu Regions	29
December 2005- March 2006	Heavy snowfall in 2006	Japan Sea side centering around Hokuriku Region	152
June 10 - July 29, 2006	Torrential rains due to seasonal rain front	Kanto, Chubu, Kinki, Chugoku, Kyushu Regions	33
September 15-20, 2006	Typhoon 13	Chugoku and Kyushu Regions	10
November 7, 2006	Tornado in town of Saroma	Hokkaido (Saroma-cho)	9
March 25 2007	Noto Hanto Earthquake (M6.9) of 2007	Ishikawa	1
April 15, 2007	Earthquake (M5.4) epicentered in central Mie Prefecture	Mie	0
July 5-17, 2007	Heavy rains from Typhoon 4 and seasonal rain front	Chubu, Shikoku and Kyushu Regions	7
July 16, 2007	2007 Niigataken Chuetsu-oki Earthquake (M6.8)	Niigata	15
August 2-4, 2007	Typhoon 5	Kyushu Region	0
September 6-8, 2007	Typhoon 9	Tohoku, Kanto and Chubu Regions	3
September 13-18, 2007	Heavy rains from Typhoon 11 and rain front	Tohoku Region	4
October 1, 2007	Earthquake (M4.9) epicentered is western Kanagawa Prefecture	Kanagawa	0
February 23-24, 2008	Damage from low-pressure system	Hokkaido, Tohoku and Chubu Regions	3
June 14, 2008	Iwate-Miyagi Nairiku Earthquake (M7.2) of 2008	Tohoku Region (Especially Miyagi and Iwate)	23
July 24, 2008	Earthquake (M6.8) epicentered on northern coast of Iwate Prefecture	Hokkaido and Tohoku Regions	1
July 28-29, 2008	Damage from heavy rains	Hokuriku and Kinki Regions (Especially Hyogo)	6
August 26-31, 2008	Torrential rains at the end of August 2008	Tohoku, Kanto, Tokai and Chugoku Regions (Especially Aichi)	2
July 21-26, 2009	Torrential rains in Chugoku and northern Kyushu Regions in July 2009	Chugoku and Kyushu Regions (Especially Yamaguchi and Fukuoka)	36
August 10-11, 2009	2009 Typhoon 9	Kinki and Shikoku Regions (Especially Hyogo)	27
August 11, 2009	Earthquake (M6.5) epicentered in Suruga Bay	Tokai Region	1
October 7-8, 2009	2009 Typhoon 18	Tohoku, Kanto, Chubu and Kinki Regions	5
February 28, 2010	Tsunami from an earthquake epicentered on central Chilean coast	Tohoku, Kanto, Tokai, Kinki and Shikoku Regions	0
June 11 - July 19, 2010	Heavy rains due to 2010 seasonal rain front	Nationwide centering around Chugoku and Kyushu Regions	22
October 18-30, 2010	Heavy rains in Amami region of Kagoshima Prefecture	Kagoshima (Amami)	3
November 2010- March 2011	Heavy snowfall in 2010	Hokkaido, Tohoku and Hokuriku Regions	131

Date	Disaster	Main Affected Areas	Number of Dead and Missing
January 26, 2011 -	Mt. Kirishima (Shinmoedake) Eruption	Miyazaki and Kagoshima	0
March 11, 2011	2011 Tohoku Earthquake and Tsunami (Great East Japan Earthquake) (Mw9.0)	Eastern Japan (Especially in Miyagi, Iwate, Fukushima)	22,199
July 19-24, 2011	2011 Typhoon 6	Kanto, Tokai, Kinki and Shikoku Regions	3
July 28-30, 2011	Torrential rains in Niigata and Fukushima in July 2011	Tohoku and Hokuriku Regions (Especially Niigata and Fukushima)	6
August 30 – September 5, 2011	2011 Typhoon 12	Kanto, Tokai, Kinki, Chugoku and Shikoku Regions	98
September 15-22, 2011	2011 Typhoon 15	Nationwide	20
November 2011- March 2012	Heavy snowfall in 2011	Hokkaido, Tohoku and Hokuriku Regions	133
May 6, 2012	Wind gusts occurring in May 2012	Kanto Region (Especially Ibaraki and Tochigi)	3
June 18-20, 2012	2012 Typhoon 4	Nationwide	1
July 2-9, 2012	Heavy rains from July 3, 2012	Nationwide centering around Kyushu and Okinawa Regions	2
July 11-14, 2012	Heavy rains from July 11, 2012	Nationwide centering around northern Kyushu Region	33
August 13-15, 2012	Heavy rains from August 13, 2012	Kinki and Chubu Regions	3
September 15-19, 2012	2012 Typhoon 16	Nationwide	0
September 28 - October 1, 2012	2012 Typhoon 17	Chubu, Kinki, Kyushu and Okinawa Regions	1
November 2012- March 2013	Heavy snowfall in 2012	Hokkaido, Tohoku and Hokuriku Regions	104
April 6-9, 2013	Low-pressure system from April 6, 2013	Nationwide	1
June 8 - August 9, 2013	Heavy rains in the 2013 rainy season	Tohoku and Chugoku Regions	17
August 23-28, 2013	Heavy rains from August 23, 2013	Nationwide centering around Chugoku Region	2
September 2 & 4, 2013	Tornados on September 2 and 4, 2013	Kanto Region	0
September 15-16, 2013	2013 Typhoon 18	From Northern Japan to Western Japan on the Japan Sea side (especially Kinki)	6
October 15-16, 2013			
October 24-26, 2013	2013 Typhoon 26 & 27	From Eastern Japan to Western Japan on the Pacific Ocean side (especially Kanto)	45
November 2013- March 2014	Heavy snowfall in 2013	Tohoku and Kanto-Koshinetsu Regions	95
July 6-11, 2014	2014 Typhoon 8	Nationwide	3
July 30 - August 11, 2014	2014 Typhoon 12 & 11	Nationwide	5
August 15-26, 2014	Heavy rains from August 15, 2014 (Except Hiroshima Sediment Disaster)	Kinki, Hokuriku and Tokai Regions	8
August 20, 2014	Torrential rains of August 2014 (Hiroshima Sediment Disaster)	Hiroshima	77
September 27, 2014	2014 Eruption of Mt. Ontake	Nagano and Gifu	63
November 22, 2014	Earthquake (M6.7) epicentered in northern Nagano Prefecture	Nagano	0
November 2014 - March 2015	Heavy snowfall in 2014	Hokkaido, Tohoku, Hokuriku and Shikoku Regions	83
May 29, 2015	Kuchinoerabu-jima Eruption (Volcanic Alert Level 5)	Kagoshima	0
June 30, 2015	Eruption of Mt. Hakone (Volcanic Alert Level 3)	Kanagawa	0
July 16-18, 2015	2015 Typhoon 11	Various Places from Western to Eastern Japan	2
August 15, 2015	Volcanic activity at Sakurajima (Volcanic Alert Level 4)	Kagoshima	0
August 22-26, 2015	2015 Typhoon 15	Various Places in Western Japan	1
September 9-11, 2015	Torrential Rain of September 2015 in the Kanto and Tohoku Regions	Kanto and Tohoku Regions (especially Ibaraki, Tochigi, Miyagi)	20
September 27-28, 2015	2015 Typhoon 21	Okinawa	0
April 14 and 16, 2016	The 2016 Kumamoto Earthquake (M7.3)	Kyushu Region	267
June 16, 2016	Earthquake in Uchiura Bay (M5.3)	Hokkaido	0
June 20 - July 17, 2016	Heavy rains from June 20, 2016	Kyushu Region (especially Kumamoto)	7
August 16 - 18, 2016	2016 Typhoon 7	Hokkaido, Tohoku and Kanto Regions	0
August 20 - 23, 2016	2016 Typhoon 11 & 9	Hokkaido, Tohoku and Kanto Regions	2
August 26 - 31, 2016	2016 Typhoon 10	Hokkaido and Tohoku Regions (especially Iwate)	29
September 1 - 5, 2016	2016 Typhoon 12	Kyushu Region	0
September 6 - 7, 2016	Heavy rains from 2016 Typhoon 13 and rain front	Nationwide	1
September 16 - 20, 2016	2016 Typhoon 16	Various Places from Western to Eastern Japan	1
September 30 - October 5, 2016	2016 Typhoon 18	Nationwide	0
October 8, 2016	Volcanic activity at Asosan (Volcanic Alert Level 3)	Kumamoto	0
October 21, 2016	Earthquake (M6.6) epicentered in central Tottori Prefecture	Tottori, Okayama	0
November 22, 2016	Earthquake (M7.4) epicentered off coast of Fukushima Prefecture	Fukushima	0
December 28, 2016	Earthquake (M6.3) epicentered in northern Ibaraki Prefecture	Ibaraki	0
November 2016 - April 2016	Heavy Snowfall in 2016	Hokkaido, Tohoku, Kanto, Hokuriku and Chugoku Regions	65
December 28	Earthquake (M6.3) centered in the Northern Ibaraki Prefecture	Ibaraki	0
June 20, 2017	Earthquake (M5.0) centered in Bungosuido	Oita Prefecture	0
June 25, 2017	Earthquake (M5.6) centered in the southern Nagano Prefecture	Nagano Prefecture	0
June 30 - July 10, 2017	Heavy Rains from Seasonal Rain Front Starting June 30, 2017 and 2017 Typhoon 3	Various Locations from Western to Eastern Japan	44
July 11, 2017	Earthquake (M5.3) centered in Kagoshima Bay	Kagoshima Prefecture	0
July 22-26, 2017	Heavy Rains from Seasonal Rain Front Starting July 22, 2017	Tohoku, Hokuriku and Chugoku Regions	0

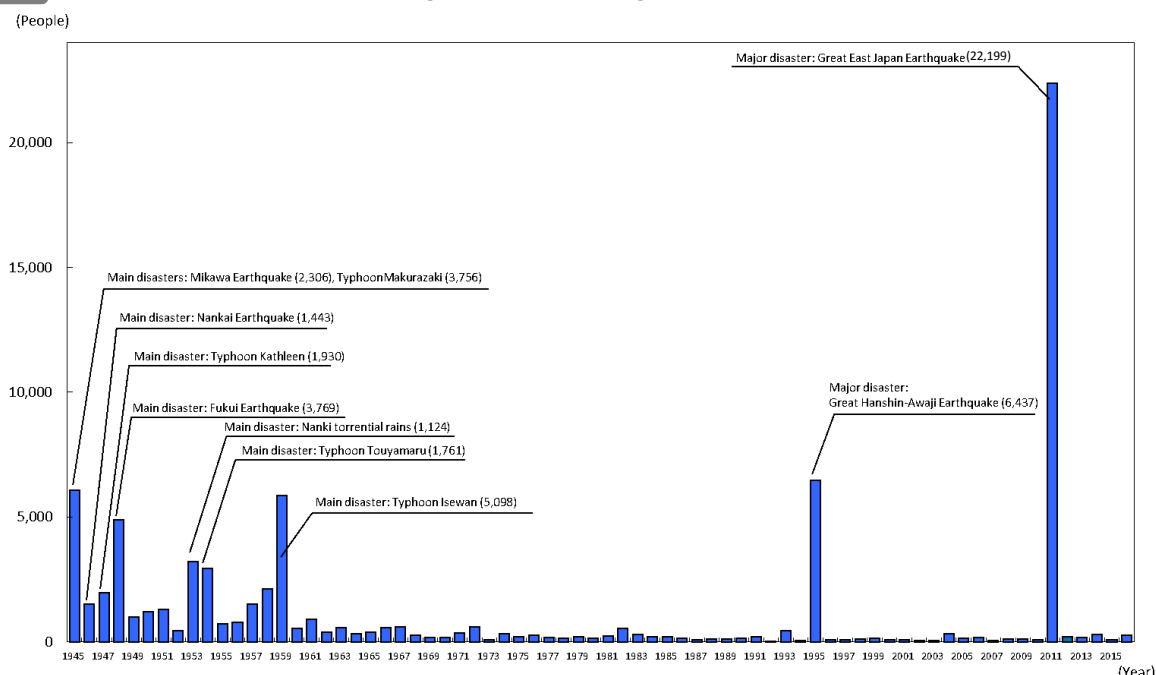
Date	Disaster	Main Affected Areas	Number of Dead and Missing
August 3-9, 2017	2017 Typhoon 5	Various Places in Western Japan	2
September 8, 2017	Earthquake (M5.2) centered in the southern Inland Akita Prefecture	Akita Prefecture	0
September 13-18, 2017	2017 Typhoon 18	Nationwide	5
October 11, 2017	Volcanic activity at Mt. Kirishima (Shinmoedake) (Volcanic Alert Level 3)	Miyazaki and Kagoshima Prefectures	0
October 21-23, 2017	2017 Typhoon 21	Nationwide	8
October 27-30, 2017	2017 Typhoon 22	Nationwide	0

Notes:

1. The table lists the natural disasters for which a Disaster Management Office or a Communication Office was set up in the Cabinet Office and which resulted in fatalities/missing persons.
2. The 2011 Tohoku Earthquake and Tsunami (Great East Japan Earthquake) includes damage from earthquakes deemed aftershocks*. The number of fatalities (including disaster-related fatalities) and missing persons is the current figure as of March 1, 2018.
(*April 7, 2011, earthquake hypocentered off the coast of Miyagi Prefecture, April 11, 2011, earthquake hypocentered in the Hamadori region of Fukushima Prefecture, March 14, 2012, earthquake hypocentered off the eastern coast of Chiba Prefecture, and December 7, 2012, earthquake hypocentered off the coast of Sanriku)
3. The details given for the 2016 Kumamoto Earthquake show the toll (including disaster-related fatalities) as of April 13, 2018.

Source: Meteorological Almanac of Japan, Chronological Scientific Tables, National Police Agency materials, Fire and Disaster Management Agency Materials, Major Disaster Management Headquarters materials

Fig. A-8 Number of Fatalities and Missing Persons Resulting from Natural Disasters



Note: Of the fatalities in 1995, the deaths from the Southern Hyogo Prefecture Earthquake (Great Hanshin-Awaji Earthquake) include 919 so-called "related deaths" (Hyogo Prefecture).

The fatalities and missing persons in 2017 are based on flash bulletins from the Cabinet Office.

Source: Fatalities and missing persons for the year 1945 came only from major disasters (source: Chronological Scientific Table). Years 1946–1952 use the Japanese Meteorological Disasters Annual Report; years 1953–1962 use National Police Agency documents; years 1963 and after formulated by the Cabinet Office based on Fire and Disaster Management Agency materials.

Fig. A-9 Breakdown of Fatalities and Missing Persons Caused by Natural Disasters

(Unit: persons)

Year	Storm/Flood	Earthquake/Tsunami	Volcano	Snow	Other	Total
1993	183	234	1	9	11	438
1994	8	3	0	21	7	39
1995	19	6,437	4	14	8	6,482
1996	21	0	0	28	35	84
1997	51	0	0	16	4	71
1998	80	0	0	28	1	109
1999	109	0	0	29	3	141
2000	19	1	0	52	6	78
2001	27	2	0	59	2	90
2002	20	0	0	26	2	48
2003	48	2	0	12	0	62
2004	240	68	0	16	3	327
2005	43	1	0	98	6	148
2006	87	0	0	88	2	177
2007	14	16	0	5	4	39
2008	22	24	0	48	7	101
2009	76	1	0	35	3	115
2010	31	0	0	57	1	89
2011	136	22,203	0	125	2	22,466
2012	52	0	0	138	0	190
2013	75	0	0	92	6	173
2014	112	0	63	108	0	283
2015	28	0	0	49	0	77
2016	45	267	0	32	0	344
2017	59	0	0	77	0	136

Notes: This table shows the number of fatalities and missing persons between Jan. 1 and Dec. 31.

Fatalities and missing persons in 2017 are based on flash bulletins from the Cabinet Office.

(The earthquake/tsunami disaster figures for 2011 include 22,199 fatalities (including disaster-related fatalities) and missing persons from the 2011 Tohoku Earthquake and Tsunami (Great East Japan Earthquake) (March 7, 2018).

Source: Formulated by the Cabinet Office based on the Fire and Disaster Management Agency report "Status of Regional Disaster Management Administration"

Fig. A-10 Recent Major Natural Disasters (Since the Great Hanshin-Awaji Earthquake)

(Total: As of April 13, 2018)

Name of Disaster	Major Events	Human Casualties (persons)		Houses Damaged (houses)			Remarks
		Fatalities/ Missing Persons	Injured	Completely Destroyed	Half Destroyed	Above- floor Flooding	
1995 Southern Hyogo Prefecture Earthquake (Great Hanshin-Awaji Earthquake) (January 17, 1995)	Maximum seismic intensity of 7. Unprecedented major disaster in Western Japan. Became a turning point in DRR measures for national and local governments, with various DRR measures developed and strengthened.	6,437	43,792	104,906	144,274	—	<ul style="list-style-type: none"> Establishment of Extreme Disaster Management Headquarters¹ Establishment of Major Disaster Management Headquarters Inspection by Prime Minister Deployment of government survey team Invocation of Disaster Relief Act Invocation of Special Measures Act for Specified Disaster Designation as an extremely severe disaster
2011 Tohoku Earthquake and Tsunami (Great East Japan Earthquake) (March 11, 2011)	Maximum seismic intensity of 7. Tsunami caused extreme damage mainly along the coast of Eastern Japan, including Iwate, Miyagi, and Fukushima Prefectures.	22,199	6,230	121,768	280,160	1,628	<ul style="list-style-type: none"> Establishment of Extreme Disaster Management Headquarters Establishment of On-site Extreme Disaster Management Headquarters Inspection by Prime Minister Deployment of government survey team Inspection by Minister of State for Disaster Management Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Invocation of Special Measures Act for Specified Disaster Designation as an extremely severe disaster
2000 Eruption of Mt. Usu (March 31, 2000 - June 28, 2001)	The Japan Meteorological Agency announced emergency volcano information and residents evacuated before the eruption began, resulting in no human casualties.	—	—	119	355	—	<ul style="list-style-type: none"> Establishment of Major Disaster Management Headquarters Establishment of On-site Major Disaster Management Headquarters Inspection by Prime Minister Deployment of government survey team Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
2000 Miyake Is. Eruption and Nijijima and Kozushima Is. Earthquake (June 25, 2000 - March 31, 2005)	A caldera was formed along with the summit eruption. Large amounts of volcanic gases were emitted over an extended period, and evacuation instructions were issued to all residents of the town of Miyake, which forced all residents to evacuate and live off the island.	1	15	15	20	—	<ul style="list-style-type: none"> Establishment of Major Disaster Management Headquarters Inspection by Prime Minister Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
2004 Typhoon 23 (October 18-21, 2004)	Very large number of human casualties due to rising river levels, sediment disasters, and high waves nationally, but concentrated in the Kinki and Shikoku regions. The Maruyama River, Izushi River, and other Maruyama River system rivers overflowed their banks and flooded.	98	555	909	7,776	14,323	<ul style="list-style-type: none"> Establishment of Major Disaster Management Headquarters Deployment of government survey team Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
2004 Mid Niigata Prefecture Earthquake (October 23, 2004)	Maximum seismic intensity of 7. Homes were destroyed, landslides and other disasters caused many human casualties, communities were isolated, people were forced to evacuate, and there was massive damage to homes, lifelines, transportation, and agricultural land.	68	4,805	3,175	13,810	—	<ul style="list-style-type: none"> Establishment of Major Disaster Management Headquarters Inspection by Prime Minister Deployment of government survey team Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
Fukuoka-ken-Seihouki Earthquake (March 20, 2005)	Maximum seismic intensity of Lower 6. Homes were destroyed on Genkai Island and elsewhere, and window glass fell from buildings in Fukuoka City.	1	1,204	144	353	—	<ul style="list-style-type: none"> Inspection by Prime Minister Deployment of government survey team Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Invocation of Remote Islands Development Act
2005 Typhoon 14 (September 4-8, 2005)	Record-breaking rains fell, mainly in the Kyushu region, and sediment disasters caused many human casualties.	29	177	1,217	3,896	3,551	<ul style="list-style-type: none"> Deployment of government survey team Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
2006 Heavy Snowfalls (December 2005 - March 2006)	Following 1963, the second-largest number of fatalities and missing persons since WW II (on par with 1981.)	152	2,145	18	28	12	<ul style="list-style-type: none"> Invocation of Disaster Relief Act
2006 Torrential Rains Due to Seasonal Rain Front (June 10-July 29, 2006)	Many fatalities due to sediment disasters in Nagano and Kagoshima Prefectures.	33	64	313	1,457	1,971	<ul style="list-style-type: none"> Deployment of government survey team Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
2006 Typhoon 13 (September 15-20, 2006)	Damage due to strong winds from the Okinawa region to the Kyushu region, and a tornado in Nobeoka City, Miyazaki Prefecture.	10	446	121	518	251	<ul style="list-style-type: none"> Deployment of government survey team Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
Tornado in Saroma Hokkaido Prefecture (November 7, 2006)	Highest number of fatalities on record attributed to a tornado.	9	31	7	7	—	<ul style="list-style-type: none"> Deployment of government survey team Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims

Name of Disaster	Major Events	Human Casualties (persons)		Houses Damaged (houses)			Remarks
		Fatalities/ Missing Persons	Injured	Completely Destroyed	Half Destroyed	Above- floor Flooding	
2007 Noto Hanto Earthquake (March 25, 2007)	Maximum seismic intensity of Upper 6. Disaster in mountainous regions with a high percentage of aging population and advancing depopulation.	1	356	686	1,740	—	<ul style="list-style-type: none"> • Inspection by Prime Minister • Deployment of government survey team • Invocation of Disaster Relief Act • Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims • Designation as an extremely severe disaster
2007 Heavy Rains from Typhoon 4 and Seasonal Rain Front (July 5-31, 2007)	The typhoon that made landfall in July was very powerful. Record rainfalls in various regions.	7	75	33	33	434	<ul style="list-style-type: none"> • Deployment of government survey team • Invocation of Disaster Relief Act • Designation as an extremely severe disaster
2007 Niigataken Chuetsu-oki Earthquake (July 16, 2007)	Maximum seismic intensity of Upper 6. Many human casualties due to homes collapsing. Damage to homes, lifelines, transportation, and nuclear power plants.	15	2,346	1,331	5,710	—	<ul style="list-style-type: none"> • Inspection by Prime Minister • Deployment of government survey team • Invocation of Disaster Relief Act • Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims • Invocation of Special Measures Act for Specified Disaster • Designation as an extremely severe disaster
2008 Iwate-Miyagi Nairiku Earthquake (June 14, 2008)	Maximum seismic intensity of Upper 6. Many human casualties due to landslides and other sediment disasters. Many river channels became blocked (natural dams) in rivers in mountainous areas.	23	426	30	146	—	<ul style="list-style-type: none"> • Inspection by Prime Minister • Deployment of government survey team • Invocation of Disaster Relief Act • Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims • Designation as an extremely severe disaster
Earthquake epicentered on Northern Coast of Iwate Prefecture (July 24, 2008)	Maximum seismic intensity of Lower 6. Earthquake with a deep hypocenter occurring inside a plate. Seismic intensity of Lower 5 and higher recorded in affected areas of inland Iwate and Miyagi Prefectures.	1	210	1	0	—	<ul style="list-style-type: none"> • Deployment of government survey team
Heavy Rains from July 28 (July 28-29, 2008)	Localized heavy rains in the Hokuriku and Kinki regions. Human casualties along the Toga River in Kobe City.	6	13	6	16	585	<ul style="list-style-type: none"> • Invocation of Disaster Relief Act • Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims • Designation as an extremely severe disaster
Torrential Rains at the End of August 2008 (August 26-31, 2008)	Record heavy rains in various regions, especially extensive flood damage in Aichi Prefecture.	2	7	6	7	3,106	<ul style="list-style-type: none"> • Deployment of government survey team • Invocation of Disaster Relief Act • Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims
July 2009 Torrential Rains in Chugoku and Northern Kyushu (July 19-26, 2009)	Record heavy rains in Yamaguchi and Fukuoka Prefectures due to seasonal rain front. Numerous fatalities from sediment disasters in Yamaguchi Prefecture and other prefectures.	36	59	52	102	2,139	<ul style="list-style-type: none"> • Inspection by Prime Minister • Deployment of government survey team • Invocation of Disaster Relief Act • Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims • Designation as an extremely severe disaster
2009 Typhoon 9 (August 8-11, 2009)	Heavy rains from the Chugoku and Shikoku regions to the Tohoku region due to the effects of the typhoon. Human casualties and homes damaged due to flooding in Hyogo Prefecture.	27	23	183	1,130	974	<ul style="list-style-type: none"> • Inspection by Prime Minister • Deployment of government survey team • Invocation of Disaster Relief Act • Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims • Designation as an extremely severe disaster
Earthquake epicentered in Suruga Bay (August 11, 2009)	Maximum seismic intensity of Lower 6. Tomei Expressway closed due to slope collapse.	1	319	0	6	—	—
2009 Typhoon 18 (October 6-8, 2009)	Destructive storm and heavy rains over a wide area from the Okinawa region to Hokkaido Prefecture due to the effects of the typhoon. Winds and rains in Aichi Prefecture caused partial damage and flood damage to many homes.	5	139	9	86	571	<ul style="list-style-type: none"> • Designation as an extremely severe disaster
Tsunami from Earthquake epicentered in Central Chilean Coast (February 27-28, 2010)	An earthquake struck the central coast of Chile just after noon on Feb. 27. A tsunami was approaching Japan the next day on the 28th, and a major tsunami warning and tsunami warning were issued at 9:33 a.m. on the 28th. Extensive fishery damage to aquaculture facilities.	0	0	0	0	6	<ul style="list-style-type: none"> • Designation as an extremely severe disaster
2010 Heavy Rains Due to Seasonal Rain Front (June 11 - July 19, 2010)	The seasonal rain front stalled over the region from Kyushu to Honshu from mid-June, with intermittent bursts of activity. Southern Kyushu received more than twice its average annual rainfall. There were large-scale landslides in Kagoshima Prefecture, and fatalities and missing persons mainly in Hiroshima and Gifu Prefectures.	22	21	43	91	1,844	<ul style="list-style-type: none"> • Inspection by Prime Minister • Inspection by Minister of State for Disaster Management • Invocation of Disaster Relief Act • Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims • Designation as an extremely severe disaster
Heavy Rains in Amami Region of Kagoshima Prefecture (October 18-25, 2010)	The rain front stalled over the Amami region, with moist air flowing in from the south toward this rain front, creating unstable atmospheric conditions. The Amami region received intense rainfall of more than 120 mm per hour, with more than 800 mm of rainfall since the rains began.	3	2	10	443	116	<ul style="list-style-type: none"> • Inspection by Minister of State for Disaster Management • Invocation of Disaster Relief Act • Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims • Designation as an extremely severe disaster
Heavy Snowfall in 2010 (November 2010 - March 2011)	Record snows fell from the end of the year to the beginning of the following year in some areas of the Japan Sea side of Western Japan. Fishing boats overturned and sank along with other damage in Tottori and Shimane Prefectures.	131	1,537	9	14	6	<ul style="list-style-type: none"> • Cabinet meeting held • Inspection by Minister of State for Disaster Management • Invocation of Disaster Relief Act

Name of Disaster	Major Events	Human Casualties (persons)		Houses Damaged (houses)			Remarks
		Fatalities/ Missing Persons	Injured	Completely Destroyed	Half Destroyed	Above- floor Flooding	
Mt. Kirishima (Shinmoedake) Eruption (January 26 - September 7, 2011)	Following a small eruption on January 19, a medium-sized eruption occurred at Shinmoedake on January 26 and the volcanic alert level was raised to 3. Eruptions continued repeatedly thereafter until early September, with air waves and cinders breaking windows and causing other damage. In addition, falling ash from the eruptions was recorded over a wide area mainly to the southeast of the mountain, including Kirishima City, Kagoshima Prefecture, and Miyakonojo City, Miyazaki Prefecture.	0	52	0	0	—	<ul style="list-style-type: none"> Cabinet meeting held (twice) Inspection by Minister of State for Disaster Management Designation as an area requiring the emergency development of evacuation facilities and an ash prevention area Invocation of Disaster Relief Act
2011 Typhoon 6 (July 12-24, 2011)	The typhoon made landfall in southern Tokushima Prefecture around 12:30 a.m. on July 20. At the time of landfall, maximum peak winds of 40m/s were recorded, and the large typhoon maintained its powerful force. Record heavy rains were recorded in Western Japan, with rainfall of more than 1,000 mm recorded in some parts of the Shikoku region since the rains began.	3	54	0	1	28	<ul style="list-style-type: none"> Designation as an extremely severe disaster
July 2011 Niigata and Fukushima Torrential Rains (July 27-30, 2011)	Rain began falling in Niigata Prefecture and Aizu, Fukushima Prefecture, from around noon on the 27th. Intermittent intense rains of more than 80 mm per hour fell starting on the 28th. In Niigata and Fukushima Prefectures, record heavy rains exceeding the July 2004 Niigata and Fukushima Torrential Rains were recorded.	6	13	74	1,000	1,082	<ul style="list-style-type: none"> Deployment of government survey team (twice) Local survey by Minister of State for Disaster Management Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
2011 Typhoon 12 (August 30 - September 5, 2011)	Record rains were recorded across a wide area from Western Japan to Northern Japan. Especially on the Kii Peninsula, the highest amount of rainfall since the rains began at 5:00 p.m. on August 30 exceeded 1,800 mm, and many river channels became blocked.	98	113	379	3,159	5,500	<ul style="list-style-type: none"> Establishment of Major Disaster Management Headquarters Site inspection by Prime Minister Noda Deployment of government survey team (twice) Local survey by Minister of State for Disaster Management Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster (national)
2011 Typhoon 15 (September 15-22, 2011)	Strong winds and record rains were recorded across a wide area from Western Japan to Northern Japan. Total rainfall from 12:00 a.m., September 15 to 9:00 a.m., September 22 exceeded 1,000 mm in some parts of Kyushu and Shikoku, with many points recording rainfall of more than double the average rainfall for September.	20	425	34	1,524	2,270	<ul style="list-style-type: none"> Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
Heavy Snowfall in 2011 (November 2011 - March 2012)	Record snows fell mainly on the Japan Sea side, with cumulative snowfall of more than 28% higher than the average for the past 5 years. In addition, in some regions the depth of the snowfall was more than double the average for the past 30 years.	133	1,990	13	12	3	<ul style="list-style-type: none"> Cabinet meeting held (twice) Local survey by Minister of State for Disaster Management (twice) Invocation of Disaster Relief Act
Wind Gusts in May 2012 (May 6, 2012)	Lightning strikes, wind gusts, and hail were recorded from the Tokai region to the Tohoku region. From Joso City to Tsukuba City, Ibaraki Prefecture, a tornado formed that was estimated to be one of the strongest (F3) recorded in Japan. Multiple tornadoes were recorded in the region from Mooka City, Tochigi Prefecture, to Hitachi-Omiya City, Ibaraki Prefecture, including a destructive tornado of approx. 32 km, the second longest recorded since statistics have been kept.	3	61	103	234	—	<ul style="list-style-type: none"> Deployment of government survey team Local survey by Minister of State for Disaster Management Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims
2012 Typhoon 4 (June 18-20, 2012)	Heavy rains fell across a wide area from the Okinawa region to the Tohoku region due to the typhoon and seasonal rain front. Following the path of the typhoon, strong winds, high waves, and a storm surge were recorded across a wide area from the Okinawa region to the Tohoku region.	1	85	1	3	49	<ul style="list-style-type: none"> Designation as an extremely severe disaster
Heavy Rains from June 21 to July 7, 2012 (June 21 - July 7, 2012)	Due to the effects of the seasonal rain front and a low-pressure system in the Yellow Sea forming above the seasonal rain front, from June 21 to July 7, rains were recorded from Western to Eastern Japan, and Northern Japan, with heavy rains in parts of Kyushu and other locations.	2	7	36 ^{(*)2}	180 ^{(*)2}	1,131 ^{(*)2}	<ul style="list-style-type: none"> Deployment of government survey team Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
July 2012 Northern Kyushu Torrential Rains (July 11-14, 2012)	From July 11 to 14, moist air from the south flowed in toward the seasonal rain front that was stalled near Honshu, and heavy rains were recorded across a wide area from Western to Eastern Japan. Extremely heavy rains fell intermittently with thunder especially in the northern region of Kyushu.	33	34	276 ^{(*)3}	2,306 ^{(*)3}	2,574 ^{(*)3}	<ul style="list-style-type: none"> Site inspection by Prime Minister Noda Deployment of government survey team (twice) Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
Heavy Snowfall from November 2012 (November 2012 - March 2013)	Due to the cold, there was a long stretch of low-temperature days in Northern Japan, with a large amount of snow falling mainly on the Japan Sea side. This resulted in record snowfall recorded mainly on the Japan Sea side of Northern Japan, including snowfall with a depth of 566 cm recorded at Sukayu, Aomori Prefecture.	104	1,517	5	7	2	<ul style="list-style-type: none"> Cabinet meeting held Deployment of government survey team Invocation of Disaster Relief Act

Name of Disaster	Major Events	Human Casualties (persons)		Houses Damaged (houses)			Remarks
		Fatalities/ Missing Persons	Injured	Completely Destroyed	Half Destroyed	Above- floor Flooding	
Earthquake epicentered Near Awajishima Island (April 13, 2013)	Maximum seismic intensity of Lower 6.	0	34	8	97	—	—
Heavy Rains in 2013 Seasonal Rain Front (Disaster due to torrential rains and destructive storms between June 8 and August 9, 2013)	From June 8 to August 9, the seasonal rain front stalled from Kyushu to the vicinity of Honshu with intermittent bursts of activity. In addition, warm and very moist air surrounding a highpressure ridge flowed in even after the rainy season ended. During this time, Typhoons 4 and 7 approached Japan, causing heavy rains in various regions.	17	50	73	222	1,845	<ul style="list-style-type: none"> Local survey by Prime Minister Abe Deployment of government survey team (seven times) Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
Heavy Rains from August 23, 2013 (August 23-28, 2013)	Warm, moist air flowed in toward the rain front, creating extremely unstable atmospheric conditions and heavy rains mainly on the Japan Sea side of Eastern Japan, and Western Japan. On August 24, record heavy rains on par with the torrential rains of July 28 were recorded, especially in Shimane Prefecture. Some areas of Hokkaido Prefecture also received heavy rains.	2	4	9	53	243	<ul style="list-style-type: none"> Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
Tornadoes on September 2 and 4, 2013 (September 2, 4, & 7, 2013)	<ul style="list-style-type: none"> On September 2, F2 tornadoes were recorded in Saitama City, Koshigaya City, and Matsubushi Town, Saitama Prefecture, Noda City, Chiba Prefecture, and Bando City, Ibaraki Prefecture. On September 4, an F0 tornado was recorded in Sukumo City, Kochi Prefecture, an F0 tornado in Aki City, Kochi Prefecture, F1 tornadoes respectively from Kanuma City to Utsunomiya City, Tochigi Prefecture, and from Shioya Town, Shioya District to Yaita City, and F0 tornadoes from Ise City to Obata Town, Mie Prefecture. On September 7, F0 wind gusts were recorded in Komaki City, Hokkaido Prefecture. 	0	67	13	38	0	<ul style="list-style-type: none"> Deployment of government survey team (twice) Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims
Heavy Rains from 2013 Typhoon 18 (September 15-16, 2013)	On September 15, localized intense rains fell in Eastern Japan and Northern Japan. On the 16th, heavy rains fell across a wide area from Shikoku to Hokkaido. Record heavy rains fell especially in Fukui, Shiga, and Kyoto Prefectures. A total of ten F0-F1 tornadoes also occurred.	6	136	40	967	2,453	<ul style="list-style-type: none"> Deployment of government survey team (five times) Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
2013 Typhoon 26 & 27 (October 14-16, 2013) (October 24-26, 2013)	Heavy rains fell mainly on the Pacific Ocean side of Eastern Japan and Northern Japan. Driving rains of more than 100 mm per hour fell especially in Oshima-machi, Tokyo Prefecture, with record rainfall of 824 mm recorded in 24 hours.	45	140	65	63	2,011	<ul style="list-style-type: none"> Local survey by Prime Minister Abe Deployment of government survey team Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
Heavy Snowfall from 2013 (November 2013 - March 2014)	<ul style="list-style-type: none"> Record heavy snowfall was recorded across a wide area from Northern Japan to Kanto-Koshinetsu. Especially from February 14 to 16, record heavy snows fell, substantially surpassing past snowfall depths mainly in the Kanto-Koshinetsu region, including Kofu (Yamanashi Prefecture) with 114 cm, Chichibu (Saitama Prefecture) with 98 cm, and Maebashi (Gunma Prefecture) with 73 cm of snowfall. 	95	1,770	28	40	3	<ul style="list-style-type: none"> Establishment of Major Disaster Management Headquarters Establishment of On-site Major Disaster Management Headquarters Site inspection by Prime Minister Abe Deployment of government survey team (five times) Invocation of Disaster Relief Act
2014 Typhoon 8 (July 6-11, 2014)	<ul style="list-style-type: none"> Record heavy rains were recorded on Okinawa Island. Due to the effects of the moist southerly wind surrounding the typhoon and the seasonal rain front, some regions even far from the typhoon received localized driving rains. 	3	70	14	12	409	<ul style="list-style-type: none"> Deployment of government survey team (three times) Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims
Torrential Rains of August 2014							
2014 Typhoon 12 & 11 (July 30 - August 11, 2014)	<p><Typhoon 12></p> <ul style="list-style-type: none"> From the night of the 5th, heavy rains were recorded in the Chugoku and Tohoku regions. Especially in Yamaguchi Prefecture, localized driving rains of more than 100 mm per hour were recorded in some places. <p><Typhoon 11></p> <p>Heavy rains fell across a wide area from Western Japan to Northern Japan. Especially in Kochi Prefecture, total rainfall from the 7th to the 11th, when the heaviest rains fell, was more than 1,000 mm. Total rainfall from the Shikoku region to the Tokai region was more than 600 mm. Atmospheric conditions were extremely unstable, with extremely strong winds including tornadoes in Tochigi Prefecture and other areas.</p>	5	93	22	374	1,529	<ul style="list-style-type: none"> Deployment of government survey team (twice) Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster

Name of Disaster	Major Events	Human Casualties (persons)		Houses Damaged (houses)			Remarks
		Fatalities/ Missing Persons	Injured	Completely Destroyed	Half Destroyed	Above- floor Flooding	
Heavy Rains from August 15, 2014 (August 15-26, 2014) *Excludes Hiroshima Sediment Disaster on August 20	<ul style="list-style-type: none"> Extremely intense localized rains with thunder. The amount of rainfall that fell during the 2 days of the 16th and 17th set new records in places such as Fukuchiyama City, Kyoto Prefecture, and Takayama City, Gifu Prefecture, with heavy rains mainly in the Kinki, Hokuriku, and Tokai regions. 	8	7	38	332	2,240	<ul style="list-style-type: none"> Deployment of government survey team (twice) Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
Hiroshima Sediment Disaster on August 20, 2014 (Disaster in Hiroshima Prefecture due to heavy rains from August 19, 2014)	<ul style="list-style-type: none"> Warm, moist air flowed in toward the rain front, and extremely unstable atmospheric conditions were recorded mainly in the Chugoku region and northern Kyushu region. At 3:30 a.m. on the 20th, driving rains of approx. 120 mm per hour were recorded in Hiroshima Prefecture, and heavy rains, including a new record set for the highest recorded rainfall in a 24-hour period, were recorded. 	77	68	179	217	1,086	<ul style="list-style-type: none"> Establishment of Major Disaster Management Headquarters Establishment of On-site Major Disaster Management Headquarters Site inspection by Prime Minister Abe Deployment of government survey team (three times) Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
2014 Eruption of Mt. Ontake (September 27, 2014)	<ul style="list-style-type: none"> Volcanic tremors started at 11:41 a.m. on September 27, with an eruption on the same day around 11:52 a.m. Volcanic smoke descended the southern slope and was recorded for more than 3 km. Therefore, a level 3 volcano warning (mountain access restricted) was issued, with entry within 4 km of the crater restricted. Many mountain climbers suffered casualties due to this eruption. 	63	69	0	0	0	<ul style="list-style-type: none"> Establishment of Major Disaster Management Headquarters Establishment of On-site Major Disaster Management Headquarters Deployment of government survey team (twice) Invocation of Disaster Relief Act
Earthquake with a Seismic Source in Northern Nagano Prefecture (November 22, 2014)	Maximum seismic intensity of Lower 6.	0	46	81	133	—	<ul style="list-style-type: none"> Site inspection by Prime Minister Abe Deployment of government survey team (twice) Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
Heavy Snowfall in 2014 (November 2014 - March 2015)	Due to the effects of a strong winter air-pressure pattern as well as a low-pressure system and cold air, heavy snows fell on the mountainous areas of the Japan Sea side from Northern Japan to Eastern Japan.	83	1,029	9	12	5	<ul style="list-style-type: none"> Deployment of government survey team Invocation of Disaster Relief Act
Kuchinoerabu-jima Eruption [Volcanic Alert Level 5] (May 29, 2015)	<ul style="list-style-type: none"> An explosive eruption occurred at Shindake at 9:59 am on May 29. This eruption triggered a volcanic cloud of black-gray smoke that rose 9,000m above the crater rim and a pyroclastic flow that reached the northwestern coast (Mukaeahama district). At 10:07 am, the JMA raised the Volcanic Alert Level from 3 to 5 (evacuate). The municipal ferry, Ferry-Taiyo, and other vessels were used to evacuate all those on the island at the time of the eruption to Yakushima (all individuals were confirmed to be safe) 	0	1	To be confirmed			<ul style="list-style-type: none"> Installation of government on-site communications office (Yakushima Town, Kagoshima) Site inspection by Prime Minister Abe Deployment of government survey team Invocation of Disaster Relief Act
Eruption of Mt. Hakone [Volcanic Alert Level 3] (June 30, 2015)	<ul style="list-style-type: none"> A very small amount of volcanic ash was observed inside the crater, which was thought to have been the result of a very small eruption, so the JMA raised the volcanic alert level from 2 to 3 (Do not approach the volcano) at 12:30 on June 30 At the same time, Hakone-machi imposed a ban on entering the area within around 1km of the crater and issued an evacuation instruction for parts of the Ubako, Kamiyuba, Shimoyuba, and Hakone Souunkyo Bessochi areas, as well as evacuating residents, etc. from those areas 	0	0	0	0	0	<ul style="list-style-type: none"> Deployment of a Cabinet Office advance information-gathering team
2015 Typhoon 11 (July 16-18, 2015)	<ul style="list-style-type: none"> The typhoon and warm, moist air heading toward the typhoon caused increased rainfall, primarily over West and East Japan. The Kinki region in particular saw the highest rainfall in 24 hours since records began, with heavy rain in excess of the usual rainfall for the entire month of July in an ordinary year. This caused river flooding, damage to public civil engineering works, and suspension of transport services, mainly in West Japan. 	2	57	5	10	85	<ul style="list-style-type: none"> Appeal to the public by the Minister of State for Disaster Management

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Volcanic activity at Sakurajima [Volcanic Alert Level 4] (August 15, 2015)	<ul style="list-style-type: none"> At around 07:00 on August 15, a series of volcanic earthquakes centered on the island occurred. Rapid crustal movement indicative of inflation of the volcanic edifice was also observed. At 10:15 that day, the JMA raised the volcanic alert level from 3 to 4 (Prepare to evacuate) (caution required in Arimura-cho and Furusato-cho, within 3km of the Showa crater and the Minamidake summit crater). At 16:50 that day, Kagoshima City issued evacuation advisories to the residents of the Arimura district of Arimura-cho, the Furusato district of Furusato-cho (areas within 3km of the crater), and the Shioyagamoto district of Kurokami-cho. At 18:10 that day, evacuation of all residents (77 people from 51 households) in the areas subject to evacuation was completed. 	0	0	0	0	0	<ul style="list-style-type: none"> Field survey by Parliamentary Vice Minister Matsumoto Deployment of a Cabinet Office liaison team
2015 Typhoon 15 (August 22-26, 2015)	<ul style="list-style-type: none"> The typhoon that made landfall near Arao City in Kumamoto Prefecture just after 06:00 on the 25th retained its powerful momentum as it moved northward to northern Kyushu, reaching the Sea of Japan during the daylight hours of the 25th. A maximum instantaneous wind speed of 71.0m was observed at 21:16 on the 23rd on Ishigaki Island, Okinawa Prefecture. In addition, the typhoon and warm, moist air flowing in from the south resulted in heavy rain over the Ryukyu Islands, West Japan, and the Tokai region, with more than 500mm of rain falling on Mie Prefecture in a single day on the 25th. 	1	147	12	138	53	<ul style="list-style-type: none"> Designation as an extremely severe disaster
Torrential Rain of September 2015 in the Kanto and Tohoku Regions [Including 2015 Typhoon 18] (September 9-11, 2015)	<ul style="list-style-type: none"> After making landfall near Nishio City, Aichi Prefecture at around 09:30 on September 9, 2015 Typhoon 18 moved on to the Sea of Japan and turned into an extra-tropical cyclone at 15:00 that day. As a result of 2015 Typhoon 18 and weather fronts, heavy rain fell over a wide area from western to northern Japan. In particular, between the 9th and the 11th, a southerly wind flowing into the low-pressure system into which 2015 Typhoon 18 developed and, subsequently, a southeasterly wind from the vicinity of 2005 Typhoon 17 supplied flows of moist air that triggered a succession of line-shaped rainbands, causing record-breaking rainfall in the Kanto and Tohoku regions and prompting the issue of emergency heavy rain warnings for Tochigi, Ibaraki, and Miyagi prefectures. 	20	82	81	7,090	2,523	<ul style="list-style-type: none"> Minister of State for Disaster Management issues a list of requests to relevant ministries and agencies Deployment of a Cabinet Office advance information-gathering team Deployment of government survey team Cabinet meeting held (twice) Site inspection by Prime Minister Abe Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
2015 Typhoon 21 (September 27-28, 2015)	<ul style="list-style-type: none"> 2015 Typhoon 21 approached the Ishigaki and Yonaguni island areas with ferocious intensity during the day on the 28th. On Yonaguni Island, a maximum instantaneous wind speed of 81.1m was observed at 15:41 on the 28th, the highest figure since statistics began to be compiled. A severe gale buffeted Yaeyama and the surrounding area, while the Sakishima Islands saw stormy seas with high swells and the Okinawa Island area was also battered by rough seas. 	0	0	5	23	0	<ul style="list-style-type: none"> Deployment of government survey team Invocation of Disaster Relief Act
The 2016 Kumamoto Earthquake (April 14 and 16, 2016)	<ul style="list-style-type: none"> At 09:26 p.m. on April 14, 2016 Maximum seismic intensity of 7 At 01:25 a.m. on April 16, 2016 Maximum seismic intensity of 7 	267	2,804	8,673	34,726	—	<ul style="list-style-type: none"> Establishment of Major Disaster Management Headquarters Establishment of On-site Major Disaster Management Headquarters Site inspection by Prime Minister Abe (three times) Deployment of government survey team Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Invocation of Special Measures Act for Specified Disaster Partial invocation of the Act on Reconstruction from Large-Scale Disasters Designation as an extremely severe disaster

Name of Disaster	Major Events	Human Casualties (persons)		Houses Damaged (houses)			Remarks
		Fatalities/ Missing Persons	Injured	Completely Destroyed	Half Destroyed	Above- floor Flooding	
Heavy Rains from Seasonal Rain Front Starting June 20, 2016 (June 20-25, 2016)	<ul style="list-style-type: none"> Warm, moist air flowed in toward the seasonal rain front having stalled over Western to Eastern Japan and a low-pressure system above the seasonal rain front, creating extremely unstable atmospheric conditions. Rainfall from 00:00 on 19 onward exceeded 300 mm over a wide area of Kyushu, as well as Chugoku, Shikoku and part of the Izu Islands, while rain in some parts of Kumamoto, Oita and Miyazaki Prefectures exceeded 500 mm. 	7	12	37	165	520	• Designation as an extremely severe disaster
2016 Typhoon 7 (August 16-18, 2016)	<ul style="list-style-type: none"> 2016 Typhoon 7 moved northward along the Pacific coast of the Kanto and Tohoku regions, making landfall near Cape Erimo at around 17:30 on August 17. It then continued up through Hokkaido and turned into an extra-tropical cyclone near Sakhalin at 03:00 on the 18th. The passage of the cold front of the extra-tropical cyclone that was formerly Typhoon 7 caused localized driving rains in the Kanto region, with 83 mm per hour of rain recorded in Utsunomiya City, Tochigi Prefecture up to 03:14 on the 18th. The total rainfall between 00:00 on August 16 and 06:00 on August 18 exceeded 100 mm over an extensive area in the Kanto, Tohoku, and Hokkaido regions. 	0	5	0	9	67	• Designation as an extremely severe disaster
2016 Typhoon 11 & 9 (August 20-23, 2016)	<ul style="list-style-type: none"> 2016 Typhoon 11 originated over the sea to the east of Japan at 09:00 on August 20 and approached the Tohoku region before making landfall near Kushiro City, Hokkaido after 23:00 on the 21st. It then continued up through Hokkaido and turned into an extra-tropical cyclone in the Sea of Okhotsk at 03:00 on the 22nd. 2016 Typhoon 9 made landfall near Tateyama City, Chiba Prefecture at around 12:30 on August 22 and continued up through the Kanto and Tohoku regions, making landfall once more in the central Hidaka region of Hokkaido before 06:00 on the 23rd. It then continued up through Hokkaido before turning into an extra-tropical cyclone in the Sea of Okhotsk at 12:00 on the 23rd. These typhoons and weather fronts caused heavy rain in eastern and northern Japan. Between 00:00 on August 20 and 24:00 on the 23rd, there was 448.5 mm of rainfall at Mt. Amagi in Izu City, Shizuoka Prefecture; 297.5 mm at Ome in Ome City, Tokyo; and 296.0 mm at Itokushibetsu in Shibetsu Town, Hokkaido. Hokkaido experienced particularly heavy rain, receiving double the average rainfall for August. 	2	76	6	19	665	<ul style="list-style-type: none"> Deployment of government survey team Designation as an extremely severe disaster
2016 Typhoon 10 (August 26-31, 2016)	<ul style="list-style-type: none"> 2016 Typhoon 10 approached the Kanto region in the morning of August 30 and made landfall near Ofunato City, Iwate Prefecture at around 17:30 on the 30th, accompanied by a storm area. It then gathered speed as it passed through the Tohoku region on a peculiar course that saw it exit onto the Sea of Japan, and turned into an extra-tropical cyclone on the 31st. This was the first time that a typhoon had made landfall on the northeastern Pacific coast since the Japan Meteorological Agency began recording statistics in 1951. 	29	14	518	2,281	279	<ul style="list-style-type: none"> Installation of government on-site communications office Appeal to the public by the Minister of State for Disaster Management Local survey by Prime Minister Abe (twice) Deployment of government survey team (twice) Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster
2016 Typhoon 16 (September 16-20, 2016)	<ul style="list-style-type: none"> With powerful momentum, 2016 Typhoon 16 made landfall on the Osumi Peninsula, Kagoshima Prefecture after 00:00 on September 20 and then headed northeast across the waters off Shikoku before making landfall once more near Tanabe City, Wakayama Prefecture at around 13:30 the same day. After making landfall yet again just after 17:00 that day near Tokoname City, Aichi Prefecture, it turned into an extra-tropical cyclone at 21:00 the same day over the waters off the Tokaido coast. 	1	47	8	65	509	• Designation as an extremely severe disaster
2016 Earthquake centered in the central Tottori Prefecture (October 21, 2016)	Maximum seismic intensity of Lower 6	0	32	18	312	—	<ul style="list-style-type: none"> Deployment of government survey team Invocation of Disaster Relief Act Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims Designation as an extremely severe disaster

Name of Disaster	Major Events	Human Casualties (persons)		Houses Damaged (houses)			Remarks
		Fatalities/ Missing Persons	Injured	Completely Destroyed	Half Destroyed	Above- floor Flooding	
Earthquake centered in the northern Ibaraki Prefecture (December 28, 2016)	Maximum seismic intensity of Lower 6	0	2	0	1	—	
March 27, 2017Avalanche in Nasu, Tochigi Prefecture on (March 27, 2017)	An avalanche hit the Nasu Onsen Family Ski Resort, affecting high-school students were involved during a mountain climbing workshop.	8	40	—	—	—	
Heavy rains from Seasonal Rain Front starting June 30, 2017 and 2017 Typhoon 3 (including July 2017 Northern Kyushu Heavy Rain) (June 30 - July 10, 2017)	Localized intense rain caused by a seasonal rain front and Typhoon 3 fell mainly in northern Kyushu. Especially from July 5 to 6, record heavy rain hit northern Kyushu due to warm and very moist air flowing in toward the rain front stalling in the vicinity of the Tsushima Straits.	44	34	326	1,110	222	<ul style="list-style-type: none"> · Local survey by Prime Minister Abe · Deployment of a Cabinet Office advance information gathering team · Deployment of government survey team (twice) · Installation of government on-site communications office · Invocation of Disaster Relief Act · Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims · Designation as an extremely severe disaster
Heavy Rains from Seasonal Rain Front Starting July 22, 2017 (July 22 - 26, 2017)	Warm and moist air flowed in towards the rain front stalling over Tohoku and Hokuriku regions; stimulating it and causing heavy rain, concentrated in these regions, from July 22.	0	0	3	44	616	<ul style="list-style-type: none"> · Invocation of Disaster Relief Act · Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims · Designation as an extremely severe disaster
2017 Typhoon 18 (September 13 - 18, 2017)	Typhoon 18, heading north near Miyako Island on September 13, made landfall in the vicinity of Minami-Kyushu City of Kagoshima Prefecture at around 11:30 on 17th. It continued to move north along the Japanese islands with an accompanying storm and became an extra-tropical cyclone at 21:00 on 18th near Sakhalin. The typhoon and active rain front caused driving rains from Western to Northern Japan.	5	72	5	617	1,486	<ul style="list-style-type: none"> · Invocation of Disaster Relief Act · Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims · Designation as an extremely severe disaster
2017 Typhoon 21 (October 21 - 23, 2017)	Typhoon 21 moved northward from the southern part of Japan during 21 - 22 October and made landfall near Omaezaki in Shizuoka Prefecture while retaining its supersized and powerful momentum. It proceeded northeasterly with an accompanying large storm area and became an extra-tropical cyclone in the eastern sea of Hokkaido at 15:00 on 23rd. This brought heavy rain over much of Western and Eastern Japan and the Tohoku region; due to well-developed rain clouds surrounding the typhoon and the rain front stalling near Honshu.	8	244	7	434	2,776	<ul style="list-style-type: none"> · Deployment of government survey team · Invocation of Disaster Relief Act · Invocation of Act on Support for Reconstructing Livelihoods of Disaster Victims · Designation as an extremely severe disaster

Notes: *1 Established by a Cabinet meeting decision, and therefore not based on the Basic Act on Disaster Management.

*2 The number of damaged houses in the July 2012 Northern Kyushu Torrential Rains contains some duplications.

*3 The number of damaged houses due to heavy rains from June 21 to July 7, 2012 contains some duplications.

*4 The details given for the 2016 Kumamoto Earthquake show the toll as of April 13, 2018.

Source: Cabinet Office, Fire and Disaster Management Agency Materials, Major Disaster Management Headquarters materials

Fig. A-11 Establishment of Extreme Disaster Management Headquarters and Major Disaster Management Headquarters

As of February 23, 2018

	Name of Headquarters	Period of Establishment	Manager of Headquarters
1	Heavy Snowfall Major Disaster Management Headquarters	Jan. 29 - May 31, 1963	Minister of State
2	Niigata Earthquake Major Disaster Management Headquarters	Jun. 16 - Oct. 31, 1964	Minister of State
3	1965 Typhoon 23, 24, and 25 Major Disaster Management Headquarters	Sep. 17 - Dec. 17, 1965	Minister of State
4	1966 Typhoon 24 and 26 Major Disaster Management Headquarters	Sep. 26 - Dec. 27, 1966	Minister of State
5	1967 July and August Torrential Rains Major Disaster Management Headquarters	Jul. 9 - Dec. 26, 1967	Minister of State
6	1968 Tokachi-oki Earthquake Major Disaster Management Headquarters	May 16, 1968 - May 2, 1969	Minister of State
7	July 1972 Torrential Rains Major Disaster Management Headquarters	Jul. 8 - Dec. 19, 1972	Minister of State
8	1976 Typhoon 17 Major Disaster Management Headquarters	Sep. 13 - Dec. 10, 1976	Director General of National Land Agency (NLA)
9	1977 Mt. Usu Eruption Major Disaster Management Headquarters	Aug. 11, 1977 - Dec. 4, 1979	Director General of NLA
10	1978 Izu-Oshima-kinkai Earthquake Major Disaster Management Headquarters	Jan. 15 - Aug. 4, 1978	Director General of NLA
11	1978 Miyagi-ken-oki Earthquake Major Disaster Management Headquarters	Jun. 13 - Nov. 28, 1978	Director General of NLA
12	1979 Typhoon 20 Major Disaster Management Headquarters	Oct. 20 - Dec. 4, 1979	Director General of NLA
13	July and August 1982 Torrential Rains Major Disaster Management Headquarters	Jul. 24 - Dec. 24, 1982	Director General of NLA
14	1983 Nihon-kai-chubu Earthquake Major Disaster Management Headquarters	May 26 - Dec. 23, 1983	Director General of NLA
15	July 1983 Torrential Rains Major Disaster Management Headquarters	Jul. 23 - Dec. 23, 1983	Director General of NLA
16	1983 Miyake Island Eruption Major Disaster Management Headquarters	Oct. 4, 1983 - Jun. 5, 1984	Director General of NLA
17	1984 Nagano-ken-seibu Earthquake Major Disaster Management Headquarters	Sep. 16, 1984 - Feb. 19, 1985	Director General of NLA
18	1991 Mt. Unzen Eruption Major Disaster Management Headquarters	Jun. 4, 1991 - Jun. 4, 1996	Director General of NLA
19	1993 Hokkaido-nansei-oki Earthquake Major Disaster Management Headquarters	Jul. 13, 1993 - Mar. 31, 1996	Director General of NLA
20	August 1993 Torrential Rains Major Disaster Management Headquarters	Aug. 9, 1993 - Mar. 15, 1994	Director General of NLA
21	1995 Great Hanshin-Awaji Earthquake Major Disaster Management Headquarters	Jan. 17, 1995 - Apr. 21, 2002	Director General of NLA ↓ Minister of Great Hanshin-Awaji Earthquake Measures ↓ Director General of NLA ↓ Minister of State for Disaster Management
	Great Hanshin-Awaji Earthquake Extreme Disaster Management Headquarters ^{*1}		Jan. 19 - Apr. 28, 1995
22	1997 Diamond Grace Oil Spill Major Disaster Management Headquarters	Jul. 2-11, 1997	Minister of Transport
23	2000 Mt. Usu Eruption Major Disaster Management Headquarters	Mar. 31, 2000 - Jun. 28, 2001 ^{*2}	Director General of NLA ↓ Minister of State for Disaster Management
24	2000 Miyake Island Eruption and Niijima and Kozushima Island Earthquake Emergency Management Headquarters	Aug. 29, 2000 - May 15, 2002	Director General of NLA ↓
	2000 Miyake Island Eruption Major Disaster Management Headquarters ^{*3}	May 16, 2002 - Mar. 31, 2005	Minister of State for Disaster Management
25	2004 Typhoon 23 Major Disaster Management Headquarters	Oct. 21, 2004 - Mar. 31, 2007	Minister of State for Disaster Management
26	2004 Mid Niigata Prefecture Earthquake Major Disaster Management Headquarters	Oct. 24, 2004 - Mar. 31, 2008	Minister of State for Disaster Management
27	2011 Great East Japan Earthquake Extreme Disaster Management Headquarters	Mar. 11, 2011 -	Prime Minister
28	2011 Typhoon 12 Major Disaster Management Headquarters	Sep. 4, 2011 - Dec. 26, 2014	Minister of State for Disaster Management
29	2014 Torrential Rains Major Disaster Management Headquarters	Feb. 18 - May 30, 2014	Minister of State for Disaster Management
30	August 2014 Torrential Rains Major Disaster Management Headquarters	Aug. 22, 2014 - Jan. 9, 2015	Minister of State for Disaster Management
31	2014 Mt. Ontake Eruption Major Disaster Management Headquarters	Sep. 28, 2014 - Nov. 9, 2015	Minister of State for Disaster Management
32	2016 Emergency Response Headquarters for the Earthquake Centered in the Kumamoto Region of Kumamoto Prefecture	April 14, 2016 -	Minister of State for Disaster Management

Notes: The above are Extreme Disaster Management Headquarters and Major Disaster Management Headquarters based on the Basic Act on Disaster Management (Act No. 223 of 1961).

*1 Established within the Cabinet Office based on a Cabinet meeting resolution, not based on the Basic Act on Disaster Management.

*2 Based on reports that the eruption had subsided. Upon dissolution of the Headquarters, the Mt. Usu Eruption Disaster Restoration and Recovery Measures Council was established.

*3 The names of Niijima Island and Kozushima Island were changed with the conclusion of response measures.

Source: Cabinet Office

Fig. A-12 Deployment of Government Survey Teams (Since the Great Hanshin-Awaji Earthquake)

As of March 16, 2018

Year	Name of Disaster	Deployment Dates	Prefecture Surveyed	Team Leader
1995	1995 Hyogo-ken-Nanbu Earthquake (Great Hanshin-Awaji Earthquake)	Jan. 17-18	Hyogo	Director General of National Land Agency (NLA)
1997	July 1997 Torrential Rains from Seasonal Rain Front	Jul. 11-12	Kagoshima, Kumamoto	Director General of NLA
1998	End of August 1998 Torrential Rains	Aug. 28	Tochigi, Fukushima	Parliamentary Vice-Minister of National Land
1999	Heavy Rains Starting June 23, 1999	Jun. 30 - Jul. 1	Hiroshima	Director General of NLA
	Heavy Rains from 1999 Typhoon 18 and Rain Front	Sep. 25	Kumamoto	Director General of NLA
2000	2000 Eruption of Mt. Usu	Mar. 31 - Apr. 1	Hokkaido	Director General of NLA
	2000 Tottori-seibu Earthquake	Oct. 7	Tottori	Director General of NLA
2001	2001 Geiyo Earthquake	Mar. 29	Hiroshima, Ehime	Parliamentary Vice-Minister of Cabinet Office
2003	July Seasonal Rain Front Torrential Rains	Jul. 22	Kumamoto, Kagoshima	Minister of State for Disaster Management
	Northern Miyagi Earthquake	Jul. 27	Miyagi	Minister of State for Disaster Management
	2003 Tokachi-oki Earthquake	Sep. 26-27	Hokkaido	State-Minister of the Cabinet Office
2004	July 2004 Niigata and Fukushima Torrential Rains	Jul. 14	Niigata	Minister of State for Disaster Management
		Jul. 15	Fukushima	State-Minister of the Cabinet Office
	July 2004 Fukui Torrential Rains	Jul. 20	Fukui	State-Minister of the Cabinet Office
	2004 Typhoon 21	Oct. 1	Mie	Minister of State for Disaster Management
	2004 Typhoon 22	Oct. 14	Shizuoka	State Minister of the Cabinet Office
	2004 Typhoon 23	Oct. 22	Hyogo, Kyoto	Minister of State for Disaster Management
		Oct. 22	Kagawa, Okayama	State-Minister of the Cabinet Office
2004 Mid Niigata Prefecture Earthquake	Oct. 24	Niigata	Minister of State for Disaster Management	
2005	Fukuoka-ken-Seihou-oki Earthquake	Mar. 20-21	Fukuoka	State-Minister of the Cabinet Office
	Miyagi-ken-oki Earthquake	Aug. 16-17	Miyagi	Parliamentary Vice-Minister of Cabinet Office
	2005 Typhoon 14	Sep. 9	Miyazaki	Minister of State for Disaster Management
2006	Heavy Rains from Seasonal Rain Front Starting July 4	Jul. 21	Nagano	Minister of State for Disaster Management
		Jul. 25	Kagoshima	State-Minister of the Cabinet Office
	2006 Typhoon 13	Sep. 19	Miyazaki	Minister of State for Disaster Management
	Tornado in Saroma, Hokkaido	Nov. 7-8	Hokkaido	Minister of State for Disaster Management
2007	2007 Noto-hanto Earthquake	Mar. 25-26	Ishikawa	Minister of State for Disaster Management
	Heavy Rains from Typhoon 4 and Seasonal Rain Front	Jul. 13	Kumamoto	State-Minister of the Cabinet Office
	2007 Niigataken Chuetsu-oki Earthquake	Jul. 16	Niigata	Minister of State for Disaster Management
2008	2008 Iwate-Miyagi Nairiku Earthquake	Jun. 14-15	Iwate, Miyagi	Minister of State for Disaster Management
	Earthquake Epicentered Along Northern Coast of Iwate Prefecture	Jul. 24	Iwate, Aomori	Minister of State for Disaster Management
	End of August 2008 Torrential Rains	Aug. 29	Aichi	Minister of State for Disaster Management
2009	July 2009 Torrential Rains in Chubu and Northern Kyushu	Jul. 22	Yamaguchi	Minister of State for Disaster Management
		Jul. 27	Fukuoka	Minister of State for Disaster Management
	2009 Typhoon 9	Aug. 11	Hyogo, Okayama	Minister of State for Disaster Management
2011	2011 Tohoku Earthquake and Tsunami (Great East Japan Earthquake)	Mar. 11	Miyagi	State-Minister of the Cabinet Office
		Mar. 12	Iwate	State-Minister of the Cabinet Office
		Mar. 12	Fukushima	Parliamentary Vice-Minister of Finance
	July 2011 Niigata and Fukushima Torrential Rains	Jul. 31	Niigata, Fukushima	Minister of State for Disaster Management
		Aug. 2	Fukushima	State-Minister of the Cabinet Office
	2011 Typhoon 12	Sep. 4-7	Wakayama, Nara, Mie	Parliamentary Vice-Minister of Cabinet Office
Sep. 6		Nara	Minister of Land, Infrastructure, Transport and Tourism	
2012	May 2012 Gust	May 7	Ibaraki, Tochigi	State-Minister of the Cabinet Office
	July 2012 Torrential Rains in Northern Kyushu	Jul. 13-14	Kumamoto, Oita	Minister of State for Disaster Management
		Jul. 21-22	Fukuoka, Oita, Kagoshima	Minister of State for Disaster Management

Year	Name of Disaster	Deployment Dates	Prefecture Surveyed	Team Leader
2013	Heavy Snowfall in 2012	Mar. 4-5	Hokkaido	Parliamentary Vice-Minister of Cabinet Office, Special Advisor to the Prime Minister
	Heavy Rains with Seasonal Rain Front	Jul. 29-30	Shimane, Yamaguchi	State-Minister of the Cabinet Office
		Aug. 3	Yamagata, Fukushima	Parliamentary Vice-Minister of Cabinet Office
		Aug. 3	Niigata	Parliamentary Vice-Minister of Agriculture, Forestry and Fisheries
		Aug. 3	Iwate, Miyagi	Parliamentary Vice-Minister of Land, Infrastructure, Transport and Tourism
		Aug. 9	Shimane, Yamaguchi	Minister of State for Disaster Management
		Aug. 13	Akita	State-Minister of the Cabinet Office
		Aug. 13	Iwate, Akita	Parliamentary Vice-Minister of Cabinet Office
	Tornadoes on September 2 and 4	Sep. 3	Saitama	Parliamentary Vice-Minister of Cabinet Office
		Sep. 4	Chiba	Parliamentary Vice-Minister of Cabinet Office
	Heavy Rains from Typhoon 18	Sep. 17	Saitama	Parliamentary Vice-Minister of Cabinet Office
		Sep. 18	Kyoto	Acting Minister of State for Disaster Management
		Sep. 18	Shiga, Fukui	State-Minister of the Cabinet Office
		Sep. 19	Mie	Parliamentary Vice-Minister of Cabinet Office
	Typhoon 26	Sep. 19-20	Aomori, Iwate, Akita	Special Advisor to the Prime Minister
		Oct. 19	Oshimacho (Tokyo)	Minister of State for Disaster Management
2014	Heavy Snowfall in 2013	Feb. 6	Akita	State-Minister of the Cabinet Office
		Feb. 17	Yamanashi	Parliamentary Vice-Minister of Cabinet Office
		Mar. 7	Tokyo, Yamanashi	State-Minister of the Cabinet Office, State-Minister of the Environment
		Mar. 10	Saitama	State-Minister of the Cabinet Office
	Typhoon 8 and Seasonal Rain Front	Mar. 15	Nagano, Gunma	State-Minister of the Cabinet Office
		Jul. 11	Nagano	Parliamentary Vice-Minister of Cabinet Office
		Jul. 12	Yamagata	Parliamentary Vice-Minister of Cabinet Office
	Typhoon 12 & 11	Jul. 14-15	Okinawa	Parliamentary Vice-Minister of Cabinet Office
		Aug. 11-13	Tokushima, Kochi	State-Minister of the Cabinet Office
		Aug. 11	Tochigi	Parliamentary Vice-Minister of Cabinet Office
	Heavy Rains Starting August 15	Aug. 18-19	Hyogo, Kyoto	State-Minister of the Cabinet Office
		Aug. 19	Gifu	Parliamentary Vice-Minister of Cabinet Office
	Heavy Rains in Hiroshima Prefecture Starting August 19	Aug. 20-21	Hiroshima	Minister of State for Disaster Management
		Sep. 6	Hiroshima	Minister of State for Disaster Management
		Sep. 17	Hiroshima	Parliamentary Vice-Minister of Cabinet Office
	Mt. Ontake Eruption	Sep. 28	Nagano	State-Minister of the Cabinet Office
		Oct. 11	Nagano	Minister of State for Disaster Management
	Earthquake Epicentered in Northern Nagano Prefecture	Nov. 23	Nagano	Parliamentary Vice-Minister of Cabinet Office
Dec. 2		Nagano	Minister of State for Disaster Management	
Heavy Snowfall in 2014	Dec. 9	Tokushima	Minister of State for Disaster Management	
2015	Eruption of Kuchinoerabu-jima	May 29-30	Kagoshima	State-Minister of the Cabinet Office
	Torrential Rain of September 2015 in the Kanto and Tohoku Regions	Sep. 11	Ibaraki, Tochigi	State-Minister of the Cabinet Office
	Typhoon 21	Sep. 30-Oct. 1	Okinawa	Parliamentary Vice-Minister of Cabinet Office
2016	The 2016 Kumamoto Earthquake	Apr. 15	Kumamoto	State-Minister of the Cabinet Office
	2016 Typhoon 11 & 9	Aug. 28-29	Hokkaido	Parliamentary Vice-Minister of Cabinet Office
		Aug. 31-Sep. 1	Iwate	Parliamentary Vice-Minister of Cabinet Office
	2016 Typhoon 10	Sep. 5	Hokkaido	Minister of State for Disaster Management
Earthquake centered in the central Tottori Prefecture	Oct. 29	Tottori	State-Minister of the Cabinet Office	
2017	Heavy Rains from Seasonal Rain Front Starting June 30, 2017 and 2017 Typhoon 3	Jul. 7	Fukuoka	State-Minister of the Cabinet Office
		Jul. 9	Oita, Fukuoka	Minister of State for Disaster Management
	2017 Typhoon 21	Oct. 27	Osaka, Wakayama	Minister of State for Disaster Management
2018	Heavy Snowfall in 2017	Feb. 24	Fukui	Minister of State for Disaster Management

Source: Cabinet Office

Fig. A-13 Invocation History of the Disaster Relief Act (Since the Great Hanshin-Awaji Earthquake)

As of March 1, 2018

Year	Name of Disaster	Date of Invocation	Prefecture	No. of Municipalities Invoking the Act	
1995	1995 Hyogo-ken-Nanbu Earthquake (Great Hanshin-Awaji Earthquake)	Jan. 17	Hyogo	20	
			Osaka	5	
	Niigata-ken-Hokubu Earthquake	Apr. 1	Niigata	1	
	Heavy Rain Starting on July 3	Jul. 5	Ehime	1	
	July 1995 Seasonal Rain Front Torrential Rains	Jul. 11, Jul. 12	Jul. 11	Niigata	2
			Jul. 11, Jul. 12	Nagano	2
Heavy Rain Starting on August 10	Aug. 10	Niigata	1		
1996	Typhoon 17	Sep. 22	Saitama	1	
			Chiba	2	
1997	July 1997 Seasonal Rain Front Torrential Rains	Jul. 10	Kagoshima	1	
	1997 Typhoon 19	Sep. 16	Oita	1	
			Miyazaki	4	
Kagoshima	1				
1998	Early August 1998 Torrential Rains	Aug. 4	Niigata	3	
	End of August 1998 Torrential Rains	Aug. 27, Aug. 30	Aug. 27	Fukushima	3
			Aug. 28	Ibaraki	1
			Aug. 27, Aug. 30	Tochigi	4
			Aug. 28	Saitama	1
			Aug. 3	Shizuoka	1
	1998 Typhoon 5	Sep. 16	Saitama	1	
	1998 Typhoon 7	Sep. 22	Fukui	1	
			Hyogo	1	
			Nara	1	
	Heavy Rains of September 23–25, 1998	Sep. 25	Kochi	6	
1998 Typhoon 10	Oct. 17	Okayama	4		
1999	Heavy Rains Starting June 23, 1999	Jun. 29	Hiroshima	2	
	Fukuoka		1		
	Torrential Rains in Tsushima Region on August 27–28, 1999	Aug. 27	Nagasaki	1	
	Heavy Rains from 1999 Typhoon 18 and Rain Front	Sep. 24	Yamaguchi	9	
			Fukuoka	1	
			Kumamoto	9	
	Tokaimura Criticality Accident	Sep. 3	Ibaraki	2	
Heavy Rains Starting October 27, 1999	Oct. 28	Aomori	1		
Iwate	1				
2000	2000 Eruption of Mt. Usu	Mar. 29	Hokkaido	3	
	2000 Miyake Is. Eruption	Jun. 26	Tokyo	1	
	2000 Niijima and Kozushima Is. Earthquake	Jul. 1, Jul. 15	Tokyo	2	
	2000 Typhoon 3	Jul. 8	Saitama	1	
	Heavy Rains from 2000 Autumn Rain Front and Typhoon 14	Sep. 11	Aichi	21	
			Gifu	1	
	2000 Tottori-ken-Seibu Earthquake	Oct. 6	Tottori	6	
Shimane			2		
2001	2001 Geiyo Earthquake	Mar. 24	Hiroshima	13	
	Ehime		1		
	Heavy Rains of September 6, 2001	Sep. 6	Kochi	2	
2001 Typhoon 16	Sep. 8, Sep. 11	Okinawa	2		
2002	2002 Typhoon 6	Jul. 10	Iwate	1	
		Jul. 11	Gifu	1	
2003	July Seasonal Rain Front Torrential Rains	Jul. 19	Fukuoka	5	
		Jul. 20	Kumamoto	1	
	Northern Miyagi Earthquake	Jul. 26	Miyagi	5	
	2003 Typhoon 10	Aug. 9	Hokkaido	3	
2004	July 2004 Niigata and Fukushima Torrential Rains	Jul. 13	Niigata	7	
	July 2004 Fukui Torrential Rains	Jul. 18	Fukui	5	
	2004 Typhoon 10, Typhoon 11, and Related Heavy Rains	Jul. 31	Tokushima	2	
	2004 Typhoon 15 and Heavy Rains from Rain Front	Aug. 17	Ehime	1	
Kochi			1		

Year	Name of Disaster	Date of Invocation	Prefecture	No. of Municipalities Invoking the Act
2004	2004 Typhoon 16	Aug. 30	Okayama	9
			Kagawa	13
			Ehime	1
			Miyazaki	2
	2004 Typhoon 18	Sep. 7	Hiroshima	2
	2004 Typhoon 21	Sep. 29	Mie	5
			Ehime	4
			Hyogo	2
	2004 Typhoon 22	Oct. 9	Shizuoka	1
2004 Typhoon 23	Oct. 2	Miyazaki	1	
		Tokushima	4	
		Kagawa	9	
		Hyogo	18	
		Gifu	1	
	Kyoto	7		
2004 Mid Niigata Prefecture Earthquake	Oct. 23	Niigata	54	
2005	2005 Fukuoka-ken-Seihou-oki Earthquake	Mar. 20	Fukuoka	1
	2005 Typhoon 14	Sep. 4	Tokyo	2
		Sep. 6	Yamaguchi	2
			Kochi	1
			Miyazaki	13
		Sep. 4	Kagoshima	1
2006 Heavy Snowfall	Jan. 6, Jan. 8, Jan. 11, Jan. 13	Niigata	11	
	Jan. 7, Jan. 12	Nagano	8	
2006	June 2006 Extended Rain Landslide Disaster	Jun. 15	Okinawa	2
	Heavy Rains from Seasonal Rain Front Starting July 4	Jul. 19	Nagano	3
		Jul. 22	Kagoshima	6
			Miyazaki	1
	2006 Typhoon 13	Sep. 17	Miyazaki	1
Tornado in Saroma, Hokkaido	Nov. 7	Hokkaido	1	
2007	2007 Noto-hanto Earthquake	Mar. 25	Ishikawa	7
	Heavy Rains from Typhoon 4 and Seasonal Rain Front	Jul. 6	Kumamoto	1
	2007 Niigataken Chuetsu-oki Earthquake	Jul. 16	Niigata	10
	2007 Typhoon 5	Aug. 2	Miyazaki	1
	2007 Heavy Rains from Typhoon 11 and Rain Front	Sep. 17	Akita	2
2008	Low-Pressure System from February 23 to 24	Feb. 24	Toyama	1
	2008 Iwate-Miyagi Nairiku Earthquake	Jun. 14	Iwate	5
			Miyagi	2
	Heavy Rains Starting July 28	Jul. 28	Toyama	1
			Ishikawa	1
End of August 2008 Torrential Rains	Aug. 28	Aichi	2	
2009	July 2009 Torrential Rains in Chubu and Northern Kyushu	Jul. 21	Yamaguchi	2
		Jul. 24	Fukuoka	1
	2009 Typhoon 9	Aug. 9	Hyogo	3
			Okayama	1
2010	2010 Heavy Rains from Seasonal Rain Front	Jul. 14	Hiroshima	2
		Jul. 15	Yamaguchi	1
		Jul. 16	Hiroshima	1
	Heavy Rains in Amami Region, Kagoshima Prefecture	Oct. 20	Kagoshima	3
2011	Heavy Snowfall Starting November 2010	Jan. 27	Niigata	4
		Jan. 30	Niigata	2
		Jan. 31	Niigata	3
	Mt. Kirishima (Shinmoedake) Eruption	Jan. 30	Miyazaki	1
		Feb. 10	Miyazaki	1

Year	Name of Disaster	Date of Invocation	Prefecture	No. of Municipalities Invoking the Act
2011	2011 Great East Japan Earthquake	Mar. 11	Aomori	2
			Iwate	34
			Miyagi	35
			Fukushima	59
			Ibaraki	37
			Tochigi	15
			Chiba	8
	July 2011 Niigata and Fukushima Torrential Rains	Jul. 29	Niigata	15
			Fukushima	9
	2011 Typhoon 12	Sep. 2	Mie	3
			Nara	10
Wakayama			5	
2011 Typhoon 15	Sep. 21	Okayama	1	
		Tottori	2	
2012	Heavy Winter Snowfall	Jan. 14	Niigata	2
		Jan. 28	Niigata	4
		Jan.31	Niigata	1
		Feb. 1	Aomori	2
			Nagano	5
		Feb. 3	Niigata	4
	Feb. 4	Niigata	1	
	May 2012 Gust	May 6	Ibaraki	4
			Tochigi	3
	Heavy Rains Starting July 3	Jul. 3	Fukuoka	1
			Oita	2
	Heavy Rains from Seasonal Rain Front Starting July 11	Jul. 12	Kumamoto	5
			Oita	1
			Fukuoka	7
	Heavy Rains Starting August 13	Aug. 14	Kyoto	1
2012 Typhoon 16	Sep. 15	Kagoshima	1	
November 27 Destructive Snow Storm	Nov. 27	Hokkaido	7	
2013	Heavy Winter Snowfall	Feb. 22	Niigata	8
		Feb. 25	Niigata	1
		Feb. 26	Yamagata	1
		Feb. 28	Yamagata	1
	Snow Melt Landslide	May 1	Yamagata	1
	Heavy Rains Starting July 22	Jul. 22	Yamagata	4
	Heavy Rains Starting July 28	Jul. 28	Yamaguchi	3
			Shimane	1
	Heavy Rains Starting August 9	Aug. 9	Akita	3
			Iwate	1
	Heavy Rains Starting August 23	Aug. 23	Shimane	1
	September 2 Gust	Sep. 2	Saitama	2
2013 Typhoon 18	Sep. 16	Saitama	1	
		Kyoto	2	
2013 Typhoon 26	Oct. 16	Tokyo	1	
		Chiba	1	
2014	Heavy Winter Snowfall	Feb. 15	Nagano	4
			Gunma	1
			Yamanashi	16
		Feb. 17	Gunma	7
			Saitama	7
		Feb. 18	Gunma	1
Yamanashi	3			
Feb. 21	Yamanashi	2		

Year	Name of Disaster	Date of Invocation	Prefecture	No. of Municipalities Invoking the Act
2014	Heavy Rains from 2014 Typhoon 8	Jul. 9	Nagano	1
			Yamagata	1
	2014 Typhoon 12	Aug. 3	Kochi	1
	2014 Typhoon 11	Aug. 9	Kochi	3
			Tokushima	1
	Heavy Rains Starting August 15, 2014	Aug. 17	Kyoto	1
			Hyogo	1
	Heavy Rains Starting August 19, 2014	Aug. 20	Hiroshima	1
Damage Related to Mt. Ontake Eruption	Sep. 27	Nagano	2	
Nagano Prefecture Kamishiro Fault Earthquake	Nov. 22	Nagano	3	
Heavy Snowfall Starting December 5	Dec. 8	Tokushima	3	
2015	Eruption of Kuchinoerabu-jima	May 29	Kagoshima	1
	Torrential Rain of September 2015 in the Kanto and Tohoku Regions	Sep. 9	Ibaraki	10
			Tochigi	8
		Sep. 10	Miyagi	8
2015 Typhoon 21	Sep. 28	Okinawa	1	
2016	The 2016 Kumamoto Earthquake	Apr. 14	Kumamoto	45
	2016 Typhoon 10	Aug. 30	Hokkaido	20
			Iwate	12
	2016 Earthquake centered in the central Tottori Prefecture	Oct. 21	Tottori	4
2016 Conflagration in Itoigawa City, Niigata Prefecture	Dec. 22	Niigata	1	
2017	July 2017 Northern Kyushu Heavy Rain	Jul. 5	Fukuoka	3
		Jul. 5	Oita	2
	Heavy Rain Starting on July 22, 2017	Jul. 22	Akita	1
	2017 Typhoon 18	Sep. 17	Oita	2
		Oct. 22	Mie	2
	2017 Typhoon 21	Oct. 22	Kyoto	1
Oct. 21		Wakayama	1	
2018	Heavy Snowfall Starting February 4, 2018	Feb. 6	Fukui	8
		Feb. 13	Fukui	1
	Heavy Snowfall in 2017	Feb. 14	Niigata	5

Source: Cabinet Office

Fig. A-14 Actual Designations of Extremely Severe Disasters in the Past Five Years

Title of Legislation	Disaster Name	Main Affected Areas	Main Applicable Measures										Other Applicable Measures
			Art. 3, 4	Art. 5	Art. 6	Art. 7	Art. 12	Art. 16	Art. 17	Art. 19	Art. 24		
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Torrential Rains and Rainstorms from June 8 to July 23, 2011	Seasonal Rain Front/Typhoon 4	Fukuoka, Kumamoto and Oita Pref.	○	○	○		●	○	○	○	○		
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Specified Regions in 2012	2012 Regional Disasters	—	●	●							●		
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Torrential Rains and Rainstorms from June 8 to August 9, 2013	Seasonal Rain Front/ Typhoon 4/ Typhoon 7	Iwate, Yamagata, Shimane and Yamaguchi Pref.	●	○	○						○ *1		
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for the Districts of Gotsu City and Onancho, Ochigun, Shimane Prefecture Due to Heavy Rains from August 23 to 25, 2013	Torrential Rains	Shimane Pref.	●	●							●		
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Rainstorms and Torrential Rains from September 15 to 17, 2013	Typhoon 18	Fukui, Shiga and Kyoto Pref.		○	○						○		
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for the District of Oshima-machi, Tokyo Prefecture Due to Rainstorms on October 15 and 16, 2013	Typhoon 26	Tokyo	●	●			●				●		
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Specified Regions in 2013	2013 Regional Disasters	—	●	●	●						●		
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for the Districts of Nagiso-machi, Kiso-gun, Nagano Prefecture, and Shiiba-son, Higashi Usuki-gun, Miyazaki Prefecture Due to Rainstorms and Torrential Rains on July 9 and 10, 2014	Seasonal Rain Front/Typhoon 8	Nagano and Miyazaki Pref.		●							●		
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Rainstorms and Heavy Rains from July 30 to August 25, 2014	Torrential Rains Caused by Typhoon 11/ Typhoon 12/ Seasonal Rain Front	Hokkaido, Kyoto, Hyogo, Osaka, Nara, Hiroshima, Tokushima, Ehime, and Kochi Pref.	○	○	○			○	○	○	○		
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for the Districts of Sumoto City and Awaji City, Hyogo Prefecture Due to Rainstorms on October 13 and 14, 2014	Typhoon 19	Hyogo Pref.		●							●		
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for the Districts of Ikeda-cho and Otari-mura, Kitaazumi-gun, Nagano Prefecture Due to the Earthquake of November 22, 2014.	Earthquake of Nov. 22, 2014	Nagano Pref	●	●							●		
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Specified Regions in 2014	2014 Regional Disasters	—	●	●							●		
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Torrential Rains and Rainstorms from June 2 to July 26, 2015	Seasonal Rain Front/Typhoon 9/ Typhoon 11/ Typhoon 12	Kumamoto Pref.	●	○							○ *1		

Title of Legislation	Disaster Name	Main Disaster-Affected Regions	Main Applicable Measures									Other Applicable Measures	
			Art. 3, 4	Art. 5	Art. 6	Art. 7	Art. 12	Art. 16	Art. 17	Art. 19	Art. 24		
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for the Districts of Odai Town, Taki-gun and Kihoku Town, Kitamuro-gun, Mie Prefecture Due to Rainstorms on August 24 and 26, 2015	Typhoon 15	Mie Pref.		●								●	
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Rainstorms and Torrential Rains from September 7 to 11, 2015	Typhoon 18, etc.	Miyagi, Fukushima, Ibaraki, and Tochigi Pref.	●	○	○		●					○ *1	
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Specified Regions in 2015	2015 Regional Disasters	—	●	●								●	
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for the 2016 Kumamoto Earthquake	The 2016 Kumamoto Earthquake	Kumamoto Pref., etc.	○	○	○		○	○	○	○	○	○	○
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Torrential Rains from June 6 to July 15, 2016	Seasonal Rain Front	Kumamoto and Miyazaki Pref.	●	○								○ *1	
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Rainstorms and Torrential Rains from August 16 to September 1, 2016	Typhoon 7/ Typhoon 9/ Typhoon 10/ Typhoon 11, etc.	Hokkaido and Iwate Pref.	○	○	○	○ *2	●	○	○	○	○	○	
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Rainstorms and Torrential Rains from September 17 to 21, 2016	Typhoon 16	Miyazaki and Kagoshima Pref.	●	○	○							○ *1	
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Specified Regions in 2016	2016 Regional Disasters	—	●	●								●	
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Torrential Rains and Rainstorms on June 7 - July 27, 2017	Seasonal Rain Front (Northern Kyushu Heavy Rain, etc.)/Typhoon 3	Fukuoka and Oita Pref.	●	○	○		●					○ *1	
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Rainstorms and Torrential Rains on September 15 - 19, 2017	Typhoon 18	Kyoto, Ehime, and Oita Pref.	●	○								○ *1	
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Rainstorms on October 21 - 23, 2017	Typhoon 21	Niigata and Mie Pref., Kinki region	●	○	○							○ *1	○
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Specified Regions in 2017	2017 Regional Disasters	—	●	●								●	

*1 Public works facilities were considered as regional disaster

*2 Limited to portions concerning item 3

[Legend]

○: Indicates a national disaster (Region is not specified, the disaster itself is specified).

●: Indicates a regional disaster (Disaster is specified at the municipal level.).

The applicable measures are the measures listed below prescribed in the Act on Special Financial Support to Deal with Extremely Severe Disasters.

[Main applicable measures]

Art. 3, 4: Special financial support for disaster recovery projects for public works facilities

Art. 5: Special measures on subsidies for disaster recovery projects for agricultural land

Art. 6: Special cases of subsidies for disaster recovery projects for agricultural, forestry, and fisheries shared-used facilities

Art. 7 (iii): Special financial support for disaster recovery projects for plant and animal aquaculture facilities

Art. 12: Special provision concerning disaster-related credit guarantees under the Small and Medium-sized Enterprise Credit Insurance Act

Art 16.: Subsidies for disaster recovery projects for public social and educational facilities

Art. 17: Subsidies for disaster recovery projects for private school facilities

Art. 19: Special cases of cost coverage for projects implemented by municipalities to prevent infectious diseases

Art. 24: Inclusion of funds for the redemption of principal and interest related to small disaster bonds in the standard budget request

[Other applicable measures]

Art. 8: Application of interim measures related to financing for agricultural, forestry, and fishery operators who are victims of natural disasters

Art. 9: Subsidies for projects to remove deposited earth and sand conducted by forestry associations

Art. 10: Subsidies for projects to remove floodwater conducted by land improvement districts

Art. 11: Subsidies for construction expenses for shared-use small fishing boats

Art. 11-2: Subsidies for disaster recovery projects for forests

Art. 14: Subsidies for disaster reconstruction projects for facilities including business cooperatives

Art. 20: Special cases of government loans based on the Act for the Welfare of Fatherless Families, motherless families and Widows

Art. 22: Special cases of subsidies for public housing construction projects for victims

Art. 25: Special cases of paying job seeker benefits based on the Employment Insurance Act

15-1 Heavy Rains from Seasonal Rain Front Starting June 30, 2017 and 2017 Typhoon 3 (including July 2017 Northern Kyushu Heavy Rain)

(1) Damage

Localized intense rains caused by a seasonal rain front and Typhoon 3 fell mainly in western Japan from June 30 onward. Especially from July 5 to 6, record heavy rains hit northern Kyushu (July 2017 Northern Kyushu Heavy Rain). This series of heavy rains damaged 316 public civil engineering works as well as causing river flooding. Casualties amounted to 42 fatalities, 2 missing persons, 9 seriously injured and 25 lightly injured, while damage to houses encompassed 326 completely destroyed, 1,110 half-destroyed, 222 with above-floor flooding and 2,016 with below-floor flooding as of February 22, 2018 (FDMA).

Especially in Fukuoka and Oita Prefectures which underwent record heavy rain, damage to farmlands and agricultural facilities, on which people in these regions depend for their livelihoods, was serious in addition to roads, rails, electricity, water and other lifeline infrastructure. Moreover, a large volume of driftwood caused by hillside collapses in many areas due to torrential rains surged toward residential areas and farmlands, leaving large amounts of disaster waste including these driftwood and debris.

Damage to numerous houses and severed roads in many affected areas forced more than 2,000 people to stay at evacuation centers just after the disaster.

(2) Response from Government Ministries and Agencies

At 12:30 on July 3, the government held an Inter-Agency Disaster Alert Meeting attended by the Minister of State for Disaster Management. During the meeting, participants shared information about the weather outlook and the steps being taken by ministries and agencies in response, confirming that they would take appropriate response measures. The Minister of State for Disaster Management made an appeal to all members of the public to take active initiatives for ensuring the safety to protect their life.

At 11:30 on July 5, in response to a heavy rain emergency warning issued to Shimane Prefecture early in the morning, the government held an Inter-Agency Disaster Management Meeting, during which participants shared information about the transition of weather, weather outlook, the extent of the damage and the steps being taken by ministries and agencies in response, confirming that they would take appropriate response measures. The Minister of State for Disaster Management made an appeal to all members of the public to take initiatives early for ensuring the safety (a total of 8 such meetings were held thereafter).

At 18:56 the same day, the Prime Minister issued the following instructions to relevant ministries and agencies in response to situations resulting from record heavy rain in northern Kyushu:

1. Ascertain the extent of the damage without delay.
2. Work closely with local governments as an integrated government team, sparing no effort in taking emergency disaster control measures, including the rescue and relief of affected people. In addition, fully implement measures to prevent further harm by such means as providing support for the evacuation of local citizens.
3. Ensure timely and accurate provision of information to the public regarding evacuation and the extent of the damage.

At 19:15 the same day, a meeting of the directors-general of related ministries and agencies was held, and at 20:08, the Emergency Response Team met, at which participants confirmed that they would spare no effort to ascertain emergency disaster control measures in response to the Prime Minister's instructions. At 09:00 the next day, a Cabinet meeting was held (a total of 3 such meetings were held thereafter) confirming that they would take every available step to ascertain emergency disaster control measures, including the understanding the damage status and rescue and relief of affected people and prevent further harm by such means as providing support for the evacuation of local citizens.

The SDF carried out the following disaster relief operations in the areas concerned, in response to requests from the governors of Fukuoka and Oita Prefectures.

A. Overview of Disaster Relief Operations

- At 19:00 on Wednesday, July 5, the Governor of Fukuoka Prefecture contacted the Commander of the GSDF 4th Division (Fukuoka) to request a disaster relief deployment for the purpose of saving lives and transporting supplies (request for withdrawal: 10:00 on Sunday, August 20)
- At 19:30 on Wednesday, July 5, the Governor of Oita Prefecture contacted the Commander of the GSDF 4th Tank Battalion (Kusu) to request a disaster relief deployment for the purpose of saving lives (request for withdrawal: 08:00 on Thursday, July 13)

B. Scale of Deployment

- Personnel: Approx. 81,950 people in total, Aircraft: 169 in total

Police organizations deployed 3,110 policemen to the affected areas in addition to the local policemen in the affected prefecture, and firefighting organizations deployed 11,256 firefighters in addition to the local firefighters to conduct rescue operations. The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) deployed TEC-FORCE to the affected areas where they surveyed the extent of the damage at about 1,700 locations for early recovery, and assisted road clearing.

The Geospatial Information Authority of Japan (GSI) used unmanned aerial vehicles (UAVs) to capture video footage and find the locations where driftwood piled up, and provided information to relevant organizations as needed and also published it on the GSI website.

Having deployed an advance information-gathering team on July 6 to Fukuoka and Oita Prefectures, the Cabinet Office established a Government Local Liaison and Coordination Office at Fukuoka Prefecture (July 7 - 28) to deal with issues such as the enhancement of living environment and disposal of disaster waste in close collaboration with local governments.

On July 7, to ascertain the extent of the damage and the status of the local response, a government survey team led by the State Minister of the Cabinet Office for Disaster Management was deployed to Fukuoka Prefecture, where it conducted a survey of the affected area, as well as exchanging views with the leaders of local governments affected by the disaster.

On July 9, to ascertain the extent of the damage and the status of the local response, a government survey team led by the Minister of State for Disaster Management was deployed to Fukuoka Prefecture, where it conducted surveys of the affected areas, as well as exchanging views with the leaders of local governments affected by the disaster.

On July 12, the Prime Minister visited Fukuoka and Oita Prefectures and inspected the extent of the damage due to torrential rains and visited evacuation centers, after which he exchanged views with the leaders of local governments affected by the disaster.

On July 10, the directors of nine related ministries and agencies organized a meeting for the disposal of piled driftwood caused by heavy rains from July 2017, a structure for combining relevant organizations to work together to accelerate the disposal of numerous pieces of driftwood, hindering search, recovery and reconstruction. An on-site disaster management team was also formulated to accurately identify the needs of affected areas and facilitate smooth coordination with local governments on various issues for confirming and sharing the responses of relevant ministries, agencies and local governments, securing temporary holding sites and allocating of roles for disposing and transporting driftwood.

Due to the heavy rain from July 5, the Disaster Relief Act was invoked in respect of three municipalities in Fukuoka Prefecture and two cities in Oita Prefecture, while the Act on Support for Reconstructing Livelihoods of Disaster Victims was invoked in respect of the all areas of Fukuoka Prefecture and one city in Oita Prefecture.

[Invocation of the Disaster Relief Act]

Fukuoka Prefecture: Asakura City, Toho Village in Asakura-gun, Soeda Town in Tagawa-gun (date of invocation: July 5)

Oita Prefecture: Nakatsu City, Hita City (date of invocation: July 5)

[Invocation of the Act on Support for Reconstructing Livelihoods of Disaster Victims]

Fukuoka Prefecture: All areas (date of invocation: July 5)

Oita Prefecture: Hita City (date of invocation: July 5)

The status of the extremely severe disaster designation for this disaster is as follows:

Torrential rains and rainstorms between June 7 and July 27, 2017

Announcement of potential designation on July 21, approved by the Cabinet on August 8

Partial revisions of the Cabinet Order approved by the Cabinet on February 6, 2018 (*1) and March 9, 2018 (*2)

Area	Applicable Measures
Nationwide	Special financial aid for disaster recovery projects focused on agricultural land Special provisions on financial assistance for disaster recovery projects for facilities for the joint use of the agriculture, forestry, and fisheries industries Inclusion of funds for the redemption of principal and interest on small disaster bonds in the standard budget request (Agricultural land related)
Fukuoka Prefecture Asakura City, Toho Village in Asakura-gun, Soeda Twon in Tagawa-gun Oita Prefecture Hita City (Addition of areas by partial revisions of the Cabinet Order (*2)) Hiroshima Prefecture Kitahiroshima Town in Yamagata-gun Nagasaki Prefecture Iki City Kumamoto Prefecture Minami-oguni Town in Aso-gun, Mizukami Village in Kuma-gun	Special financial support for disaster recovery projects focused on public civil engineering facilities Inclusion of funds for the redemption of principal and interest on small disaster bonds in the standard budget request (Public facilities related)
Fukuoka Prefecture Asakura City, Toho Village in Asakura-gun	Special provision concerning disaster-related credit guarantees under the Small and Medium-sized Enterprise Credit Insurance Act * The period of applying the special provision was prolonged by the Cabinet Order for partial revisions (*1)

15-2 Heavy Rains from Seasonal Rain Front Starting July 22, 2017

(1) Damage

Due to warm and moist air having flowed in toward the rain front and stalling around the Tohoku and Hokuriku regions, the rain front became active, causing heavy rain, mainly in the Tohoku and Hokuriku regions, from July 22. Heavy rain in Akita Prefecture reached a record high, more than 1.5 times the monthly precipitation in July in an average year and the rainfall exceeded 300 mm in some areas for two days from 22 to 23, including 348.5 mm in Yuwa of Akita City, 314.5 mm in Yokote of Yokote City, 305 mm in Daishoji. Heavy rain in the Hokuriku region for three days from 23 to 25 exceeded 200 mm in some areas, including 259 mm in Toyama City, Toyama Prefecture, 227.5 mm in Niigata City, Niigata Prefecture and 224 mm in Kanazawa City, Ishikawa Prefecture.

The damage to houses caused by this series of heavy rain encompassed 3 completely destroyed houses, 44 half-destroyed houses, 616 houses with above-floor flooding and 1,571 houses with below-floor flooding as of February 13, 2018 (information from the Fire and Disaster Management Agency).

(2) Response from Government Ministries and Agencies

At 15:30 on July 24, the government held an Inter-Agency Disaster Management Meeting during which participants shared information about the transition of weather, the extent of the damage and the steps being taken by ministries and agencies in response, confirming that they would take appropriate response measures.

Due to the damage caused by this series of heavy rains, the Disaster Relief Act and the Act on Support for Reconstructing Livelihoods of Disaster Victims were invoked to one city in Akita Prefecture.

[Invocation of the Disaster Relief Act]
[Akita Prefecture] Daisen City (effective July 22)

[Invocation of the Act on Support for Reconstructing Livelihoods of Disaster Victims]
[Akita Prefecture] Daisen City (effective July 22)

The series of torrential rain and rainstorms between June 7 and July 27, 2017 was designated as a severe disaster (see 15-1 above).

15-3 2017 Typhoon 18

(1) Damage

After making landfall near Tarumizu City, Kagoshima Prefecture at around 12:00 on September 17, Typhoon 18 again made landfalls in Kochi and Hyogo successively at the night of the same day, causing damage due to river flooding, inundation and sediment disasters over a wide area from Oita to Hokkaido Prefectures; primarily in western Japan. Casualties of the typhoon included 5 fatalities, 14 seriously injured and 58 lightly injured and damage to houses, including 5 completely destroyed houses, 617 half-destroyed houses and 1,486 houses with above-floor inundation as of February 13, 2018 (information from the Fire and Disaster Management Agency). The typhoon also caused 103 sediment disasters across the country, resulting in enormous damage to electricity, water and other lifeline infrastructure as well as agricultural land and facilities, etc.

(2) Response from Government Ministries and Agencies

Before the typhoon hit the nation, the government held an Inter-Agency Disaster Alert Meeting, attended by the Minister of State for Disaster Management and the State Minister of the Cabinet Office for Disaster Management, on September 15, during which participants shared information about the weather outlook and the steps being taken by ministries and agencies in response, confirming that they would take appropriate response measures.

At 10:30 on September 19, the government held an Inter-Agency Disaster Management Meeting, attended by the Minister of State for Disaster Management, during which participants confirmed that the government would continue to work as an integrated team, sparing no effort in implementing emergency disaster control measures.

The SDF carried out the following disaster relief operations in the areas concerned, in response to requests from the Governor of Oita Prefecture.

A. Overview of Disaster Relief Operations

At 15:25 on Sunday, September 17, the Governor of Oita Prefecture contacted the Commander of the GSDF 41st Infantry Regiment (Beppu) to request a disaster relief deployment for the purpose of protecting levees (request for withdrawal: 13:00 on Monday, September 18)

B. Scale of Deployment

Personnel: Approx. 220 people in total; Vehicles: Approx. 40 in total; Aircraft: Approx. 2 in total

Due to damage caused by this series of heavy rain, the Disaster Relief Act and the Act on Support for Reconstructing Livelihoods of Disaster Victims were invoked to two cities in Oita Prefecture.

[Invocation of the Disaster Relief Act]

[Oita Prefecture] Saeki City, Tsukumi City (effective September 17)

[Invocation of the Act on Support for Reconstructing Livelihoods of Disaster Victims]

[Oita Prefecture] Saeki City, Tsukumi City (effective September 17)

The status of the extremely severe disaster designation for this disaster is as follows:

Rainstorms and torrential rains between September 15 and 19, 2017

Announcement of potential designation on October 6, approved by the Cabinet on October 20

Partial revisions of the Cabinet Order approved by the Cabinet on March 9, 2018

Area	Applicable Measures
Nationwide	Special financial aid for disaster recovery projects focused on agricultural land Inclusion of funds for the redemption of principal and interest on small disaster bonds in the standard budget request (Agricultural land related)

Kyoto Prefecture Ine Town in Yosa-gun Oita Prefecture Tsukumi City (addition of areas by partial revisions of the Cabinet Order) Hokkaido Prefecture Shimamaki Village in Shimamaki-gun Kumamoto Prefecture Yamato Town in Kamimashiki-gun Miyazaki Prefecture Gokase Town in Nishiusuki-gun	Special financial support for disaster recovery projects focused on public civil engineering facilities Inclusion of funds for the redemption of principal and interest on small disaster bonds in the standard budget request (Public facilities related)
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15-4 2017 Typhoon 21

(1) Damage

At around 03:00 on October 23, Typhoon 21 made landfall near Kakegawa City in Shizuoka Prefecture as a super typhoon with powerful momentum and headed northeast while accompanying a large storm area. The rain clouds of the typhoon and the rain front caused torrential rain over a wide area from western to eastern Japan and the Tohoku region and because its progress coincided with a spring tide, some areas, mainly on the Pacific side, were hit by storm surges.

Casualties included 8 fatalities, 28 seriously and 216 lightly injured people and damage to houses, including

7 completely destroyed houses, 434 half-destroyed houses and 2,776 houses with above-floor inundation mainly in Wakayama and Mie Prefectures as of February 14, 2018 (information from the Fire and Disaster Management Agency). The typhoon also left traces of damage in various areas such as 373 sediment disasters, resulting in an enormous damage to road, rail and river facilities as well as coastal and educational facilities.

(2) Response from Government Ministries and Agencies

At 14:00 on October 20, the government held an Inter-Agency Disaster Alert Meeting, during which participants shared information about the weather outlook and the steps being taken by ministries and agencies in response, confirming that they would take appropriate response measures.

At 10:00 on October 22 before the typhoon hit the nation, the government held an Inter-Agency Disaster Alert Meeting, attended by the Minister of State for Disaster Management and the State Minister of the Cabinet Office for Disaster Management, during which participants shared information about the weather outlook and the steps being taken by ministries and agencies in response, confirming that they would take appropriate response measures. The Minister of State for Disaster Management made an appeal to all members of the public to take initiatives early for ensuring the safety.

At 10:45 on October 22 when the possibility of Typhoon 21 making landfall with strong momentum intensified, the Prime Minister issued the following instructions to the related ministries and agencies:

1. Disseminate specific information about heavy rain and river conditions to the public promptly.
2. Prioritize the safety of residents and take disaster response measures such as evacuation instruction early.
3. Spare no effort in implementing measures to protect the lives of citizens such as preparations from front-line response organizations such as the SDF.

The SDF carried out the following disaster relief operations in the areas concerned, in response to requests from the Governor of Osaka Prefecture:

A. Overview of Disaster Relief Operations

- At 19:45 on Sunday, October 22, the Governor of Osaka Prefecture contacted the Commander of the GSDF 37th Infantry Regiment (Shinodayama) to request a disaster relief deployment for the purpose of saving lives at landslide sites (request for withdrawal: 12:14 on Monday, October 23).

B. Scale of Deployment

Personnel: Approx. 80 people in total; Vehicles: Approx. 15 in total; Boat: Approx. 3 in total

At 11:30 on October 24, the government held an Inter-Agency Disaster Management Meeting, during which participants shared information about the extent of the damage and the steps being taken by ministries and agencies in response, confirming that they would take appropriate response measures.

On October 27, to ascertain the extent of the damage and the status of the local response, a government survey team led by the Minister of State for Disaster Management was deployed to Osaka and Wakayama Prefectures, where it conducted surveys of the affected areas, as well as exchanging views with the leaders of local governments affected by the disaster.

Due to the damage caused by the typhoon, the Disaster Relief Act and the Act on Support for Reconstructing Livelihoods of Disaster Victims were invoked to one city and one town in Mie Prefecture, one city in Kyoto Prefecture, and one city in Wakayama Prefecture.

[Invocation of the Disaster Relief Act]

[Mie Prefecture] Ise City, Tamaki Town in Watarai-gun (effective October 22)

[Kyoto Prefecture] Maizuru City (effective October 22)

[Wakayama Prefecture] Singu City (effective October 21)

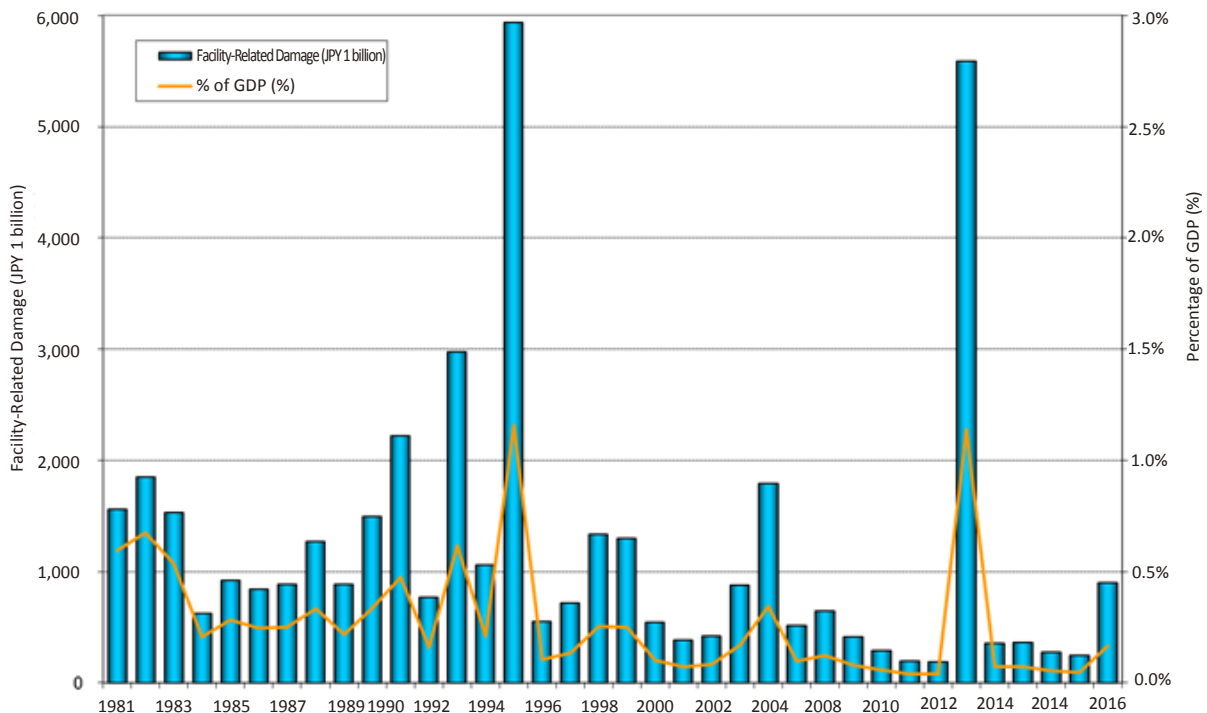
[Invocation of the Act on Support for Reconstructing Livelihoods of Disaster Victims]
 [Mie Prefecture] Ise City, Tamaki Town in Watarai-gun (effective October 22)
 [Kyoto Prefecture] Maizuru City (effective October 22)
 [Wakayama Prefecture] Shingu City (effective October 21)

The status of the extremely severe disaster designation for this disaster is as follows:
 Rainstorms between October 21 and 23, 2017

Announcement of potential designation on November 10, approved by the Cabinet on November 21
 Partial revisions of the Cabinet Order approved by the Cabinet on March 9, 2018

Area	Applicable Measures
Nationwide (Addition of measures by partial revisions of the Cabinet Order)	Special financial aid for disaster recovery projects focused on agricultural land Special provisions on financial assistance for disaster recovery projects for facilities for the joint use of the agriculture, forestry, and fisheries industries Inclusion of funds for the redemption of principal and interest on small disaster bonds in the standard budget request (Agricultural land related)
(Addition of measures and areas by partial revisions of the Cabinet Order) Miyagi Prefecture Yamamoto Town in Watari-gun Nagano Prefecture Urugi Village in Shimoina-gun Mie Prefecture Kumano City Nara Prefecture Gojo City, Yamazoe Village in Yamabe-gun, Shimoichi Town in Yoshino-gun, Kurotaki Village in Yoshino-gun	Special financial support for disaster recovery projects focused on public civil engineering facilities Inclusion of funds for the redemption of principal and interest on small disaster bonds in the standard budget request (Public facilities related)

Fig. A-16 Trends in Facility-Related Damage, Actual and as a Percentage of Gross Domestic Product (GDP)



Note) Gross domestic product (GDP) figures up to 1993 are based on the 2000 standard (SNA 1993), while those for 1994 onward are based on the 2011 standard (SNA 2008)

Source: Formulated by the Cabinet Office based on materials from various ministries and agencies

Fig. A-17 Facility-Related Damage by Disaster Type for Disasters Occurring in 2016

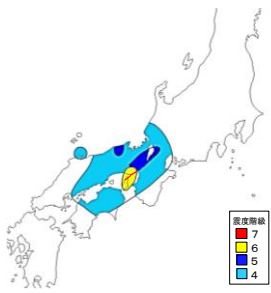
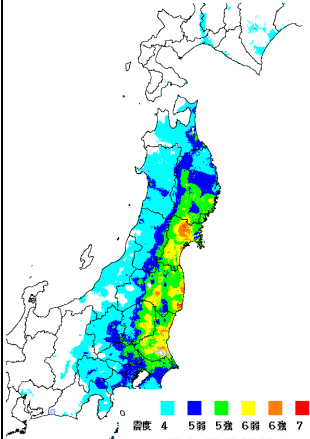
(Unit: JPY 1 million)

Facility type	Typhoon	Torrential rain	Earthquake	Heavy snowfall	Other	Total	Notes
Public works	161,872	45,156	132,975	0	17,933	357,937	Rivers, forestry conservation facilities, ports, etc.
Agriculture, forest, and fisheries industry	96,764	64,748	115,544	60	8,172	285,287	Farmland, agricultural facilities, forestry roads, fishing facilities, etc.
Educational facilities	2,468	411	43,965	9	128	46,981	School facilities, cultural heritages, etc.
Public welfare facilities	7,649	72	185,673	0	46	193,440	Social welfare facilities, waterworks facilities, etc.
Other facilities	3,299	101	14,226	10	204	17,839	Nature parks, telegraph/telephone, urban facilities, etc.
Total	272,052	110,488	492,385	79	26,483	901,485	

Note: Totals may not agree due to rounding.

Source: Formulated by the Cabinet Office based on materials from various ministries and agencies

Fig. A-18 Comparison of the Great Hanshin-Awaji Earthquake, the Great East Japan Earthquake, and the Sumatra Earthquake

	Great Hanshin-Awaji Earthquake (Japan)	Great East Japan Earthquake (Japan)	Sumatra Earthquake (Indonesia)
Date & time	5:46 a.m., Jan. 17, 1995	2:46 p.m., March 11, 2011	9:58 a.m., Dec. 26, 2004
Magnitude	M7.3	*Mw9.0	*Mw9.1
Earthquake type	Inland	Oceanic trench	Oceanic trench
Affected area	City center	Mainly agricultural, forestry, and fishery regions	Mainly agricultural, forestry, and fishery regions
No. of prefectures with seismic intensity of Lower 6 or higher	1 (Hyogo)	8 (Miyagi, Fukushima, Ibaraki, Tochigi, Iwate, Gunma, Saitama, Chiba)	—
Tsunami	Reports of tsunami measuring tens of centimeters, no damage	Large tsunami observed in various regions (max. wave height of more than 9.3 m in Soma, more than 8.5 m in Miyako, more than 8.0 m in Ofunato)	Large tsunami observed in Indonesia as well as other countries with coastline along the Indian Ocean
Damage characteristics	Structures destroyed, large fires erupted mainly in Nagataku	Large tsunami caused massive damage in coastal areas, destruction across many districts	Large tsunami caused damage to countries with coastline along the Indian Ocean, with Indonesia suffering particularly massive damage
Fatalities Missing persons	Fatalities: 6,437 Missing persons: 3 (May 19, 2006)	Fatalities: 19,630 Missing persons: 2,569 (as of March 5, 2018)	Fatalities: 126,732 Missing persons: 93,662 (as of March 30, 2005)
Homes damaged (totally destroyed)	104,906	121,781 (as of March 5, 2018)	Unknown*
Invocation of the Disaster Relief Act	25 municipalities (2 prefectures)	241 municipalities (10 prefectures) *Including 4 municipalities (2 prefectures) that invoked the Act for an earthquake centered in northern Nagano prefecture in 2011	—
Seismic intensity distribution map (showing seismic intensity of 4 and above)			—

* Mw: Moment magnitude

Note: The seismic intensity levels were revised in 1996 to newly add Lower 5, Upper 5, Lower 6, and Upper 6.

Source: Formulated by the Cabinet Office from Cabinet Office materials, Fire and Disaster Management Agency materials, and UNOCHA materials.

Fig. A-19 Damage Estimate for the Great East Japan Earthquake

June 24, 2011

Category	Damage (Approx. Value)
Structures (Homes/housing sites, stores/offices, factories, machines, etc.)	JPY 10.4 trillion
Lifeline facilities (Water, gas, electricity, communications/broadcasting facilities)	JPY 1.3 trillion
Infrastructure facilities (Rivers, roads, ports, sewers, airports, etc.)	JPY 2.2 trillion
Agriculture, forest, and fisheries-related facilities (Farmland/agricultural facilities, forests and fields, fisheries-related facilities, etc.)	JPY 1.9 trillion
Other (Educational facilities, healthcare/social welfare facilities, waste treatment facilities, other public facilities)	JPY 1.1 trillion
Total	JPY 16.9 trillion

Note: This information has been compiled by Disaster Management Bureau of the Cabinet Office based on information provided by individual prefectures and relevant ministries and agencies regarding damage to property (including buildings, lifeline facilities, and infrastructure facilities). Information is subject to change as the details become clear. In addition, the total and breakdown may not agree due to rounding.

Source: Cabinet Office

Fig. A-20 Main Volcanic Eruptions and Eruption Disasters in Japan

Year of Eruption	Name of Volcano	No. of Victims	Eruption and Damage Characteristics
1640	Hokkaido-Komagatake*	At least 700	Sector collapse, debris flow, tsunami, large amount of falling ash, pyroclastic flow
1663	Usuzan*	5	Nearby homes disappeared or were buried
1664	Unzendake	At least 30	Lava flow, flood of water from crater
1667	Tarumaesan*		Pyroclastic flow, large amount of falling ash/pumice
1694	Hokkaido-Komagatake		Eruption with earthquake/volcanic thunder, falling pumice stone, pyroclastic flow
1707	Fujisan *		"Great Hoei eruption," large amount of falling ash, landslide disaster after eruption
1721	Asamayama	15	Cinders
1739	Tarumaesan *		Pyroclastic flow, large amount of falling ash/pumice
1741	Oshima-Oshima	1,467	Sector collapse, large tsunami occurred due to debris avalanche
1769	Usuzan		Large amount of falling ash/pumice, pyroclastic flow
1777	Izu-Oshima		"Great Anei eruption," lava flow, scoria fall
1779	Sakurajima*	At least 150	"Great Anei eruption," cinders, lava flow
1781	Sakurajima	15	Eruption on an island off of Komen, tsunami
1783	Asamayama	1,151	"Great Tenmei eruption," pyroclastic flow, lava flow, flooding of Agatsuma River and Tone River
1785	Aogashima	130–140	Cinders, mud, more than one-third of islanders became victims. Uninhabited island for more than 50 years thereafter
1792	Unzendake	15,000	"Shimabara taihen, Higo meiwaku," tsunami on opposing shore due to collapse of Mt. Mayuyama
1822	Usuzan	50–103	Pyroclastic flow, former Abuta village totally destroyed
1853	Usuzan		Large amount of volcanic ash/pumice, formation of lava dome, pyroclastic flow
1856	Hokkaido-Komagatake	21–29	Falling pumice, pyroclastic flow
1888	Bandaisan*	461–477	5 towns and 11 villages buried in debris avalanche, debris flow (volcanic mud flow)
1900	Adatarayama	72	Cinders, sulfur mine at crater totally destroyed
1902	Izu-Torishima	125	All islanders became victims
1914	Sakurajima*	58	"Great Taisho eruption," volcanic thunder, lava flow, earthquake, air wave, villages buried, large amount of falling ash
1926	Tokachidake	144	Larger mudflow, towns of Kamifurano and Biei buried
1929	Hokkaido-Komagatake	2	Large amount of falling ash/pumice, pyroclastic flow, volcanic gas damage
1940	Miyakejima	11	Large amount of volcanic ash/volcanic bombs, lava flow
1952	Beyonesu (Bayonnaise) Rocks (Myojin-sho)	31	Pyroclastic surge
1943–45	Usuzan	1	Large amount of volcanic ash, cinders, formation of Showa-shinzan (new mountain)
1958	Asosan	12	Cinders
1991	Unzendake	43	Pyroclastic flow, debris flow
2014	Ontakesan	58	Cinders

*Indicates eruptions with apparent volume of ejecta of more than 1 km³

Note: Lists "Eruption disasters with 10 or more fatalities and/or missing persons" and "Large eruptions with an apparent volume of ejecta of 0.1 km³ or more"

Source: Formulated by the Cabinet Office based on the National Catalogue of the Active Volcanoes in Japan (4th Edition) (edited by the Japan Meteorological Agency, 2013).

Fig. A-21 Number of Sediment Disasters

As of December 31, 2017

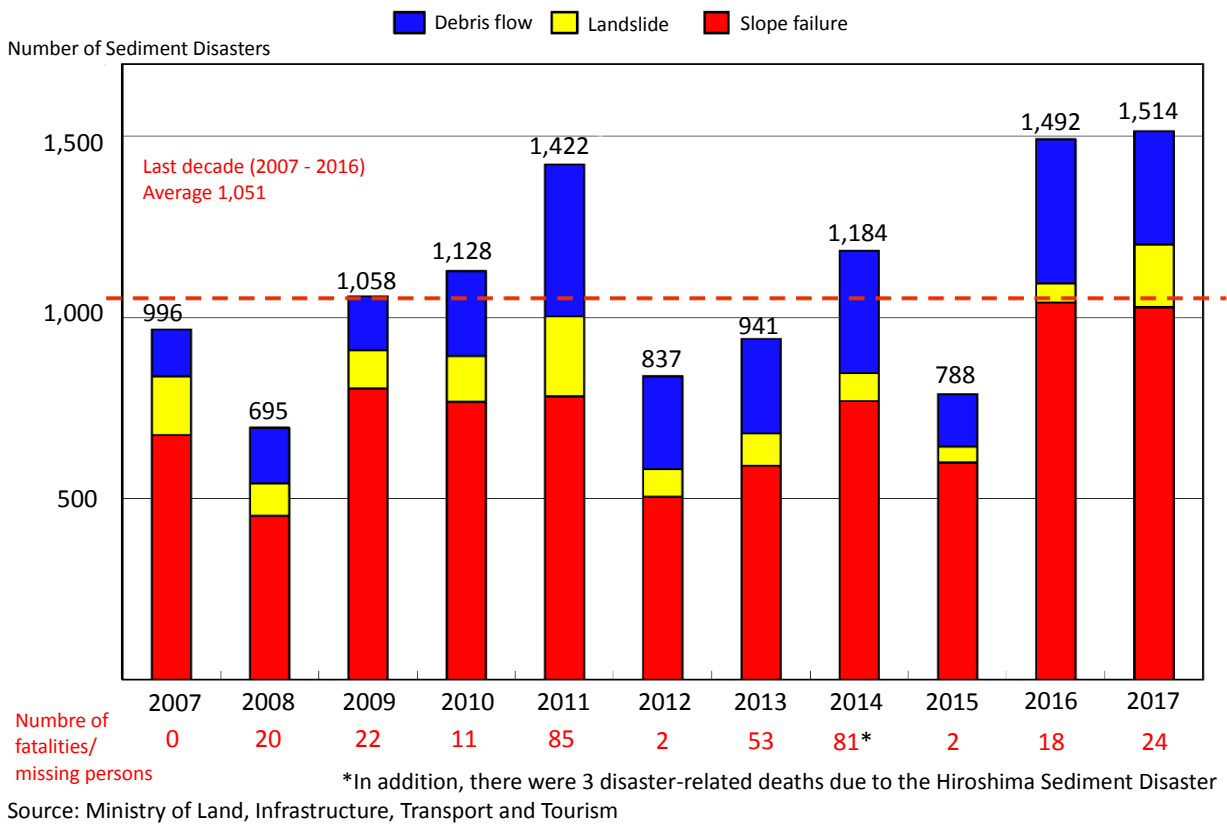
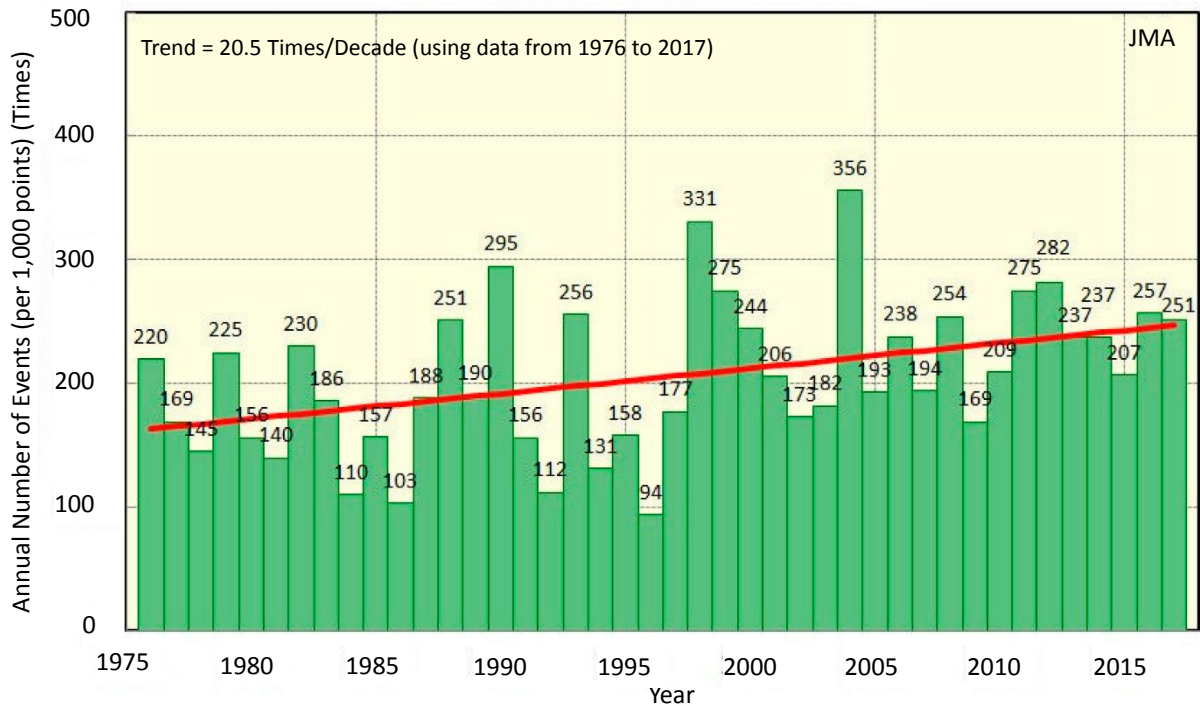


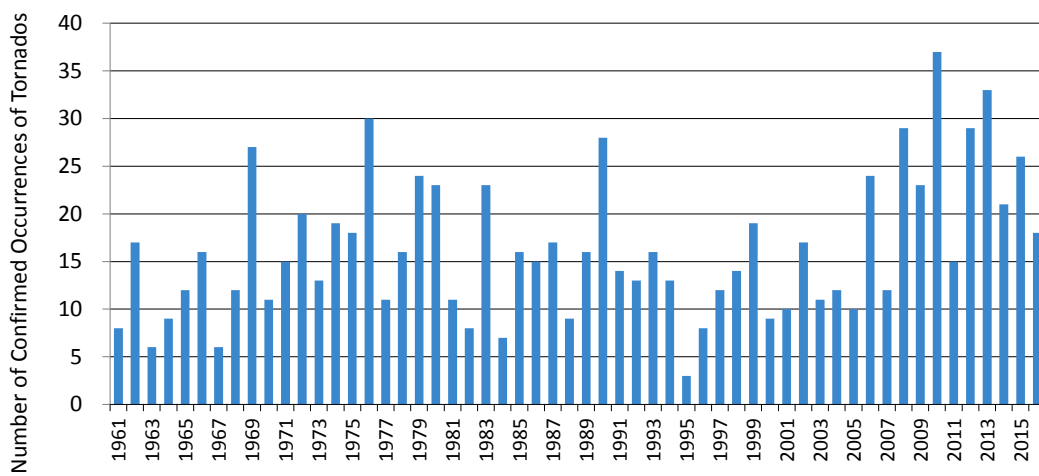
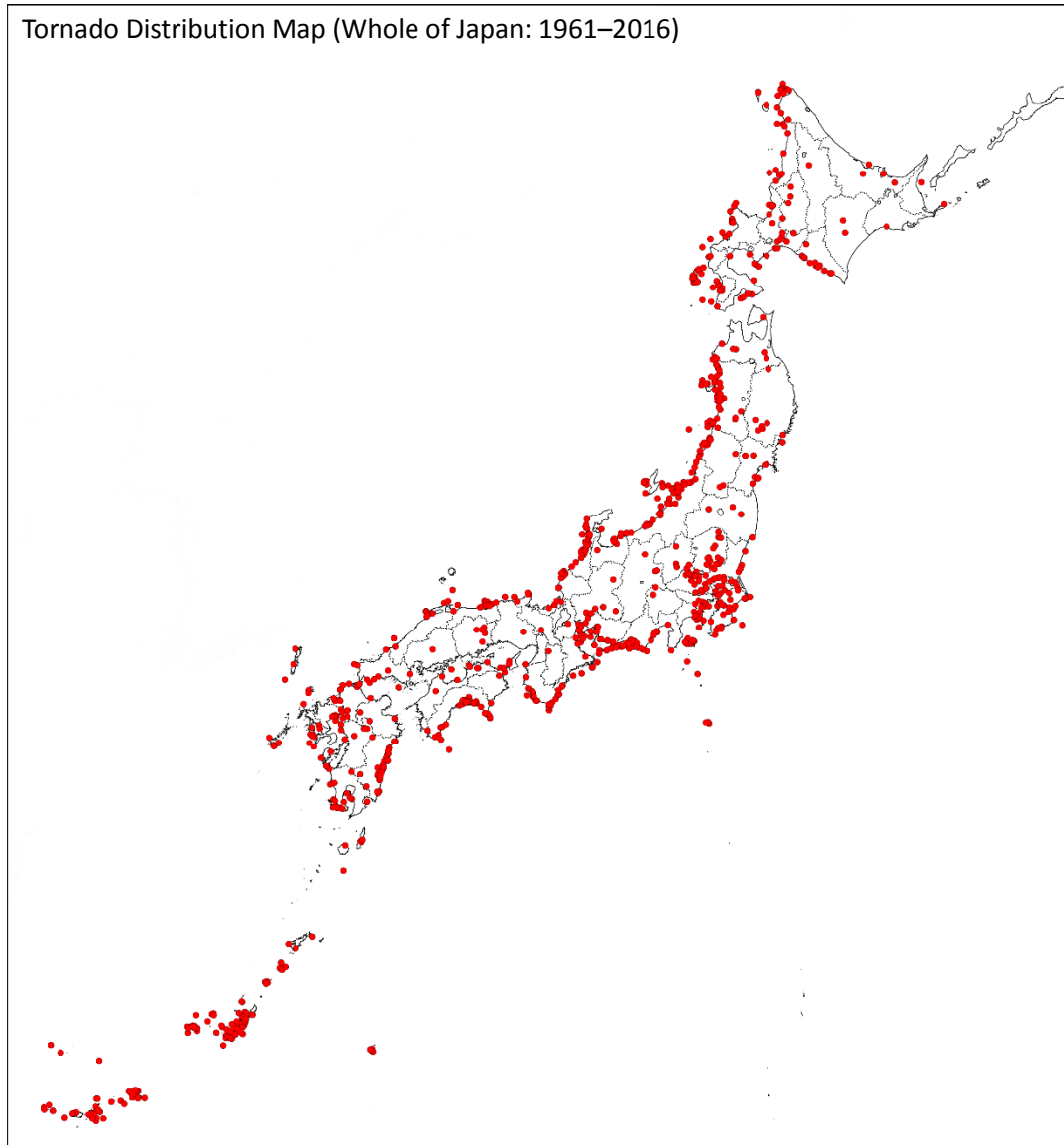
Fig. A-22 Increase in the frequency of short-duration downpours

[AMeDAS] Annual Number of Events with Precipitation ≥ 50 mm/hour



Source: Japan Meteorological Agency (website)

Fig. A-23 Number of Confirmed Occurrences of Tornadoes



Source: (Upper) Japan Meteorological Agency.
(Lower) Formulated by the Cabinet Office based on materials from JMA

Fig. A-24 Major Natural Disasters in the World Since 1900

Year	Disaster Type	GLIDE number	Country (Areas)	Fatalities/Missing Persons (approx.)
1900	Hurricane Galveston		Texas, USA	6,000
1902	Volcanic Eruption		Martinique (West Indies, Mt. Pelée)	29,000
1902	Volcanic Eruption		Santa Maria Volcano, Guatemala	6,000
1905	Earthquake		Northern India	20,000
1906	Earthquake (Chiayi earthquake)		Taiwan	6,000
1906	Earthquake/Fire		San Francisco, USA	1,500
1906	Earthquake		Chile	20,000
1906	Typhoon		Hong Kong	10,000
1907	Earthquake		Tianshan, China	12,000
1907	Earthquake		Uzbekistan (former Soviet Union)	12,000
1908	Earthquake (Messina earthquake)		Sicily, Italy	75,000
1911	Flood		China	100,000
1911	Volcanic Eruption		Taal Volcano, Philippines	1,300
1912	Typhoon		Wenzhou, China	50,000
1915	Earthquake		Central Italy	30,000
1916	Landslide		Italy, Austria	10,000
1917	Earthquake		Bali, Indonesia	15,000
1918	Earthquake		Guangdong, China	10,000
1919	Volcanic Eruption		Kelut Volcano, Indonesia	5,200
1920	Earthquake/Landslide (Haiyuan earthquake)		Gansu, China	180,000
1922	Typhoon		Shantou, China	100,000
1923	Earthquake/Fire (Great Kanto earthquake)		Southeast Kanto region, Japan	143,000
1927	Earthquake (Kitatango earthquake)		Northern Kyoto, Japan	2,930
1927	Earthquake		Nanchang, China	200,000
1928	Hurricane/Flood		Florida, USA	2,000
1930	Volcanic Eruption		Merapi volcano, Indonesia	1,400
1931	Flood		Coastal areas of the Yangtze River and other rivers in China	3,700,000
1932	Earthquake (Gansu earthquake)		Gansu, China	70,000
1933	Flood		Henan, China	18,000
1933	Tsunami (Showa Sanriku Tsunami)		Sanriku, Japan	3,000
1933	Earthquake		China	10,000
1935	Flood		China	142,000
1935	Earthquake (Quetta Earthquake)		Balistan, Pakistan	60,000
1939	Earthquake/Tsunami		Chile	30,000
1939	Flood		Hunan, China	500,000
1939	Earthquake		Eastern Turkey	32,962
1942	Cyclone		Bangladesh	61,000
1942	Cyclone		Orissa, India	40,000
1943	Earthquake		Tottori, Japan	1,083
1944	Earthquake (Showa Tonankai Earthquake)		Tonankai, Japan	1,200
1944	Earthquake		Midwestern Argentina	10,000
1945	Earthquake (Mikawa Earthquake)		Aichi, Japan	2,300
1945	Typhoon (Typhoon Makurazaki)		Western Japan	3,700
1946	Earthquake/Tsunami (Showa Nankai Earthquake)		Nankai, Japan	1,400
1947	Typhoon (Typhoon Kathleen)		North of Tohoku, Japan	1,900
1948	Earthquake (Fukui Earthquake)		Fukui, Japan	3,900
1948	Earthquake (Ashgabat Earthquake)		Turkmenistan (former Soviet Union)	110,000
1949	Earthquake/Landslide		Tajikistan (former Soviet Union)	12,000
1949	Flood		China	57,000
1949	Flood		Guatemala	40,000
1951	Volcanic Eruption		Mt. Lamington, Papua New Guinea	2,900
1953	Flood		Coastal areas of the North Sea	1,800
1953	Flood		Kyushu, Japan	1,000
1953	Flood		Honshu, Japan	1,100
1954	Flood		China	40,000
1954	Typhoon (Typhoon Toyamaru)		Japan	1,700
1959	Flood		China	2,000,000
1959	Typhoon (Typhoon Ise-wan)		Japan	5,100
1960	Flood		Bangladesh	10,000
1960	Earthquake		Southwestern Morocco	12,000
1960	Earthquake/Tsunami		Chile	6,000
1961	Cyclone		Bangladesh	11,000

Year	Disaster Type	GLIDE number	Country (Areas)	Fatalities/Missing Persons (approx.)
1962	Earthquake		Northwestern Iran	12,000
1963	Cyclone		Bangladesh	22,000
1965	Cyclone		Bangladesh	36,000
1965	Cyclone		Southern Pakistan	10,000
1968	Earthquake		Northwestern Iran	12,000
1970	Earthquake		Yunnan, China	10,000
1970	Earthquake/Landslide		Northern Peru	70,000
1970	Cyclone Bhola		Bangladesh	300,000
1971	Cyclone		Orissa, India	10,000
1972	Earthquake (Managua earthquake)		Nicaragua	10,000
1974	Earthquake		Yunnan and Sichuan, China	20,000
1974	Flood		Bangladesh	28,700
1975	Earthquake		Liaoning, China	10,000
1976	Earthquake (Guatemala earthquake)		Guatemala	24,000
1976	Earthquake (Tangshan earthquake)		Tianjin, China	242,000
1977	Cyclone		Andhra Pradesh, India	20,000
1978	Earthquake		Northeastern Iran	25,000
1982	Volcanic Eruption		El Chichon Volcano, Mexico	17,000
1985	Cyclone		Bangladesh	10,000
1985	Earthquake		Mexico City, Mexico	10,000
1985	Volcanic Eruption		Nevado del Ruiz Volcano, Colombia	22,000
1986	Toxic gas		Lake Nyos, Western Cameroon	1,700
1986	Earthquake		San Salvador, El Salvador	1,000
1987	Earthquake		Northwestern Ecuador	5,000
1987	Flood		Bangladesh	1,000
1988	Earthquake		India, Nepal	1,000
1988	Flood		Bangladesh	2,000
1988	Earthquake (Spitak Earthquake)		Armenia (former Soviet Union)	25,000
1988	Earthquake		Yunnan, China	1,000
1989	Flood		India	1,000
1989	Flood/Landslide		Sichuan, China	2,000
1990	Earthquake (Manjil Earthquake)		Northern Iran	41,000
1990	Earthquake		Philippines	2,000
1991	Cyclone/Storm Surge		Chittagong, Bangladesh	137,000
1991	Flood		Jiangsu, China	1,900
1991	Typhoon Thelma		Philippines	6,000
1992	Flood		Pakistan	1,300
1992	Earthquake/Tsunami		Indonesia	2,100
1993	Flood		Nepal	1,800
1993	Earthquake (Maharashtra Earthquake)		India	9,800
1993	Flood		India	1,200
1994	Torrential Rain, Flood		India	2,000
1994	Typhoon, Flood		Six Southern Provinces of China	1,000
1994	Tropical Storm		Haiti	1,100
1995	Earthquake (Great Hanshin-Awaji Earthquake)		Japan	6,300
1995	Earthquake		Russia	1,800
1995	Flood		China	1,200
1996	Flood/Typhoon		Seven southern and five northern and northwestern provinces of China	2,800
1996	Typhoon/Flood		Viet Nam	1,000
1997	Earthquake	EQ-1997-000095-IRN	Eastern Iran	1,600
1997	Flood	FL-1997-000260-IND	India	1,400
1997	Flood	FL-1997-000265-SOM	Southern Somalia	2,000
1997	Typhoon Linda	TC-1997-000007-VNM	Southern Viet Nam	3,700
1998	Earthquake	EQ-1998-000026-AFG	Northern Afghanistan	2,300
1998	Earthquake	EQ-1998-000152-AFG	Northern Afghanistan	4,700
1998	Flood/Landslide	FL-1998-000392-IND	Assam state, India	3,000
1998	Cyclone		India	2,900
1998	Flood	FL-1998-000203-BGD	Bangladesh	1,000
1998	Flood	FL-1998-000165-CHN	Coastal areas of the Yangtze River and other rivers in China	3,700
1998	Tsunami (Aitape Tsunami)	TS-1998-000220-PNG	Papua New Guinea	2,600
1998	Hurricane Mitch	TC-1998-000012-HND	Honduras, Nicaragua	17,000
1999	Earthquake (Quindio Earthquake)	EQ-1999-000007-COL	Mid-western Colombia	1,200
1999	Earthquake (Izmit Earthquake)	EQ-1999-000008-TUR	Western Turkey	15,500
1999	Earthquake (Chi-Chi earthquake)	EQ-1999-000321-TWN	Taiwan	2,300
1999	Cyclone	ST-1999-000425-IND	India	9,500

Year	Disaster Type	GLIDE number	Country (Areas)	Fatalities/Missing Persons (approx.)
2000	Flood		Venezuela	30,000
2001	Earthquake (Gujarat earthquake)	EQ-2001-000033-IND	India	20,000
2001	Earthquake	EQ-2001-000013-SLV	El Salvador	1,200
2003	Earthquake	EQ-2003-000074-DZA	Northern Algeria	2,300
2003	Earthquake (Bam earthquake)	EQ-2003-000630-IRN	Iran	26,800
2004	Flood	FL-2004-000028-HTI	Haiti	2,700
2004	Hurricane	TC-2004-000089-JAM	USA, Jamaica, Puerto Rico, Haiti	3,000
2004	Earthquake, Tsunami (2004 Indian Ocean Earthquake and Tsunami)	TS-2004-000147-LKA TS-2004-000147-IDN TS-2004-000147-MDV TS-2004-000147-IND TS-2004-000147-THA TS-2004-000147-MYS TS-2004-000147-MMR TS-2004-000147-SOM TS-2004-000147-BGD	Sri Lanka, Indonesia, Maldives, India, Thailand, Malaysia, Myanmar, Seychelles, Somalia, Tanzania, Bangladesh, Kenya	Over 226,000
2005	Flood/Landslide	FL-2005-000125-IND	India	1,200
2005	Hurricane Katrina	TC-2005-000144-USA	USA	1,800
2005	Rainstorm	ST-2005-000162-IND ST-2005-000162-BGD	India, Bangladesh	1,300
2005	Hurricane Stan/Flood	TC-2005-000171-GTM FL-2005-000171-SLV	Guatemala, El Salvador, Mexico	1,500
2005	Earthquake (Pakistan earthquake)	EQ-2005-000174-PAK EQ-2005-000174-IND	Pakistan and northern India	75,000
2006	Landslide	LS-2006-000024-PHL	Philippines	1,100
2006	Earthquake/Volcanic Eruption	VO-2006-000048-IDN	Merapi volcano, Indonesia	5,800
2006	Typhoon Xangsane	TC-2006-000144-PHL	Luzon, Philippines	1,400
2007	Heavy Rain, Flood	FL-2007-000096-IND	India	1,100
2007	Cyclone Sidr	TC-2007-000208-BGD	Bangladesh	4,200
2008	Earthquake (Great Sichuan Earthquake)	EQ-2008-000062-CHN	China	87,500
2008	Cyclone Nargis	TC-2008-000057-MMR	Myanmar	138,400
2008	Flood	FL-2008-000089-IND	North-eastern India	1,100
2009	Earthquake (2009 Sumatra Earthquake)	EQ-2009-000273-IDN	Indonesia	1,200
2009	Flood	FL-2009-000217-IND	Southern India	1,200
2010	Earthquake (Haiti Earthquake)	EQ-2010-000009-HTI	Haiti	222,600
2010	Earthquake (Yushu Earthquake)	EQ-2010-000073-CHN	Qinghai, China	3,000
2010	Flood	FL-2010-000141-PA	North-western Pakistan	2,000
2010	Torrential Rain, Debris Flow	LS-2010-000156-CHN	Yangtze River Basin, China	1,800
2011	Earthquake, Tsunami (Great East Japan Earthquake)	EQ-2011-000028-JPN	Tohoku and Kanto regions, Japan	19,000
2011	Typhoon Washi	TC-2011-000189-PH	Mindanao, Philippines	1,400
2012	Typhoon Bopha	TC-2012-000197-PHL	Mindanao, Philippines	1,900
2013	Flood	FL-2013-000070-IND	Northern India	1,500
2013	Typhoon Haiyan	TC-2013-000139-PHL	Leyte, Philippines	6,200
2015	Earthquake (Nepal Earthquake)	EQ-2015-000048-NPL	Nepal	9,000

Note) GLIDE number (GLObal unique disaster IDentifier number) was proposed by the Asian Disaster Reduction Center (ADRC) in 2001 to share disaster information between different databases by allocating a common and unique disaster number to each of various disasters in the world, and operated jointly by the Office for the Coordination of Humanitarian Affairs (OCHA, ReliefWeb) for use of numerous disaster-related organizations. The number does not cover all kinds of disasters because it is allocated for a disaster when the relevant organization decides to allocate as required according to respective criteria. If the use of GLIDE is more common in disaster-related organizations in the future, more information on disasters can be shared.

Source: Formulated by the Cabinet Office based on materials from EM-DAT: The International Disaster Database (Centre for Research on the Epidemiology of Disasters (CRED), Université Catholique de Louvain).

Fig. A-25 Top 10 Largest Earthquakes Since 1900

(As of March 31, 2018)

Ranking	Date (Japan Time)	Location	Magnitude (Mw)*
1	May 23, 1960	Chile	9.5
2	March 28, 1964	Gulf of Alaska	9.2
3	December 26, 2004	Off the West Coast of Northern Sumatra, Indonesia	9.1
4	March 11, 2011	Off the Sanriku Coast, Japan (2011 Great East Japan Earthquake)	9.0
	November 5, 1952	Kamchatka Peninsula	9.0
6	February 27, 2010	Offshore Maule, Chile	8.8
	February 1, 1906	Offshore Ecuador	8.8
8	February 4, 1965	Aleutian Islands, Alaska	8.7
9	April 11, 2012	Off the West Coast of Northern Sumatra, Indonesia	8.6
	March 29, 2005	Northern Sumatra, Indonesia	8.6
	March 10, 1957	Aleutian Islands, Alaska	8.6
	August 16, 1950	Tibet, Assam	8.6
	April 1, 1946	Aleutian Islands, Alaska	8.6

* Mw: Moment magnitude. The 2011 Tohoku Earthquake and Tsunami is based on materials from JMA.

Source: US Geological Survey

Fig. A-26 Major Natural Disasters Since 2017

Date	Country	Disaster Type	Fatalities	Affected People	Direct Damages (USD 1,000)
Jan.- Apr. 2017	Somalia	Plague	302	13,126	0
Jan. - September 2017	Sri Lanka	Plague	320	155,715	0
Jan. 1-10, 2017	Thailand	River flooding	46	1,600,000	860,000
Jan. 15- Mar 16, 2017	Chile	Forest fire	11	7,623	870,000
Jan. 16-31, 2017	Philippines	Flood	9	1,500,000	8,100
Feb. 16-21, 2017	USA	Storm	5	14,000	1,300,000
Mar.-May. 2017	Chad	Drought	0	1,886,800	0
Mar. 13-15, 2017	USA	Storm	11	12	1,000,000
Mar. 15-19, 2017	Peru	Flood	177	1,700,353	3,100,000
Mar. 28-Apr. 05, 2017	Australia	Tropical cyclone	12	20,000	2,700,000
Mar. 28-Apr. 15, 2017	Bangladesh	River flooding	0	102,875	352,000
Mar. 31-Apr. 01, 2017	Columbia	Debris flow	273	45,262	0
Apr.-Aug. 2017	Mauritania	Drought	0	3,893,774	0
Apr. 01-Jul. 2017	Ghana	Flood	0	1,000,000	0
Apr. 28-May. 01, 2017	USA	Flood	20	70	2,000,000
May-Jun. 2017	Angola	Drought	0	1,400,000	0
May-Jun. 2017	Niger	Drought	0	1,131,300	0
May 1-31, 2017	China	Drought	0	2,000,000	122,000
May 5-20, 2017	Canada	Flood	4	15,600	200,000
May 25-31, 2017	Sri Lanka	Flood	292	769,410	197,000
May 26-Jun. 10, 2017	Brazil	River flooding	14	104,140	100,000
May 30, 2017	Bangladesh	Tropical cyclone	7	3,300,000	0
Jun. -Aug. 2017	India	Flood	254	8,600,000	0
Jun. 20-12, 2017	China	Flood	11	10,800	115,000
Jun. 12-14, 2017	Bangladesh	Debris flow	160	80,187	0
Jun. 17-21, 2017	Portugal	Forest fire	64	704	129,000
Jun. 22-Jul. 03, 2017	China	Flood	78	9,500,000	428,291
Jun. 22-25, 2017	China	River flooding	31	393,000	2,350,000
Jun. 22-Jul. 03, 2017	China	Flood	78	9,500,000	428,291

Date	Country	Disaster Type	Fatalities	Affected People	Direct Damages (USD 1,000)
Jun. 25-Jul. 24, 2017	India	River flooding	75	1,735,000	0
Jun. 29-Jul.05, 2017	China	Flood	82	754,800	3,930,000
Jul. 2017	Italy	Drought	0	0	2,300,000
Jul. 05-Aug. 02, 2017	Thailand	Flood	23	1,000,000	0
Jul. 08-Jul. 11, 2017	China	Flood	13	21,600	145,000
Jul. 13-17, 2017	China	Storm	36	174,300	3,400,000
Aug. 01-Nov. 17, 2017	Madagascar	Plague	207	2,384	0
Aug. 10-Sep. 07, 2017	Nepal	Flood	159	1,700,134	536
Aug. 10-31, 2017	Bangladesh	Flood	144	8,000,000	0
Aug. 11-31, 2017	India	Flood	943	31,000,000	0
Aug. 11-16, 2017	China	Flood	18	37,800	429,000
Aug.12-13, 2017	Sierra Leone	Landslide	915	8,100	0
Aug. 16, 2017	Congo	Landslide	200	250	0
Aug. 25-29, 2017	USA	Tropical cyclone	69	480,024	58,000,000
Sep. 06-09, 2017	China	Flood	40	0	315,000
Sep. 08, 2017	Mexico	Earthquake	369	250	2,000,000
Sep. 08-10, 2017	Cuba	Tropical cyclone	10	10,000,000	0
Sep. 09-10, 2017	Italy	Flood	9	1,000	215,000
Sep. 10-28, 2017	USA	Tropical cyclone	58	70,000	50,000,000
Sep. 11, 2017	Croatia	River flooding	0	600	160,000
Sep. 15-16, 2017	Vietnam	Tropical cyclone	18	615,112	484,000
Sep. 17-19, 2017	Japan	Tropical cyclone	5	21,749	700,000
Sep. 18, 2017	Sudan	Plague	657	30,762	0
Sep. 18-19, 2017	Dominica	Tropical cyclone	27	71,293	2,000,000
Sep. 19, 2017	Mexico	Earthquake	230	1,819	0
Sep. 19-20, 2017	Congo	Flood	105	500	0
Sep. 20, 2017	Puerto Rico	Tropical cyclone	27	5,700	780,000
Sep. 24-Oct. 07, 2017	China	Flood	16	61,500	361,000
Oct. 01-10, 2017	China	Flood	23	35,000	494,000
Oct. 07-08, 2017	USA	Tropical cyclone	0	0	250,000
Oct. 08-16, 2017	Vietnam	Flood	103	40,000	0
Nov. 04-05, 2017	Vietnam	Tropical cyclone	123	4,330,000	1,000,000
Nov. 12, 2017	Iran	Earthquake	444	209,000	740,000

Source: Formulated by the Cabinet Office based on materials from EM-DAT: The International Disaster Database (Centre for Research on the Epidemiology of Disasters (CRED), Université Catholique de Louvain).

(1) Flood in India (FL-2017-000084-IND)

Ongoing torrential rain during the monsoon in early August 2017 caused massive floods and mudslides. Fatalities reached 900 in India, 150 in Nepal and 140 in Bangladesh; totaling 1,200 in all three countries. In India, massive floods occurred in the northern four states (Assam, Bihar, Uttar Pradesh and West Bengal); affecting more than 31 million people and causing enormous damage, including 12,400 school facilities in Bihar state and more than 400,000 hectares of farmland in the Assam state.

The Government of Japan provided emergency support; including distributing food and daily necessities and helping improve the hygienic environment in Nepal through the Japan Platform (NPO). The Indian Red and Nepalese Red Cross Societies and the Bangladesh Red Crescent Society offered food and relief supplies, delivered safe water and deployed emergency relief operations while the Japanese Red Cross Society provided financial support to Nepal and Bangladesh.

(2) Flood, Landslide and Debris Flow in Sierra Leone (MS-2017-000109-SLE)

Heavy rain continued in the suburbs of Freetown, the capital city of the Republic of Sierra Leone, from August 13 to 14, 2017, resulting in major flood, landslides and debris flows. There were more than 900 fatalities and missing persons and more than 8,000 people affected overall. The possibility of secondary accidents compounded the difficulty of searching for people and removing rubble from land already loosened by the continued rain season. Because the water sources in the affected areas were contaminated and the water supply networks were damaged, the epidemics of infectious diseases such as cholera were feared. Under these circumstances, the WHO supported the government of Sierra Leone in conducting assessment surveys for infectious diseases.

In response to a request from the government of Sierra Leone, the government of Japan provided emergency aid supplies (e.g. tents, plastic tanks, water purifiers) through the Japan International Cooperation Agency (JICA), while also distributing food and daily necessities and helping improve the hygienic environment through the Japan Platform (NGO).

(3) Mexico Earthquake (EQ-2017-000138-MEX)

At around 13:14 on September 19, 2017 (around 03:14 on the 20th in Japan), Mexico was struck by a magnitude 7.1 earthquake centered 12 km southeast from of Axochiapan, Morelos, causing enormous damage, including 369 fatalities and destroying about 1.84 billion houses and 16,000 schools. On September 7, about two weeks before this earthquake occurred, a magnitude 8.1 earthquake had occurred in Chiapas in southern Mexico, which was in the process of recovering from the damage, including 90 fatalities.

On September 19, the next day after the earthquake, the government of Japan decided to mobilize Japan Disaster Relief (JDR) teams, comprising 72 members from the fire and police stations, etc., which conducted relief activities at the site from September 21 to 28. The Japan International Cooperation Agency (JICA) launched initiatives for medium- to long-term support, such as deploying a survey team to assist with recovery in the next month after the earthquake and organizing seminars for better recovery in Mexico City in December.

3. Laws and Systems

Fig. A-27 Progress on Disaster Management Laws and Systems Since 1945

Disasters that triggered law/system introduction	Disaster Management Law	Explanation
1940s		
1945 Typhoon Ida (Makurazaki)	47 The Disaster Relief Act	
1946 The Nankai Earthquake		
1947 Typhoon Kathleen		
1948 The Fukui Earthquake		
	49 The Flood Control Act	
1950s		
1959 Typhoon Vera (Isewan)	50 The Building Standards Act	
1960s		
1961 Heavy Snowfalls	60 Soil Conservation and Flood Control Urgent Measures Act	Establishment of fundamental disaster prevention laws - Clear assignment of federal responsibilities - Development of cumulative and organized disaster prevention structures etc.
	61 Basic Act on Disaster Management	
	62 National Disaster Management Council established	
	63 Basic Plan for Disaster Risk Reduction	
	62 Act on Special Financial Support to Deal with Extremely Severe Disasters	
1964 The 1964 Niigata Earthquake	63 Act on Special Measures for Heavy Snowfall Areas	
	66 Act on Earthquake Insurance	
1967 Torrential Rains in Uetsu		
1970s		
1973 Mt. Sakurajima Eruption Mt. Asama Eruption The Seismological Society of Japan publishes reports on a possible Tokai Earthquake	73 Act on Provision of Disaster Condolence Grant Act on Development of Evacuation Facilities in Areas Surrounding Active Volcanoes (Act on Special Measures for Active Volcanoes (1978))	
1978 The 1978 Miyagi Earthquake	78 Act on Special Measures Concerning Countermeasures for Large-Scale Earthquakes	
1980s		
	80 Act on Special Financial Measures for Urgent Earthquake Countermeasure Improvement Projects in Areas for Intensified Measures	Induction of current earthquake engineering laws, etc.
	81 Partial amendment of Order for Enforcement of the Building Standard Law	
1990s		
1995 The Southern Hyogo Earthquake (The Great Hanshin-Awaji Earthquake)	95 Act on Special Measures for Earthquake Disaster Countermeasures Act on Promotion of the Earthquake-proof Retrofit of Buildings Partial amendment of Basic Act on Disaster Management	Establishment of disaster management mechanisms based on volunteer groups and private organizations, loosening of requirements for the establishment of a National Disaster Management Council led by the Prime Minister, the codification of disaster relief requests for the JSDF, etc.
	96 Act on Special Measures for the Preservation of Rights and Interests of the Victims of Specified Disasters	
	97 Act on Promotion of Disaster Resilience Improvement in Densely Inhabited Areas	
	98 Act on Support for Reconstructing Livelihoods of Disaster Victims	
1999 Torrential Rains in Hiroshima Tokaimura Nuclear Accident (The JCO Nuclear Accident)	99 Act on Special Measures Concerning Nuclear Emergency Preparedness	
2000s		
2000 Torrential Rains in the Tokai Region	00 Act on the Promotion of Sediment Disaster Countermeasures for Sediment Disaster Hazard Areas	More rivers were added to flood alert lists, announcement of expected inundation areas. Expansion of list of designated rivers in expected inundation area.
	01 Partial amendment of the Flood Control Act	
	02 Act on Special Measures for Promotion of Tohankai and Nankai Earthquake Disaster Management	Increased efforts in public education through use of Sediment Disaster Hazard Maps. Establishment of basic national directives and regional earthquake-proof retrofit plans, and promotion of organized earthquake-proofing.
	03 Specified Urban River Inundation Countermeasures Act	
2004 Torrential Rains in Niigata, Fukushima The 2004 Niigata Chuetsu Earthquake	04 Act on Special Measures for Promotion of Disaster Management for Trench-type Earthquakes in the Vicinity of the Japan and Chishima Trenches	First Amendment (2012) Regional response for large-scale disasters. Incorporated lessons from the disaster, improvements to disaster management education, and improvements to regional disaster management capabilities through participation of diverse entities in implementation. Second Amendment (2013) Improvement of support for affected people. Improvements to rapid response capabilities in the event of a large-scale and regional disaster. Smooth and safe evacuation of residents. Improvements in disaster countermeasures in daily life.
	05 Partial amendment of the Flood Control Act Partial amendment of the Act on the Promotion of Sediment Disaster Countermeasures in Sediment Disaster Hazard Areas Partial amendment of the Act on the Promotion of the Seismic Reinforcement and Retrofitting of Buildings	
2011 The 2011 Tohoku Region Pacific Coast Earthquake (The Great East Japan Earthquake)	11 Act on the Promotion of Measures for Tsunami Act on Development of Areas Resilient to Tsunami Disasters	Establishment of obligatory earthquake-proofing examinations and publication of test results for large buildings in need of emergency safety checks. Participation of diverse entities including river management organizations in flood control activities, acquisition of appropriate maintenance and management needs in river management facilities, etc.
	12 Partial amendment of Basic Act on Disaster Management Act for Establishment of the Nuclear Regulation Authority	
	13 Partial amendment of Basic Act on Disaster Management Act on Reconstruction from Large-Scale Disasters Partial amendment of the Act on the Promotion of the Seismic Reinforcement and Retrofitting of Buildings Partial amendment of the Flood Control Act and River Act Act on Special Measures for Land and Building Leases in Areas Affected by Large-scale Disasters	Designation of Nankai Trough Earthquake Disaster Countermeasure Promotion Areas, promotion of earthquake disaster management for the Nankai Trough Earthquake through the creation of a Basic Plan. Designation of Areas for Urgent Implementation of Measures against a Tokyo Inland Earthquake and promotion of earthquake management through the creation of a Basic Plan.
	Act on Special Measures for the Promotion of Nankai Trough Earthquake Disaster Management (Partial amendment of the Act on Special Measures for the Promotion of Tonankai and Nankai Earthquake Disaster Management) Act on Special Measures against Tokyo Inland Earthquake	
2014 Heavy Snowfall Hiroshima Sediment Disaster Mt. Ontake Eruption	14 Partial amendment of Basic Act on Disaster Management Partial amendment of Act on the Promotion of Sediment Disaster Countermeasures for Sediment Disaster Hazard Areas	Establishment of laws regarding abandoned vehicles in opening up transportation routes for emergency vehicles in large-scale disasters, etc. (Responsible organization: road managers) Clear definitions of sediment disaster-prone areas (publication of basic investigations), provision of information necessary for issuing evacuation alerts. Formulation of basic guidelines by the government; designation of volcanic eruption hazard zones; establishment of Volcanic Disaster Management Councils in designated zones; imposition of mandatory preparation of evacuation implementation plans, etc.
	15 Partial amendment of Act on Special Measures for Active Volcanoes	
	Partial amendment of Basic Act on Disaster Management	Matters concerning the disposal of waste generated by a specific major disaster: formulation of disaster waste management guidelines by the Minister of the Environment; central government takeover of the disposal of disaster waste, etc. Establishment of laws regarding abandoned vehicles in opening up transportation routes for emergency vehicles in large-scale disasters. (Port management bodies and fishing port management bodies added as responsible organizations)
2016	16 Partial amendment of Basic Act on Disaster Management	

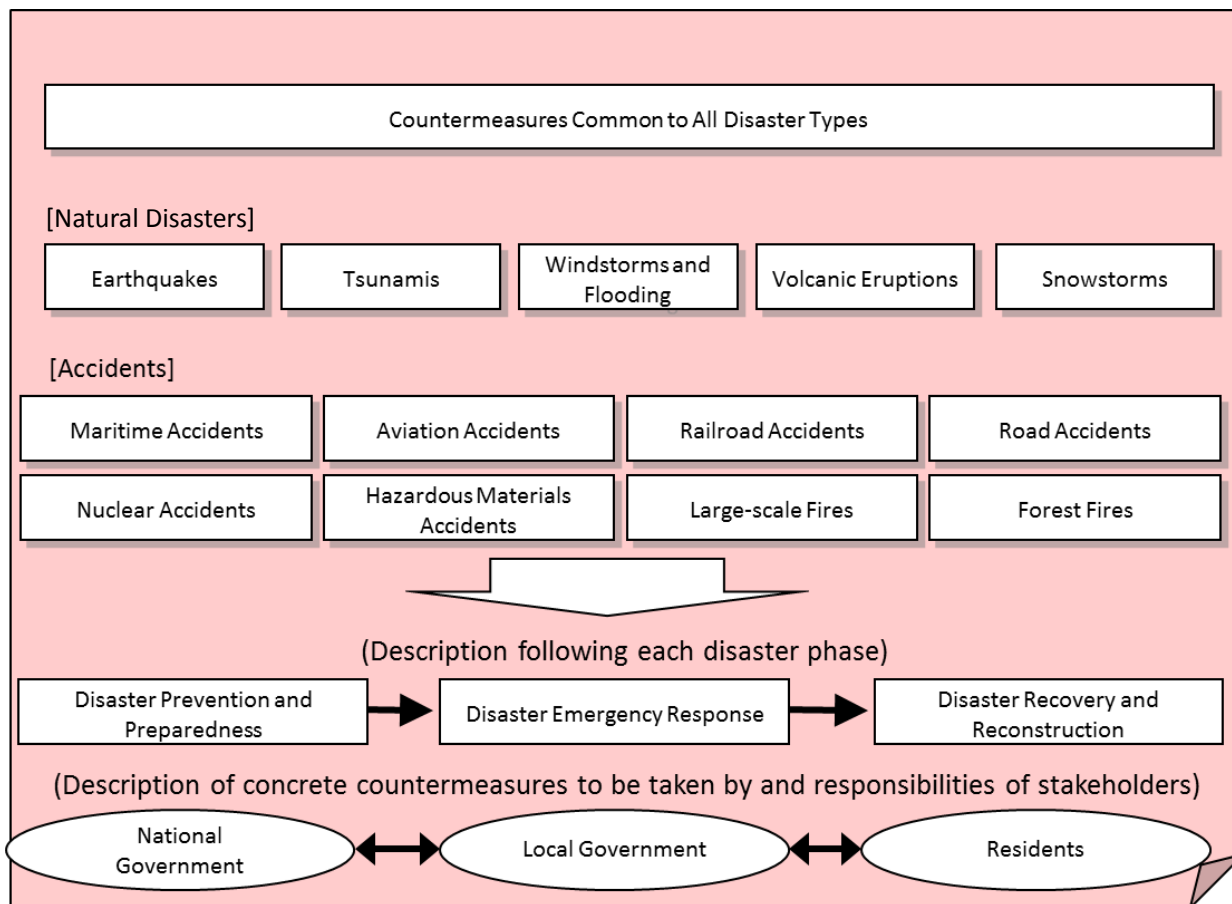
Source: Cabinet Office

Fig. A-28 Major Disaster Management Laws by Type of Disaster

Type	Prevention	Emergency Response	Recovery/Reconstruction		
Earthquakes, Tsunamis	Basic Act on Disaster Management				
	<ul style="list-style-type: none"> • Act on Special Measures Concerning Countermeasures for Large-Scale Earthquakes • Act on the Promotion of Measures for Tsunami 	<ul style="list-style-type: none"> • Disaster Relief Act • Fire Service Act • Police Act • Self-Defense Forces Act 	<p><General Relief and Assistance Measures></p> <ul style="list-style-type: none"> • Act on Special Financial Support to Deal with Extremely Severe Disasters <p><General Relief and Support Measures></p> <ul style="list-style-type: none"> • Small and Medium-sized Enterprise Credit Insurance Act • Act on Financial Support of Farmers, Forestry Workers and Fishery Workers Suffering from Natural Disaster • Act on Provision of Disaster Condolence Grant • Employment Insurance Act • Act on Support for Reconstructing Livelihoods of Disaster Victims • Japan Finance Corporation Act <p><Disposal of Disaster Waste></p> <ul style="list-style-type: none"> • Waste Management and Public Cleansing Act <p><Disaster Recovery Work></p> <ul style="list-style-type: none"> • Act on Temporary Measures for Subsidies from National Treasury for Expenses for Project to Recover Facilities for Agriculture, Forestry and Fisheries Damaged by Disaster • Act on National Treasury's Sharing of Expenses for Project to Recover Public Civil Engineering Works Damaged by Disaster • Act on National Treasury's Sharing of Expenses for Recovery of Public School Facilities Damaged by Disaster • Act on Special Measures concerning Reconstruction of Urban Districts Damaged by Disaster • Act on Special Measures concerning Reconstruction of Condominiums Destroyed by Disaster <p><Insurance and Mutual Aid System></p> <ul style="list-style-type: none"> • Act on Earthquake Insurance • Act on Compensation for Agricultural Loss • Government Managed Forest Insurance Act <p><Acts relating to Disaster Taxation></p> <ul style="list-style-type: none"> • Act on Reduction or Release, Deferment of Collection and Other Measures Related to Tax Imposed on Disaster Victims <p><Other></p> <ul style="list-style-type: none"> • Act on Special Measures for the Preservation of Rights and Interests of the Victims of Specified Disasters • Act on Special Financial Support for Promoting Group Relocation for Disaster Mitigation • Act on Special Measures for Land and Building Leases in Areas Affected by Large-scale Disaster 		
	<ul style="list-style-type: none"> • Act on Special Financial Measures for Urgent Earthquake Countermeasure Improvement Projects in Areas for Intensified Measures • Act on Special Measures for Earthquake Disaster Countermeasures • Act on Special Measures for the Promotion of Nankai Trough Earthquake Disaster Management • Act on Special Measures against Tokyo Inland Earthquake • Act on Special Measures for Promotion of Disaster Management for Trench-type Earthquakes in the Vicinity of the Japan and Chishima Trenches • Act on Promotion of the Earthquake-proof Retrofit of Buildings • Act on Promotion of Disaster Resilience Improvement in Densely Inhabited Areas • Act on Development of Areas Resilient to Tsunami Disasters 				
	Volcanic eruptions			<ul style="list-style-type: none"> • Act on Special Measures for Active Volcanoes 	
	Windstorms, flooding			<ul style="list-style-type: none"> • River Act 	<ul style="list-style-type: none"> • Flood Control Act
	Landslides, rockfalls, debris flow			<ul style="list-style-type: none"> • Erosion Control Act • Forest Act • Landslide Prevention Act • Act on Prevention of Disasters Caused by Steep Slope Failure • Act on Promotion of Sediment Disaster Countermeasures in Sediment Disaster Hazard Areas 	
Heavy snowfall	<ul style="list-style-type: none"> • Act on Special Measures for Heavy Snowfall Areas • Act on Special Measures concerning Maintenance of Road Traffic in Specified Snow Coverage and Cold Districts 				
Nuclear power	<ul style="list-style-type: none"> • Act on Special Measures Concerning Nuclear Emergency Preparedness 	<ul style="list-style-type: none"> • Act on Reconstruction from Large-Scale Disasters 			

Source: Cabinet Office

Fig. A-29 Structure and System of the Basic Plan for Disaster Risk Reduction



Source: Cabinet Office

Fig. A-30 History of Revisions to the Basic Plan for Disaster Risk Reduction

Revision Date	Outline of Revision	Background
June 1963	- The Basic Plan for Disaster Risk Reduction formulated based on the Basic Act on Disaster Management - Stipulations regarding various measures to prevent natural disasters, mitigate damage, and promote disaster reconstruction	Sep. 26, 1959: Typhoon Ise-wan Nov. 15, 1961: Enactment of the Basic Act on Disaster Management
May 1971	Partial revision - Enhancement of earthquake countermeasures (facilities for earthquake prediction, preparation of fire fighting helicopters) - Renewed positioning of countermeasures to tackle hazardous materials, petrochemical complexes, and wildfires	Sep. 6, 1967 Recommendation concerning Disaster Prevention Measures (recommending revisions in response to a modern socioeconomy)
July 1995	Complete revision - Structured this version by disaster type, and included stipulations in the following order: prevention, emergency response, recovery/reconstruction - Clearly defined the stakeholders, such as national governments, public agencies, local governments, and businesses, and specified countermeasures - Stipulated that changes in social structure such as the aging of society should be taken into account	Jan. 17, 1995: Southern Hyogo Prefecture Earthquake (Great Hanshin-Awaji Earthquake)
June 1997	Partial revision - Addition of section on countermeasures to address disasters caused by accidents (structural improvements such as the establishment of an emergency countermeasures headquarters) - Addition of a section on snowstorm countermeasures	Jan. 2, 1997: Nakhodka Oil Spill Accident
May 2000	Partial revision - Revision of the section on countermeasures to tackle nuclear power disasters, following the enactment of the Act on Special Measures Concerning Nuclear Emergency Preparedness	Sep. 30, 1999: Criticality accident at uranium fabrication plant in Tokai-mura, Ibaraki prefecture
December 2000	Partial revision - Revisions resulting from the national government reformation	National government reformation
April 2002	Partial revision - Enhancement of descriptions relating to information transmission to residents and evacuation measures regarding countermeasures against flooding, sediment disasters, and storm surges - New positioning of nuclear power disasters related to nuclear vessels	Jun. 29, 1999: Torrential rain disaster in Hiroshima Prefecture Sep. 24, 1999: Storm surge disaster in Kumamoto Prefecture
March 2004	Partial revision - Revisions based on the creation of the Basic Plan for the Promotion of Tonankai and Nankai Earthquake Countermeasures (seismic retrofitting of public buildings, etc.) - Revisions based on the development of policies such as the development of an earthquake early warning system	Mar. 31, 2004: Creation of a Basic Plan for the Promotion of Tohankai and Nankai Earthquake Countermeasures
July 2005	Partial revision - Revisions based on developments in policy, such as the promotion of a nationwide movement to practice disaster preparedness, the promotion of corporate disaster risk reduction efforts, the formulation and implementation of an earthquake DRR strategy, tsunami DRR measures such as the development of tsunami evacuation buildings, information transmission during torrential rains, evacuation support for the elderly, etc.	July 28, 2004: Creation of an Earthquake Disaster Risk Reduction Strategy Dec. 26, 2004: Indian Ocean Tsunami (Sumatra/Andaman Earthquake)
March 2007	Partial revision - Revisions resulting from the transition from Defense Agency to Ministry of Defense	Transition from Defense Agency to Ministry of Defense
February 2008	Partial revision - Implementation of follow-up actions on key issues regarding the Basic Plan for Disaster Risk Reduction, development of strategic national movements, establishment of conditions for the promotion of corporate disaster risk reduction, full-scale introduction of earthquake early warning system, strengthening of nuclear power disaster countermeasures in light of lessons learned from the Niigataken Chuetsu-oki Earthquake	July 16, 2007: The Niigataken Chuetsu-oki Earthquake
December 2011	Partial revision - Radical strengthening of earthquake/tsunami countermeasures in light of the Great East Japan Earthquake (addition of tsunami disaster countermeasure section)	Mar. 11, 2011 Tohoku Earthquake and Tsunami (The Great East Japan Earthquake)
September 2012	Partial revision - Strengthening of countermeasures against large-scale regional disasters in light of revisions to the Basic Act on Disaster Management (First Revision), and the final report of the National Disaster Management Council's Committee for Policy Planning on Disaster Management (each section) - Strengthening of nuclear power disaster countermeasures in light of the enactment of the Act for Establishment of the Nuclear Regulation Authority (nuclear power disaster countermeasures section)	Mar. 11, 2011 The Great East Japan Earthquake Jun. 27, 2012 Partial revisions to the Basic Act on Disaster Management Sep. 19, 2012 Inauguration of the Nuclear Regulatory Authority
January 2014	Partial revision - Strengthening of countermeasures against large-scale disasters in light of revisions to the Basic Act on Disaster Management (Second Revision) and the enactment of the Act on Reconstruction from Large-Scale Disasters (each section) - Strengthening of nuclear disaster countermeasures in light of investigations by the Nuclear Regulation Authority	Mar. 11, 2011 The Great East Japan Earthquake Jun. 21, 2013 Partial revisions to the Basic Act on Disaster Management, enactment of the Act on Reconstruction from Large-Scale Disasters

Revision Date	Outline of Revision	Background
November 2014	Partial revision - Strengthening of countermeasures against abandoned and stranded vehicles following revision of the Basic Act on Disaster Management - Addition of descriptions in light of lessons learned from heavy snowfall of February 2014, such as the diversification of information transmission methods such as warnings of heavy snow	Feb. 2014: Heavy snowfall Nov. 21, 2014: Partial revisions to the Basic Act on Disaster Management
March 2015	Partial revision - Improvement and strengthening of nuclear disaster risk reduction systems e.g., through the establishment of local nuclear disaster management committees and national support for the enhancement of local plans for disaster risk reduction/evacuation plans (nuclear disaster countermeasures section)	Mar. 5, 2015: Cabinet Secretariat Three-Year Revision and Investigation Team "Improvement and Strengthening of the Nuclear Disaster Management System (Second Report)"
July 2015	Partial revision -Revisions resulting from the strengthening of measures in light of lessons learned from the Hiroshima Sediment Disaster and the Mt. Ontake Eruption (each section)	Jan. 18, 2015: Partial revisions to the Act on the Promotion of Sediment Disaster Countermeasures in Sediment Disaster Hazard Areas Mar. 26, 2015: Working Group for the Promotion of Volcano Disaster Prevention report Jun. 4, 2015: Working Group for Studying Comprehensive Countermeasures against Sediment Disasters report
February 2016	Partial revision -Revisions resulting from the strengthening of measures in light of the revision of laws, including the Act on Special Measures for Active Volcanoes, the Flood Control Act, the Sewerage Act, the Waste Management and Public Cleansing Act, and the Basic Act on Disaster Management (each section)	Dec. 10, 2015: Partial revisions to the Act on Special Measures for Active Volcanoes
May 2016	Partial revision -Revisions resulting from the strengthening of measures in light of lessons learned from the Torrential Rain of September 2015 in the Kanto and Tohoku Regions (each section)	Mar. 31, 2016: Working Group on Study on Evacuation and Emergency Response Measures for Flood Disasters report
April 2017	Partial revision -Revisions resulting from the strengthening of measures in light of lessons learned from the 2016 Kumamoto Earthquake and 2016 Typhoon 10 disaster (each section)	Dec. 20, 2016: Report of the Working Group for Studying Emergency Response and Livelihood Support Measures in Light of the 2016 Kumamoto Earthquake Dec. 26, 2016: Report of the Study Group on Guidelines for Producing a Handbook on Decision and Dissemination for Evacuation Recommendations

Source: Cabinet Office

4. Organizations

Fig. A-31 Organization of the National Disaster Management Council

National Disaster Management Council (Section I, Chapter II of the Basic Act on Disaster Management)			
Chair	Prime Minister		
Members	Minister of State for Disaster Management	Heads of Designated Public Corporations (appointed by Prime Minister)	Experts (appointed by Prime Minister)
	Other ministers of state (all appointed by Prime Minister)	Governor of the Bank of Japan Haruhiko Kuroda President of Japanese Red Cross Society Tadateru Konoe President of Japan Broadcasting Corporation (NHK) Ryoichi Ueda President of Nippon Telegraph and Telephone Corporation Hiroo Unoura	Director, Earthquake Prediction Research Center, Earthquake Research Institute, The University of Tokyo Naoshi Hirata Professor of Tokyo International University Hisako Komuro Chairman, Special Committee for Risk Management/Disaster Control, National Governors' Association (Mie Prefecture Governor) Eikei Suzuki Vice President of the Japan Firefighters Association Kazuo Ueda Chairman of the Disaster Victims Health Support Liaison Council Yoshitake Yokokuta
Committees for Technical Investigation			
● Disaster Management Implementation Committee (established March 26, 2013)			
Chair: Parliamentary Vice-Minister of Cabinet Office			
Vice Chair: Director General for Disaster Management, Cabinet Office, and Deputy Manager of the Fire and Disaster Management Agency			
Advisor: Deputy Chief Cabinet Secretary for Crisis Management			
Secretary: Relevant directors-general of each ministry and agency			

Prime Minister, Minister of State for Disaster Management

Inquiry →
 Report →
 Offer Opinion →

[Role]

- Formulate a Basic Plan for Disaster Risk Reduction and Earthquake Disaster Management Plan and promote their implementation
 - Discuss important issues related to disaster management in response to inquiries from the Prime Minister or the Minister of State for Disaster Management (e.g., basic approaches to disaster management, comprehensive coordination of disaster management policies, and the declaration of states of emergency)
- Offer opinions on important issues related to disaster management to the Prime Minister or the Minister of State for Disaster Management

Source: Cabinet Office

Fig. A-32 Recent Meetings of the National Disaster Management Council (Since 2009)

FY2009	
Apr. 21, 2009	<ul style="list-style-type: none"> • FY2009 Comprehensive Disaster Management Drill Framework • Framework for Chubu and Kinki Region Inland Earthquake Countermeasures • New Promotion of Earthquake Research • Volcanic eruption possibilities and DRR measures
Jan. 15, 2010	<ul style="list-style-type: none"> • Establishment of the Committee for the Technical Investigation of Best Practices for Earthquake Disaster Management in Regional Cities • Revisions to the General Framework for Tokyo Inland Earthquake Countermeasures • Report of the Committee for the Technical Investigation of the Dissemination of Lessons Learned from Disasters • Earthquake DRR measures in Japan
FY2010	
Apr. 21, 2010	<ul style="list-style-type: none"> • FY2010 Comprehensive Disaster Management Drill Framework • Establishment of the Committee for the Technical Investigation of Disaster Evacuation • Report of the Committee for the Technical Investigation of Large-Scale Flood Measures • Tsunamis caused by earthquakes centered along the coast of Chile • Tokyo Metropolitan Area Flooding: Measures Needed for Damage Mitigation
FY2011	
Apr. 27, 2011	<ul style="list-style-type: none"> • Great East Japan Earthquake: Characteristics and Challenges • Conventional earthquake and tsunami policies
Oct. 11, 2011	<ul style="list-style-type: none"> • Report of the Committee for the Technical Investigation of Earthquake and Tsunami Measures Based on Lessons Learned from the Great East Japan Earthquake • Government ministry and agency efforts related to future DRR efforts • Establishment of the Committee for Policy Planning on Disaster Management
Dec. 27, 2011	<ul style="list-style-type: none"> • Revisions to the Basic Plan for Disaster Risk Reduction • Revisions to the National Disaster Management Council Operation Guidelines • Report of the Committee for the Technical Investigation of the Dissemination of Lessons Learned from Disasters • Status of the investigations by the Committee for Policy Planning on Disaster Management
Mar. 29, 2012	<ul style="list-style-type: none"> • Interim Report of the Committee for Policy Planning on Disaster Management • Current efforts aimed at bolstering and reinforcing DRR measures • FY2012 Comprehensive Disaster Management Drill Framework
FY2012	
Sep. 6, 2012	<ul style="list-style-type: none"> • Revisions to the Basic Plan for Disaster Risk Reduction • Framework for Large-Scale Flood Measures in the Capital Region • New Promotion of Earthquake Research • Final Report of the Committee for Policy Planning on Disaster Management • Report of the Committee for the Technical Investigation of Best Practices for Earthquake Disaster Management in Regional Cities • Report of the Committee for the Technical Investigation of Disaster Evacuation • Report on Tsunami Heights and Inundation Areas Resulting from Nankai Trough Megaquake (Secondary Report) and Damage Estimates (Primary Report)
Mar. 26, 2013	<ul style="list-style-type: none"> • Review of the legal systems for disaster management; status of investigations into Nankai Trough Megaquake Measures and Tokyo Inland Earthquake Measures • Establishment of the Disaster Management Implementation Committee • FY2013 Comprehensive Disaster Management Drill Framework
FY2013	
Jan. 17, 2014	<ul style="list-style-type: none"> • Designation of Areas for the Promotion of Nankai Trough Earthquake DRR Measures and Areas for the Special Reinforcement of Nankai Trough Earthquake Tsunami Evacuation Measures • Designation of Tokyo Inland Earthquake Emergency Management Zones • Revisions to the Basic Plan for Disaster Risk Reduction • Final Report of the Working Group to Investigate Tokyo Inland Earthquake Measures and a National Government Business Continuity Plan Proposal
Mar. 28, 2014	<ul style="list-style-type: none"> • Act on Special Measures for the Promotion of Nankai Trough Earthquake Disaster Management • Act on Special Measures against Tokyo Inland Earthquake • Framework for Large-Scale Earthquake Disaster Management and Reduction • FY2014 Comprehensive Disaster Management Drill Framework
FY2014	
Nov. 28, 2014	<ul style="list-style-type: none"> • Revisions to the Basic Plan for Disaster Risk Reduction
Mar. 31, 2015	<ul style="list-style-type: none"> • Revisions to the Basic Plan for Disaster Risk Reduction • FY2015 Comprehensive Disaster Management Drill Framework • Earthquake Disaster Risk Reduction Strategy for a Tokyo Inland Earthquake
FY2015	
Jul. 7, 2015	<ul style="list-style-type: none"> • Revisions to the Basic Plan for Disaster Risk Reduction
Feb. 16, 2016	<ul style="list-style-type: none"> • Basic Guidelines on the Comprehensive Promotion of Measures for Active Volcanoes • Designation of volcanic eruption hazard areas • Revisions to the Basic Plan for Disaster Risk Reduction
FY2016	
May 31, 2016	<ul style="list-style-type: none"> • FY2016 Comprehensive Disaster Management Drill Framework • Revisions to the Basic Plan for Disaster Risk Reduction
FY2017	
Apr. 11, 2017	<ul style="list-style-type: none"> • FY2017 Comprehensive Disaster Management Drill Framework • Revisions to the Basic Plan for Disaster Risk Reduction

Source: Cabinet Office

Fig. A-33 Status of the Establishment of National Disaster Management Council Committees for Technical Investigation

	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
Name of Committee for Technical Investigation	Committee for the Technical Investigation of Total Earthquakes (total 11 meetings)	Mar. 14, '01	Dec. 13, '01															
		Sep. 27, '01	Jun. 26, '02															
Committee for the Technical Investigation of Future Earthquake Measure Effective Practices (total 11 meetings)		Oct. 15, '01	Nov. 26, '04															
		Oct. 15, '01	Nov. 26, '04															
Committee for the Technical Investigation of Toonai and Noto Earthquakes (total 30 meetings)		Oct. 11, '05	Jun. 28, '02															
		Oct. 11, '05	Jun. 28, '02															
Committee for the Technical Investigation of Basis Plans for Disaster Risk Reduction (total 9 meetings)		May 4, '02	May 12, '03															
		May 4, '02	May 12, '03															
Committee for the Technical Investigation of the Cultivation of Disaster Management Human Resources (total 11 meetings)		Sep. 25, '02	May 13, '03															
		Sep. 25, '02	May 13, '03															
Committee for the Technical Investigation of Disaster Management Information Sharing (total 11 meetings)		Oct. 3, '02	Jul. 16, '03															
		Oct. 3, '02	Jul. 16, '03															
Committee for the Technical Investigation of the Dissemination of Lessons Learned from Disasters (total 11 meetings)		Jul. 31, '03	Jul. 31, '03															
		Jul. 31, '03	Jul. 31, '03															
Committee for the Technical Investigation of Tokyo Earthquake Measures (total 20 meetings)		Sep. 12, '03	Sep. 12, '03															
		Sep. 12, '03	Sep. 12, '03															
Committee for the Technical Investigation of Improving Disaster Preparedness Using the Power of the Markets and Private Sector (total 5 meetings)		Oct. 14, '05	Oct. 14, '05															
		Oct. 14, '05	Oct. 14, '05															
Committee for the Technical Investigation of French-type Disaster Preparedness in the Vicinity of the Japanese Chishima Frontier (total 12 meetings)		Oct. 27, '03	Oct. 27, '03															
		Oct. 27, '03	Oct. 27, '03															
Committee for the Technical Investigation of the Disaster Preparedness in the Vicinity of the Japanese Chishima Frontier to Reduce Disaster Damage (total 14 meetings)		Dec. 5, '05	Dec. 13, '06															
		Dec. 5, '05	Dec. 13, '06															
Committee for the Technical Investigation of Tokyo Earthquake Measures (total 11 meetings)		Aug. 15, '06	Oct. 21, '08															
		Aug. 15, '06	Oct. 21, '08															
Committee for the Technical Investigation of Large-Scale Flood Measures (total 20 meetings)		Mar. 18, '10	Apr. 18, '10															
		Mar. 18, '10	Apr. 18, '10															
Committee for the Technical Investigation of Effective Practices for Earthquake Disaster Management in Regional Cities (total 10 meetings)		Apr. 26, '10	Apr. 26, '10															
		Apr. 26, '10	Apr. 26, '10															
Committee for the Technical Investigation of Disaster Evacuation (total 8 meetings)		May 28, '11	May 28, '11															
		May 28, '11	May 28, '11															
Committee for the Technical Investigation of Earthquake and Tsunami Measures Based on Lessons Learned from the Great East Japan Earthquake (total 12 meetings)		Oct. 28, '11	Oct. 28, '11															
		Oct. 28, '11	Oct. 28, '11															
Committee for Policy Planning on Disaster Management (total 11 meetings)		Jul. 31, '12	Jul. 31, '12															
		Jul. 31, '12	Jul. 31, '12															
Disaster Management Implementation Committee																		

Source: Cabinet Office

5. Budget

Fig. A-34 Disaster Management Budgets by Year

Fiscal Year	Science and Technology Research		Disaster Prevention		Land Conservation		Disaster Reconstruction		Total (JPY million)
	(JPY million)	Share (%)	(JPY million)	Share (%)	(JPY million)	Share (%)	(JPY million)	Share (%)	
1962	751	0.4	8,864	4.3	97,929	47.1	100,642	48.3	208,006
1963	1,021	0.4	8,906	3.7	116,131	47.7	117,473	48.2	243,522
1964	1,776	0.7	13,724	5.4	122,409	48.3	115,393	45.6	253,302
1965	1,605	0.5	17,143	5.6	147,858	48.3	139,424	45.6	306,030
1966	1,773	0.5	20,436	5.9	170,650	49.0	155,715	44.7	348,574
1967	2,115	0.6	23,152	6.1	197,833	52.3	154,855	41.0	377,955
1968	2,730	0.7	25,514	6.8	207,600	55.4	138,815	37.1	374,659
1969	2,747	0.7	30,177	7.5	236,209	59.0	131,270	32.8	400,403
1970	2,756	0.6	36,027	8.2	269,159	60.9	133,998	30.3	441,940
1971	3,078	0.5	50,464	8.6	352,686	60.3	178,209	30.5	584,437
1972	3,700	0.4	93,425	10.3	488,818	54.1	316,895	35.1	902,838
1973	6,287	0.7	111,321	12.4	493,580	54.9	287,082	32.0	898,270
1974	14,569	1.5	118,596	12.1	505,208	51.5	342,556	34.9	980,929
1975	17,795	1.5	159,595	13.3	615,457	51.3	405,771	33.9	1,198,618
1976	21,143	1.3	186,297	11.5	711,159	43.9	700,688	43.3	1,619,287
1977	22,836	1.4	234,409	13.9	904,302	53.6	525,886	31.2	1,687,433
1978	29,642	1.7	307,170	17.3	1,093,847	61.6	345,603	19.5	1,776,262
1979	35,145	1.6	435,963	20.4	1,229,401	57.6	432,759	20.3	2,133,268
1980	29,929	1.2	456,575	18.9	1,229,615	50.8	705,168	29.1	2,421,287
1981	29,621	1.2	474,926	18.9	1,240,788	49.5	761,950	30.4	2,507,285
1982	28,945	1.1	469,443	17.2	1,261,326	46.3	963,984	35.4	2,723,698
1983	29,825	1.1	489,918	18.4	1,268,712	47.6	875,851	32.9	2,664,306
1984	28,215	1.2	485,219	20.7	1,350,592	57.7	475,878	20.3	2,339,904
1985	27,680	1.1	512,837	20.2	1,355,917	53.5	640,225	25.2	2,536,659
1986	28,646	1.2	482,889	19.7	1,354,397	55.3	581,462	23.8	2,447,394
1987	38,296	1.4	612,505	21.9	1,603,599	57.2	548,337	19.6	2,802,737
1988	31,051	1.1	587,073	20.8	1,550,132	54.9	657,681	23.3	2,825,937
1989	34,542	1.2	588,354	20.7	1,638,104	57.5	587,819	20.6	2,848,819
1990	35,382	1.1	625,239	20.0	1,669,336	53.4	796,231	25.5	3,126,188
1991	35,791	1.1	628,596	19.8	1,729,332	54.3	788,603	24.8	3,182,322
1992	36,302	1.1	745,405	22.8	2,017,898	61.6	475,411	14.5	3,275,015
1993	43,152	0.9	866,170	18.6	2,462,800	52.9	1,280,569	27.5	4,652,691
1994	40,460	1.0	747,223	18.9	1,945,295	49.1	1,230,072	31.0	3,963,050
1995	105,845	1.4	1,208,134	16.0	2,529,386	33.5	3,696,010	49.0	7,539,375
1996	52,385	1.2	1,029,658	24.5	2,156,714	51.3	968,182	23.0	4,206,938
1997	49,128	1.2	1,147,102	28.2	2,014,695	49.4	864,370	21.2	4,075,295
1998	62,435	1.1	1,228,539	22.3	2,905,921	52.8	1,310,515	23.8	5,507,411
1999	78,134	1.7	1,142,199	25.0	2,400,534	52.6	941,886	20.6	4,562,752
2000	73,502	1.8	1,011,535	24.4	2,376,083	57.3	689,225	16.6	4,150,346
2001	49,310	1.2	1,060,445	26.7	2,238,816	56.4	618,427	15.6	3,966,998
2002	48,164	1.3	1,202,984	31.9	1,981,686	52.5	543,949	14.4	3,776,783
2003	35,133	1.1	814,101	25.7	1,625,670	51.4	689,255	21.8	3,164,159
2004	30,478	0.7	815,059	19.3	1,753,418	41.5	1,622,112	38.4	4,221,067
2005	11,097	0.4	866,290	28.6	1,426,745	47.0	728,606	24.0	3,032,738

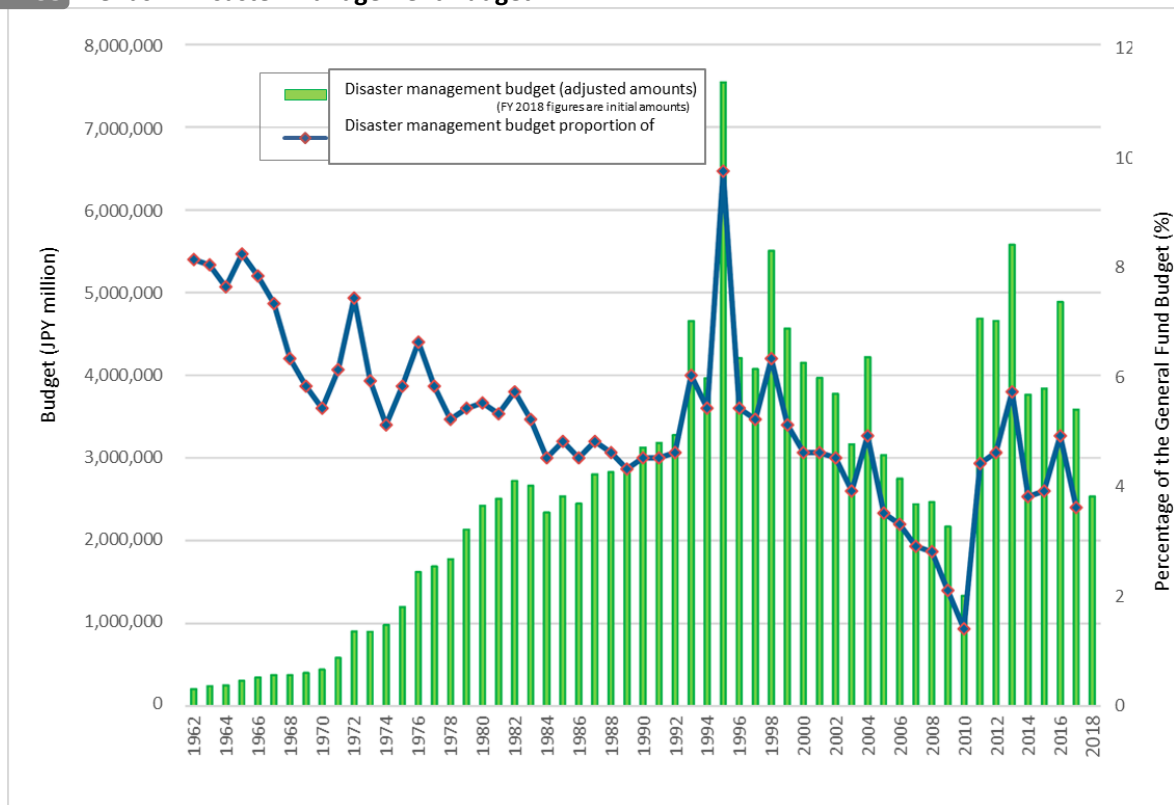
Fiscal Year	Science and Technology Research		Disaster Prevention		Land Conservation		Disaster Reconstruction		Total (JPY million)
	(JPY million)	Share (%)	(JPY million)	Share (%)	(JPY million)	Share (%)	(JPY million)	Share (%)	
2006	11,627	0.4	689,505	25.1	1,439,129	52.3	610,302	22.2	2,750,563
2007	9,687	0.4	706,853	29.0	1,332,222	54.6	391,637	16.0	2,440,399
2008	8,921	0.4	819,359	33.2	1,275,135	51.7	363,471	14.7	2,466,886
2009	8,761	0.4	498,397	23.0	1,383,254	63.7	279,789	12.9	2,170,201
2010	7,695	0.6	224,841	16.9	813,359	61.1	285,038	21.4	1,330,933
2011	28,072	0.6	376,169	8.0	743,936	15.9	3,536,475	75.5	4,684,652
2012	29,422	0.6	561,021	12.0	790,422	17.0	3,129,561	67.2	4,656,656
2013	15,339	0.3	788,576	14.1	879,932	15.8	3,883,911	69.6	5,578,036
2014	16,688	0.4	639,966	13.9	836,580	18.2	3,101,555	67.5	4,594,789
2015	14,961	0.4	713,477	18.6	155,475	4.1	2,954,355	77.0	3,838,268
2016	14,023	0.3	696,399	14.3	318,320	6.5	3,855,516	78.9	4,884,258
2017	10,123	0.3	790,361	22.1	267,629	7.5	2,515,384	70.2	3,583,497
2018	21,061	0.8	414,413	16.3	102,549	4.0	1,999,368	78.8	2,537,391

Notes:

1. These are adjusted budget (national expenditures) amounts. However, the FY2018 figures are preliminary figures reflecting the initial budget.
2. The reduced amount allocated to science and technology research in FY2007 is largely due to the structural conversion of national lab and research institutions into independent administrative agencies (the budgets of independent administrative agencies are not included in this table).
3. The amount allocated to disaster prevention in FY2009 is reduced because a portion of the revenue sources set aside for road construction were converted to general fund sources making it impossible to allocate certain portions to the disaster management budget.
4. The reduced amount allocated to disaster prevention and land conservation in FY2010 is due to the fact that, following the creation of the General Grant for Social Capital Development, some disaster prevention policies and many subsidy programs in land conservation were established using those grants.
5. The reduced amount allocated to land conservation in FY2011 is a result of the fact that relevant personnel expenses were accounted for separately.
6. The reduced amount of the disaster reconstruction budget in FY2018 is a result of the reduced amount of post-disaster reconstruction measures, etc. budget.

Source: Formulated by the Cabinet Office based on materials from various ministries and agencies

Fig. A-35 Trends in Disaster Management Budget



Source: Formulated by the Cabinet Office using materials from various ministries and agencies

Fig. A-36 Earthquake Emergency Development Project Plans

(As of the end of FY2016; Unit: JPY million)

Category	FY1980 - FY2019		
	Planned Amount (a)	Actual Amount (b)	Rate of Progress (b)/(a)
1 Evacuation sites	177,539	163,226	91.9%
2 Evacuation roads	93,983	83,345	88.7%
3 Firefighting facilities	141,083	125,532	89.0%
4 Emergency transport routes	951,107	817,765	86.0%
4-1 Emergency transport routes	840,671	720,723	85.7%
4-2 Emergency transport ports	59,631	52,919	88.7%
4-3 Emergency transport fishing ports	50,805	44,123	86.8%
5 Telecommunications facilities	17,240	16,545	96.0%
6 Public medical institutions	54,012	54,012	100.0%
7 Social welfare facilities	55,586	55,586	100.0%
8 Public elementary and junior high schools	443,534	425,960	96.0%
9 Tsunami countermeasures	272,080	181,555	66.7%
9-1 River management facilities	104,233	60,965	58.5%
9-2 Coastal preservation facilities	167,847	120,590	71.8%
10 Landslide prevention	540,415	496,171	91.8%
10-1 Erosion control facilities	102,887	93,842	91.2%
10-2 Security facilities	171,243	155,759	91.0%
10-3 Landslide facilities	84,622	78,015	92.2%
10-4 Steep slope facilities	160,033	152,693	95.4%
10-5 Ponds	21,630	15,862	73.3%
Total	2,746,579	2,419,697	88.1%

Notes:

1. The content of Earthquake Emergency Development Project Plans (FY1980-2019) is as of the end of FY2016.
2. Project expenses include expenses for projects that may not be solely designed for earthquake disaster management, but that, while having other policy objectives, also are intended to have an overall effect on earthquake disaster management. Project expenses are not comprised solely of expenses used entirely for disaster management.

Source: Cabinet Office

Fig. A-37 Estimated Budgets for Five-Year Plans for Emergency Earthquake Disaster Management Project

Based on lessons learned from the Great Hanshin-Awaji Earthquake, the Act on Special Measures for Earthquake Disaster Countermeasures was enacted in July 1995 to protect citizens' lives, health and assets from earthquake-related damage. This law allows prefectural governors to create a Five-Year Plan for Emergency Earthquake Disaster Management Projects for communities where there are concerns about the occurrence of a severe earthquake disaster and a portion of the projects to be implemented based on this plan are eligible for an increased rate of financial support from the national government. Thus far, these plans have been created by the prefectural governors over fifth terms, and earthquake disaster projects have begun to be implemented. These plans are five-year plans created for 29 facilities that need to be urgently developed from the perspective of achieving earthquake disaster reduction. When a prefecture wants to create a plan, hearings are held to listen to the opinions of the municipalities involved, and the consent of the Prime Minister must be obtained. Project budgets for these plans over fifth terms are shown in the table below.

Category	First Five-Year Plan (FY 1996-2000)				Second Five-Year Plan (FY 2001-2005)				Third Five-Year Plan (FY 2006-2010)				Fourth Five-Year Plan (FY 2011-2015)				(All prefectures, as of FY 2016. Unit: JPY 1,000,000)			
	Planned Amt. (a)	Actual Amt. (b)	% Complete (b)/(a)	Project Scope (Unit) (c)	Planned Amt. (d)	Actual Amt. (e)	% Complete (e)/(d)	Project Scope (Unit) (f)	Planned Amt. (g)	Actual Amt. (h)	% Complete (h)/(g)	Project Scope (Unit) (i)	Planned Amt. (j)	Actual Amt. (k)	% Complete (k)/(j)	Project Scope (Unit) (l)	Planned Amt. (m)	Actual Amt. (n)	% Complete (n)/(m)	
1. Evacuation sites	1,462,502	959,276	65.6%	3,168 ha	931,413	543,233	58.3%	2,515 ha	488,257	400,283	82.0%	1,456 ha	305,490	257,218	84.2%	1,034 ha	272,316	44,915	16.5%	
2. Evacuation routes	1,481,509	1,105,639	74.6%	2,601 km	1,188,051	900,446	75.8%	1,405 km	952,865	655,957	65.7%	897 km	1,336,465	781,628	58.5%	588 km	829,297	130,228	14.5%	
3. Firefighting facilities	917,213	697,067	76.0%	28,153 sites	540,784	297,301	55.0%	21,039 sites	448,460	246,745	55.0%	20,052 sites	677,209	472,644	69.8%	13,019 sites	423,777	72,815	17.2%	
4. Roads for firefighting activities	168,387	138,163	76.1%	361 km	119,229	92,958	77.9%	102 km	46,719	49,136	105.2%	56 km	23,506	19,998	85.1%	29 km	24,095	3,700	15.4%	
5. Emergency transport roads, etc.	6,067,258	5,719,897	94.3%	3,920 km	5,267,008	4,242,139	80.5%	2,552 km	3,813,169	3,291,461	86.3%	2,191 km	2,773,563	2,443,339	88.1%	2,162 km	2,735,638	550,053	20.1%	
5-1. Emergency transport roads	5,355,626	5,355,365	96.4%	3,448 facilities	4,998,277	4,067,023	81.4%	2,439 facilities	3,557,657	3,106,165	87.3%	2,191 km	2,584,039	2,279,595	88.2%	2,162 km	2,617,849	530,555	20.3%	
5-2. Emergency transport (traffic control) facilities	23,900	21,017	87.9%	1 sites	16,855	8,473	50.3%	0 sites	9,242	6,844	74.0%	4,837 sites	15,464	12,214	79.0%	6,458 sites	21,856	6,723	30.8%	
5-3. Emergency transport heliports	6,327	2,094	33.1%	1 sites	550	387	70.4%	0 sites	0	0	-	2 sites	117	78	66.7%	0 sites	0	0	-	
5-4. Emergency transport port facilities	359,671	237,940	66.2%	113 sites	181,503	119,869	66.0%	100 sites	198,676	136,895	68.9%	77 sites	153,101	133,801	87.4%	46 sites	75,432	8,952	11.9%	
5-5. Emergency transport fishing port facilities	121,734	103,481	85.0%	73 sites	70,423	46,387	65.9%	43 sites	47,594	41,558	87.3%	26 sites	20,848	17,652	84.7%	24 sites	20,501	3,824	18.7%	
6. Medical institutions	261,385	275,238	105.6%	844 km	39,948	257,890	65.3%	591 km	259,420	175,571	67.7%	471 km	255,017	208,175	81.6%	462 km	262,686	57,094	21.7%	
7. Social welfare facilities	784,899	526,548	67.1%	115 facilities	391,016	277,721	71.0%	93 facilities	239,424	150,877	63.0%	219 facilities	689,917	506,681	73.4%	64 facilities	239,092	94,292	39.4%	
8-2. Public kindergartens	482,317	219,490	45.5%	87 facilities	280,028	176,408	63.0%	521 facilities	114,756	56,400	49.1%	681 facilities	128,275	98,772	76.2%	254 facilities	46,604	7,402	15.9%	
11. Public buildings	-	-	-	-	-	-	-	995 schools	35,198	7,074	20.1%	1,159 schools	54,480	27,203	49.9%	246 schools	24,349	3,992	16.4%	
12. Coast and over facilities	1,359,672	765,344	56.3%	5,840 schools	1,078,849	594,777	55.1%	16,256 schools	3,077,544	1,399,624	45.5%	13,612 schools	2,327,751	1,631,920	70.3%	1,107 schools	370,343	90,738	24.5%	
6. Multipurpose underground utility conduits	84,577	29,685	35.1%	114 schools	32,094	12,070	37.6%	264 schools	56,834	23,262	40.9%	1,737 facilities	369,417	209,134	56.6%	7 schools	5,283	1,729	32.7%	
9. Public elementary and jr. high schools	24,169	5,267	21.8%	29 facilities	2,622	62,975	2,429	670 facilities	62,975	24,429	38.8%	1,737 facilities	369,417	209,134	56.6%	706 facilities	226,150	55,518	24.3%	
10. Public special education schools	235,686	187,310	79.5%	334 sites	272,744	225,598	82.7%	491 sites	237,787	182,211	76.9%	687 sites	345,184	302,195	87.5%	771 sites	635,531	114,949	18.1%	
12-1. Coastal preservation facilities	140,865	109,301	77.7%	215 sites	196,096	146,699	74.7%	423 sites	187,407	146,044	77.9%	525 sites	229,583	184,601	80.4%	569 sites	351,374	64,286	18.3%	
12-2. River management facilities	94,821	77,809	82.1%	119 sites	76,248	78,899	103.5%	68 sites	50,380	36,867	73.2%	10,504 sites	1,069,686	976,742	91.3%	202 sites	284,157	50,663	17.8%	
13. Erosion control facilities, etc.	1,729,574	1,702,042	98.4%	14,332 sites	1,622,048	1,339,438	82.6%	10,504 sites	1,069,686	976,742	91.3%	9,327 sites	845,288	786,324	93.0%	8,727 sites	899,398	219,410	24.4%	
13-2. Security facilities	268,151	247,050	92.1%	2,278 sites	436,635	409,636	93.8%	2,033 sites	334,972	325,910	97.5%	2,063 sites	303,286	257,665	85.0%	1,823 sites	285,306	63,871	22.4%	
13-3. Landslide prevention facilities	409,216	469,126	114.6%	5,583 sites	330,719	263,907	79.8%	3,673 sites	210,861	202,299	95.9%	2,683 sites	146,012	173,261	118.7%	2,595 sites	159,784	41,216	25.8%	
13-4. Steep slope failure prevention facilities	359,433	356,331	99.2%	1,651 sites	275,558	219,200	79.5%	1,151 sites	158,479	160,883	101.5%	849 sites	119,025	109,130	91.7%	712 sites	95,120	27,494	28.9%	
13-5. Reservoirs	522,261	497,690	95.3%	3,568 sites	446,098	356,530	79.9%	2,500 sites	244,461	220,779	90.3%	2,629 sites	193,935	185,729	95.8%	1,849 sites	187,322	54,115	28.9%	
13-1. Erosion control facilities	170,513	131,645	77.2%	1,252 sites	133,638	90,165	67.5%	1,147 sites	100,913	66,870	66.3%	1,303 sites	83,029	60,539	72.9%	1,748 sites	171,886	32,713	19.0%	
14. Community DR base facilities	162,319	102,857	63.4%	121 sites	81,442	40,342	49.4%	78 sites	60,905	34,277	56.3%	161 sites	90,683	68,591	75.6%	82 sites	81,082	21,993	27.1%	
17. Storage warehouses	224,276	126,236	56.3%	1,702 sites	126,944	38,693	30.5%	5,844 sites	239,525	78,112	32.6%	8,777 sites	190,612	105,334	55.3%	8,952 sites	155,565	25,955	16.7%	
18. Response and relief systems	221,622	126,320	57.0%	444 sites	89,322	55,599	61.9%	405 sites	142,958	72,142	50.5%	517 sites	121,728	93,437	76.8%	369 sites	110,508	28,613	25.9%	
15. Disaster management radio communications system	17,763	8,028	45.2%	487 sites	10,338	5,292	51.2%	296 sites	4,081	838	20.5%	600 sites	7,053	3,968	56.3%	417 sites	9,388	647	6.9%	
16. Portable water facilities/power generation systems	3,595	659	18.3%	610 groups	1,133	687	60.6%	515 groups	314	262	83.4%	304 groups	891	161	18.0%	29 groups	150	8	5.3%	
18. Downstream areas with high density of populated housing	2,814,605	1,431,714	50.9%	6,960 ha	1,725,332	916,981	53.1%	7,839 ha	846,197	563,811	66.6%	12,156 ha	301,836	340,080	67.8%	12,540 ha	428,804	47,476	11.1%	
	38,503,368	14,117,470	36.3%		14,157,285	10,018,773	70.8%		12,197,074	8,359,916	68.5%		11,080,537	8,386,758	75.7%		7,782,046	1,565,526	20.1%	

Notes:
 1. The content of the Fifth Five-Year Plan (FY2016-2020) is current as of the end of FY2016.
 2. The expenses for each project are not limited to projects aimed at achieving earthquake DR; they include expenses for projects that have other policy purposes, such as those related to urban infrastructure development, but that also are effective in terms of earthquake DR.
 3. Public special education schools include schools known as schools for the blind, schools for the deaf, and schools for the physically or mentally handicapped prior to FY2006.
 Source: Cabinet Office materials.

6. Status of Disaster Management Facilities and Equipment

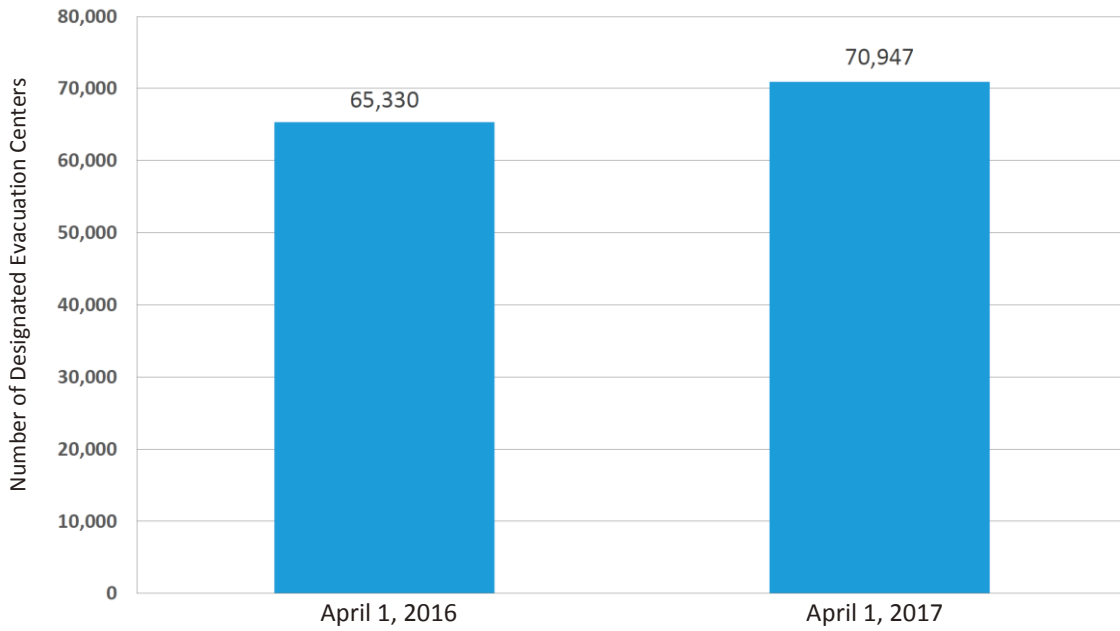
Fig. A-38 Number of Red Cross Hospitals, Emergency Medical Centers, and Disaster Base Hospitals

Prefectures	Red Cross Hospital	Emergency Medical Center	Disaster Base Hospital	Prefectures	Red Cross Hospital	Emergency Medical Center	Disaster Base Hospital
Hokkaido	10	12	34	Shiga	3	4	10
Aomori	1	3	9	Kyoto	3	6	13
Iwate	1	3	11	Osaka	2	16	19
Miyagi	2	6	16	Hyogo	4	10	18
Akita	2	1	13	Nara	0	3	7
Yamagata	0	3	7	Wakayama	1	3	10
Fukushima	1	4	8	Tottori	1	2	4
Ibaraki	2	6	15	Shimane	2	4	10
Tochigi	3	5	11	Okayama	2	5	10
Gunma	2	4	17	Hiroshima	3	7	18
Saitama	3	8	18	Yamaguchi	2	5	13
Chiba	1	13	25	Tokushima	1	3	11
Tokyo	4	26	80	Kagawa	1	3	9
Kanagawa	6	21	33	Ehime	1	3	8
Niigata	1	6	14	Kochi	1	3	12
Toyama	1	2	8	Fukuoka	3	10	30
Ishikawa	1	2	10	Saga	1	4	8
Fukui	1	2	9	Nagasaki	2	3	13
Yamanashi	1	1	9	Kumamoto	2	3	14
Nagano	6	7	10	Oita	1	4	14
Gifu	2	6	12	Miyazaki	0	3	12
Shizuoka	5	11	22	Kagoshima	1	3	14
Aichi	2	23	35	Okinawa	1	3	13
Mie	1	4	15	Total	97	289	731

Source: Red Cross Hospital information was formulated by the Cabinet Office based on the website of the Japanese Red Cross Society (as of March 2018).

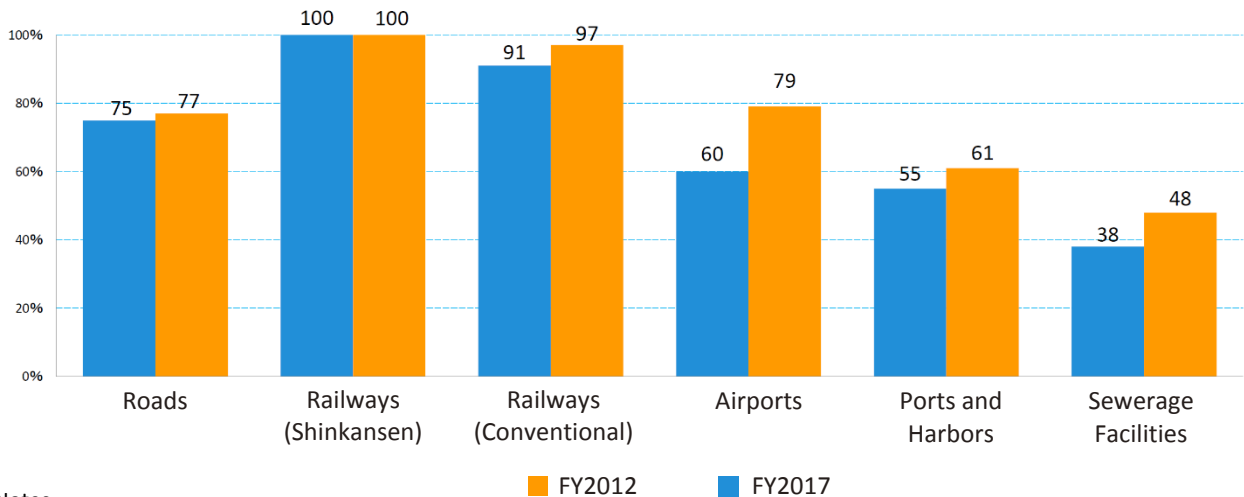
Information on emergency medical centers and disaster base hospitals was formulated by the Cabinet Office based on materials from the Ministry of Health, Labour and Welfare (as of April 1, 2018).

Fig. A-39 Designation of Designated Evacuation Centers



Source: Formulated by the Cabinet Office based on the Fire and Disaster Management Agency report "Status of Regional Disaster Management Administration"

Fig. A-40 Seismic Reinforcement of Public Infrastructure



Notes

Roads: The rate of bridges not in danger of being damaged related to all bridges along emergency transport roads (important roads that have to be secured for evacuation and rescue as well as ensuring the passage of emergency vehicles immediately after the earthquake, including national expressways, national highways and the arterial roads that connect them.) (As of end of FY2016)

Railway (Shinkansen): Elevated bridges.

Railway (Conventional): Elevated bridges of major railway lines in regions where a seismic intensity of 6 Upper or greater would be expected to occur in the case of a Tokyo Inland Earthquake or Nankai Trough Earthquake. (Left: As of end of FY2012. Right: As of end of FY2016.)

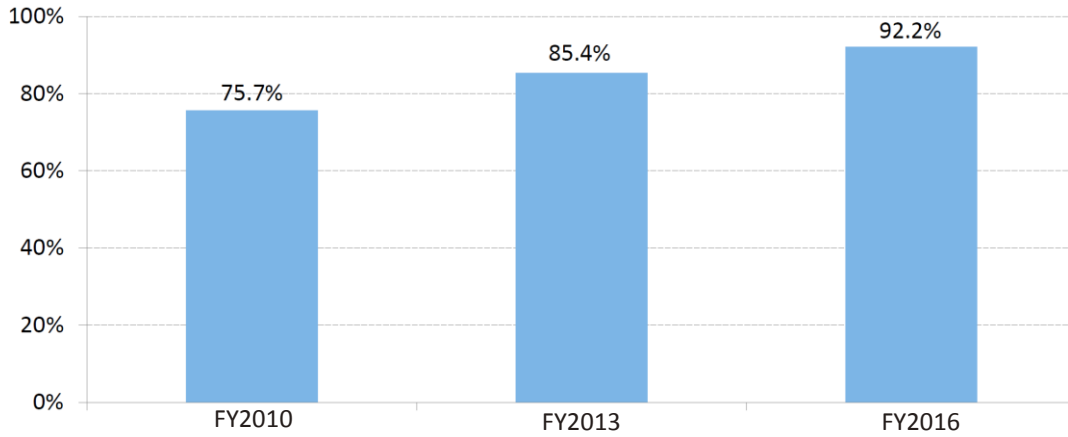
Airports: Percentage of population in a 100 km area around an airport that could be used for emergency transport.

Ports and Harbors: Seismically reinforced piers (number completed as a proportion of those detailed in plans for seismic retrofit of piers to facilitate the transportation of emergency supplies (those classed as major ports or higher)).

Sewerage Facilities: Important main lines (pipes that can accommodate drainage from river basin lines, DRR bases, and evacuation sites, main pipes connected to pump stations and disposal stations, pipes buried beneath emergency transport roads and railroad tracks. (Left: As of end of FY2012. Right: As of end of FY2016.)

Source: Formulated by the Cabinet Office using materials from the Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Fig. A-41 Trends in the Seismic Reinforcement Rate of Public Facilities That Serve as Disaster Management Bases



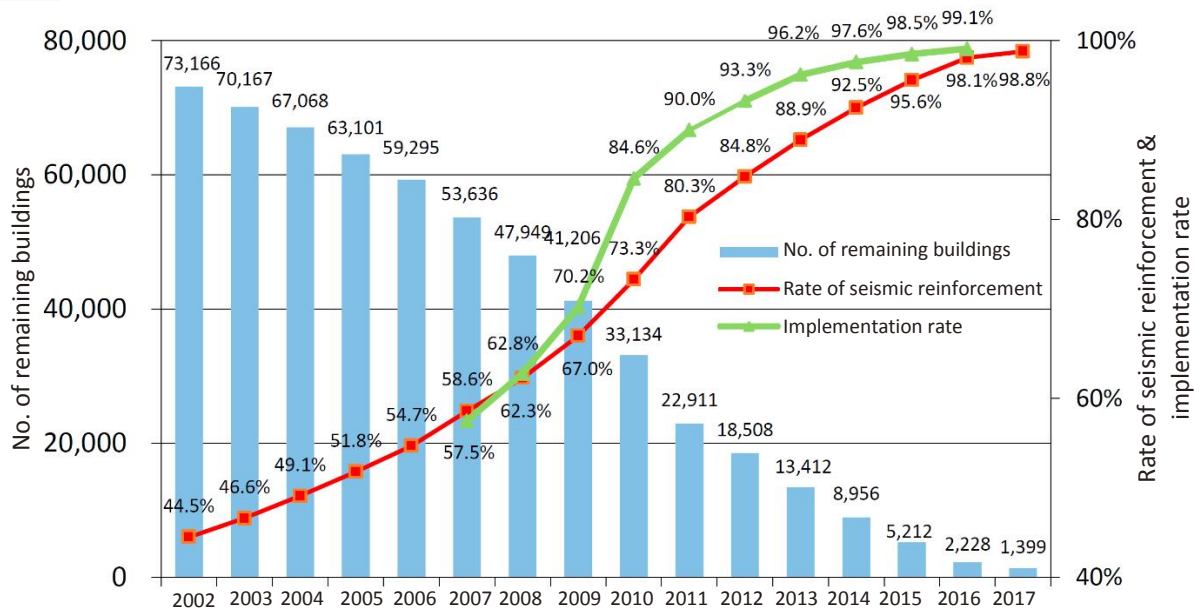
Note) Of all the public facilities owned or managed by local governments (buildings for public or public-private use: non-wooden structures built two stories or taller or buildings with a floor area of 200 m² or more), the facilities that could serve as disaster management bases for implementing disaster response measures are identified, consolidated and analyzed based on the criteria below.

<Classification criteria of public facilities that serve as disaster management bases>

(1) Social welfare facilities	All facilities
(2) Education facilities (classrooms, gymnasiums)	Facilities designated as designated emergency evacuation site or designated evacuation center
(3) Government buildings	Facilities that will be used for the implementation of disaster response measures
(4) Prefectural civic halls, civic centers	Facilities designated as designated emergency evacuation site or designated evacuation center
(5) Gymnasiums	Facilities designated as designated emergency evacuation site or designated evacuation center
(6) Health care facilities	Facilities positioned in local plans for disaster risk reduction as medical care facilities
(7) Police headquarters and police stations	All facilities

Source: "Results of the Survey on the Seismic Reinforcement Rate of Public Facilities That Serve as Disaster Management Bases" Ministry of Internal Affairs and Communications (November 2017)

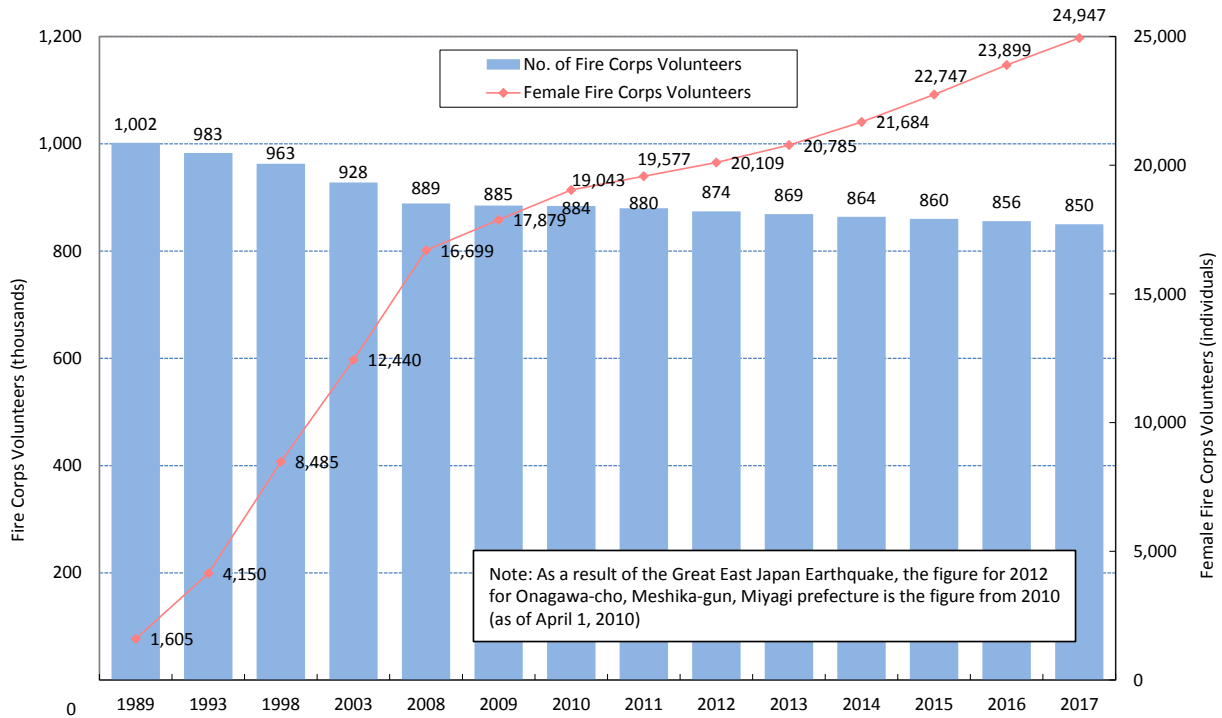
Fig. A-42 Seismic Reinforcement Status of Public Elementary and Junior High Schools



Source: "Results of the Survey on the Seismic Reinforcement Status of Public School Facilities," Ministry of Education, Culture, Sports, Science and Technology (MEXT) (April 2017)

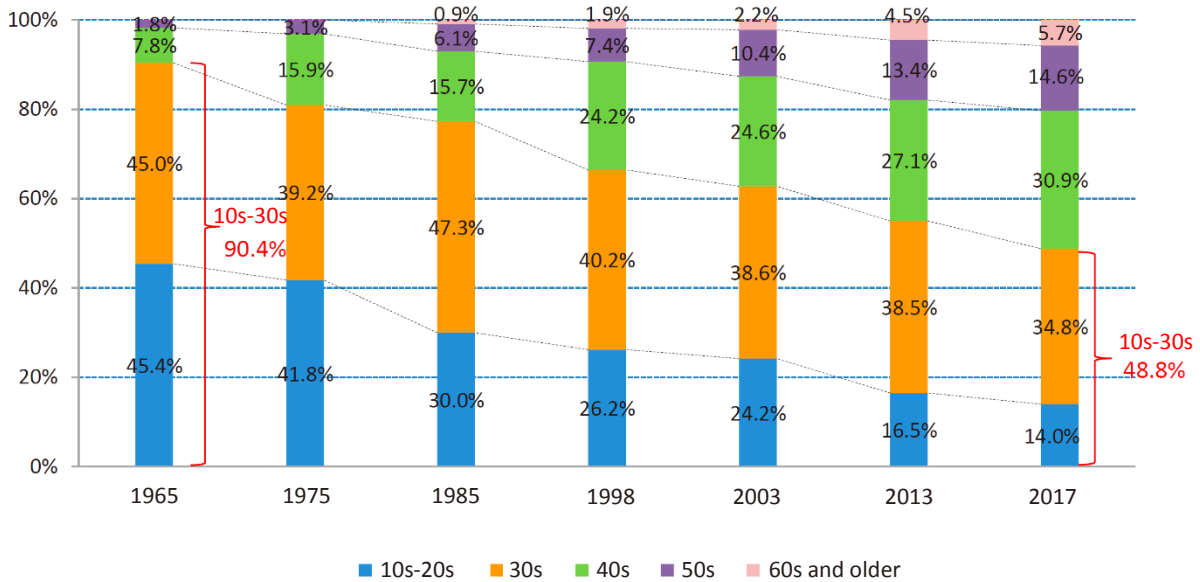
7. Trends in Numbers of Workers in Disaster Management

Fig. A-43 Trends in Numbers of Fire Corps Volunteers



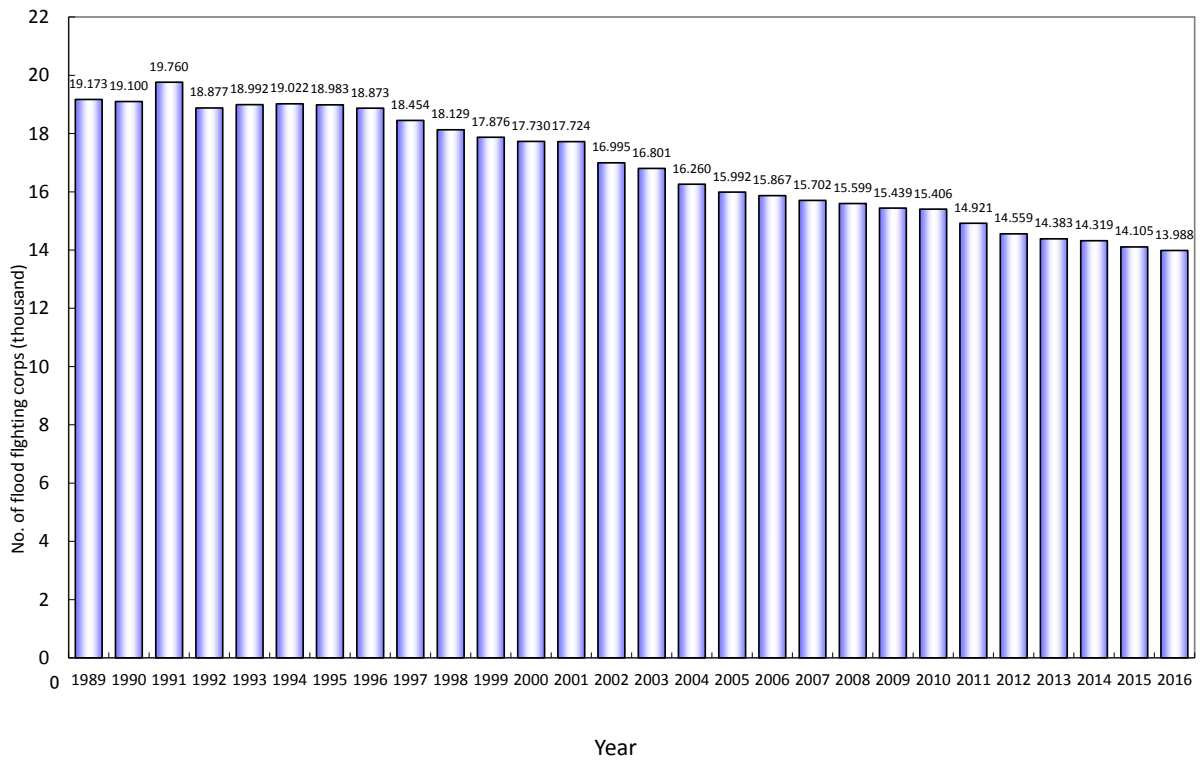
Source: Formulated by the Cabinet Office based on the Survey on the Current Status of Fire and Earthquake Disaster Management Measures of the Fire and Disaster Management Agency

Fig. A-44 Trends in Age Composition Ratios among Fire Corps Volunteers



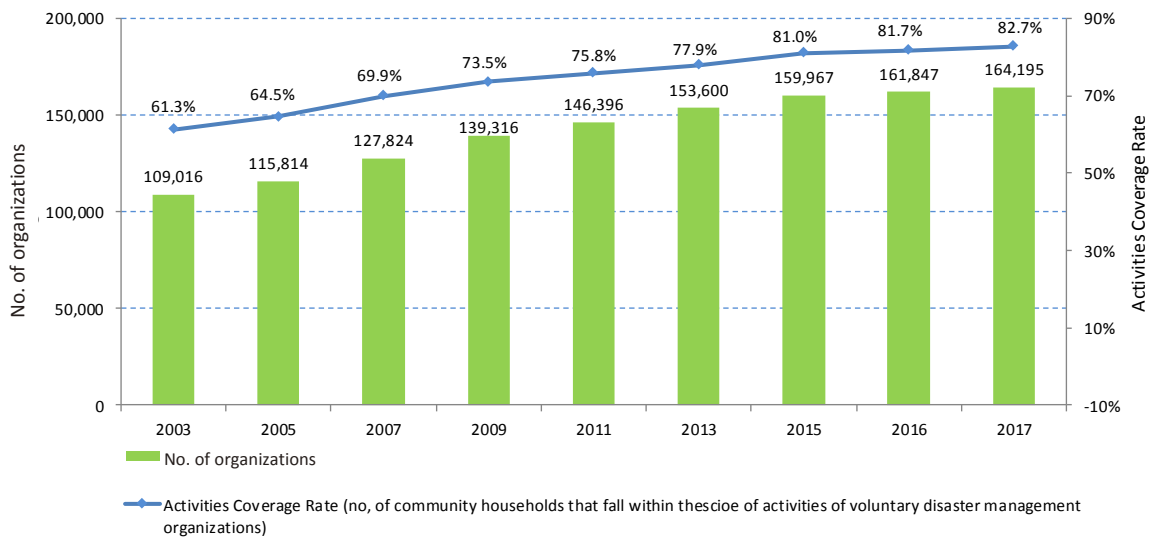
Source: Formulated by the Cabinet Office based on the Survey on the Current Status of Fire and Earthquake Disaster Management Measures of the Fire and Disaster Management Agency

Fig. A-45 Trends in Numbers of Flood Fighting Corps Personnel



Note) Number of full-time flood fighting corps personnel
 Source: Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Fig. A-46 Trends in Voluntary Disaster Management Organizations



Source: Formulated by the Cabinet Office based on the Survey on the Current Status of Fire and Earthquake Disaster Management Measures of the Fire and Disaster Management Agency. Figures as of April 1 each year.

Fig. A-47 Female Representation on Local Disaster Management Councils (by Prefecture, 2017)

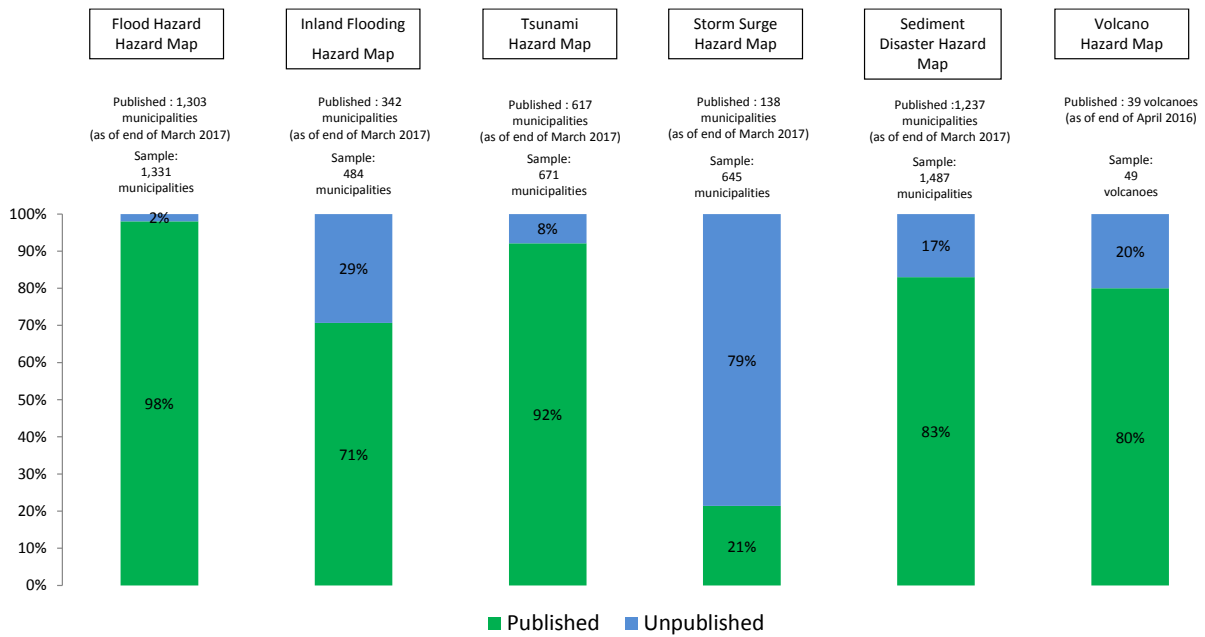
	Prefectural Disaster Management Council			Municipal Disaster Management Council		
	Total Members	Of which, Female Members	Proportion of Women (%)	Total Members	Of which, Female Members	Proportion of Women (%)
Hokkaido	65	4	6.2	3,988	122	3.1
Aomori	55	10	18.2	731	34	4.7
Iwate	72	11	15.3	1,137	88	7.7
Miyagi	55	9	16.4	858	50	5.8
Akita	60	5	8.3	715	81	11.3
Yamagata	59	10	16.9	984	55	5.6
Fukushima	54	6	11.1	1,054	44	4.2
Ibaraki	52	6	11.5	1,276	93	7.3
Tochigi	52	8	15.4	656	62	9.5
Gunma	47	4	8.5	903	62	6.9
Saitama	68	6	8.8	2,174	207	9.5
Chiba	61	9	14.8	1,472	152	10.3
Tokyo	67	4	6.0	2,262	258	11.4
Kanagawa	57	13	22.8	1,001	96	9.6
Niigata	72	20	27.8	865	51	5.9
Toyama	65	9	13.8	522	25	4.8
Ishikawa	70	7	10.0	421	25	5.9
Fukui	56	2	3.6	498	47	9.4
Yamanashi	62	5	8.1	601	50	8.3
Nagano	67	10	14.9	2,086	149	7.1
Gifu	61	12	19.7	1,046	80	7.6
Shizuoka	55	4	7.3	1,056	91	8.6
Aichi	76	2	2.6	1,512	144	9.5
Mie	55	5	9.1	894	84	9.4
Shiga	57	10	17.5	541	50	9.2
Kyoto	66	10	15.2	730	57	7.8
Osaka	58	6	10.3	1,442	156	10.8
Hyogo	55	6	10.9	1,266	125	9.9
Nara	61	8	13.1	809	85	10.5
Wakayama	52	6	11.5	606	38	6.3
Tottori	67	29	43.3	381	60	15.7
Shimane	71	29	40.8	616	46	7.5
Okayama	56	8	14.3	503	82	16.3
Hiroshima	58	2	3.4	824	59	7.2
Yamaguchi	59	6	10.2	604	60	9.9
Tokushima	81	39	48.1	576	41	7.1
Kagawa	59	8	13.6	430	44	10.2
Ehime	61	6	9.8	483	31	6.4
Kochi	58	7	12.1	757	75	9.9
Fukuoka	58	4	6.9	1,353	184	13.6
Saga	68	20	29.4	448	43	9.6
Nagasaki	66	10	15.2	656	40	6.1
Kumamoto	56	6	10.7	1,665	112	6.7
Oita	52	5	9.6	562	47	8.4
Miyazaki	53	6	11.3	747	47	6.3
Kagoshima	62	6	9.7	1,069	63	5.9
Okinawa	54	7	13.0	634	52	8.2
Total	2,851	425	14.9	46,414	3,747	8.1

Notes)

1. Formulated by the Cabinet Office from its material titled the "Implementation Status of Measures for Promoting the Formation of a Gender-equal Society or Policy Considerations for Gender in Local Government" (FY2017)
2. Figures for April 1, in principle.

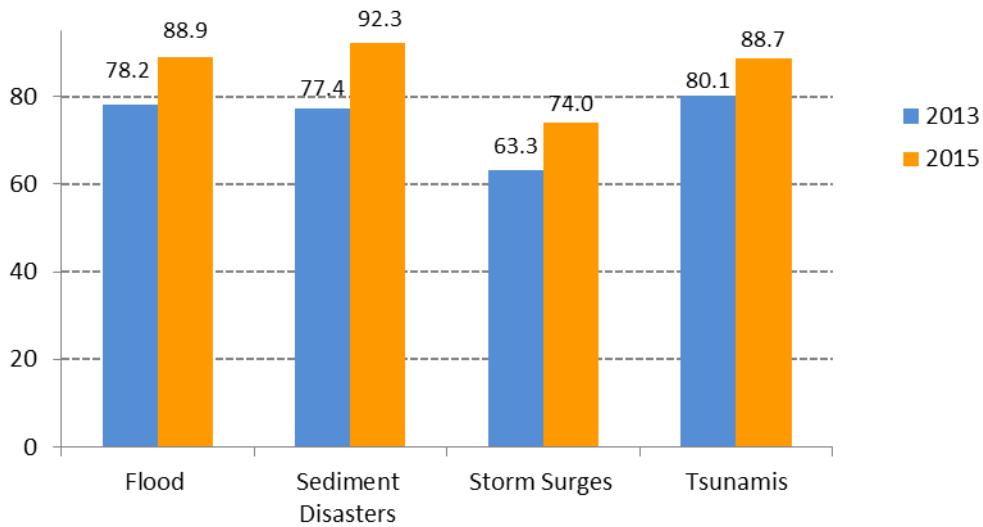
8. Various Policies and Measures

Fig. A-48 Status of Hazard Map Development



Source: Formulated by the Cabinet Office from materials (excluding volcano hazard maps) of the Ministry of Land, Infrastructure, Transport and Tourism (volcano hazard maps are materials owned by the Cabinet Office).

Fig. A-49 Formulation Status of Official Announcement Criteria for Evacuation Recommendations in Municipalities where Natural Disasters Are Anticipated



Note) The disasters anticipated vary from one municipality to another, so the formulation rate is calculated using different denominators, according to the type of disaster.

Source: Formulated by the Cabinet Office based on the "Results of a Survey into the Formulation Status of Specific Official Announcement Criteria for Evacuation Recommendations" from the Fire and Disaster Management Agency

Fig. A-50 Methods of Communicating Evacuation Instructions to Residents in Municipalities

Year	Disaster management radio communications system		Using the communication facilities of agricultural/ fishery cooperatives (including wired systems)	Patrols by loudspeaker vans	Siren	Bell ringing	News media	Through voluntary disaster management organizations	Other
	Individual Home Receivers System	Simultaneous Broadcasting System							
2003	1,748 54%	2,126 66%	591 18%	2,942 92%	2,537 79%	698 22%	675 21%	1,065 33%	1,106 34%
2004	1,731 55%	2,095 67%	559 18%	2,864 92%	2,463 79%	659 21%	663 21%	1,064 34%	1,106 35%
2005	1,365 56%	1,670 69%	449 19%	2,254 93%	1,927 80%	525 22%	642 27%	942 39%	925 38%
2006	1,118 61%	1,349 73%	362 20%	1,739 94%	1,487 81%	414 22%	666 36%	887 48%	781 42%
2007	1,125 62%	1,350 74%	343 19%	1,722 94%	1,462 80%	383 21%	718 39%	939 51%	800 44%
2008	1,117 62%	1,348 74%	323 18%	1,713 95%	1,455 80%	358 20%	750 41%	987 55%	829 46%
2009	1,118 62%	1,361 76%	311 17%	1,702 95%	1,440 80%	345 19%	782 43%	1,015 56%	830 46%
2010	1,096 63%	1,333 76%	289 17%	1,647 94%	1,383 79%	324 19%	811 46%	1,033 59%	830 47%
2011	1,006 62%	1,240 77%	248 15%	1,530 95%	1,271 79%	270 17%	787 49%	1,002 62%	806 50%
2012	1,086 62%	1,340 77%	245 14%	1,644 94%	1,357 78%	285 16%	848 49%	1,129 65%	955 55%
2013	1,097 63%	1,377 79%	219 13%	1,648 95%	1,347 77%	276 16%	878 50%	1,154 66%	998 57%
2014	1,112 64%	1,398 80%	206 12%	1,651 95%	1,334 77%	256 15%	925 50%	1,169 67%	1,049 60%
2015	1,128 65%	1,412 81%	192 11%	1,659 95%	1,317 76%	238 14%	975 56%	1,193 69%	1,093 63%
2016	1,145 66%	1,426 82%	178 10%	1,654 95%	1,282 74%	219 13%	993 57%	1,204 69%	1,078 62%
2017	1,157 66%	1,443 83%	169 10%	1,651 95%	1,277 73%	208 12%	1,028 59%	1,212 70%	1,081 62%

Source: Formulated by the Cabinet Office based on the Fire and Disaster Management Agency report "Status of Regional Disaster Management Administration"

Fig. A-51 Instances of Assistance Based on Mutual Support Agreements between Prefectures and Support Agreements with Private-Sector Institutions in Recent Years

Year	Instances of Support Based on Mutual Support Agreements Between Prefectures		Status of Support Agreements with Private-Sector Institutions													
			Broadcasting Agreements (agmts.)		Reporting Agreements		Emergency Relief Agreements		Transportation Agreements		Disaster Recovery Agreements		Resources Agreements		Other	
	Total no.	No. of orgs.	Total no. of concluded agmts.	No. of orgs.	Total no. of concluded agmts.	No. of orgs.	Total no. of concluded agmts.	No. of orgs.	Total no. of concluded agmts.	No. of orgs.	Total no. of concluded agmts.	No. of orgs.	Total no. of concluded agmts.	No. of orgs.	Total no. of concluded agmts.	No. of orgs.
2003	23	6	288	47	347	31	191	37	148	39	400	37	711	34	124	19
2004	4	2	288	47	359	33	218	39	165	41	474	39	828	36	134	23
2005	13	8	304	47	362	32	221	43	178	42	504	40	873	40	182	31
2006	5	2	301	46	370	33	241	44	201	40	587	43	992	42	212	37
2007	0	0	304	46	337	34	272	43	211	41	778	43	1,196	44	317	36
2008	12	1	306	46	400	36	316	45	239	43	818	45	1,294	46	461	39
2009	5	1	314	46	399	36	339	44	247	43	857	45	1,364	46	546	41
2010	24	5	329	47	393	36	420	45	254	43	1,590	46	1,431	45	676	42
2011	18	4	318	44	373	33	472	43	235	41	1,568	43	1,357	44	676	39
2012	25	6	334	47	395	36	495	46	291	44	1,825	46	1,461	47	931	46
2013	29	8	360	47	419	38	575	47	317	46	1,913	47	1,558	47	1,178	46
2014	28	6	351	47	445	40	703	47	374	46	2,360	47	1,672	47	1,299	46
2015	24	6	343	47	454	39	893	47	382	46	2,397	47	1,694	47	1,515	46
2016	19	5	352	47	461	40	970	47	438	46	2,626	47	1,795	47	1,751	47
2017	16	5	351	47	438	40	1065	47	477	47	2,648	47	1,754	47	1,898	47

Source: Formulated by the Cabinet Office based on the Fire and Disaster Management Agency report "Status of Regional Disaster Management Administration"

Fig. A-52 Status of Mutual Support Agreements in Municipalities

Year	No. of Municipalities	No. of mutual support agreements to which municipalities belong within the prefecture	No. of municipalities that have concluded mutual support agreements with other municipalities
2003	3,213	1,459	2,363 74%
2004	3,123	1,527	2,306 74%
2005	2,418	1,502	1,771 73%
2006	1,843	1,408	1,457 79%
2007	1,827	1,512	1,471 81%
2008	1,811	1,625	1,656 91%
2009	1,800	1,725	1,646 91%
2010	1,750	1,778	1,571 90%
2011	1,619	1,738	1,476 91%
2012	1,742	2,254	1,645 94%
2013	1,742	2,920	1,650 95%
2014	1,742	3,419	1,697 97%
2015	1,741	3,642	1,705 98%
2016	1,741	4,013	1,699 98%
2017	1,741	4,280	1,698 98%

Source: Formulated by the Cabinet Office based on the Fire and Disaster Management Agency report "Status of Regional Disaster Management Administration"

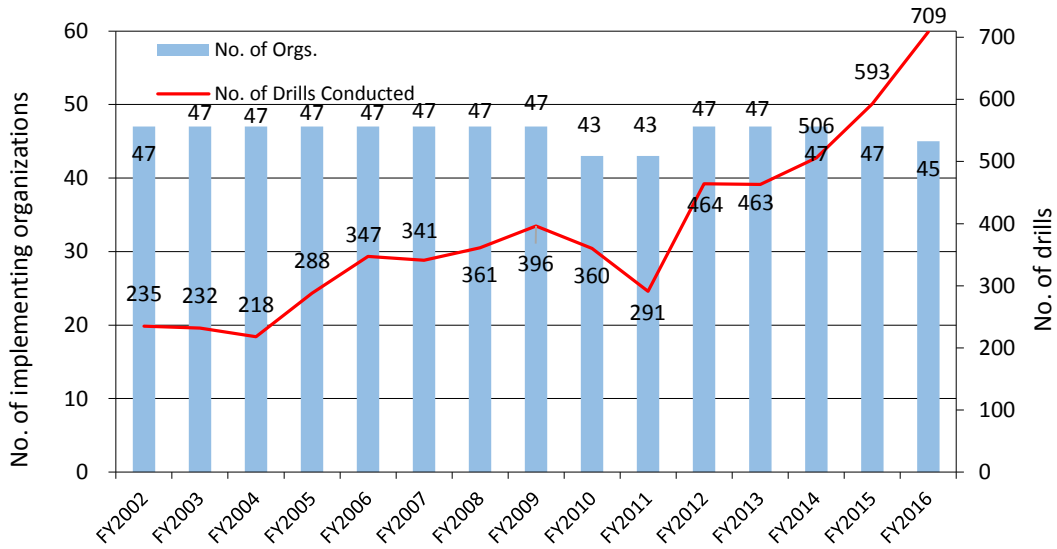
Fig. A-53 Status of Municipalities' Support Agreements with Private-Sector Institutions

Year	Broadcast Agreements		Reporting Agreements		Emergency Relief Agreements		Transportation Agreement		Disaster Recovery Agreements		Resources Agreements		Other	
	No. of orgs.	No. of support instances	No. of orgs.	No. of support instances	No. of orgs.	No. of support instances	No. of orgs.	No. of support instances	No. of orgs.	No. of support instances	No. of orgs.	No. of support instances	No. of orgs.	No. of support instances
2003	150	10	22	2	726	4	253	2	392	21	562	7	334	6
2004	171	20	20	2	713	4	260	2	445	18	589	5	361	5
2005	191	50	27	2	647	6	271	15	445	39	583	17	376	9
2006	225	38	18	2	574	10	267	3	451	24	619	8	401	2
2007	275	35	24		596	7	292	2	662	23	794	6	484	9
2008	315	62	33		619	2	319	5	813	35	936	17	510	5
2009	362	48	33		658	3	355	2	979	35	1,060	33	559	11
2010	378	35	35		683	6	376	3	1,052	42	1,125	22	580	8
2011	376	107	36	2	645	17	386	109	1,066	548	1,118	226	579	57
2012	437	59	41	3	719	19	462	48	1,242	167	1,309	123	684	54
2013	495	81	58		778	3	519	9	1,318	42	1,412	20	743	6
2014	554	59	66		827	2	602	3	1,360	131	1,466	40	800	17
2015	609	50	83	1	869	34	719	3	1,408	62	1,500	31	809	15
2016	636	48	101	1	921	43	811	6	1,451	41	1,526	44	810	25
2017	676	108	116	1	948	2	870	14	1,454	49	1,543	40	821	11

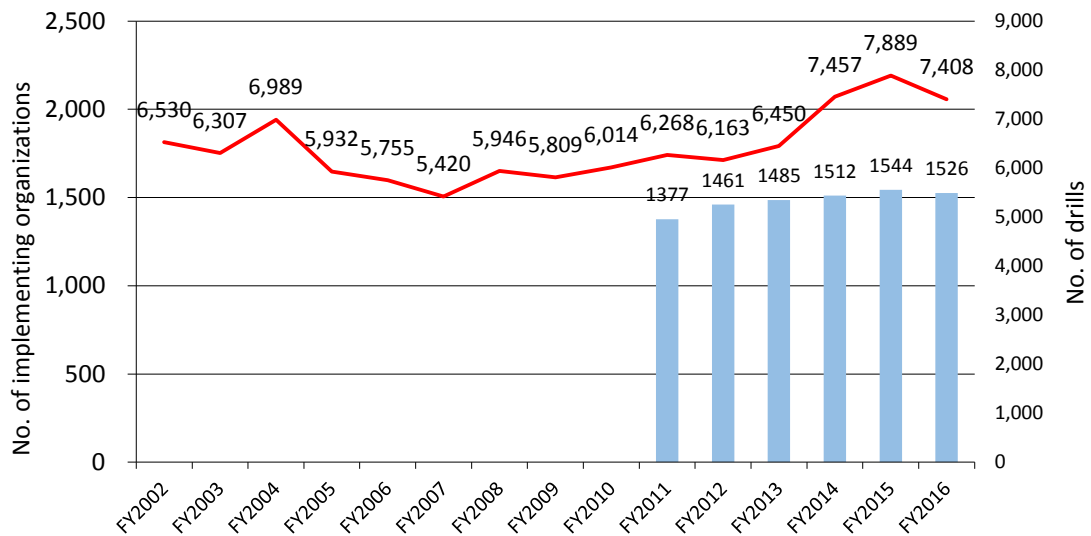
Source: Formulated by the Cabinet Office based on the Fire and Disaster Management Agency report "Status of Regional Disaster Management Administration"

Fig. A-54 Status of Disaster Management Drill Implementation

Trends in the No. of Prefectural Organizations Conducting Disaster Management Drills and the No. of Drills Conducted



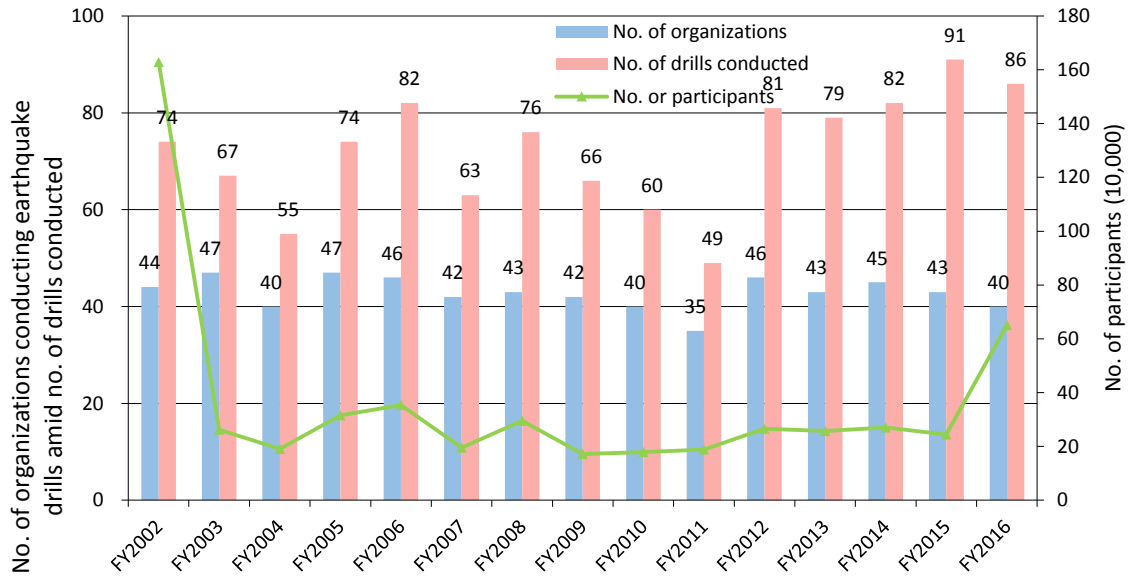
Trends in the No. of Municipal Organizations Conducting Disaster Management Drills and the No. of Drills Conducted



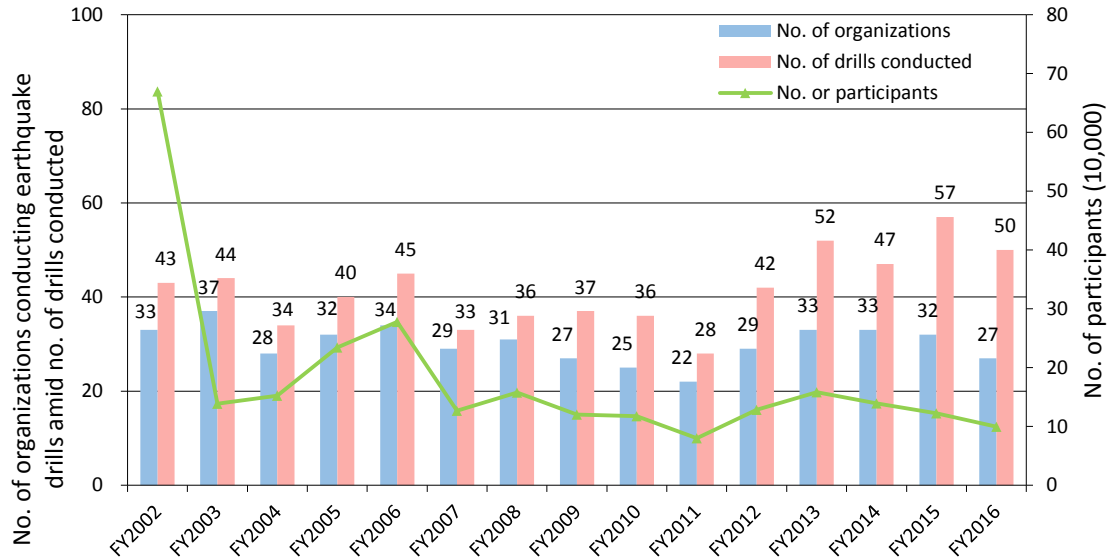
Source: Formulated by the Cabinet Office based on the Fire and Disaster Management Agency report "Status of Regional Disaster Management Administration"

Fig. A-55 Status of Earthquake Disaster Management Drill Implementation

Trends in the No. of Prefectural Organizations Conducting Earthquake Disaster Management Drills, No. of Drills Conducted, and the No. of Participants (Comprehensive Drills)



Trends in the No. of Prefectural Organizations Conducting Earthquake Disaster Management Drills, No. of Drills Conducted, and the No. of Participants (Including Region-Wide Drills)



Source: Formulated by the Cabinet Office based on the Fire and Disaster Management Agency report "Status of Regional Disaster Management Administration"

Fig. A-56 Implementation Status of Tsunami Countermeasures

Unit: Extended distance = km

Year	No. of govts.	Along the Coast?		Designated as likely tsunami inundation areas	Recorded in local plan for disaster risk reduction	Evacuation Routes		Evacuation Sites		Tsunami Breakwaters	
		Yes	No			No. of routes	No. of govts.	No. of facilities	No. of govts.	Extended distance (km)	No. of govts.
2003	3,213	1,014	2,199	401	812	1,700	108	5,355	311	1,631	204
2004	3,123	984	2,139	420	799	1,817	104	5,609	306	1,535	204
2005	2,418	806	1,612	374	465	2,099	111	6,442	316	1,472	180
2006	1,843	666	1,177	367	299	3,066	107	6,830	286	1,233	149
2007	1,827	667	1,160	374	384	2,297	108	7,307	292	1,231	143
2008	1,811	659	1,152	417	393	2,593	118	7,647	297	1,105	133
2009	1,800	655	1,145	424	353	2,674	118	7,919	307	1,042	125
2010	1,750	648	1,102	439	385	2,757	118	8,396	304	1,025	123
2011	1,619	609	1,010	425	357	2,448	106	7,448	276	787	93
2012	1,742	646	1,096	492	379	4,058	130	12,110	323	886	107
2013	1,742	646	1,096	539	383	5,054	139	16,238	361	905	104
2014	1,742	646	1,096	576	403	5,591	155	19,405	380	848	96
2015	1,741	646	1,095	603	431	6,176	166	22,589	410	841	97
2016	1,741	646	1,095	612	444	6,086	174	23,263	418	913	93
2017	1,741	645	1,096	623	483	9,414	179	23,481	425	959	98

Source: Formulated by the Cabinet Office based on the Fire and Disaster Management Agency report "Status of Regional Disaster Management Administration"

9. Japan's International Cooperation

Fig. A-57 List of Cooperation Projects Conducted by Ministries and Agencies

Ministry/ Agency	Project	Partner/ Target Country (Target Institution)	Description	Budget for FY2017 (in JPY million; if applicable)	Department Responsible
Cabinet Office (CAO)	Partnership between the Cabinet Office and FEMA	US	Based on the Memorandum of Cooperation signed by the Cabinet Office and FEMA in December 2014, the FEMA and the Cabinet Office representatives signed the FY2018 Work Plan in January 2018 as an annex to their Memorandum of Cooperation.	—	Disaster Preparedness, Public Relations and International Cooperation Division, Disaster Management Bureau, CAO
	Partnership between the Cabinet Office and Indian Ministry of Home Affairs	India	Based on the Memorandum of Cooperation signed by the Cabinet Office and the Ministry of Home Affairs in India in September 2017; aiming to develop a disaster management partnership and strengthen the relationship between the two countries, the Cabinet Office and the Ministry of Home Affairs cosponsored the Japan-India Workshop on Disaster Risk Reduction 2018 in India (New Delhi) in March 2018.	—	Disaster Preparedness, Public Relations and International Cooperation Division, Disaster Management Bureau, CAO
	Japan-U.S. Emergency Management Working Group	US	Partnerships in the field of nuclear emergency prevention systems were deepened through regular exchanges of opinions and information, and reciprocal invitations to exercises, which took place within the framework of the Emergency Management Working Group (EMWG) under the U.S.-Japan Bilateral Commission on Civil Nuclear Cooperation.	—	Director General for Nuclear Disaster Management, CAO
	Cooperation between the Cabinet Office of Japan and the Ministry of the Interior of France on emergency management related to nuclear accidents	France	Along with regular exchanges of opinions and information between the relevant bodies in both countries, reciprocal invitations to exercises were issued within the framework of the memorandum of cooperation on nuclear emergency preparedness signed in May 2015.	—	Director General for Nuclear Disaster Management, CAO
	International Nuclear Emergency Exercise (INEX)	OECD/NEA	Japan participates in the International Nuclear Emergency Exercise (INEX) held by the OECD/NEA and in the INEX5 International Workshop, held in France in October 2017, aiming to improve working-level efforts to address nuclear accidents and disaster countermeasures.	—	Director General for Nuclear Disaster Management, CAO
	Hosting observers of a nuclear emergency response exercise	IAEA, US, France, Germany, Finland, Russia, Republic of Korea, Taiwan	With the objective of sharing information and exchanging views concerning nuclear emergency preparedness in each country, Japan invited international organizations such as IAEA, as well as the US, France, Germany and the Republic of Korea as observers at the Comprehensive Nuclear Emergency Response Exercise held at Genkai Nuclear Power Station in September 2017 and exchanged views with them.	—	Director General for Nuclear Disaster Management, CAO/ International Affairs Office, Policy Planning and Coordination Division, Secretary-General's Secretariat, the Secretariat of the Nuclear Regulation Authority

Ministry/ Agency	Project	Partner/ Target Country (Target Institution)	Description	Budget for FY2017 (in JPY million; if applicable)	Department Responsible
Ministry of Internal Affairs and Communications (MIC)	Promotion of International Cooperation of ICT Systems for Disaster Management	ASEAN, Latin America and Caribbean and others	In order to promote the overseas development of Japan's ICT systems for disaster management, which have been cultivated based on Japan's many years of experience and expertise, MIC will propose the systems for adopting them by the countries that are prone to natural disasters, while taking advantage of being able to propose solutions that can respond finely to the circumstances and needs of each country.	Included as a part of packaged assistance projects for strengthening international competitiveness in the field of ICT, FY2017 (JPY 606m)	International Cooperation Division, Global Strategy Bureau, MIC
	Support to AHA Center (ASEAN Coordinating Centre for Humanitarian Assistance on disaster management)	AHA Center (ASEAN)	Since FY2011, MIC and MOFA have been utilizing the Japan-ASEAN Integration Fund (JAIF) to support the AHA Center, which is the disaster management information hub for the ASEAN region. The center not only shares disaster information with the ASEAN nations and coordinates emergency responses in the event of a natural disaster or emergency, but also monitors the ASEAN region, supports disaster drills in the region and holds workshops to consolidate the partnership with disaster response organizations in normal times.	—	International Cooperation Division, Global Strategy Bureau, MIC Regional Policy Division, Asian and Oceanian Affairs Bureau, MOFA
Fire and Disaster Management Agency (FDMA)	International Forum on Fire and Disaster Management	Mainly Asian countries	The International Forum on Fire and Disaster Management has been held since 2007 to enable the countries of Asia, first and foremost, to enhance their firefighting and disaster management capacity, and to introduce Japan's firefighting technologies and systems.	3	(Counselor of) Civil Protection and Disaster Management Department, FDMA
	Japan-Republic of Korea Firefighting Administration Seminar	Republic of Korea	During the Year of Japan-Republic of Korea National Exchange, which was held to coincide with the joint hosting of the 2002 FIFA World Cup by Japan and the Republic of Korea, a Japan-Republic of Korea Firefighting Administration Seminar was held in both countries to promote Japanese-Republic of Korean exchange, partnership, and cooperation, through the sharing of information and the exchange of ideas regarding firefighting and disaster management in both countries.	1	(Counselor of) Civil Protection and Disaster Management Department, FDMA

Ministry/ Agency	Project	Partner/ Target Country (Target Institution)	Description	Budget for FY2017 (in JPY million; if applicable)	Department Responsible
Ministry of Foreign Affairs (MOFA)	Disaster Risk Reduction Collaboration/ Disaster Restoration Support in Cooperation with Japan's International Cooperation NGOs	Countries affected by natural disasters	This project promotes (1) DRR cooperation in developing countries through the Grant Aid for Japanese NGO's Projects, emergency humanitarian relief and disaster recovery support through the Japan Platform, ¹ and (2) by establishing an international DRR network in the Asia Pacific region and carrying out emergency humanitarian relief through the Asia Pacific Alliance (PAD). ² 1: A framework by which Japanese NGOs, the business community, and the government work together to provide emergency humanitarian support following the occurrence of a natural disaster or conflict either in Japan or overseas. 2: A framework that aims to develop an international DRR network for NGOs, the business community, and the governments of the APAD member states to tackle large-scale natural disasters in the Asia Pacific region, under the leadership of Japanese NGOs. The Japanese government contributed approx. JPY 100 million in FY2013 and plans to contribute JPY 200 million in FY2015 and JPY 100 million in FY2016.	(1) Included in the JPY 162,904m of grant aid (2) Voluntary financial contributions to A-PAD (104m)	Non-Governmental Organizations Cooperation Division, International Cooperation Bureau, MOFA
	Financial Contributions to International Organizations in Response to the Establishment of World Tsunami Awareness Day	UNISDR, UNITAR, ESCAP UNOCHA	In response to the establishment of World Tsunami Awareness Day, Japan worked with international organizations on activities to raise awareness of tsunami (symposiums and seminars, etc.) in various parts of the world, primarily in Asian countries that are most vulnerable to tsunami damage. In addition, Japan held Technical Training in Japan on the topic of tsunami preparedness. Japan also supported the UN Office for the Coordination of Humanitarian Affairs (UNOCHA) which runs ReliefWeb to provide global disaster information in real time.	757	Global Issues Cooperation Division, International Cooperation Bureau, MOFA Humanitarian Assistance and Emergency Relief Division
	Science and Technology Research Partnership for Sustainable Development (SATREPS)	Country for technical support	A project launched jointly by the Japan International Cooperation Agency (JICA), Japan Science and Technology Agency (JST) and the Japan Agency for Medical Research and Development (AMED), aiming to solve global issues on the environment and energy, biological resources, disaster management and infectious diseases. It supports collaborative research programs by Japanese researchers and those in developing countries to obtain new insights and technologies as well as improving the scientific and technological standards and research capabilities of developing nations. As for the research into disaster management, 23 programs had been implemented in 19 countries as of FY2017.	Included in JICA Management Expenses Grant	Development Administration Division, International Cooperation Bureau, MOFA
	Provision of Emergency Relief Goods	Countries affected by natural disasters	In the event of a large-scale disaster overseas, MOFA decides providing emergency relief goods to support the immediate needs of affected people, upon request of the government of the affected country through Japan International Cooperation Agency (JICA). In FY2017, 16 cases of such assistance were carried out. One example is the provision of electric generators in response to the flood damage in Columbia in April.	Included in JICA Management Expenses Grant	MOFA Humanitarian Assistance and Emergency Relief Division International Cooperation Bureau, MOFA
	Operation of IAEA RANET Capacity Building Centre (CBC)	IAEA member countries (IAEA)	The IAEA RANET Capacity Building Centre (CBC), where IAEA staff are permanently stationed, was designated in Fukushima Prefecture in May 2013, based on the "Practical Arrangements Between the Ministry of Foreign Affairs of Japan and the International Atomic Energy Agency on Cooperation in the Area of Emergency Preparedness and Response" signed between MOFA and the IAEA in December 2012. Materials and equipment stored for emergency response in the CBC are used in an emergency involving radiation. In addition, the CBC serves as the venue for training courses for officials from foreign and Japanese local governments held several times a year.		International Nuclear Energy Cooperation Division, Disarmament, Non-proliferation and Science Department, MOFA

Ministry/ Agency	Project	Partner/ Target Country (Target Institution)	Description	Budget for FY2017 (in JPY million; if applicable)	Department Responsible
Ministry of Education, Culture, Sports, Science and Technology (MEXT)	Promotion of "Sentinel Asia" Project to Share Information on Natural Disasters Between Asia - Pacific Countries	28 countries and regions of the Asia Pacific Region/ 15 international organizations	This project is led and implemented by Japan to contribute to disaster management efforts in the Asia-Pacific Region. It uses satellites to share information relating to natural disasters. Participants consist of 28 countries and regions, 91 institutions, and 15 international institutions (as of February 2018).	Included in JAXA Management Expenses Grant	Office for Space Utilization Promotion, Space Development and Utilization Division, Research and Development Bureau, MEXT
	Science and Technology Research Partnership for Sustainable Development (SATREPS) Program	134 countries that are the object of ODA	MEXT and the Japan Science and Technology Agency (JST) together with MOFA and the Japan International Cooperation Agency (JICA), through leading science and technology and Official Development Assistance (ODA), have set up SATREPS in order to promote joint international research on solutions to global issues that occur in developing countries, including DRR.	(MOFA) Included in JICA Management Expenses Grant (MEXT) Included in JST Management Expenses Grant	International Science and Technology Affairs Division, Science and Technology Policy Bureau, MEXT
Ministry of Land, Infrastructure Transport and Tourism (MLIT)	ASEAN-Japan Port Technology Group (Formulation of Port DRR Guidelines)	ASEAN nations	Under a three-year program launched in FY2014, Japan has been sharing the lessons learned from the Great East Japan Earthquake with the ASEAN nations and preparing Port DRR Guidelines to which all of the ASEAN nations can refer when implementing initiatives relating to port DRR. A substantive agreement on the guidelines was reached at a meeting of port engineers in Phnom Penh, Cambodia in February 2017 and the guidelines were approved at the 15th ASEAN and Japan Transport Ministers Meeting held in Singapore in October 2017.	—	International Policy Planning Office, Industrial Port Policy Division, Ports and Harbors Bureau/ Risk Management Office, Coastal Administration and Disaster Management Division, Ports and Harbors Bureau, MLIT
	Initiatives on Tsunami Preparedness in Partnership with Chile	Chile	Assumption a tsunami caused by an earthquake in Chile propagated the Pacific Ocean, communication drills, etc. were conducted in Japan on November 9, 2017 in accord with tsunami evacuation drills in Chile.	—	Risk Management Office, Coastal Administration and Disaster Management Division, Ports and Harbors Bureau, MLIT
	Raising Awareness of World Tsunami Awareness Day (Hamaguchi Award)	All relevant countries	Taking advantage of the opportunity presented by the establishment of World Tsunami Awareness Day, Japan founded the Hamaguchi Award (presented by the Minister of Land, Infrastructure and Transport and Tourism) in FY2016 for individuals and/or organizations within Japan or overseas that have made significant contributions in the field of technologies for coastal disaster risk reduction, especially tsunami preparedness. Two individuals and one organization were recognized at the award ceremony held on November 1, 2017: Prof. Philip Li-Fan Liu, Associate Chancellor/Emeritus Professor of National University of Singapore and Emeritus Professor of Cornell University, Prof. Julio Kuroiwa, Emeritus Professor of National University of Engineering in Peru and Director/General Manager of Disaster Risk Reduction Peru International SAC and Kuroshio Town (Hata-gun, Kochi Prefecture).	—	Port and Airport Research Institute, National Institute of Maritime, Port and Aviation Technology,
	Disaster Management Collaboration Dialogues	Vietnam, Thailand, Myanmar, Indonesia, Turkey, South Africa	Held since 2013, these dialogues aim to enhance the DRR functions of developing nations principally in Asia, while also expanding Japan's DRR technology overseas. They also aim to develop a lasting structure for cooperation in each individual country through collaborations between industry, government, and academia.	30	River Planning Division, Water and Disaster Management Bureau/ Overseas Projects Division, Policy Bureau.
	Collaboration between MLIT and the European Commission's Humanitarian Aid and Civil Protection Department (ECHO)	ECHO	Following the exchange of correspondence between Japan's MLIT and EU's ECHO in March 2013, an information exchange has been conducted every year to share DRR knowledge and experience through the reciprocal exchange of experts and practitioners, with the objective of enhancing disaster management systems on both sides.	—	River Planning Division, Water and Disaster Management Bureau.
	Discussion with India on DRR Technology Through a Bilateral Conference	Ministry of Road Transport and Highways in India	In accordance with the cooperation framework concluded in September 2014, the 4th meeting of the Japan-India Joint Working Group on Roads and Road Transport was held in Tokyo. At the meeting, the Japanese side presented the recovery measures and technologies used in the areas affected by the 2016 Kumamoto Earthquake and Heavy Rains in FY2017.	—	International Affairs Office, Planning Division, Road Bureau, MLIT

Ministry/ Agency	Project	Partner/ Target Country (Target Institution)	Description	Budget for FY2017 (in JPY million; if applicable)	Department Responsible
Ministry of Land, Infrastructure Transport and Tourism (MLIT)	International Centre for Water Hazard and Risk Management (ICHARM)	UNESCO, etc.	As a UNESCO Category 2 center, the International Centre for Water Hazard and Risk Management (ICHARM) actively undertook research, training, and information networking activities aimed at mitigating damage due to water hazards worldwide. Specifically, it developed the Integrated Flood Analysis System and the Rainfall-Runoff-Inundation model, and put them into practice in the field; conducted research and development on risk management; and offered master's and doctoral courses in disaster mitigation studies. In addition, it undertook technical assistance and international support initiatives funded by organizations including UNESCO and the Asian Development Bank.	—	Public Works Research Institute
	6th Plenary Meeting of UN Global Geospatial Information Management for Asia and the Pacific (UN-GGIM-AP)	Member countries in the Asia-Pacific region	The 6th Plenary Meeting of UN Global Geospatial Information Management for Asia and the Pacific (UN-GGIM-AP), in which the geospatial information authorities of each country participate, was held in Kumamoto in October 2017. During the meeting, a special session titled "Geospatial Information for Disaster Response - Case Study on the Disaster Response for the 2016 Kumamoto Earthquake -" was held and Japan took a lead in the discussion as the chair of this committee and participants of each country shared their experience in disaster responses, contributing to enhancing the capability of member countries.	7	International Affairs Division, Planning Department, Geospatial Information Authority of Japan, MLIT
	US-Japan Natural Resources Panel on Earthquake Research (UJNR)	US	A meeting of a panel consisting of the earthquake research organizations in Japan and the US was held to exchange information on the research, investigation and observation of earthquakes and discuss about the future plans. It adopted a resolution on the points to bear in mind in collaboration to mitigate earthquake damage. The coordinating office for the Japanese side is the Geospatial Information Authority of Japan, while that for the US side is the United States Geological Survey (USGS). The next meeting will be held in Kumamoto in October 2018 (the meeting is held alternately in the US and Japan every two years).	—	Research Management Division, Geography and Crustal Dynamics Research Center, Geospatial Information Authority of Japan, MLIT
Japan Meteorological Agency (JMA)	International Cooperation through WMO	WMO member countries	The JMA, as a constituent member of the WMO (one of the specialized institutions of the UN which functions to collect and promote the distribution of observations and data on weather around the world, and to improve information relating to the weather and the climate), sends experts to international conferences, and is responsible for international centers.	—	Office of Disaster Mitigation, Planning Division, Administration Department, JMA
	International Cooperation through UNESCO	UNESCO member countries, etc.	The JMA provides technological contributions relating to the field of oceans and tsunamis, within the framework of the UNESCO Intergovernmental Oceanographic Commission (IOC). - It collects, analyzes, and provides data on oceans and maritime meteorology for the northeast Asian region, in cooperation with other related countries (China, Republic of Korea, and Russia). - It provides each country with information on tsunamis caused by earthquakes that occur in the northwest Pacific region.	—	Office of Disaster Mitigation, Planning Division, Administration Department, JMA
	International Cooperation through International Civil Aviation Organization (ICAO)	ICAO member countries	The JMA participates in meetings relating to aeronautical meteorology organized by the ICAO, as well as investigations into adopting and improving standard international criteria for aviation weather services. It has also been appointed by the ICAO to operate international centers such as the Tokyo Volcanic Ash Advisory Center, and the Tropical Cyclone Advisory Center, thus contributing to the safe operation of global aircraft.	—	Office of Disaster Mitigation, Planning Division, Administration Department, JMA
	Collaboration on International Research Plans	All relevant countries	The JMA promotes various international research projects in cooperation with other countries. On climate change, it has been involved in writing evaluation reports on the activities of the Intergovernmental Panel on Climate Change (IPCC) since the panel was established in 1988.	—	Office of Disaster Mitigation, Planning Division, Administration Department, JMA
	Human Resource Development Aid and Technological Cooperation to Developing Countries	All relevant countries	Together with the Japan International Cooperation Agency (JICA), the JMA has spent more than 40 years conducting trainings designed for the staff of the national meteorological institutions of developing countries, in order to improve their meteorological services. Also, in response to demands from the WMO and individual countries, the JMA dispatches staff who are experts in observations using meteorological radar, weather analysis, and weather forecasting, and receives trainees from the national meteorological institutions.	—	Office of Disaster Mitigation, Planning Division, Administration Department, JMA

Ministry/ Agency	Project	Partner/ Target Country (Target Institution)	Description	Budget for FY2017 (in JPY million; if applicable)	Department Responsible
Japan Coast Guard (JCG)	Participation in the projects of the Northwest Pacific Action Plan (NOWPAP) Marine Environmental Emergency Preparedness and Response Regional Activity Centre (MERRAC)	Republic of Korea, China, Russia	The JCG participates in the projects of the NOWPAP MERRAC, which is a center responsible for preparing for and responding to marine environmental emergencies. As well as undertaking a marine environmental conservation initiative focused on the Sea of Japan and the Yellow Sea, etc. in partnership with neighboring countries, the JCG takes part in joint oil spill clean-up drills organized by relevant organizations and attends meetings held each year. Through these activities, it promotes international cooperation by striving to build systems that will enable relevant countries to work together in the event of an accident.	—	Protection of Marine Environment Division, Guard & Rescue Department, JCG
The Secretariat of the Nuclear Regulation Authority (NRA)	IAEA Safety Measure Contributions for Nuclear Power Plants (Emergency Measures Project)	IAEA	Japan also participates in IAEA projects to promote the publication and sharing of information relating to accidents and issues that are reported to the IAEA by member countries regarding their nuclear facilities.	—	International Affairs Office, Policy Planning and Coordination Division, Secretary-General's Secretariat, the Secretariat of the Nuclear Regulation Authority
	Japan, China, and Republic of Korea Trilateral Top Regulators Meeting (TRM) on Nuclear Safety and Working Group on Emergency Preparedness and Response (WGEPR)	China, Republic of Korea	The TRM is a meeting held by the regulatory bodies of Japan, China, and the Republic of Korea to promote the exchange of information on regulatory issues concerning nuclear energy and the improvement of technology. Its other objectives are to increase nuclear safety and strengthen regional cooperation. Established under its auspices, the WGEPR is a forum for the exchange of information concerning emergency preparedness and response.	—	International Affairs Office, Policy Planning and Coordination Division, Secretary-General's Secretariat, the Secretariat of the Nuclear Regulation Authority
Ministry of Defense (MOD)	Multinational Joint Training "Equator 17" organized by French military based in New Caledonia	France, Australia, Tonga, New Zealand, Vanuatu, Papua New Guinea, Fiji, US, UK	Following the press release issued in May 2014, at the time of the Prime Minister's visit to France, personnel were dispatched to this training in September 2017, and field training was conducted in connection with relief activities for disasters on islands.	—	Training Division, Bureau of Defense Policy, MOD
	Inspection of disaster drills by the staff of ASEAN nations' embassies in Tokyo	Brunei, Laos, Malaysia, Philippines, Singapore, Thailand, Vietnam	Opportunities to increase knowledge about disaster management systems and disaster responses in Japan, including the inspection of a joint emergency drill involving nine prefectures and cities, etc., were offered to the staff of ASEAN nations' embassies in Tokyo.	—	Training Division, Bureau of Defense Policy, MOD
	US-Philippines Joint Training Exercise Kamandag 2017	US, Philippines	The purpose of the exercise is to improve the capability of participating nations to coordinate with other nations in international disaster relief activities and repair facilities through humanitarian and public welfare support activities.	—	Training Division, Bureau of Defense Policy, MOD
	Japan-U.S.-Australia Joint Training for Humanitarian Assistance and Disaster Relief in the Federated States of Micronesia and other Countries	Australia and US	Aimed at improving interoperability with the US Air Force and Royal Australian Air Force in humanitarian aid and disaster relief activities, this training includes exercises in which the participating countries undertake air transport, pack supplies, and deliver them by air drop.	—	Training Division, Bureau of Defense Policy, MOD
	Japan-U.S.-Australia Joint Training for Humanitarian Assistance and Disaster Relief	Australia and US	This is a training program that aims to improve interoperability with the US and Australian air forces with respect to humanitarian aid and disaster relief activities. The participating countries conduct air transport training, supply-drop training, soft-field take-off and landing training, and search training.	—	Training Division, Bureau of Defense Policy, MOD
	ADMM-Plus Exercise in Humanitarian Aid, Disaster Relief and Defense Medicine	Thailand, US, Indonesia, Singapore, Malaysia, Republic of Korea, Malaysia, India and China	In addition to the existing bilateral training drills conducted between the US and Thailand, this training has been implemented in recent years as a multinational training program focusing on peace operations in areas of conflict, UN peace-keeping activities, and humanitarian and public welfare support activities. Japan conducted medical activity drills.	—	Training Division, Bureau of Defense Policy, MOD
	Komodo 2018 Multilateral Joint Training Exercise Hosted by the Indonesian Navy	Indonesia, etc.	Japan will send a destroyer to participate in this exercise, which includes humanitarian support and disaster relief activities.	—	Training Division, Bureau of Defense Policy, MOD
	Multi-National Joint Training Exercise, RIMPAC	Australia, Canada, US, and others	This is a joint training exercise planned by the US Navy and conducted with the involvement of foreign vessels. Japan will participate in humanitarian support and disaster relief activities.	—	Training Division, Bureau of Defense Policy, MOD

Source: Formulated by the Cabinet Office using materials from various ministries and agencies.

Fig. A-58 Examples of Technical Cooperation Projects in Disaster Risk Reduction (FY2017)

Country	Cooperation Period	Project Name	Description
Indonesia	2013-2019	Project for Assessing and Integrating Climate Change Impacts into the Water Resources Management Plans for Brantas and Musi River Basins	Supports the implementation by Indonesia of water resources management that takes into account the effects of climate change, by providing advice on the formulation of water resource management plans in Indonesia's Brantas and Musi River Basins that take such effects into consideration, and by drafting guidelines that can also be applied to other river basins.
Indonesia	2013-2018	Project for Integrated Study on the Mitigation of Multimodal Disasters Caused by the Ejection of Volcanic Products (SATREPS)	Aims to comprehensively reduce disaster risks caused by the ejection of volcanic products through the development of a "Multimodal Sediment Disaster Countermeasures Decision-Making Support System" composed of a "Volcanic Eruption Early Warning System", an "Integrated GIS Multimodal Sediment Disaster Simulator", and a "Floating Volcanic Ash Warning System", all addressing the six volcanoes within Indonesia (Merapi, Semeru, Kelud, Galunggung, Guntur and Sinabung), and through the practical use of such system by the institutions related to DRR.
Indonesia	2014-2018	Project on Capacity Development for River Basin Organizations (RBOs) in Integrated Water Resources Management in the Republic of Indonesia (Phase II)	In the field of integrated water resources management in Indonesia (operation and maintenance of river facilities, coordination of water use and allocation, preservation of aquatic environments, flood management, etc.), supports the improvement of the structure and capacity of the RBOs and the continuous strengthening of efforts relating to integrated water resources management, by means of (1) site confirmations using field practice, (2) development and management of organizational structures and systems for strengthening the capacity of the RBOs, and (3) improving access to reliable guidelines and manuals.
Philippines	2014-2017	Project for Enhancing Capacity on Weather Observations, Forecasting and Warnings	Enhances weather observation, forecasting, and warning capacity in the Philippines through capacity development for weather observations, weather data analysis and forecasting, establishment of warning criteria for Southern Luzon, and improvements in communication methods for and details of weather information, as well as awareness-raising activities relating to weather information in Southern Luzon.
Philippines	2016-2019	Project for Strengthening Capacity of Integrated Data Management of Flood Forecasting and Warning	This project aims to enhance the capacity of PAGASA (Philippine Atmospheric, Geophysical and Astronomical Service Administration) on integrated data management and utilization for river flood forecasting and warning. The project gives focus on the operation in Cagayan de Oro/Tagoloan River Flood Forecasting and Warning Center.
Philippines	2017-2021	Development of an Extreme Weather Observation and Information Sharing System (SATREPS)	This includes establishing a lightning, weather and 3D cloud structure monitoring system, developing technologies for short-term weather forecasts of extreme weather and the intensity of cyclones in Metropolitan Manila using an extrapolation method and developing software to distribute information to disaster management organizations.
Thailand	2016-2019	Project for Strengthening the ASEAN Regional Capacity on Disaster Health Management (ARCH Project)	Thailand's National Institute for Emergency Medicine (NIEM) serves as the implementing agency for this project, which aims to strengthen collaborative frameworks for disaster health management in the ASEAN region through collaborative intraregional disaster health management drills, the development of collaboration tools, and training courses, thereby enhancing disaster response capabilities within the region. ASEAN has endorsed this project as an official ASEAN project.
Myanmar	2015-2020	Project for Development of a Comprehensive Disaster Resilience System and Collaboration Platform in Myanmar (SATREPS)	Yangon Technological University, which falls under the jurisdiction of Myanmar's Ministry of Education, is planning to develop and build a scenario analysis system that forecasts changes in disaster vulnerability as needed, and an integrated disaster response system based on this to enhance disaster resilience. In addition, it is planning to establish an industry-academia-government collaborative platform to disseminate these systems in governmental organizations and industry. Japan will provide support for R&D of these systems, human resource development required for this R&D, and the establishment of a platform, thereby helping to enhance disaster resilience in Myanmar.
China	2015-2018	The Project for Promotion and Capacity Development of Disaster Mitigation Education in Sichuan Province	As part of this project, which encompasses 100 or so model schools for disaster mitigation education, model schools in the city of Ya'an will carry out model lessons, to facilitate research into drills and activities that involve teaching materials, curricula, and communities, as well as research into the development of government policy. The objective of this initiative is to build models for ongoing disaster mitigation education and to improve awareness of disaster preparedness and disaster response capabilities at every level, including boards of education, school managers, teachers, and the students themselves.
Mongolia	2016-2019	Project for Strengthening the National Capacity of Earthquake Disaster Protection and Prevention in Mongolia	This project seeks to strengthen capacity at the Mongolian national government's disaster prevention body (National Emergency Management Agency: NEMA) by strengthening preventive measures in respect of earthquake-related disaster preparedness. In addition to increasing NEMA's capacity to formulate its own disaster prevention plans, this project will improve NEMA's capacity through the engagement in the initiatives such as the formulation and updating of disaster prevention plans by regional governments and earthquake-resistant construction and disaster preparedness education by other ministries and agencies.
Armenia	2014-2017	Landslide Disaster Management Project	In Armenia, this project works towards enhancing the capacity to manage and respond to landslide disasters of the Landslide Disaster Management Working Group, by improving the technology and capacity relating to sediment disaster management, developing plans, guidelines, and legislation, and strengthening implementation systems.
Kyrgyzstan	2016-2019	Project for Capacity Development for Road Disaster Prevention Management	This road disaster prevention project involving Kyrgyzstan's Ministry of Transport and Roads seeks to (1) summarize the roles of relevant departments; (2) improve road disaster prevention inspection and analysis capabilities; (3) build and operate a road disaster prevention database management system; and (4) promote cooperation in improving capabilities in the area of preparing road disaster prevention management plans. Through this, it aims to develop capacity for road disaster prevention management within the Ministry of Transport and Roads, and thereby increase the safety of road traffic against slope or snow disasters in the area under the jurisdiction of the road maintenance management office targeted by the project.
Turkmenistan	2017-2020	Project for Improvement of the Earthquake Monitoring System in and around the Ashgabat City	The purpose of this project is to improve the capacity of the nation in earthquake observation and earthquake hazard assessment of earthquake risk using earthquake observation data and the result of earthquake hazard assessment and formulate earthquake disaster management plans by developing an earthquake observation and strong motion observation system to establish a system for early decision-making on seismic intensity, epicenter and earthquake size and prediction of seismic intensity in pilot districts of the Ashgabat Area.

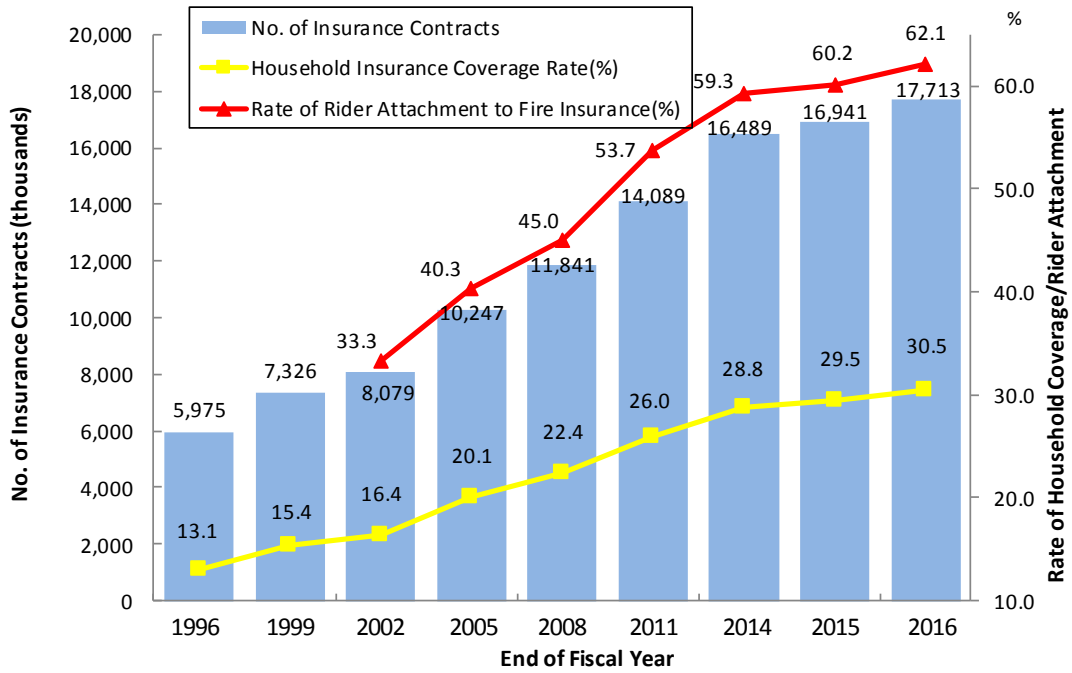
Country	Cooperation Period	Project Name	Description
Bangladesh	2013-2017	Project for Capacity Development of Management for Sustainable Water-Related Infrastructure	To reduce flood damage in Bangladesh, this project provides support for investigations and inspections into the causes of damage at existing levees, and support for levee design, construction, and maintenance manuals through demonstrations to verify levee construction.
Bangladesh	2014-2018	Research Project on Disaster Prevention/Mitigation Measures against Floods and Storm Surges (SATREPS)	This projects proposes prevention and mitigation measures for storm surge and flood damage including the creation of flood risk maps and storm surge risk maps, measures to address river bank erosion and river levee collapse, and measures to prevent toxic substance diffusion at times of flooding, and experimentally conducts such measures.
Bangladesh	2015-2019	Building Safety Promotion Project for Disaster Risk Reduction (BSPP)	Primarily targeting staff at the Public Works Department under the Ministry of Housing and Public Works, this project seeks to increase the safety of buildings in Bangladesh and reduce the risk of disaster in urban areas by supporting efforts to strengthen human resource development systems aimed at increasing building safety and making use of manuals to enhance the capability of the staff for evaluating seismic capacity, undertaking seismic design and supervising construction at the end of the project.
Bangladesh	2016-2021	Technical Development to Upgrade Structural Integrity of Buildings in Densely Populated Urban Areas and its Strategic Implementation towards Resilient Cities (SATREPS)	Focusing on buildings in Dhaka that are primarily built from reinforced concrete, this project involves research into diagnostic techniques and reinforcement methods suitable to local components and structural styles, and the presentation of recommendations for a strategies for applying them. Through this, it aims to increase the structural resilience of buildings, and encourage technology development and its effective implementation, thereby contributing to reducing the structural vulnerability of buildings in Bangladesh, and increasing safety against urban earthquakes.
Nepal	2016-2021	The project for Integrated Research on Great Earthquakes and Disaster Mitigation in Nepal Himalaya (SATREPS)	The goal of this project is to strengthen remote monitoring systems and develop human resources in the earthquake field by estimating future earthquakes that could occur in the Himalayan seismic gap, thoroughly examining the ground properties of the Kathmandu basin, and enhancing the seismographic network.
Pakistan	2016-2019	Project for Capacity Development of Disaster Management	Via the National Institute of Disaster Management (NIDM), a public training institution established in 2007 to develop capacity at the National Disaster Management Authority (NDMA), this project will support efforts to strengthen human resource development implementation systems in the field of disaster management and contribute to increasing the knowledge concerning disaster management held by personnel belonging to the country's disaster management administration bodies.
Sri Lanka	2014-2017	Project for Improving of Meteorological Observations, Weather Forecasting and Dissemination	Conducts maintenance and inspection as well as calibration capacity improvements on meteorological observation equipment, enhances the capacity to send and receive meteorological data, improves weather forecasting capacity, refines warning criteria, improves transmission methods for and contents of weather information, and works towards improving capacity for meteorological observations, forecasting, warnings, and dissemination in Sri Lanka.
Sri Lanka	2014-2018	Technical Cooperation for Landslide Mitigation Project	This project supports the enhancement of sediment disaster management capacity in Sri Lanka through conducting surveys and assessments of sediment disaster countermeasures, development of designs to prevent landslide, slope failures and rocks fall, design and construction supervision and monitoring, and accumulation of knowledge and know-how on sediment disasters mitigation measures.
Fiji	2014-2018	Project for Reinforcing Meteorological Training Function of FMS	The Project Purpose is to enhance comprehensively and effectively the capability of weather and flood forecasting and warning services. Through the project, all National Meteorological Services (NMS) in the South Pacific are effectively enhanced, maintenance and operations of equipment and systems are enhanced in all NMSs, quality control of data is improved in all NMSs, and dissemination of weather information is improved in all NMSs.
Tuvalu	2011-2017	Project on Pilot Gravel Beach Nourishment against Coastal Disasters on Fongafale Island, Tuvalu	In Tuvalu, measures to address coastal erosion are urgently required since marine pollution has worsened due to storm surges and domestic wastewater. This project verifies the suitability of the construction method and maintenance and management approaches by demonstrating and monitoring artificial beach nourishment using coral gravel and sand as measures to preserve the coast following the natural beach formation mechanism of reef islands.
Central America	2015-2020	Project on Capacity Development for Disaster Risk Management in Central America, Phase 2	The Project on Capacity Development for Disaster Risk Management in Central America was conducted to build disaster-resilient societies by improving the disaster risk reduction capabilities of six countries in Central America (El Salvador, Honduras, Guatemala, Nicaragua, Costa Rica, and Panama), which face similar risks in terms of natural disasters, including earthquakes, floods, and volcanic disasters. Based on the results of that project, Phase 2 supports the strengthening of capacity among administrative organizations with a view to nationwide rollout, and the strengthening of frameworks for sustained efforts to popularize systematic community disaster preparedness, as well as supporting the construction of frameworks for sharing each country's experiences with others in Central America, with the aim of developing disaster risk management capacity throughout the region.

Country	Cooperation Period	Project Name	Description
Mexico	2016-2021	Hazard Assessment of Large Earthquakes and Tsunamis in the Mexican Pacific Coast for Disaster Mitigation (SATREPS)	This project involves installing measuring instruments on the earth's surface and sea floor in the coastal region of Guerrero state in southern Mexico, and gathering and analyzing earthquake data. This will be used to develop scenarios for major earthquake and tsunami disasters that could occur in future and to prepare a hazard map and evacuation signs. In addition, the project will develop and disseminate a disaster mitigation education program that takes local sociocultural attributes into account.
Nicaragua	2016-2019	Project for Strengthening of Capacity of the Central American Tsunami Advisory Center (CATAC)	Focusing on the Instituto Nicaraguense de Estudios Territoriales (INETER) (Nicaraguan Institute of Territorial Studies) which implemented a 24-hour earthquake and tsunami monitoring system for the first time in the Central America and the Central American Tsunami Advisory Center (CATAC) in Nicaragua, the goal of this project is to improve the quantitative tsunami forecasting capabilities required for CATAC's tsunami advisory information so that the information can be used in the tsunami warnings of Central American countries. It will involve increasing CATAC's ability to analyze earthquake parameters and forecast tsunami using observation data from Central American countries; putting in place facilities and infrastructure for conducting human resource development in Central American countries; and conducting human resource development among core personnel.
Brazil	2013-2017	Project for Strengthening the National Strategy of Integrated Natural Disaster Risk Management	Damage from sediment disasters has been escalating in Brazil, with increased habitation of risk areas due to development cited as a contributory factor. With the objective of reducing the risk of sediment disasters, this project aims to identify disaster risks and, based on this, strengthen comprehensive disaster response capabilities, including urban expansion plans, prevention and recovery, monitoring, and the transmission of information.
Chile	2015-2020	Disaster Risk Reduction Training Program for Latin America and the Caribbean	With a view to contributing to the improvement of disaster risk reduction measures in Latin America and the Caribbean, this project will support the development of mechanisms to establish Chile as a base for human resource development in the field of disaster risk reduction, focusing primarily on earthquakes and tsunami. These mechanisms will cover such matters as cooperation policy, budget planning, needs surveys in countries receiving assistance, and the coordination and investment of cooperation resources appropriate to those needs.
Colombia	2015-2018	Project for Strengthening Flood Risk Management Capacity	This project will seek to strengthen flood risk management capabilities among relevant organizations in Colombia by strengthening capacity in the areas of flood risk assessment, flood forecast and warning, and the communication of forecasts and warnings, as well as by clarifying the roles and responsibilities of national and local governments, and enhancing flood risk management planning capabilities.
Colombia	2015-2020	Project for Application of State of the Art Technologies to Strengthen Research and Response to Seismic, Volcanic and Tsunami Events, and Enhance Risk Management (SATREPS)	Colombia experiences frequent disasters due to earthquakes, tsunami, and volcanic eruptions. This project involves promoting partnerships between research institutes and relevant disaster management organizations, along with research and practical activities aimed at strengthening measures to mitigate the damage due to disaster through capacity building in such areas as earthquake, tsunami, and volcanic activity monitoring, modeling, damage forecasting, and the transmission of information. In addition, it will contribute to advances in disaster research in South America through collaboration with neighboring countries.
Ecuador	2017-2021	Project for Safe and Resilient Cities for Earthquake and Tsunami Disaster	Initiatives for developing "disaster resilient cities" will be deployed nationwide to mitigate damage caused by earthquakes and tsunamis by formulating tsunami evacuation plans, updating the disaster management agenda and strengthening the operational structure of building system in three pilot cities (Atacames, Portoviejo and Salinas).
Mozambique	2014-2018	Project for the Capacity Enhancement of Meteorological Observations, Weather Forecasting and Warnings	This project, which targets the staff of the Mozambique Meteorological Office and regional observation stations, aims to improve the capacity for responding to water-related disasters in Mozambique, a country which is vulnerable to natural disasters and is exposed to cyclones and flooding every year. The project works towards the improvement of forecasts and warnings that use quality controlled weather data by aiming to improve meteorological observation capacity and weather forecasting and warning capacity.
Afghanistan	2012-2018	Project for Capacity Enhancement on Hydro-Meteorological Information Management in the Ministry of Energy and Water	This project supports a cooperative relationship between the Ministry of Energy and Water (MEW) and other hydro/meteorological information management institutions (Ministry of Agriculture, Irrigation and Livestock (MAIL), National Meteorological Service (NMS), etc.), and then to enable the mutual exchange of Afghanistan's hydro/meteorological data and information and its application in the appropriate development of irrigation and agriculture, so that it will be used by the general public.
Turkey	2013-2018	Project on Earthquake and Tsunami Disaster Mitigation in the Marmara Region and Disaster Education in Turkey (SATREPS)	In the Marmara Region, with its high earthquake risk, this project conducts research on earthquake observations and on earthquake and tsunami disaster simulations. By maintaining the results of this research in the form of visual resources (such as images and pamphlets), this project works to improve the general public's awareness and knowledge of DRR.

Source: Japan International Cooperation Agency (JICA)

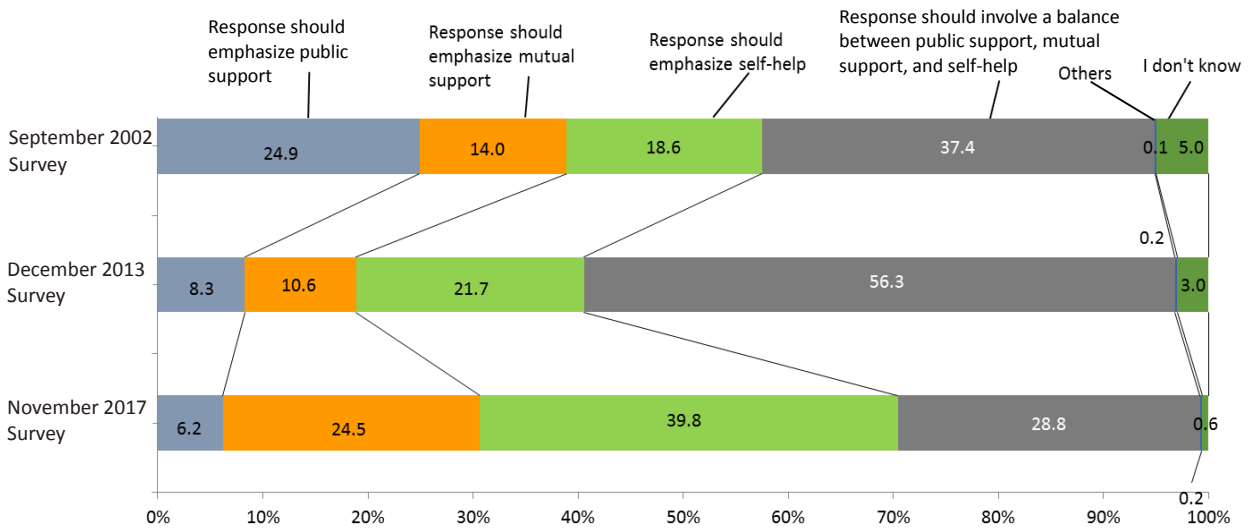
10. Others

Fig. A-59 Trends in the Number of Earthquake Insurance Contracts



Source: Formulated by the Cabinet Office based on materials from the General Insurance Rating Organization of Japan

Fig. A-60 Awareness of Self-Help, Mutual Support, and Public Support Measures



Source: Formulated by Cabinet Office on basis of "Public Opinion Poll regarding Disaster Risk Reduction" conducted by the Cabinet Office, Public Relations Office

Fig. A-61 Tables Explaining the Japan Meteorological Agency Seismic Intensity Scale

Notes:

- (1) As a rule, seismic intensities announced by JMA are values observed using seismic intensity meters installed on the ground or on the first floor of low-rise buildings. This document describes the phenomena and damage that may be observed for individual seismic intensity levels. Seismic intensities are not determined from the observed phenomena described here.
- (2) Seismic ground motion is significantly influenced by underground conditions and topography. Seismic intensity is the value observed at a site where a seismic intensity meter is installed, and may vary even within the same city. In addition, the amplitude of seismic motion generally differs by floor and location within the same building, as shaking on upper floors may be considerably amplified.
- (3) Sites with the same level of seismic intensity will not necessarily suffer the same degree of damage, as the effect of tremors depends on the nature of the seismic motion (such as amplitude, period and duration), the type of construction and underground conditions.
- (4) This document describes typical phenomena that may be seen at individual levels of seismic intensity. In some cases, the level of damage may be greater or less than specified. Not all phenomena described for each intensity level may necessarily occur.
- (5) The information outlined here is regularly checked at intervals of about five years, and is updated in line with actual phenomena observed in new cases or improvements in the earthquake resistance of buildings and structures.
- (6) In these materials, where the extent of damage is not shown in round numbers, the following adverbs and adjectives have been used as a tentative guide.

Term	Definition
Rarely	Extremely limited. Hardly ever.
A few/little	Number/extent is extremely small. Just a little bit.
Majority	Half or more. Less than “almost all.”
Almost all	Not all but close to all.
There are (also), there may be	Used to express something that typically starts to appear at this seismic intensity level, where the quantity is not great, but it is hard to quantify the number/extent.
Increases	It is difficult to specify the quantity, but it is more than would be the case for a lower level of intensity.
Increases further	Same meaning as “increases” above. Used in relation to lower levels of intensity, just like “increases” above.

* The JMA sometimes publishes earthquake intensities obtained from questionnaire surveys, but these are expressed as “corresponding to seismic intensity xx” and are distinguished from seismic intensity levels observed by seismometers.

●Human perception and reaction, indoor situation, outdoor situation

Seismic intensity	Human perception and reaction	Indoor situation	Outdoor situation
0	Imperceptible to people, but recorded by seismometers.	—	—
1	Felt slightly by some people keeping quiet in buildings.	—	—
2	Felt by many people keeping quiet in buildings. Some people may be awoken.	Hanging objects such as lamps swing slightly.	—
3	Felt by most people in buildings. Felt by some people walking. Many people are awoken.	Dishes in cupboards may rattle.	Electric wires swing slightly.
4	Most people are startled. Felt by most people walking. Most people are awoken.	Hanging objects such as lamps swing significantly, and dishes in cupboards rattle. Unstable ornaments may fall.	Electric wires swing significantly. Those driving vehicles may notice the tremor.
5 Lower	Many people will be frightened and feel the need to hold onto something stable.	Hanging objects such as lamps swing violently. Dishes in cupboards and items on bookshelves may fall. Many unstable ornaments fall. Unsecured furniture may move, and unstable furniture may topple over.	In some cases, windows may break and fall. People notice electricity poles moving. Roads may sustain damaged.
5 Upper	Many people find it hard to move; walking is difficult without holding onto something stable.	Dishes in cupboards and items on bookshelves are more likely to fall. TVs may fall from their stands, and unsecured furniture may topple over.	Windows may break and fall, unreinforced concrete-block walls may collapse, poorly installed vending machines may topple over, automobiles may stop due to the difficulty of continued movement.
6 Lower	It is difficult to remain standing.	Many unsecured furniture moves and may topple over. Doors may become wedged shut.	Wall tiles and windows may sustain damage and fall.
6 Upper	It is impossible to remain standing or move without crawling. People may be thrown through the air.	Most unsecured furniture moves, and is more likely to topple over.	Wall tiles and windows are more likely to break and fall. Most unreinforced concrete-block walls collapse.
7		Most unsecured furniture moves and topples over, or may even be thrown through the air.	Wall tiles and windows are even more likely to break and fall. Reinforced concrete-block walls may collapse.

●Wooden houses

Seismic intensity	Wooden houses	
	High earthquake resistance	Low earthquake resistance
5 Lower	—	Slight cracks may form in walls.
5 Upper	—	Cracks may form in walls.
6 Lower	Slight cracks may form in walls.	Cracks are more likely to form in walls. Large cracks may form in walls. Tiles may fall, and buildings may lean or collapse.
6 Upper	Crazing or cracks may be seen in walls.	Large cracks are more likely to form in walls. Buildings are more likely to lean or collapse.
7	Cracks are more likely to form in walls. Buildings may lean in some cases.	Buildings are even more likely to lean or collapse.

Notes:

- (1) Wooden houses are classified into two categories according to their earthquake resistance, which tends to be higher for newer foundations. Earthquake resistance tends to be low for structures built up to 1981, and high for those built since 1982. However, to maintain a certain range of earthquake resistance according to differences in structure and wall arrangement, resistance is not necessarily determined only by foundation age. The earthquake resistance of existing buildings can be ascertained through quakeproofing diagnosis.
- (2) The walls in this table are assumed to be made of mud and/or mortar. Mortar in a wall with a weak base can easily break off and fall, even under conditions of low deformation.
- (3) Damage to wooden houses depends on the period and duration of seismic waves. In some cases (such as the Iwate-Miyagi Nairiku Earthquake of 2008), few buildings sustain damage in relation to the level of seismic intensity observed.

●Reinforced-concrete buildings

Seismic intensity	Reinforced-concrete buildings	
	High earthquake resistance	Low earthquake resistance
5 Upper	—	Cracks may form in walls, crossbeams and pillars.
6 Lower	Cracks may form in walls, crossbeams and pillars.	Cracks are more likely to form in walls, crossbeams and pillars.
6 Upper	Cracks are more likely to form in walls, crossbeams and pillars.	Slippage and X-shaped cracks may be seen in walls, crossbeams and pillars. Pillars at ground level or intermediate floors may disintegrate, and buildings may collapse.
7	Cracks are even more likely to form in walls, crossbeams and pillars. Ground level or intermediate floors may sustain significant damage. Buildings may lean in some cases.	Slippage and X-shaped cracks are more likely to be seen in walls, crossbeams and pillars. Pillars at ground level or on intermediate floors crumble are more likely to disintegrate, and buildings are more likely to collapse.

Notes:

- (1) Earthquake resistance tends to be higher for newer foundations. The value tends to be low for structures built up to 1981, and high for those built since 1982. However, to maintain a certain range of earthquake resistance according to differences in structure and 2D/3D arrangement of reinforced walls, resistance is not necessarily determined only by foundation age. The earthquake resistance of existing buildings can be ascertained through quakeproofing diagnosis.
- (2) Slight cracks may form in reinforced-concrete buildings without their core structure being affected.

●Situation of ground and slopes, etc.

Seismic intensity	Situation of ground	Situation of slopes, etc.
5 Lower	Small cracks* ¹ may form and liquefaction* ² may occur.	Rock falls and landslips may occur.
5 Upper		
6 Lower	Cracks may form.	Landslips and landslides may occur.
6 Upper	Large cracks may form.	Landslips are more likely to occur; large landslides and massif collapses may be seen.* ³
7		

Notes:

*1 A crack is the same phenomenon as a fissure, but the expression is used here to refer to a small fissure or opening in the ground.

*2 Liquefaction may be seen in areas with a high groundwater level and loose sand deposits. Damage observed as a result of liquefaction includes spouts of muddy water from the ground, outbreaks of subsidence in riverbanks and quays, elevation of sewage pipes and manholes, and leaning or destruction of building foundations.

*3 When large landslides and massif collapse occurs, dams may form depending on geographical features, and debris flow may occur due to the large quantities of sediment produced.

●Influence on utilities and infrastructure, etc.

Suspension of gas supply	In the event of shaking with a seismic intensity of about 5 Lower or more, gas meters with safety devices are tripped, stopping the supply of gas. In the event of stronger shaking, the gas may stop for entire local blocks.*
Suspension of water supply, electrical blackouts	Suspension of water supply and electrical blackouts may occur in regions experiencing shaking with a seismic intensity of about 5 Lower or more.*
Suspension of railroad services, regulation of highways, etc.	In the event of shaking with a seismic intensity of about 4 or more, services on railroads or highways may be stopped for safety confirmation. Speed control and traffic regulations are performed according the judgment of the relevant bodies. (Standards for safety confirmation differ by organization and area).
Disruption to lines of communication such as telephones	In the event of an earthquake, telephone line congestion may occur as a result of increased use related to safety confirmation around regions of strong shaking. To combat this, telecommunications providers offer message boards and message dial services for use in disasters resulting from earthquakes with a seismic intensity of about 6 Lower or more.
Suspension of elevator service	In the event of shaking with a seismic intensity of about 5 Lower or more, elevators with earthquake control devices will stop automatically for safety reasons. Resumption of service may be delayed until safety is confirmed.

*In the event of shaking with a seismic intensity of 6 Upper or more, gas, water, and electric supplies may stop over wide areas.

●Effect on large-scale structures

Shaking of skyscrapers from long-period ground motion*	Due to their longer characteristic period, skyscrapers react less to earthquakes than general reinforced-concrete buildings, which have a shorter characteristic period. However, they exhibit slow shaking over a long time in response to long-period ground motion. If motion is strong, poorly fixed office appliances may move significantly, and people may have to hold onto stable objects to maintain their position.
Sloshing of oil tanks	Sloshing of oil tanks occurs in response to long-period ground motion. As a result, oil outflows or fires may occur.
Damage or collapse of ceilings etc. at institutions covering large spaces	In institutions covering large spaces such as gymnasiums or indoor pools, ceilings may shake significantly and sustain damage or collapse, even in cases where ground motion is not severe enough to cause other structural damage.

*Occasionally, when a large earthquake occurs, long-period seismic waves reach locations far from the hypocenter; such waves may be amplified over plains depending on the characteristic period of the ground, thus extending their duration.

Source: Japan Meteorological Agency

Fig. A-62 Emergency Warning Issuance Criteria

■ Criteria for Meteorological Emergency Warnings

Phenomenon	Criteria	
Heavy rain	Heavy rainfall with a level of intensity observed only once every few decades is predicted in association with a typhoon or similar. Or: Heavy rainfall is predicted in association with a typhoon expected to have a level of intensity observed only once every few decades or an extratropical cyclone with comparable intensity.	
Storm	A storm is predicted...	...in association with a typhoon expected to have a level of intensity observed only once every few decades or an extratropical cyclone with comparable intensity.
Storm surge	A storm surge is predicted...	
High waves	High waves are predicted...	
Snowstorm	A snowstorm is predicted in association with an extratropical cyclone expected to have a level of intensity observed only once every few decades.	
Heavy snow	Heavy snowfall with a level of intensity observed only once every few decades is predicted.	

■ Criteria for Tsunami, Volcanic eruptions, and Earthquake Emergency Warnings

Phenomenon	Criteria
Tsunami	Tsunami height is expected to be greater than 3 meters. (Major Tsunami Warnings are issued in the classification of Emergency Warnings.)
Volcanic eruption	Eruption or possibility of eruption that may cause serious damage in residential areas and non-residential areas nearer the crater. (Volcanic Warning (Level 4 and 5) and Volcanic Warning (residential areas)* are issued in the classification of Emergency Warnings.)
Earthquake	Seismic intensity of 6-lower or more is expected. (Earthquake Early Warnings incorporating prediction of tremors measuring 6-lower or more on JMA's seismic intensity scale are issued in the classification of Emergency Warnings.)

Source: Japan Meteorological Agency

Pictograms in the Hazard Specific Evacuation Guidance Sign System



Debris flow



Slope failure
and landslide



Storm surge
and tsunami

The places with these yellow pictograms indicate that designated hazards are like to occur. People must stay away from these places immediately after an earthquake or torrential rain.

Reference:

White Paper on Disaster Management in Japan, Cabinet Office

URL: http://www.bousai.go.jp/en/documentation/white_paper/index.html

For more safe and secure travel in Japan

JTA/JNTO reinforcing communication tools for international visitors in case of emergency

URL: <http://www.bousai.go.jp/tolink/out181019.html>