2019

White Paper
Disaster Management
in Japan

Cabinet Office

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Part 1 Current Disaster Risk Management Measures in Japan

Special Feature

Consecutive Disasters
--Toward the Establishment of a Disaster Conscious Society--

In 2018, many disasters occurred consecutively in various parts of Japan, including earthquakes, heavy rains, and typhoons. In particular, the earthquake that hit the northern part of Osaka Prefecture on June 18, the Heavy Rain Event of July 2018 centered on West Japan starting June 28, Typhoons Jebi (1821) and Trami (1824), and the earthquake that stroke the eastern Iburi region, Hokkaido Prefecture on September 6 caused damage to a wide area throughout Japan. The damage from the disaster was further extended due to other disaster that occurred subsequently in the same areas. The consecutive occurrence of major disasters highlighted the importance of disaster prevention, disaster mitigation, and building national resilience, which will lead to preparing for natural disasters and protecting people's lives and assets. In order to continue to maintain and improve Japan's DRR measures into the future, it is necessary to build a "disaster conscious society" where each member of society has an awareness and a sense of responsibility for protecting their own life.

The "Special Feature" of the Reiwa Era's first White Paper on Disaster Management covers major disasters that occurred during the last year of the Heisei era. Chapter 1, Section 1 gives an overview of those that caused especially extensive damage among a series of major disasters that occurred in 2018, while also looking back at response measures taken by the government. Chapter 1, Section 2 and Chapter 2 discuss the outline of disaster prevention and mitigation measures and national resilience initiatives that the government as a whole will promote over the next years based on the lessons learned from the major disasters in 2018. Chapter 3 covers a Nankai Trough Megathrust Earthquake, the largest expected disaster in Japan, explaining the steps being taken by the government and preparedness measures to be implemented in the future.

Chapter 1 Disasters in 2018

Section 1 Consecutive Disasters

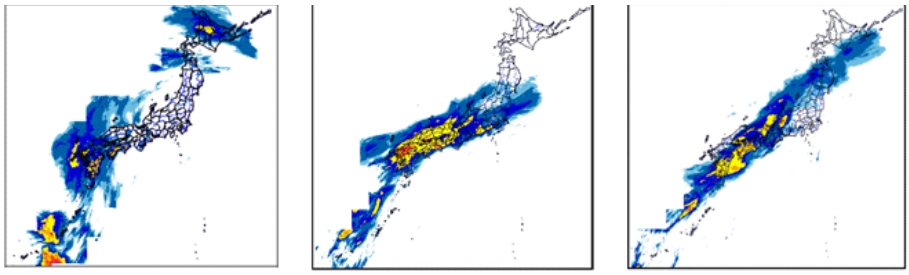
1-1 The Heavy Rain Event of July 2018 (Western Japan)

(1) Overview

The rain front that had moved from Central China up through the Japan Sea was stalling in northern Japan from June 28, 2018. It then further moved north and reached the vicinity of Hokkaido Prefecture on July 4. On July 5, the rain front moved down south and stalled in western Japan. From July 5 to 8, fifteen line-shaped precipitation systems were formed over the Tokai region to western Japan. With nine of these systems, the maximum three-hour total rainfall exceeded 150 mm. In addition, Typhoon Prapiroon (1807) formed as a tropical storm around the sea south-southeast of Okinawa Island on June 29 and was upgraded to typhoon intensity around Okinawa Island on July 2. Due to the effects of the rain front and Typhoon Prapiroon (1807), warm and very moist air kept flowing into the vicinity of Japan, causing record-breaking heavy rains across a wide area throughout Japan, especially in western Japan.

Daily Precipitation (Analyzed Precipitation)

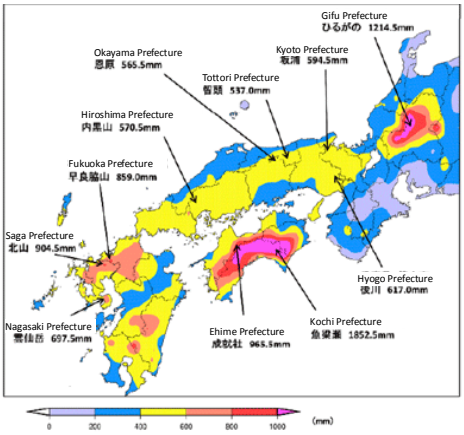
July 3 July 6 July 7



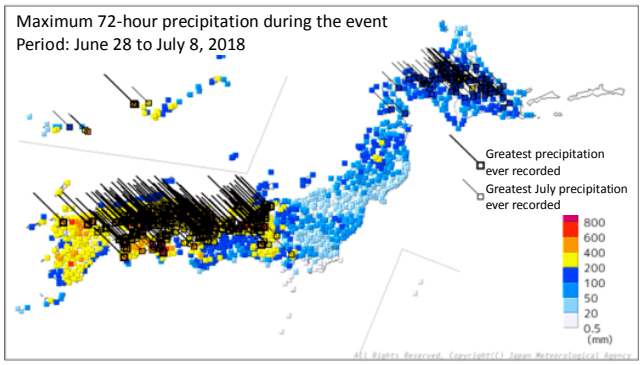
Note) Analyzed precipitation: 1-km-mesh precipitation distribution obtained by analyzing data from weather radars, AMeDAS, and other rain gauge systems
Source: Japan Meteorological Agency website
(Reference: https://www.data.jma.go.jp/obd/stats/data/bosai/report/2018/20180713/20180713.html)

The total precipitation from June 28 to July 8 exceeded 1,800 mm in some areas of the Shikoku region and 1,200 mm in some areas of the Tokai region, recording two to four times the average monthly precipitation in July. In addition, the largest 24-hour, 48-hour, and 72-hour precipitations in recorded history were observed at many observation points in the northern Kyushu, Shikoku, Chugoku, Kinki, Tokai, and Hokkaido regions. The record-breaking heavy rainfalls affected an enormous area of Japan over a long period of time.

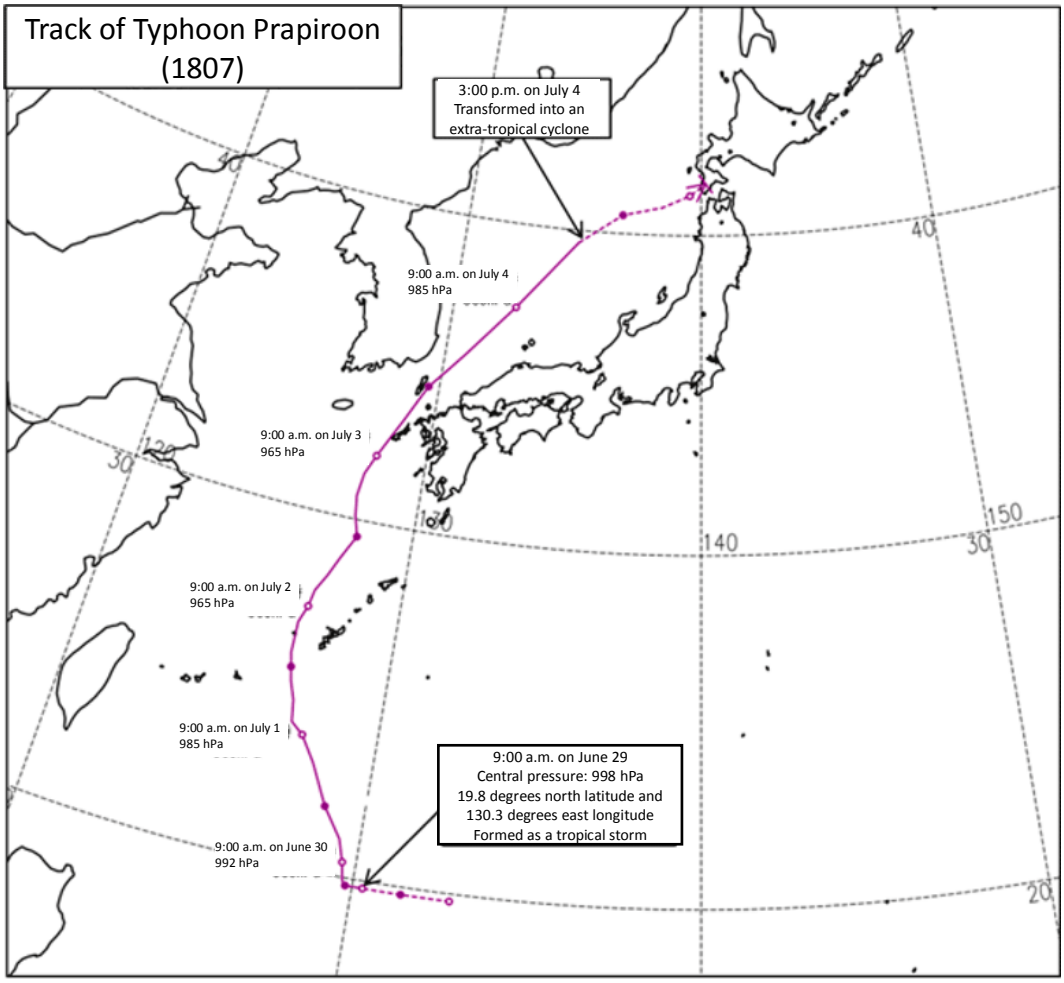
Precipitation distribution during the event
(between 00:00 on June 28 and 24:00 on July 8)



Distribution of the maximum 72-hour precipitation during the event
(between 00:00 on June 28 and 24:00 on July 8)



Source: Japan Meteorological Agency website
(Reference: https://www.data.jma.go.jp/obd/stats/data/bosai/report/2018/20180713/20180713.html)



Source: Japan Meteorological Agency website
(Reference: https://www.jma.go.jp/jma/jma-eng/jma-center/rsmc-hp-pub-eg/bstve_2018_m.html)

After mid-July, temperatures rose significantly in northern, eastern, and western Japan. The monthly average temperature for July in eastern Japan was the highest ever recorded in July since statistics began in 1946. This record high temperature was due to the North Pacific Subtropical High and the Tibetan high both continuing to extend to Japan. One of the causes was the sea surface temperature near the northern hemisphere tropics being higher than normal, which caused more active cumulus convection than usual.

The series of extensive heavy rainfalls that affected a vast area of Japan, mainly western Japan, was named by the Japan Meteorological Agency (JMA) as “the Heavy Rain Event of July 2018.” The JMA convened a special meeting of the Japan Meteorological Agency Advisory Panel on Extreme Weather Events on August 10, 2018. The Advisory Panel concluded that the torrential rains were caused as a massive amount of water vapor continued to flow into the Baiu front, which was stalling in western Japan over the four days due to the meandering of the upper two jet streams. It also suggested that the Heavy Rain Event may be linked to global warming, associated with a long-term trend of temperature increase and a similar increasing trend in the amount of water vapor in the air (Source:https://ds.data.jma.go.jp/tcc/tcc/news/press_20180822.pdf).

(2) Damage

The Heavy Rain Event of July 2018 caused river flooding, inundation, and sediment and other disasters, which left 237 people dead (115 in Hiroshima Prefecture, 66 in Okayama Prefecture, 31 in Ehime Prefecture, 25 in other prefectures), 8 persons missing, and 432 people seriously or lightly injured. (Information by the Fire and Disaster Management Agency, as of January 9, 2019. Reference: https://www.fdma.go.jp/disaster/info/2018/).

○**Human casualties** (as of January 9, 2019)

Prefecture	Fatality	Missing persons	Seriously injured	Lightly injured
Okayama	**66**	**3**	**9**	**152**
Hiroshima	**115**	**5**	**61**	**85**
Ehime	**31**		**33**	**2**
Others	**25**		**20**	**70**
Total	**237**	**8**	**123**	**309**

In Hiroshima Prefecture, debris flows occurred concurrently in several locations, including Hiroshima City, Kure City, and Saka Town. In Okayama Prefecture, a massive flooding disaster occurred in Mabi Town, Kurashiki City, and other areas due to the breach of levees along the Odagawa River and other rivers. This levee breach was caused by the water level remaining high over a long period of time due to a "backwater phenomenon" (meaning that there was no or little current of water) at the point where the tributary, the Odagawa River, met the main stream, the Takahashigawa River. In Ehime Prefecture, river flooding occurred due to a heavy rainfall exceeding the capacity of river control facilities. Debris flows occurred in Yoshida Town, Uwajima City, which caused a sediment disaster that destroyed a water purification plant.

Nationally, the heavy rainfalls caused damage to 346 points in 47 government-administered rivers of 22 riverine systems, and 267 prefectural government-administered rivers of 69 riverine systems. Inland inundation occurred in 88 municipalities in 19 prefectures. 2,581 sediment disasters occurred in 32 prefectures (debris flow: 791; landslide: 56; cliff failure: 1,734). (Information by the Ministry of Land, Infrastructure, Transport and Tourism, as of January 9, 2019. Reference: http://www.bousai.go.jp/updates/h30typhoon7/index.html)

Flood in Mabi Town, Kurashiki City, Okayama Prefecture

Damage from a sediment disaster in Yasu-ura Town, Kure City, Hiroshima Prefecture

A road cave-in in Mizushiri District, Saka Town, Aki-gun, Hiroshima Prefecture
(Hiroshima-Kure Road)

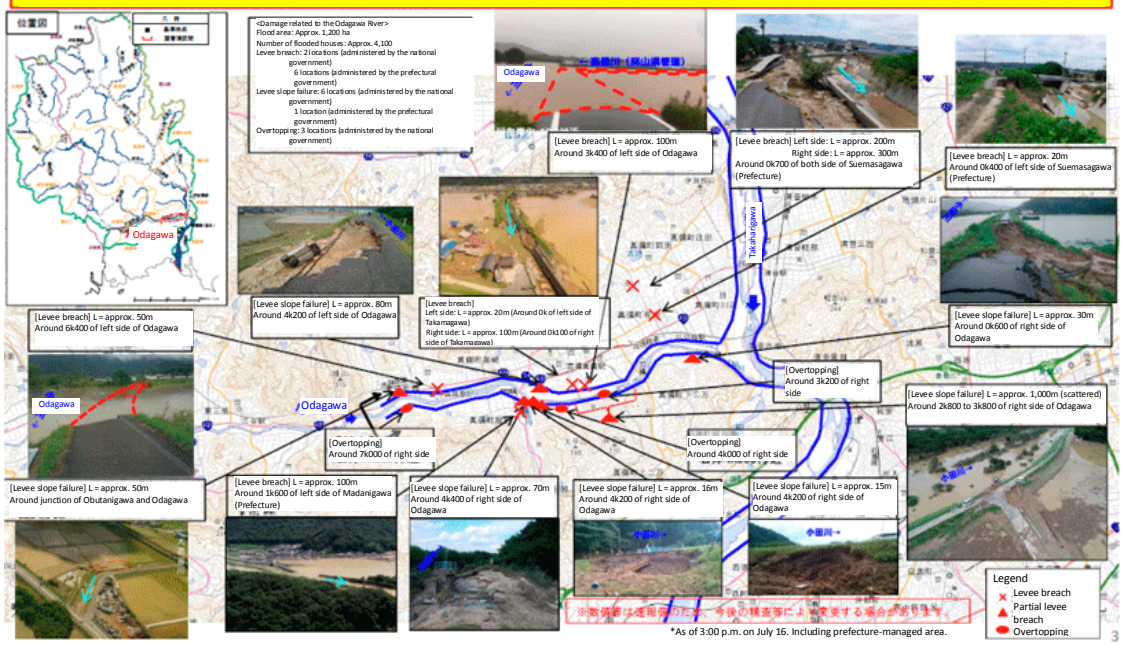
Sediment disaster near Yoshida Town, Uwajima City, Ehime Prefecture

Flood in Higashi-Ozu District, Ozu City, Ehime Prefecture (Photo by courtesy of Ozu City)

Levee breaches in the Takahashigawa River, Okayama Prefecture

Extent of the Damage of the Heavy Rain Event of July 2018 (Odagawa River of the Takahashigawa River System)

○ During the Heavy Rain Event of July 2018, the water level of the Odagawa River of the Takahashigawa River System remained high over a long period of time due to a backwater phenomenon and other factors. This caused levee breaches at eight locations in Mabi Town, Kurashiki City, along the Odagawa River and tributaries flowing into it.
○ The flood exceeded 5 m in depth and caused many deaths.



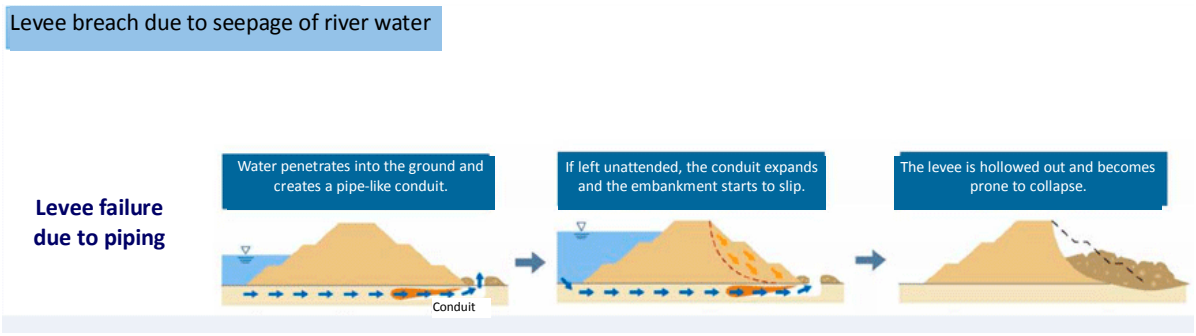
Source: Material provided at the First Ministerial Meeting on Emergency Inspection of Critical Infrastructure held on September 21, 2018
(Reference: https://www.kantei.go.jp/jp/singi/jyuyouinfura/index.html)

[Column]

Soil Piping

Soil piping is a type of internal erosion phenomenon where a pipe-like structure connecting the inside and outside of a levee is developed. When the river level rises and the pressure of seepage water on the foundation ground increases, soil particles of the ground (solid particles composing the soil) begin to be discharged to the other side of the bank along with the seepage water. This creates and expands a pipe-like hollow structure that eventually becomes a conduit for water to flow. Growing erosion may degrade the security of levees and may eventually cause a levee breach. It has been pointed out that a piping phenomenon can occur in many rivers across Japan. During the Heavy Rain Event of July 2018, piping phenomena were observed at 28 locations in 12 government-administered rivers. In response to this, the government has implemented retrofitting measures as needed, such as installing metal plates (sheet piles) and impervious sheets in the river to reduce water permeation.

There are a few reasons why many rivers are prone to piping phenomena. Firstly, the foundation ground of every river includes some permeable parts (such as the ruins of old rivers) in an intricate manner. The second reason is that the quality of soil and soil compaction methods used are inconsistent for different parts of the same river, because reinforcement works have been conducted on different parts as needed in different times over the long history. Lastly, rising river levels due to heavy rainfalls in recent years and increasing water pressure on levees are also considered to have contributed to piping phenomena.



Source: Ministry of Land, Infrastructure, Transport and Tourism

Damage to houses included 6,767 completely destroyed, 15,234 half-destroyed or partially damaged, and 28,469 flooded. (Information by the Fire and Disaster Management Agency, as of January 9, 2019. Reference: http://www.bousai.go.jp/updates/h30typhoon7/index.html)

○**Houses damaged** (as of January 9, 2019)

Prefecture	Completely destroyed	Half-destroyed	Partially damaged	Above-floor flooding	Below-floor flooding
Okayama	4,828	3,302	1,131	1,666	5,446
Hiroshima	1,150	3,602	2,119	3,158	5,799
Ehime	625	3,108	207	187	2,492
Others	164	1,231	534	2,162	7,559
Total	6,767	11,243	3,991	7,173	21,296

Damage to lifeline utilities included power outages affecting a maximum of approximately 80,000 households (approximately 60,000 households serviced by the Chugoku Electric Power Company and approximately 20,000 serviced by the Shikoku Electric Power Company). Power supply for residential areas was recovered on July 13, 2018. There were also disruptions to gas supply affecting approximately 290 households. This was recovered on July 8. (Information by the Ministry of Economy, Trade and Industry, as of January 9, 2019. Reference: http://www.bousai.go.jp/updates/h30typhoon7/index.html)

Water outages occurred in 80 municipalities in 18 prefectures, affecting a maximum of approximately 260,000 households. Water supply was restored in all areas by August 13. (Information by the Ministry of Health, Labour and Welfare, as of January 9, 2019. Reference: http://www.bousai.go.jp/updates/h30typhoon7/index.html)

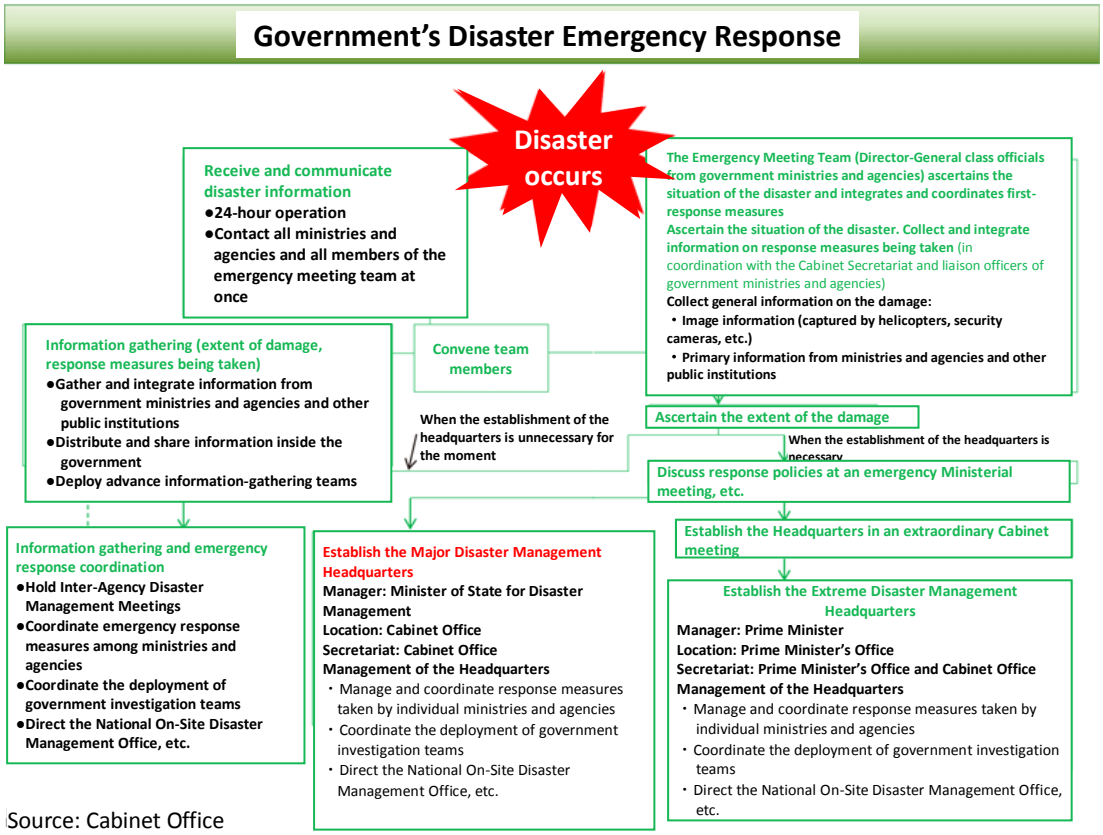
○Damage to lifeline utilities

	Maximum number of households affected	Recovery
Power	**Approx. 80,000**	**Recovered on July 13 (residential areas)**
Water	**263,593**	**Recovered on August 13 (excluding the areas where houses were damaged)**

The total number of shelters in all prefectures was 3,779 at its peak, including 436 in Okayama Prefecture, 660 in Hiroshima Prefecture, and 462 in Ehime Prefecture. The maximum number of evacuees was approximately 28,000 (approximately 2500 in Okayama Prefecture, approximately 12,000 in Hiroshima Prefecture, and approximately 800 in Ehime Prefecture). (Information by the Fire and Disaster Management Agency, as of July 7, 2018. Reference: http://www.bousai.go.jp/updates/h30typhoon7/index.html)

About a month later, the number of evacuees dropped to below 3,500. All of the general shelters were closed by December of the same year (some welfare shelters continued to open until March 2019).

(3) Response of Government Ministries and Agencies



Source: Cabinet Office

From July 2, 2018, the government held a series of Inter-Agency Disaster Alert Meetings to prepare for emergencies. Through Cabinet Meetings, the government ministries and agencies coordinated with each other for managing the disaster under the direction of the Prime Minister. Based on the damage information gathered by the Cabinet Office information-gathering teams, the government established the Major Disaster Management Headquarters headed by the Minister of State for Disaster Management at 8:00 a.m. on July 8. The Headquarters held a total of 23 meetings (Reference: http://www.bousai.go.jp/updates/h30typhoon7/h30typhoon7/taisakukaigi.html). The Prime Minister attended most of the meetings and led activities to grasp the extent of the damage, the overall coordination of response measures, and the prevention of secondary disasters.

Response to the Heavy Rain Event of July 2018

July 2 Inter-Agency Disaster Alert Meeting

July 5 Press conference by the JMA (regarding the heavy rain that would last until around the 8th); Inter-Agency Disaster Alert Meeting

July 6 Press conference by the JMA (regarding the possibility of the announcement of an emergency warning); instruction given by Chief Cabinet Secretary Suga; Inter-Agency Disaster Management Meeting
Hiroshima Prefecture invokes the Disaster Relief Act with respect to Hiroshima City and Saka Town, Aki-gun (date of invocation: July 5).
(The Act was invoked with respect to 110 municipalities in 11 prefectures as of September 5.)

July 7 Cabinet meeting; instructions given by Prime Minister Abe
Deployment of Cabinet Office advance information-gathering teams (to Okayama and Hiroshima Prefectures)

July 8 Establishment of the Major Disaster Management Headquarters (a total of 23 meetings were held by September 6)
Deployment of a Cabinet Office advance information-gathering team (to Ehime Prefecture)
Hiroshima Prefecture decides to invoke the Act on Support for Reconstructing Livelihoods of the Affected due to Disaster with respect to Hiroshima City (date of invocation: July 5).
(The Act was invoked with respect to 88 municipalities in 12 prefectures as of September 26.)

July 9 Deployment of a government investigation team led by H.E. Mr. Okonogi, then Minister of State for Disaster Management to Okayama and Hiroshima Prefectures
Establishment of a Team to Support the Daily Lives of the Affected

July 10 [The Heavy Rain Event of July 2018] Relief Goods Procurement and Transport Team was established under the Team to Support the Daily Lives of the Affected.

July 11 Prime Minister Abe visits one of the affected areas (Okayama Prefecture).

July 12 Cabinet approval on the use of contingency reserves (approx. 2 billion yen)

July 13 Prime Minister Abe visits one of the affected areas (Ehime Prefecture).

First meeting of the Major Disaster Management Headquarters (July 8)

H.E. Mr. Okonogi, then Minister of State for Disaster Management visiting a shelter in Okayama Prefecture as the leader of the government investigation team

July 14 Designation as a Specified Disaster

July 15 H.E. Mr. Okonogi, then Minister of State for Disaster Management visits one of the affected areas (Hiroshima Prefecture).
The first announcement of the possibility of designation as a Disaster of Extreme Severity
The announcement of the Support Measures for the affected of the Heavy Rain Event of July 2018

July 21 H.E. Mr. Abe, Prime Minister visits one of the affected areas (Hiroshima Prefecture). The second announcement of the possibility of designation as a Disaster of Extreme Severity

July 22 H.E. Mr. Abe, Prime Minister instructs the government to develop a package for the restoration of lives and livelihoods of the affected.

July 24 Designation as a Disaster of Extreme Severity (Cabinet approval on the 24th; promulgated on the 27th)

July 31 H.E. Mr. Okonogi, then Minister of State for Disaster Management visits one of the affected areas (Ehime Prefecture).

August 2 Approval on the Support Package for the Life and Livelihood Restoration from the Heavy Rain Event of July 2018

August 3 Cabinet approval on the use of contingency reserves (approx. 105.8 billion yen)

August 5 H.E. Mr. Abe, Prime Minister visits one of the affected areas (Hiroshima Prefecture).

October 21 to 22 H.E. Mr. Yamamoto, Minister of State for Disaster Management visits affected areas (Okayama, Ehime, and Hiroshima Prefectures).

November 7 Approval of the FY2018 supplementary budget, including expenses for recovery and reconstruction from the Heavy Rain Event of July 2018 (503.4 billion yen)

H.E. Mr. Abe, Prime Minister, visiting an affected area (Ehime Prefecture)

H.E. Mr. Okonogi, then Minister of State for Disaster Management explaining to the affected the Support Measures

Source: Cabinet Office

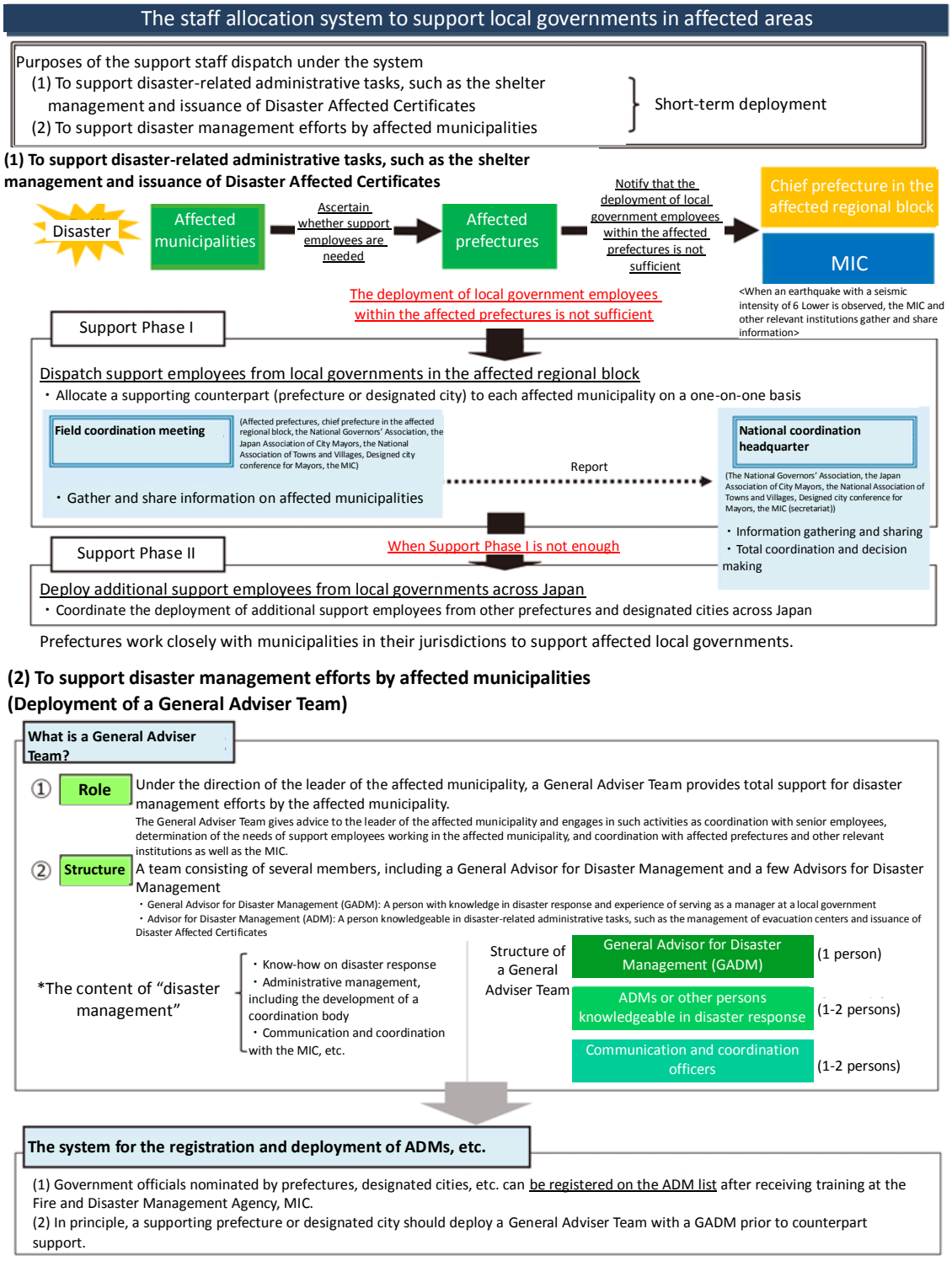
<Rescue Operation>

The government immediately started rescue operations from early July. The police, the Fire and Disaster Management Agency, the SDF, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) and other organizations dispatched rescue units from across Japan to the affected areas to conduct rescue and search operations as well as secondary damage prevention activities and life support activities.

<Invocation of the staff allocation system to support local governments in affected areas>

The Ministry of Internal Affairs and Communications (MIC) invoked the staff allocation system to support local governments in affected areas, a national system to send government staff to support affected local governments, for the first time since its establishment in March 2018. 29 prefectures and cities sent 15,033 government officials to 20 local governments in the affected areas until September 15 to help the management of shelters, issuance of Disaster Affected Certificates, and other administrative tasks.

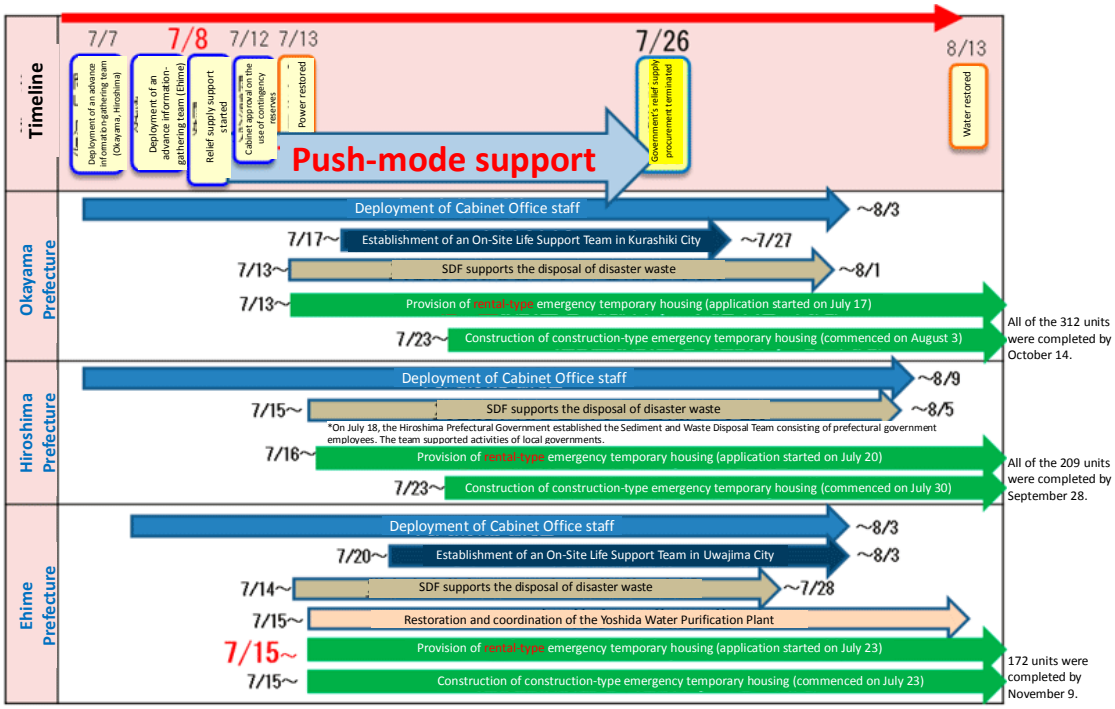
This system uses a counterpart method, meaning that each affected municipality is paired to a supporting prefecture or designated city basically on a one-on-one basis. For the Heavy Rain Event of July 2018, Okayama City was supported by Yokohama City while Kurashiki City was supported by Tokyo, Saitama, Fukuoka, and Niigata Prefectures. The system was amended in March 2019 based on the lessons learned from the disaster.



Source: Ministry of Internal Affairs and Communications website
(Reference: http://www.soumu.go.jp/main_sosiki/jichi_gyousei/koumuin_seido/hisai_chiho_kokyodantai.html)

<Push-Mode Support>

For the Heavy Rain Event of July 2018, the government conducted "push-mode support," which had been carried out in the 2016 Kumamoto Earthquake. From July 8, under the coordination of the Cabinet Office, ministries and agencies requested the industries under their supervision to procure relief supplies. Under this scheme, food, air conditioners, toilets, and other relief supplies were delivered to the affected areas up to July 26th.



Source: Cabinet Office

<Deployment of the Information Support Team>

In the event of a disaster, various organizations carry out support activities simultaneously. Information sharing is essential for efficient disaster response by these organizations. For this reason, the government established the Information Support Team (ISUT) led by the members of the Cabinet Office and sent it to the Hiroshima Prefectural Government in the disaster-affected area. (See Chapter 1, Section 1, 1-6 and Chapter 1, Section 2, 2-6.)

<Support by Volunteers>

A series of Disaster Volunteer Centers were established in the affected areas, to which many volunteers came to offer support. A total of 260,000 volunteers from across Japan came to disaster-affected areas, including Hiroshima, Okayama, and Ehime Prefectures, to help remove mud from houses and tidy up rooms and furniture. In order to coordinate support activities among volunteers, NPOs and local governments, information sharing meetings were held on a regular basis in Tokyo, Okayama, Hiroshima, and Ehime Prefectures. (See Chapter 1, Section 1, 1-7 and Part I, Chapter 1, Section 1, 1-6.)

<Invocation of the Disaster Relief Act and the Act on Support for Reconstructing Livelihoods of the Affected due to Disaster, and Designation as a Disaster of Extreme Severity>

Due to this disaster, the Disaster Relief Act was invoked with respect to 110 municipalities in 11 prefectures, while the Act on Support for Reconstructing Livelihoods of the Affected due to Disaster was invoked with respect to 88 municipalities in 12 prefectures.

A series of major disasters caused by the seasonal rain front, including Severe Tropical Storm Maliksi (1805), Tropical Storm Gaemi (1806), Typhoons Prapiroon (1807) and Maria (1808) and the Heavy Rain Event of July 2018, comprised a Disaster of Extreme Severity in 2018. On July 24, the Cabinet issued a Cabinet Order to designate this series of disasters as a Disaster of Extreme Severity. (See Appendix 14-3 “The Heavy Rain Event

of July 2018" (A-30 to 33).)

<Watch-Over Care and Counseling Services>

Affected people may need to move into a very different environment after the disaster, such as temporary housing. They also may face various issues regarding the reconstruction of their lives. In order to ensure that affected people are able to lead their lives with a sense of ease, the Ministry of Health, Labour and Welfare (MHLW) provided watch-over care and counseling services to prevent isolation, give advice on life-related issues, and create social opportunities among residents in the areas affected by the Heavy Rain Event of July 2018, namely, Okayama, Hiroshima, and Ehime Prefectures.

Visiting the affected as part of watch-over care and counseling services
(Mabi Mutual Support Center, Kurashiki City, Okayama Prefecture))

(4) Future Challenges and Measures

The government established the Heavy Rain Event of July 2018 Initial Response Review Team chaired by Deputy Chief Cabinet Secretary Sugita in order to analyze and review initial response measures taken by government officials and utilize the lessons learned from this disaster for future disaster response initiatives (Reference: http://www.bousai.go.jp/updates/h30typhoon7/h30typhoon7/shodotaio.html).

In this disaster, many government officials carried out various support activities at affected local governments. The Review Team had discussions based on reports on measures taken by individual ministries and agencies as well as reports submitted by 79 government officials, including senior officials from the Cabinet Office who were in charge of on-site coordination (Deputy Director-Generals and Directors) and other senior officials from ministries and agencies (Director-General/Director-level officials) dispatched to the affected areas. The Review Team outlined items that should be appreciated and those that require some improvement in relation to the following five areas where most initial response efforts were focused: (1) ascertainment of the shelter situation, (2) debris disposal and sediment removal, (3) water supply support and restoration of water service, (4) securing housing, and (5) support for local governments.

Many of the emergency response measures taken in the Heavy Rain Event of July 2018 were based on what was pointed out in the 2016 Kumamoto Earthquake Initial Response Review Report. (Reference: http://www.bousai.go.jp/updates/h280414jishin/h28kumamoto/shodotaio.html)

For example, the establishment of a Team to Support the Daily Lives of the Affected immediately after the disaster, the early dispatch of senior officials from ministries and agencies, push-mode support, and the establishment of the Relief Goods Procurement and Transport Team are all based on the lessons learned from the Kumamoto Earthquake. The government intends to work with ministries and agencies to review manuals

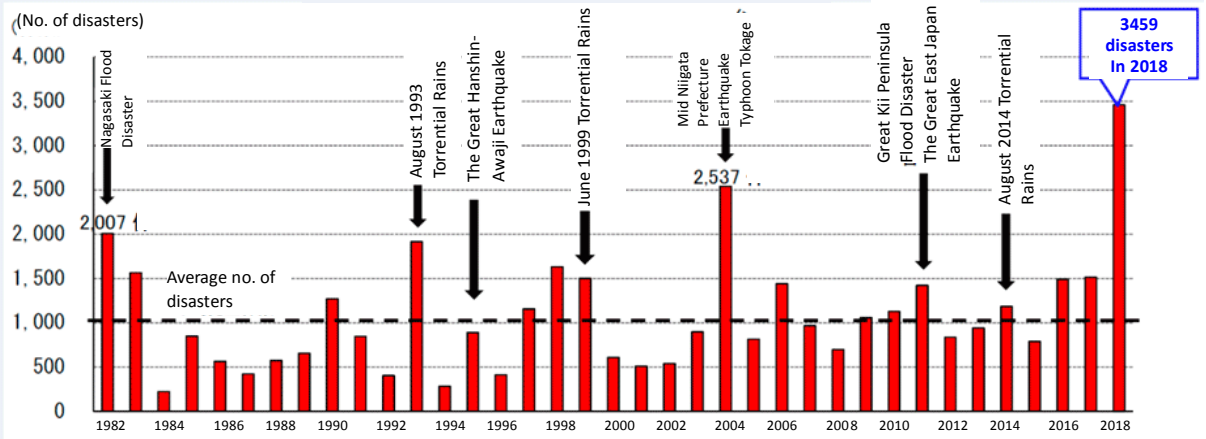
based on the Review Report from 2016 and the report on this disaster to further improve the government's disaster response capabilities. (See Chapter 1, Section 1, 1-5 for support for reconstruction from a series of 2018 disasters, including the Heavy Rain Event of July 2018.)

[Column]

The Record Breaking Number of Sediment Disasters

Japan is a country prone to storm, flood and sediment disasters due to its natural environment. From old days, the country has been hit by major disasters, such as Typhoon Kathleen which took almost 2,000 lives and Typhoon Vera (Ise-bay Typhoon) which claimed more than 5,000 lives. In recent years the country has also been struck by frequent storms, floods and sediment disasters, including Hiroshima Sediment Disaster in August 2014, Torrential Rain of September 2015 in the Kanto and Tohoku Regions, Typhoon Lionrock in 2016 and July 2017 Northern Kyushu Torrential Rain. The number of sediment disasters in 2018 was 3,459, more than twice that of 2017. This was the highest number since the statistics were started in 1982 (the number of damaged houses was also the highest at 1,505). (See Appendix 20 (A-42).)

Number of Sediment Disasters (from 1982)



No. of sediment disasters

3,459

Debris flow, etc.: 985
Landslide: 131
Slope failure: 2,343

[Damage]
Fatalities: Death toll 161
Injured 117
Housing damage:
Completely destroyed 415
Half-destroyed 566
Partially destroyed 524

	Prefecture	No.	Largest no. in the past decade	Ranking in the past decade
1	Hiroshima	1,243	182 (2014)	1st
2	Ehime	419	58 (2016)	1st
3	Hokkaido	237	56 (2014, 2016)	1st
4	Yamaguchi	193	197 (2009)	2nd
5	Kochi	171	122 (2014)	1st

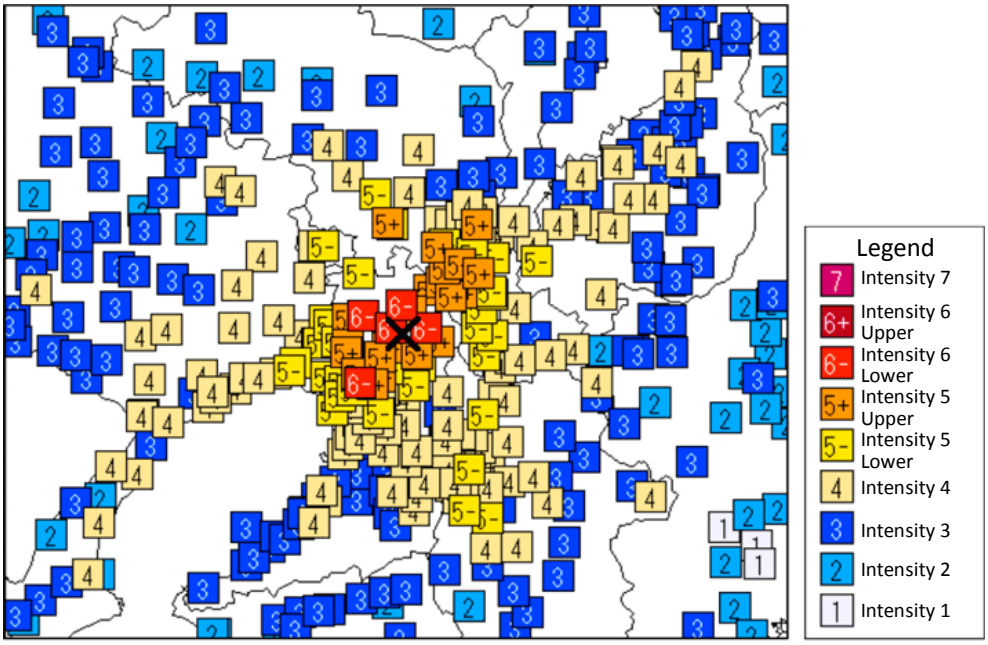
Source: Ministry of Land, Infrastructure, Transport and Tourism website
(Reference: http://www.mlit.go.jp/report/press/sabo02_hh_000049.html)

1-2 Northern Osaka Prefecture Earthquake

(1) Overview

At 7:58 a.m. on June 18, 2018, a magnitude-6.1 earthquake hit northern Osaka Prefecture. Kita-ku in Osaka City, Takatsuki City, Hirakata City, Ibaraki City, and Minoh City registered an intensity of 6 Lower, while other municipalities in Osaka, Kyoto, Shiga, Hyogo, and Nara Prefectures recorded an intensity of 5 Lower or more.

After that, 12 earthquakes with an intensity of 1 or more occurred by 9:30 a.m. (four earthquakes with an intensity of 2, and eight earthquakes with an intensity of 1).



Note) The "×" indicates the epicenter.
Source: Press release from the JMA (as of June 18, 2018)
(Reference: https://www.jma.go.jp/jma/press/1806/18a/201806181000.html)

(2) Damage

Casualties of this earthquake were 6 deaths, of which two people were killed by collapse of concrete block walls. Damage to houses included 21 completely destroyed, 454 half-destroyed, and approximately 57,000 partially damaged in Osaka Prefecture and other areas. There were three fires in Osaka City and four fires in Amagasaki City, Hyogo Prefecture. They were both extinguished on the same day. No person died from these fires. (Information by the Fire and Disaster Management Agency, as of February 12, 2019. Reference: https://www.fdma.go.jp/disaster/info/2018/)

Damage to lifeline utilities included power outages affecting a maximum of approximately 170,000 households (Osaka and Hyogo Prefectures) and water outages, which were restored in the morning of the day of the disaster, and on the next day, respectively. At one point, gas supply was suspended for a maximum of approximately 110,000 households in four cities in northern Osaka Prefecture (Ibaraki City, Takatsuki City, Settsu City, and Suita City). However, it was completely restored within a week.

A concrete block wall along a swimming pool, which collapsed during the earthquake
(Takatsuki Municipal Juei Elementary School, Osaka Prefecture)

27 shelters were opened, to which a maximum of approximately 2,700 people evacuated (2,397 in Osaka Prefecture and 279 in Kyoto Prefecture). (Information from the Cabinet Office, based on the materials provided by the Disaster management Headquarters in Osaka and Kyoto Prefectures, as of July 5, 2018. Reference: http://www.bousai.go.jp/updates/h30jishin_osaka/index.html)

The earthquake greatly affected the operation of companies in western Japan. Many companies temporarily suspended business activities as the supply of necessary components and materials was stopped. On the other hand, there were also some examples of good practices. Some companies sent support teams to affected suppliers to assist restoration according to the BCPs (Business Continuity Plans) developed following the Great Hanshin-Awaji Earthquake. An automobile manufacturer even managed to reopen its factory on the day following the disaster thanks to such efforts. It was a good lesson for future disaster response that BCPs formulated beforehand in preparation for disasters, greatly helped the restoration of business.

(3) Response of Government Ministries and Agencies

The government established the Emergency Response Office in the Prime Minister's Office on June 18, 2018 and held a Cabinet Meeting on the Earthquake Centered on Northern Osaka Prefecture. On the 21st, Prime Minister Abe visited affected areas and shelters in Takatsuki City to ascertain the extent of the damage.

Since many houses were damaged, the SDF conducted emergency disaster management support in 90 locations to seal damaged roofs with blue tarps. Due to this disaster, the Disaster Relief Act was invoked with respect to twelve cities and one town, and the Act on Support for Reconstructing Livelihoods of the Affected due to Disaster was invoked with respect to one city. (See Appendix 14-2 Earthquake centered in the northern Osaka Prefecture (A-29 to 30).)

In response to the incident of a concrete block wall failure, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) instructed Boards of Education in Osaka and other prefectures to strengthen DRR measures to secure students' and facilities' safety. On the following day of the disaster (the 19th), the MEXT issued a notification to all Boards of Education across Japan to urge them to carry out safety inspections of concrete block walls in schools. The MLIT published the Check Points for the Safety Inspection of Concrete Block Walls on June 21 and asked local governments to warn wall users. In addition, the government amended a part of the Order for Enforcement of the Act on Promotion of Seismic Retrofitting of Buildings in order to obligate the implementation of the same seismic tests as buildings for concrete block walls along evacuation routes.

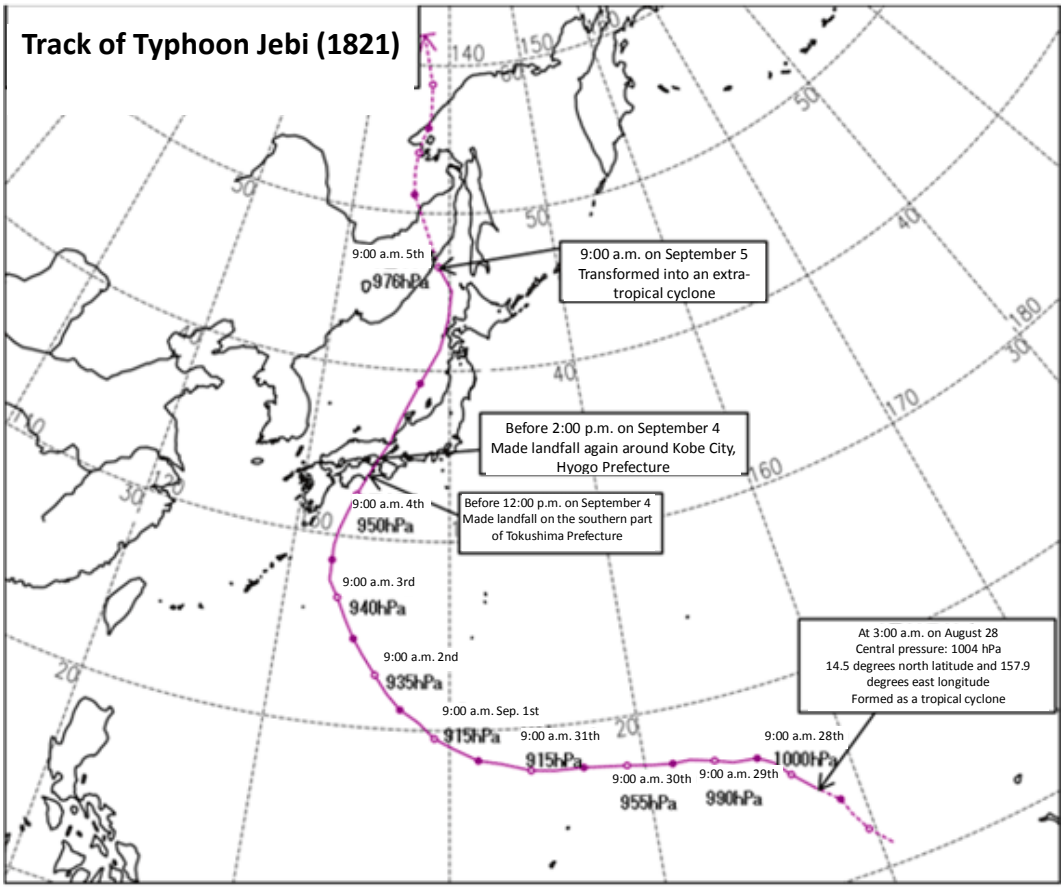
The amended Order entered into force in January 2019. In line with this, a budget to aid expenses for the removal of concrete block walls that failed the seismic test and diagnosis was allocated from the second supplementary budget for FY2018.

1-3 Damage from Typhoon Jebi (1821)

(1) Overview

Typhoon Jebi (1821) formed as a tropical storm around the Marshall Islands on August 28, 2018 and was upgraded to typhoon intensity around the sea east of the Mariana Islands on August 29. It moved northwestward over the sea south of Japan and made landfall on the southern part of Tokushima Prefecture before noon on September 4. It made landfall with very strong typhoon intensity for the first time in 25 years since 1993 Typhoon Yancy (9313). The typhoon again made landfall around Kobe City, Hyogo Prefecture before 2:00 p.m. on the same day. It crossed the Kinki region while accelerating and then transformed into an extra-tropical cyclone as it moved northward over the Japan Sea. During the approach and passage of the typhoon, very intense winds and rainfalls hit western to northern Japan. Especially, the areas that were still in recovery from the Northern Osaka Prefecture Earthquake in June suffered further damage and economic losses.

Track of Typhoon Jebi (1821)



Source: Japan Meteorological Agency website
(Reference: https://www.jma.go.jp/jma/jma-eng/jma-center/rsmc-hp-pub-eg/bstve_2018_m.html)

The Shikoku and Kinki regions experienced intense winds, rainfalls, and storm surges. The largest maximum wind velocity in Japan was observed in Muroto-Misaki Cape, Muroto City, Kochi Prefecture (maximum wind velocity: 48.2 m/s). There were also 53 AMeDAS stations that registered record-breaking maximum wind

velocities, including the Kankuu Island (Kansai International Airport) in Tajiri Town, Osaka Prefecture (maximum wind velocity: 46.5 m/s; maximum momentary wind velocity: 58.1 m/s), and Wakayama, Wakayama City, Wakayama Prefecture (maximum wind velocity: 39.7 m/s; maximum momentary wind velocity: 57.4 m/s).

Top five AMeDAS stations registering the highest maximum wind velocity
(from 0:00 on September 3 to 24:00 on September 5)

Ranking	Prefecture	Municipality	AMeDAS station	Maximum wind velocity			
				(m/s)	Wind direction	Date	Time
1	Kochi	Muroto City	Muroto-Misaki Cape	48.2	West	9/04	11:53
2	Osaka	Tajiri Town, Sennan-gun	Kankuu Island	46.5	South-southwest	9/04	13:47
3	Wakayama	Wakayama City	Tomogashima	42.9	South)	9/04	13:18
4	Wakayama	Wakayama City	Wakayama	39.7	South-southwest	9/04	13:26
5	Hyogo	Chuo-ku, Kobe City	Kobe Airport	34.6	South-southwest	9/04	13:59

Note) “South)” means that some data are missing (i.e. subnormal values).

Source: Japan Meteorological Agency website
(Reference: https://www.data.jma.go.jp/obd/stats/data/bosai/report/2018/20180911/20180911.html)

In addition, some locations in Osaka, Wakayama, Hyogo, and Tokushima Prefectures observed record-breaking tidal levels.

Stations that Observed Record-Breaking Tidal Levels

Location	Prefecture	Maximum tidal level due to Typhoon Jebi (1821)		Highest tidal level in the past	
		(cm)	Starting time	(Altitude in cm)	Date (cause)
Osaka	Osaka	329	9/4 14:18	293	1961/9/16 (Typhoon Nancy (6118); 2nd Muroto Typhoon)
Gobo	Wakayama	316	9/4 12:48	241	2012/6/19 (Typhoon Guchol (1204))
Kobe	Hyogo	233	9/4 14:09	230	1961/9/16 (Typhoon Nancy (6118); 2nd Muroto Typhoon)
Awayuki	Tokushima	203	9/4 12:08	189	2014/8/10 (Typhoon Halong (1411))

Note) The standard altitude was the Tokyo Peil (TP) or the one used by the Geospatial Information Authority of Japan.

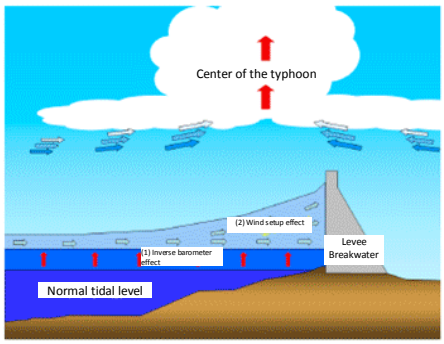
Source: Japan Meteorological Agency website
(Reference: https://www.jma.go.jp/jma/press/1903/29c/press_highestsealevel.html)

[Column]

Causes and Damage of Storm Surges

Storm Surge

●Causes of Storm Surges



A storm surge is a phenomenon where the sea level increases to an abnormal level mainly due to the inverse barometer effect and the wind setup effect.

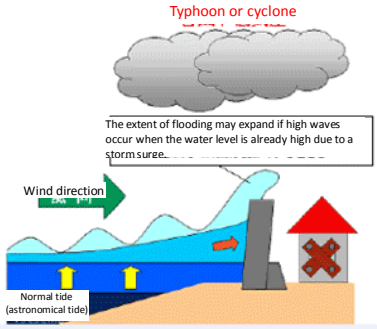
(1) Inverse barometer effect

Since the air pressure is lower at the center of a typhoon or cyclone, the sea water is "sucked" upward and the water level increases. The tidal level increases by approximately one centimeter with every 1 hPa decrease in air pressure.

(2) Wind setup effect

When a strong wind blows from the sea toward the coast, the sea water is pushed toward the coast and the sea level increases. Since the increase becomes larger in shallower oceans, the tidal level becomes particularly high on shoals.

●Damage from Storm Surges



If the water level rises due to a storm surge and the coastal levee is breached, the sea water can immediately flood the coastal area.

If high waves occur when the water level is already high due to a storm surge, waves can reach above the normal point and can further **expand the extent of flooding**.

Source: Japan Meteorological Agency website
(Reference: https://www.jma.go.jp/jma/press/1809/28a/2018092813.html)

(2) Damage

The typhoon caused 12 sediment disasters across Japan. (Information by the Ministry of Land, Infrastructure, Transport and Tourism, as of October 2, 2018.

Reference: http://www.bousai.go.jp/updates/h30typhoon21/index.html

The record-breaking strong winds caused 14 fatalities (8 in Osaka Prefecture, 2 in Aichi and Shiga Prefectures, 1 on Mie and Wakayama Prefectures) and 46 seriously injured as well as damage to more than 80,000 houses in the Kinki region and other areas. (Information by the Fire and Disaster Management Agency, as of February 12, 2018. (Reference: https://www.fdma.go.jp/disaster/info/2018/) Osaka Prefecture suffered the worst damage to houses from this typhoon, with 28 completely destroyed, 436 half-destroyed and approximately 65,000 partially damaged.

Utility poles overthrown by Typhoon Jebi (1821)
(Sennan City, Osaka Prefecture)

Damage to lifeline utilities was also enormous. There were power outages affecting 157 medical institutions and water outages affecting 23 medical institutions (information by the Ministry of Health, Labour and Welfare, as of October 2, 2018; reference: http://www.bousai.go.jp/updates/h30typhoon21/index.html). In particular, in the Kinki region, there were major blackouts and accompanying water outages due to the suspension of water supply pumps (up to about one week, depending on the area), resulting in serious disruptions to residents' lives, such as the suspension of drinking water and sewage services.

The Kansai International Airport was flooded from high waves caused by strong winds. There were runway failures and power outages in some parts of the passenger terminal. Moreover, tanker Hounmaru (length: 89 m; weight: 2,591 tons), which was anchored in Osaka Bay, drifted away by the strong winds and eventually collided with the bridge that connected the Airport and the opposite shore. This collision damaged the medium-pressure gas pipeline, resulting in the suspension of gas supply to the airport. With both air transportation and land transportation shut down, passengers were trapped inside the airport.

Flood at Kansai International Airport

Tanker that collided with the connecting bridge

In the Port of Kobe and other ports, container cranes and the management building stopped working as the power source was down due to flooding from the storm surge. This resulted in the temporary closure of terminals, which caused great disruptions to industrial and economic activities. Containers also collapsed and

were scattered due to winds. Some of the containers drifted away from the quay into ship courses and harbors, disrupting the navigation of sailing ships.

The urban areas of Osaka City managed to avert flooding thanks to the Osaka Bay Storm Surge Countermeasures and the appropriate opening and closure of the Yodogawa Floodwall Gate and the major three floodgates in Osaka Prefecture (Ujigawa-Ajigawa Floodgate, Shirinashigawa Floodgate, and Kizugawa Floodgate).

Source: Ministry of Land, Infrastructure, Transport and Tourism (Kinki Regional Development Bureau) website
(Reference: https://www.kkr.mlit.go.jp/news/river/disaster/2018/h30_september_typhoon21.html)

(3) Response of Government Ministries and Agencies

The government held an Inter-Agency Disaster Alert Meeting on September 3, 2018. On the 11th, the government sent a government investigation team led by H.E. Mr. Okonogi, then Minister of State for Disaster

Management to Hyogo and Osaka Prefectures.

The Kansai International Airport reopened some of the domestic lines on September 7, and international lines on September 8, after draining water and cleaning the runways. On the 21st, all the lines were almost fully restored to the same state as before the disaster.

On September 21, 2018, it was announced that this disaster could be designated as a Disaster of Extreme Severity as part of a series of major disasters caused by the seasonal rain front, including Typhoons Soulik (1819), Cimaron (1820) and Jebi (1821). On July 24, the Cabinet issued a Cabinet Order to designate said set of disasters as a Disaster of Extreme Severity. (See Appendix 14-4 “Typhoon Jebi (1821)” (A-34 to 35).)

(4) Future Challenges and Measures

In response to the damage to the airport due to Typhoon Jebi (1821), the MLIT established the Review Committee on Countermeasures of Large-Scale Natural Disaster for Major Airports in Japan. The Committee determined the direction of preparedness measures and identified urgent issues concerning large-scale natural disasters, in order to secure air transportation networks even in the event of a major disaster. The government intends to promote the updating of airport BCPs and flood countermeasures for the maintenance and restoration of airports as a whole and for securing the stable functioning of major airports in the times of disasters. As for the Kansai International Airport, the government will provide a fiscal loan for the reinforcement of the airport’s disaster management capability, taking advantage of the current low interest rate, to the founding company of the airport, which would pay a half of the expenses for short-term and long-term anti-flood measures conducted by the airport operator, including the elevation of the bank protection, enhancement of draining capabilities, and anti-flood retrofitting of the power system.

In addition, in order to introduce countermeasures for storm surges and strong winds based on the lessons learned from Typhoon Jebi (1821), the MLIT established an expert review committee to update the Guidelines on Storm Surge Risk Reduction Measures for Areas Surrounding Ports and Harbors. Through emergency inspections of international container terminals and critical infrastructure, it has become clear that storm surges entail the risk of causing containers to drift away as well as the risk of power outages due to flood. The government is also working on the flood countermeasures and enhancement of port BCPs for these terminals.

In response to the tanker incident, the Japan Coast Guard established the Expert Panel on the Prevention of Recurrence of an Accident Caused by Dragging Anchors under Hard Weather in October 2018. At the end of December 2018, the Panel stated in its interim report that “regulation by law would be required in order to prevent the recurrence of incidents due to dragging anchors under hard weather in the surrounding areas of the Kansai International Airport.” Based on this opinion, the government promoted the enforcement of regulation in the areas surrounding the airport from January 31, 2019. In the report issued on March 19, 2019, the Expert Panel pointed out that “necessary incident prevention measures should be taken in relevant water areas in cooperation with maritime experts and relevant local governments, while keeping in mind the surrounding environment.” Following this suggestion, the government intends to develop recurrence prevention measures in water areas surrounding Japan, including those near the Kansai International Airport.

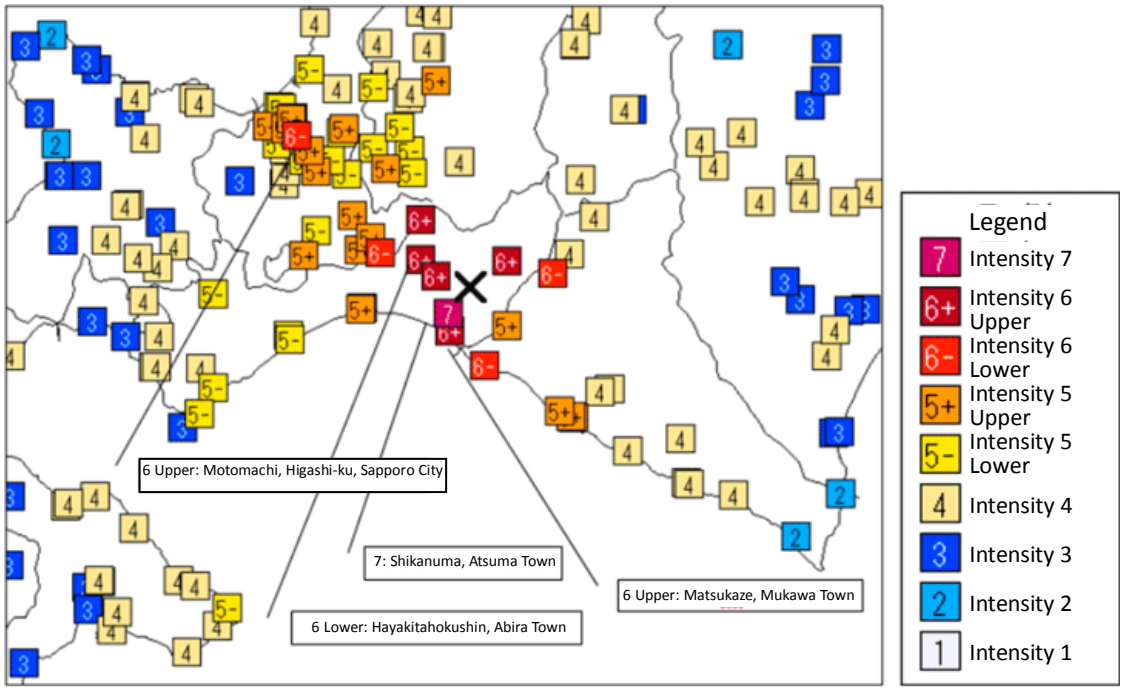
1-4 2018 Hokkaido Eastern Iburi Earthquake

(1) Overview

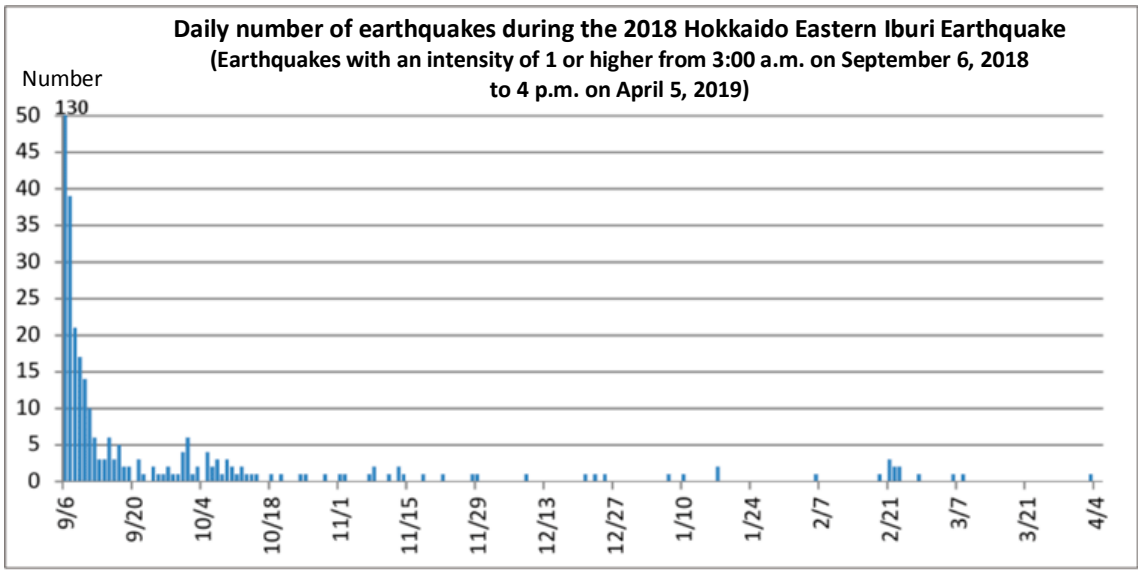
At 3:07 a.m. on September 6, 2018, a magnitude-6.7 earthquake hit the central eastern part of Iburi, Hokkaido Prefecture. The earthquake registered a seismic intensity of 7 in Atsuma Town, of 6 Upper in Abira Town and Mukawa Town, and of 6 Lower in Higashi-ku, Sapporo City. A vast area ranging from Hokkaido to a part of the Chubu region registered an intensity between 1 and 6 Lower. On the same day, the JMA named it

“2018 Hokkaido Eastern Iburi Earthquake”.
Reference: https://www.jma.go.jp/jma/press/1809/06h/201809061730_4.html

This was the first earthquake with an intensity of 7 observed in Hokkaido Prefecture. It was also the first earthquake with said intensity for Japan since the 2016 Kumamoto Earthquake (6th earthquake with an intensity of 7 in recorded history in Japan). After that, there were 344 earthquakes with an intensity of 1 or higher by the end of March 2019 (1 earthquake with an intensity of 6 Lower, 2 earthquakes with an intensity of 5 Lower, 21 earthquakes with an intensity of 4, 38 earthquakes with an intensity of 3, 89 earthquakes with an intensity of 2, and 193 earthquakes with an intensity of 1).



Note) The “×” is the epicenter.
Source: Formulated by the Cabinet Office based on materials from JMA



Source: Japan Meteorological Agency (As of April 5, 2019)
(Reference: https://www.jma.go.jp/jma/menu/20180906_iburi_jishin_menu.html)

The Earthquake Research Committee established under the government's Headquarters for Earthquake Research Promotion concluded that the earthquake did not occur in relation to the Ishikari-teichi-toen fault zone, but it was rather a reverse fault-type inland earthquake (*i.e.* one bedrock slides up onto another one (on the fault surface)) caused around a different fault where the blocks moved a maximum of approximately 30 km north-south. The southern central part of Hokkaido Prefecture near the epicenter tends to accumulate pressure due to stress from east and west, which is said to tend to cause earthquakes like this one. The same area has also experienced magnitude-5 to 6 earthquakes in the past.

Landslide due to a slip on the fault over approximately 30 km north-south (southern central Hokkaido)

Landslide (Atsuma Town, Hokkaido Prefecture)

(2) Damage

Casualties of the earthquake totaled 42 fatalities (36 in Atsuma Town, 2 in Tomakomai City, 1 in Mukawa Town, 1 in Shin-hidaka Town, and 2 in Sapporo City) and 762 lightly and seriously injured. The main cause of deaths was sediment disasters (including landslides and debris flows). In particular, a major landslide on the hill in Atsuma Town left many people dead or lightly and seriously injured. There were 227 sediment disasters (all in Hokkaido Prefecture), including 133 cliff failures (including 111 in Atsuma Town and 3 in Mukawa Town), and 94 debris flows (90 in Atsuma Town) (information by the Fire and Disaster Management Agency and the Ministry of Land, Infrastructure, Transport and Tourism, as of January 28, 2019; reference: http://www.bousai.go.jp/updates/index.html#h30).

Damage to houses included 462 completely destroyed (including 222 in Atsuma Town, 95 in Sapporo City, and 93 in Abira Town), 1,570 half-destroyed (including 684 in Sapporo City, 351 in Abira Town, and 308 in Atsuma Town), and 12,600 partially damaged (including 4,352 in Sapporo City, 3,147 in Mukawa Town, 2,412 in Abira Town, and 1,045 in Atsuma Town).

Damage to buildings along shopping streets (Mukawa Town and Abira Town)

There were many water pipe bursts and ground subsidence due to the earthquake. In particular, dozens of houses were damaged in Kiyota-ku and other residential areas in the hill zone in southeastern Sapporo City. Satozuka District in Kiyota-ku had been reclaimed by filling a valley with volcanic sandy soil. As the groundwater level was high due to Typhoon Jebi (1821), the shocks from the earthquake liquefied the soil deeper than the groundwater level, which was eventually discharged from locations with lower altitudes, causing great damage to houses in the area.

Flood due to a water pipe burst
(Kiyota-ku, Sapporo City)

Road failure due to ground subsidence
(Hiraoka District, Kiyota-ku)

In addition, there was a fire at a petroleum industrial complex in Muroran City and another at the Tomato-Atsuma Thermal Power Station in Atsuma Town. Both fires were extinguished in the morning of the day of the earthquake. No person died in these fires. (Information by the Fire and Disaster Management Agency, as of January 28, 2019. Reference: http://www.bousai.go.jp/updates/index.html)

Two of the three units (Units 2 and 4) of the Tomato-Atsuma Thermal Power Station (a major power plant accounting for approximately 40% of power produced in Hokkaido Prefecture) were automatically shut down immediately after the earthquake. The other unit (Unit 1) was shut down later due to damage to the boiler tube and lowering pressure. The demand (consumption) of power exceeded supply (servicing amount) by far due to the suspension of the above power station as well as the suspension of hydropower plants due to disruptions to four power lines affecting three routes. As power source to adjust frequencies was in short supply, it resulted in the first major blackout affecting the whole service area in Hokkaido. A maximum of approximately 2.95 million households across Hokkaido Prefecture were affected by this power outage. It took about 45 hours until power came back in almost all areas.

In addition, there were water outages affecting a maximum of approximately 68,000 households in 44 municipalities due to water pipe bursts and other reasons. With the restoration of power supply and water pipes, water supply was restored in all areas after about a month.

○Damage to lifeline utilities

	Maximum no. of affected households	Restoration
Power outage	**Approx. 2.95 million**	**Restored on September 11** (excluding areas inaccessible due to landslides, etc.)
Water outage	**68,249**	**Restored on October 9**

10 shelters were opened in Hokkaido Prefecture, to which a maximum of approximately 17,000 people evacuated.

The number of evacuees dropped to below 500 after a month. The shelters in Atsuma Town was closed down on December 6, 2018. The last shelter in the prefecture, located in Mukawa Town, was closed down on December 21, 2018.

[Column]

Causes for the Blackout

There were significant economic losses due to a blackout during the Hokkaido Eastern Iburi Earthquake. What were the causes of this blackout?

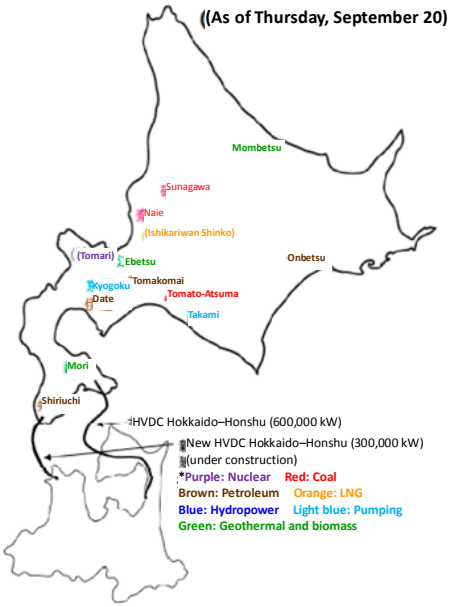
Electricity service operates based on the balance between demand and supply. Power companies constantly adjust power generation according to consumption as they distribute power to consumers. A huge fluctuation in the alternating current frequency (Hz) of transferred power interferes with power transmission. When power supply exceeds demand, the frequency goes up; when power supply is below demand, the frequency goes down. This slows down the rotation rate of the power generator's motor. Such abnormality in motor rotation adds great stress on the power generator. Power generators are designed to automatically shut down when the motor rotation rate falls below a certain threshold in order to prevent failure. After the earthquake, the demand (consumption) largely surpassed the supply (power transmission) due to the suspension of Units 1, 2, and 4 at the Tomato-Atsuma Thermal Power Station located near the epicenter and the suspension of hydropower stations caused by the failure of four power lines of three routes. As power to adjust the frequencies was also in short supply, the first massive blackout affecting the whole service area in Hokkaido occurred.

One of the important lessons from this massive incident is that it is crucial for companies and hospitals to have their own emergency power generation facilities in order to continue operation. For households, it is advised to have a small generator as well as a portable stove and gas cartridges to prepare for gas outages.

Damage to the power supply infrastructure due to the Hokkaido Eastern Iburi Earthquake

- ○ A major blackout affecting 2.95 million households across Hokkaido Prefecture occurred as the power supply-demand balance was upset due to troubles at the Tomato-Atsuma Thermal Power Station and other facilities caused by the earthquake with a seismic intensity of 7.
- ○ This affected a wide range of social and life activities, such as disruptions to medical services due to power outages affecting most medical institutions in the prefecture.
- ○ A third party committee established under the Organization for Cross-regional Coordination of Transmission Operators will analyze the causes and develop recurrence prevention measures.

Status of major power sources in Hokkaido Prefecture ((As of Thursday, September 20)



Weekly supply capacity =3.91 (+0.4) million kW *0.4 million kW from the HVDC Hokkaido–Honshu is a backup power source for emergencies and for renewable energy in normal operation	Naie Unit 1 (coal) (175,000 kW) 1968 Recovered at 4:24 a.m. on the 7th To be closed down in March 2019 Naie Unit 2 (coal) (175,000 kW) 1970 Recovered at 0:20 a.m. on the 7th To be closed down in March 2019 Sunagawa Unit 3 (coal) (125,000 kW) 1977 Recovered at 1:35 p.m. on the 6th Sunagawa Unit 4 (coal) (125,000 kW) 1982 Recovered at 0:57 a.m. on the 7th Tomato-Atsuma Unit 1 (coal) (350,000 kW) 1980 Recovered at 9:00 a.m. on the 18th (shut down due to the earthquake) Shiriuchi Unit 1 (petroleum) (350,000 kW) 1983 Recovered at 3:45 a.m. on the 7th Date Unit 1 (petroleum) (350,000 kW) 1978 Recovered at 11:30 a.m. on the 7th Date Unit 2 (petroleum) (350,000 kW) 1980 Recovered at 7:25 p.m. on the 7th Onbetsu Unit 1 (petroleum) (74,000 kW) 1978 Recovered at 8:10 p.m. on the 6th (shut down at 6:30 a.m. on the 7th due to trouble) →Recovered at 4:07 p.m. on the 11th To be decommissioned in February 2019 Hydropower (300,000 kW +) Hydropower (140,000 kW +) [JPOWER] Kyogoku Unit 1 (pumping) (200,000 kW) 2014 Recovered at 3:56 p.m. on the 13th Kyogoku Unit 2 (pumping) (200,000 kW) 2015 Recovered at 3:00 p.m. on the 14th Hydropower: Approx. 840,000 kW *Changes depending on the water level Geothermal, biomass, and waste-to-energy power (approx. 200,000 kW) [Mori, Mombetsu, Oji-Ebetsu, etc.] *The output of waste-to-energy plants reduced. In-house power generation (approx. 200,000 kW9 *Procurement of privately generated power that had influence on production activities (300,000 kW) was terminated. Procured from Honshu through the HVDC Hokkaido–Honshu (a maximum of 600,000 kW) *0.4 million kW from the HVDC Hokkaido–Honshu is a backup power source for emergencies and for renewable energy in normal operation.
Suspended 4.46 million kW *Periodical check, etc.	Tomato-Atsuma Units 2 and 4 (coal) (1.3 million kW): Suspension due to the earthquake Unit 2: Under recovery work (600,000 kW)(1985) Unit 2: Under recovery work (700,000 kW)(2002) Onbetsu Unit 2 (coal)(74,000 kW) 1978 Recovered at 9:08 a.m. on the 7th→Shut down due to trouble at 2:16 p.m. on the 11th To be decommissioned in February 2019 Shiriuchi Unit 2 (petroleum)(350,000 kW) 1998 Periodical inspection (to be completed by October 27) Tomakomai Unit 1 (petroleum)(250,000 kW) 1973 Periodical inspection (to be completed by October 31) Tomakomai Joint Thermal Power Plant (petroleum)(250,000 kW) 1974 Periodical inspection (to be completed by November 22) [Hokkaido Power Engineering] Takami Unit 2 (pumping)(100,000 kW) 1983 Periodical inspection (to be completed by December 20) Hydropower (70,000 kW) [JPOWER] Tomari Units 1, 2, and 3 (2,070,000 kW) (Unit 1) 1989, (Unit 2) 1991, (Unit 3) 2009
Under construction	Ishikariwan Shinko Unit 1 (LNG) (570,000 kW) To be open in February 2019 (pilot operation will start in October 2018) New HVDC Hokkaido–Honshu facilities (300,000 kW) To be open in March 2019

*Figures after the commission of Tomato-Atsuma Unit 1 are not simple sums of output power for each plant, due to the suspension of procurement from privately generated power that had influence on production activities and other measures.

Source: Material provided at the first Ministerial Meeting on Emergency Inspection of Critical Infrastructure on September 21, 2018 (Reference: https://www.kantei.go.jp/jp/singi/jyuyouinfura/index.html)

There were major disruptions to medical institutions. There were power outages affecting 349 hospitals in Hokkaido Prefecture. These hospitals had to transfer patients who needed medical ventilators and dialysis treatment to other hospitals. Some hospitals also had water and medical gas outages and many of them had to suspend accepting outpatients. 34 disaster base hospitals (hospitals that run 24 hours to provide first-aid medicine in emergencies) in the power outage areas were able to switch to in-house power generation and continue medical services as their in-house power generators (emergency power source) had a capacity of 60% of the normal power source and they also stored three days equivalent of fuels.

The New Chitose Airport shut down air transportation services immediately after the earthquake. As a result, many foreign tourists were stacked in the urban area of Sapporo City. Those who could not secure accommodation had to spend a few nights in the Hokkaido Prefectural Government's buildings or underground passages in Sapporo City. On the following day of the earthquake, nearly half of the domestic lines were recovered. International services were also recovered after two days.

Traffic lights stopped working in many areas due to power outages, which interfered with long-distance truck transportation. This resulted in shortage of necessities, such as food, daily supplies and petroleum fuels in various areas in Hokkaido Prefecture, especially in urban areas including Sapporo City. Cargo trains in the prefecture were also suspended from immediately after the earthquake. This affected the shipment of agricultural products, such as potatoes and onions, which were in their prime season at the time. In response, the government provided truck services as an alternative shipment means.

The massive blackout forced many manufacturers to temporarily close their factories. Some companies supplied products and components from *Honshu* by air or sea. Also, there was a nation-wide shortage of milk

supply as the dairy industry in Hokkaido Prefecture, which normally accounts for approximately 50% of the national production, was not able to produce as much milk as normal because the blackout interfered with the production processes (*e.g.* milking, cooling) of raw milk (raw material for drinking milk and butter) and because, out of all the 39 dairy products factories in the prefecture, only two that had in-house power generators were able to continue operation.

The blackout and its consequences made the public realize how all social activities in Japan heavily depend on electricity and highlighted the importance of emergency power as an urgent issue for the future.

[Column]

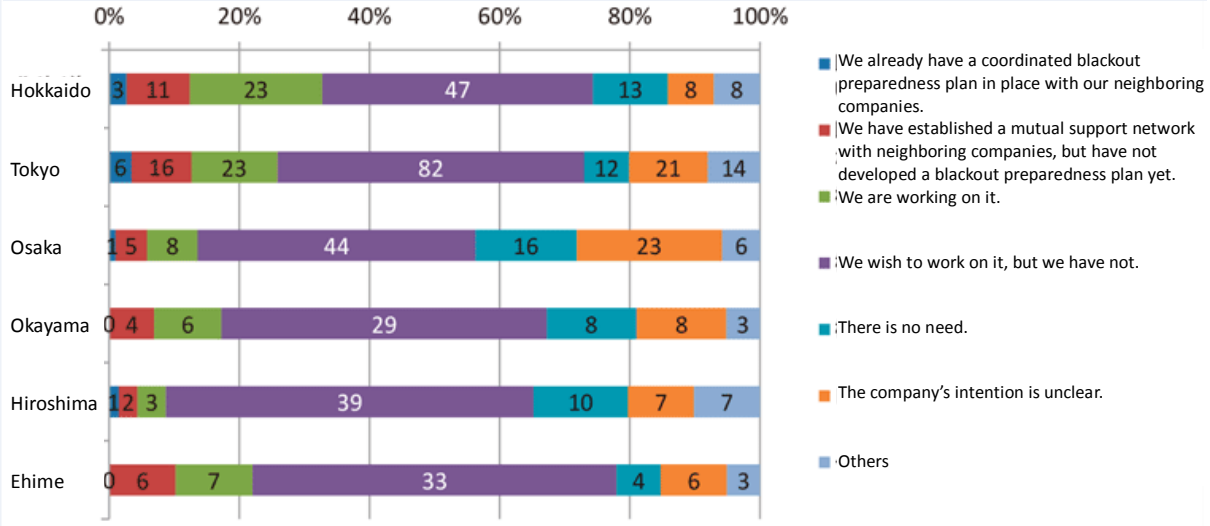
Importance of Business Continuity in the Agricultural Industry

The development of a business continuity plan (BCP) is an important issue in the agricultural industry. According to the results of the FY2017 Fact-Finding Survey on Company Business Continuity and Disaster Preparedness Initiatives conducted by the Cabinet Office, only 6 % of businesses in the agriculture, forestry and fisheries industries had a BCP in place, which is much lower compared to the figures for all industries (64% for major companies and 32% for SMEs).

The major blackout across Hokkaido Prefecture caused by the Hokkaido Eastern Iburi Earthquake caused serious damage to the agricultural industry. In particular, there was approximately 20,000 tons of milk that could not be shipped out, which was equivalent to about 2.4 billion yen of losses. This was due to the shut down of dairy products factories, automatic milking equipment and bulk coolers during the blackout. This forced many farms to dispose of the milk. In addition, many cows suffered mastitis.

Regional efforts for business continuity in the event of a blackout are not as advanced as other regions in Japan. The Cabinet Office conducted the Fact-Finding Survey on Corporate Efforts in Response to Natural Disasters in FY2018 targeting private companies in the prefectures hit by disasters in FY2018, namely, Osaka, Okayama, Hiroshima, and Ehime Prefectures. The survey included a question on mutual support plans with neighboring companies to prepare for blackouts. According to the results, most companies hoped to work toward such partnership, but they had not been able to. The survey results showed the stagnation in bringing such system into reality although many companies were aware of its necessity. It is hoped that companies promote coordinated preparedness initiatives with their neighboring companies.

Has your company worked to establish a mutual support plan with your neighboring companies after the blackout incident?



Note) The numbers indicated on the bars divided according to the region are the number of responses.
Note) Number of responses by region: Hokkaido Prefecture (total: 198; no response: 85), Tokyo (total: 383; no response: 209), Osaka Prefecture (total: 216; no response: 113), Okayama Prefecture (total: 173; no response: 115), Hiroshima Prefecture (total: 199; no response: 130), and Ehime Prefecture (total: 153; no response: 94).
Source: Prepared by the Cabinet Office based on the results of the Fact-Finding Survey on Corporate Efforts in Response to Natural Disasters in FY2018

A weakening cow lying down (Shibecha Town, Hokkaido Prefecture)

Source: Photo by courtesy of the Japan Agricultural News

(3) Response Measures of Government Ministries and Agencies

On September 6, 2018, the government established the Emergency Response Office in the Prime Minister's Office and held a Cabinet Meeting on the Earthquake Centered on the Central Eastern Iburi Region (the meeting was called "Cabinet Meeting on the 2018 Hokkaido Eastern Iburi Earthquake" form the second round on). On the 9th, H.E. Mr. Abe, Prime Minister, visited the affected area to ascertain the extent of the damage and console the affected. On the 19th, the government sent a government investigation team headed by H.E. Mr. Okonogi, then Minister of State for Disaster Management, to the affected area, while individual government ministries and agencies also carried out on-site investigations.

While there were still major confusion and disruptions to logistics in the prefecture, the relevant ministries and agencies worked together to carry out push-mode supply support in coordination with designated public corporations. In addition, the ministries and agencies and petroleum companies worked together in securing fuel supply for hospitals and other important facilities that made emergency requests.

The MIC deployed a total of 2,951 employees from seven prefectures to three affected towns under the staff

allocation system to support local governments in affected areas.

On-site investigation of a sediment disaster
(Atsuma Town, Yūfutsu-gun, Hokkaido Prefecture)

H.E. Mr. Okonogi, then Minister of State for Disaster Management, led the government investigation team

Response to the FY2018 Hokkaido Eastern Iburi Earthquake

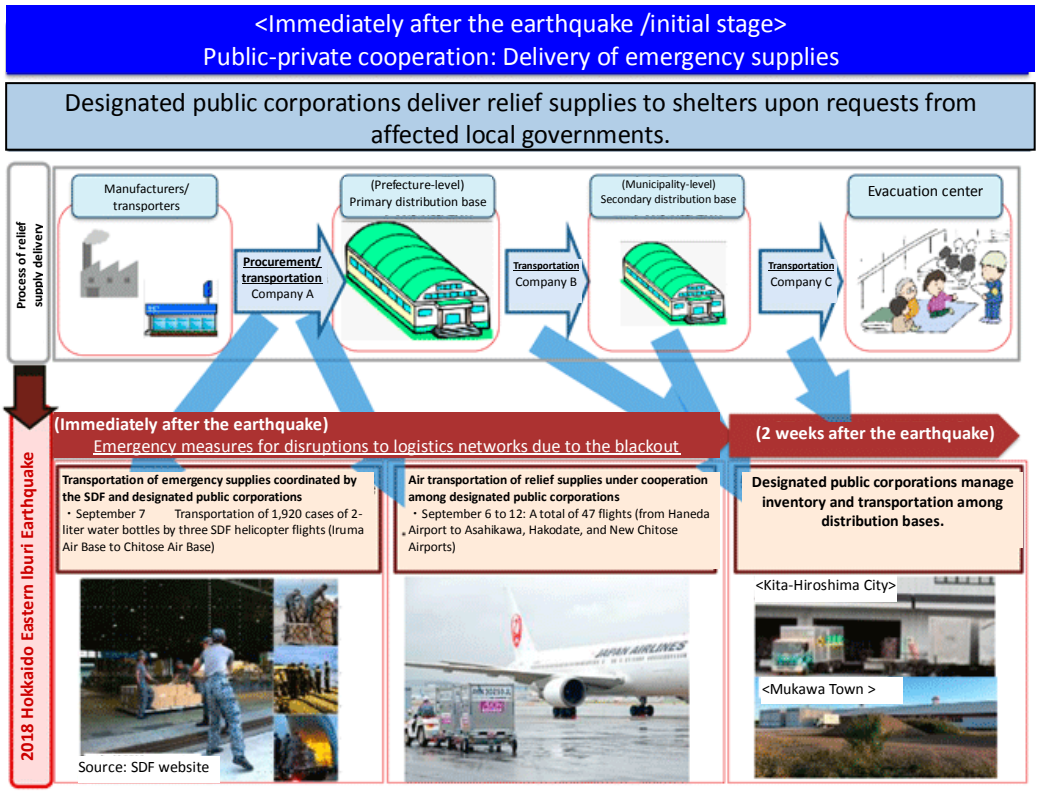
3:09 a.m. on September 6	Establishment of the Emergency Response Office in the Prime Minister's Office
3:10 a.m.	Issuance of instructions from the Prime Minister

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.
3. Fully implement measures to prevent further damage.

6:10 a.m.	A Cabinet Office information-gathering team departs for Hokkaido
7:37 a.m.	First Cabinet Meeting
6:00 p.m.	Second Cabinet Meeting (a total of 9 Cabinet Meetings were held by September 28)
11:00 p.m.	Establishment of the local liaison and coordination office in Hokkaido Prefecture Government Office (closed on September 28)
September 6	The Hokkaido Prefectural Government decided to invoke the Disaster Relief Act with respect to 179 municipalities (date of invocation: September 6)
September 7	Establishment of the Push-Mode Supply Support Coordination Council (push-mode disaster relief support continued until September 21)
September 9	Prime Minister Abe visits affected areas in Hokkaido Prefecture
September 10	Cabinet approval on the use of contingency reserves (approx. 540 million yen) Inter-Agency Disaster Management Meeting (a total of 5 Inter-Agency Disaster Management Meetings were held by September 20)
September 13	First Announcement of the possibility of designation as a Disaster of Extreme Severity
September 14	The Hokkaido Prefectural Government decided to invoke the Act on Support for Reconstructing Livelihoods of the Affected due to Disaster with respect to Sapporo City, Kita-Hiroshima City, and Atsuma Town, Yūfutsu-gun (date of occurrence: September 6) (invoked with respect to all areas in Hokkaido Prefecture on September 26)
September 19	Deployment of a government investigation team led by then Minister of State for Disaster Management Okonogi to Hokkaido Prefecture
September 21	Second Announcement of the possibility of designation as a Disaster of Extreme Severity
September 28	Cabinet approval on the designation as a Disaster of Extreme Severity (cabinet approval on September 28; promulgation and entry into force on October 1) Support measures are decided at a Cabinet meeting Cabinet approval on the use of contingency reserves (approx. 15.3 billion yen *includes the budget for support related to Typhoon Jebi)
October 17	Minister of State for Disaster Management Yamamoto visits affected areas in Hokkaido Prefecture
November 7	Approval of the FY2018 Supplementary Budget, which includes budgets for recovery and reconstruction from the Hokkaido Eastern Iburi Earthquake (118.8 billion yen)

Source: Cabinet Office

<Relief supplies>



Source: Cabinet Office

The MAFF carried out push-mode food and drink support. It also developed and announced a support package for the affected working in the agriculture, forestry and fishing industries on September 28, 2018, in order to help them rebuild their businesses with hope as early as possible (Reference: http://www.maff.go.jp/j/press/kanbo/bunsyo/saigai/180928_5.html).

In accordance with the package plan, the government carried out various meticulous support measures, such as disaster restoration projects, including the early restoration of farmland and agricultural facilities, fishing facilities, the forestry industry, support for the logging and transportation of damaged timber from affected forests, reconstruction and restoration of agricultural greenhouses and machines, support for re-starting the operation of farms, technological support for restoration of farmland provided by more than 1,000 national government employees (the Midori Disaster Relief Squad), and support concerning secondary damage due to the blackout. In addition, in order to build a strong and sustainable milk production and logistics system in preparation for blackouts, the MAFF conducted emergency inspections of dairy farmers, dairy facilities, and milk storage facilities. As a result, it was found that some facilities did not have any power outage preparedness plan in place. To improve this situation, designated milk producers' groups, dairy product companies and related organizations worked together with relevant local people to develop blackout preparedness plans based on the situation of the wide milk distribution network that extends beyond prefectural borders, in order to establish a system to secure milk production and distribution in the event of power outages or other disasters.

The MLIT deployed the TEC-FORCE consisting of more than 3,000 experts from across Japan to the affected areas to provide technical support and guidance on prompt determination of the extent of damage, occurrence and prevention of damage, early restoration of affected areas, and other emergency disaster management

measures. The MLIT also supported local governments in relation to the allotment of vacant rooms in public housing and provision of emergency temporary housing in order to secure makeshift housing for the affected people. As for damage to houses due to liquefaction, the MLIT supported Sapporo City and other local governments with conducting investigations and developing measures to build permanently secure ground. As for the massive landslide on the hill in Atsuma Town, the government has started on the construction of landslide barriers under the sediment disasters-related project and other public projects. Moreover, the government also worked with the private sector to promote tourism.

<Invocation of the Disaster Relief Act and the Act on Support for Reconstructing Livelihoods of the Affected due to Disaster, and Designation as a Disaster of Extreme Severity>

Due to this disaster, the Disaster Relief Act and the Act on Support for Reconstructing Livelihoods of the Affected due to Disaster were invoked with respect to 179 municipalities across Hokkaido Prefecture. On September 13 and 21, 2018, the government announced the possibility of designating the 2018 Hokkaido Eastern Iburi Earthquake as a Disaster of Extreme Severity. On the 28th, the Cabinet approved the Cabinet Order on this designation (see 14-5 “2018 Hokkaido Eastern Iburi Earthquake (A-35-37)).

The government intends to spare no effort in continuing to work for the recovery and reconstruction of the affected areas.

[Column]

Diversifying Construction-Type of Emergency Temporary Housing:
Using Trailer Houses and Mobile Houses

There were a series of major disasters across Japan in 2018, including the Heavy Rain Event of July 2018 and the Hokkaido Eastern Iburi Earthquake.

The Disaster Relief Act was invoked in relation to each of these disasters to provide emergency temporary housing for the affected people whose houses were completely destroyed and who found it difficult to secure housing at their own expenses.

The government provided 4,406 units of rental-type emergency temporary housing and 697 construction-type emergency temporary housing in Okayama, Hiroshima, and Ehime Prefectures for the Heavy Rain Event of July 2018, as well as 173 units of rental-type emergency temporary housing and 413 construction-type emergency temporary housing for the Hokkaido Eastern Iburi Earthquake. Details are shown in the following table.

○Number of units of construction-type emergency temporary housing for the Heavy Rain Event of July 2018

	Prefabricated temporary housing	Wooden temporary housing	Trailer and mobile houses, etc.	Total
Okayama	158	103	51	312
Hiroshima	178	31	0	209
Ehime	12	164	0	176
Total	348	298	51	697

○Number of units of construction-type emergency temporary housing for the Hokkaido Eastern Iburi Earthquake

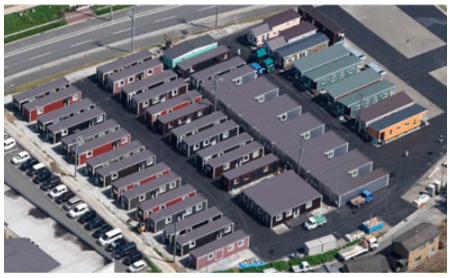
	Prefabricated temporary housing	Wooden temporary housing	Trailer and mobile houses, etc.	Total
Hokkaido	352	0	61	413

(As of March 31, 2019) (Source: Cabinet Office)

For the Heavy Rain Event of July 2018 and the Hokkaido Eastern Iburi Earthquake, trailer and mobile houses were introduced as a new type of temporary housing in Kurashiki City, Okayama Prefecture, and Atsuma Town, Abira Town, and Mukawa Town, Hokkaido Prefecture.

When asked why they introduced this type of housing, the local governments pointed out many benefits, including integrated interiors and equipment, which ensures great resistance against earthquakes, effective thermal insulation and airtightness, and the fact that it can be readily built from one unit depending on the situation of the affected.

With a view to diversifying emergency temporary housing for future disasters, the Cabinet Office intends to examine the readiness, usability, comfort and durability of the trailer and mobile houses while continuing its meticulous support for the affected people.



Yanaihara Temporary Housing Complex in Kurashiki City, Okayama Prefecture (51 units)
Trailers and mobile houses were provided.
(Photo by courtesy of Kurashiki City, Okayama Prefecture)

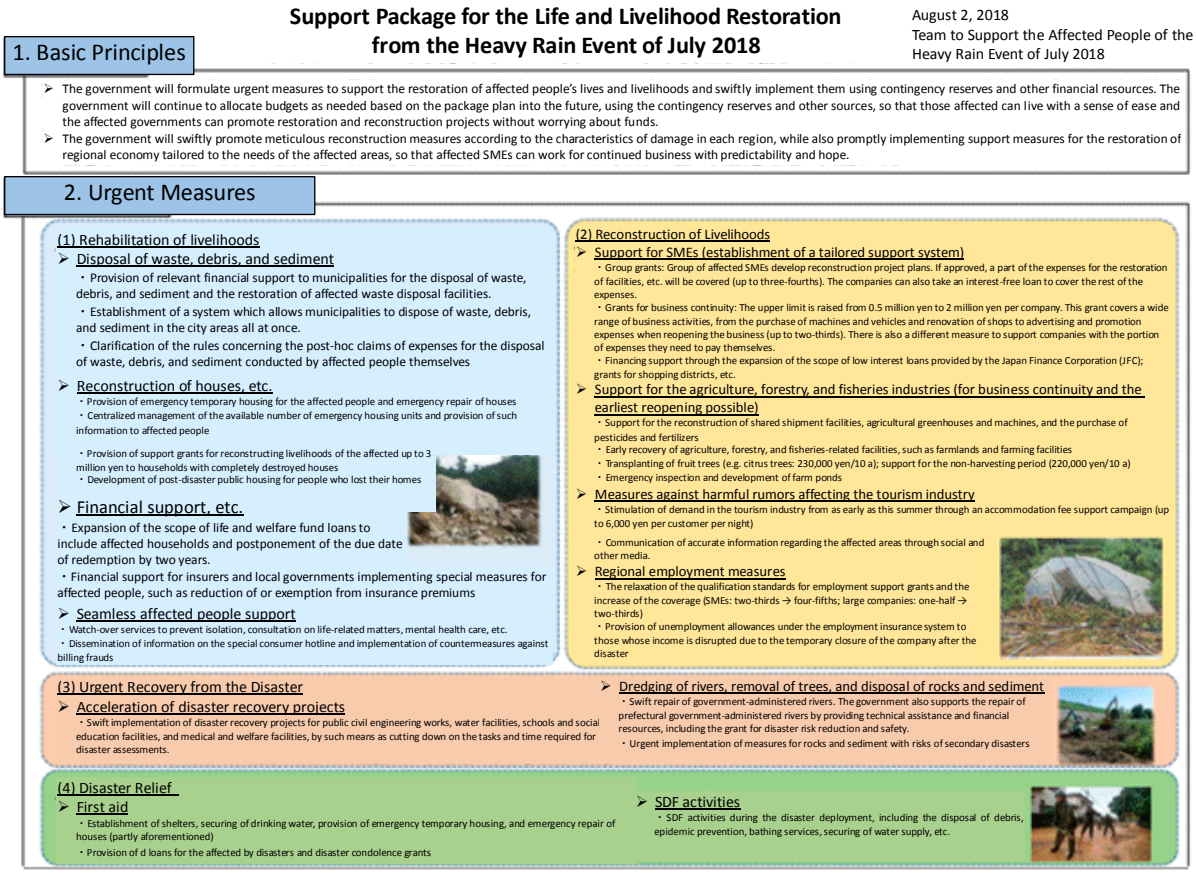
Temporary housing for students in Mukawa Town, Hokkaido Prefecture (for 36 people)
Mobile houses were provided.
(Photo by courtesy of Mukawa Town, Hokkaido Prefecture)

1-5 Support for Reconstruction in 2018

(1) Support for Reconstruction from the Heavy Rain Event of July 2018

In August 2018, the government announced the Support Package for the Life and Livelihood Restoration from the Heavy Rain Event of July 2018, which contained urgent measures to help affected people rebuild their lives and livelihoods. The government promoted projects for the restoration of infrastructure as well as life and livelihood of the affected people through the FY2018 contingency reserves, the first and second FY2018 supplementary budgets, and FY2019 budget.

Reference: https://www.kantei.go.jp/jp/headline/ooame201807/info_support_life.html



Source: Cabinet Office

(2) Support for Reconstruction from the Hokkaido Eastern Iburi Earthquake

The government decided to implement a similar reconstruction package for the Hokkaido Eastern Iburi Earthquake as the Heavy Rain Event of July 2018 (see Chapter 2 for disaster prevention, disaster mitigation, and building national resilience measures based on the lessons learned from a series of disasters in 2018).

Support for Reconstruction and Recovery from the Damage of the 2018 Hokkaido Eastern Iburi Earthquake

1. Basic Principles

- The government will formulate urgent measures for reconstruction and recovery from the damage of the 2018 Hokkaido Eastern Iburi Earthquake. These measures will be implemented using contingency reserves, supplementary budgets, and other resources as necessary.
- The government will swiftly carry out robust support measures for the tourism industry in Hokkaido Prefecture in order to bring about a happier and stronger Hokkaido than before the disaster.

2. Support Measure

(1) Support Measures for the Swift Recovery of Affected Areas

- Designation as a Disaster of Extreme Severity (Cabinet approval on the 28th)

[National] Projects for the restoration of public civil engineering works, farmlands, etc. from the disaster
[Regional: Atsuma-cho, Abira-cho, Mukawa-cho] Measures for disaster-related indemnity for SMEs

- Acceleration of disaster recovery projects for public civil engineering works, etc.

Cutting down on the tasks and time required for disaster assessments, support by the TEC-FORCE, etc.

- Emergency response measures for large hillside collapses, etc.

Establishing a monitoring system for locations where the river is blocked; implementing emergency response measures in a prompt manner
The fallen tree in the spillway of Atsuma Dam has been removed. A disaster recovery project is being promoted.

- Disposal of waste, debris, and sediment

The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) and the Ministry of the Environment (MOE) are jointly running a support system for the removal of waste, debris, and sediment.

(2) Support for the Rehabilitation of Livelihoods

- Smooth implementation of affected people support

Emergency disaster relief activities, including the establishment of shelters and providing drinking water; provision of disaster condolence grants and affected people support loans

- Support concerning affected houses and emergency temporary housing

Provision of emergency temporary housing; first aid measures, including emergency repair of houses and development of post-disaster public housing
For areas affected by soil liquefaction, permanent reinforcement measures will be taken as soon as possible after the investigation of the causes and emergency recovery work, in addition to the above measures.

- Other support measures for the reconstruction of affected people's lives

Provision of support grants for reconstructing livelihoods of affected people (for all areas in Hokkaido Prefecture; approved on the 26th); expansion of the scope of life welfare loans and relaxation of the criteria; promotion of debt consolidation based on the guidelines

(3) Reconstruction from Damage to Industry Due to Tight Power Supply

- Full recovery of electricity and reinforcement of energy supply

A technical review by a third party committee will be conducted.
Development of winter power supply-demand measures and a package based on emergency inspections of power infrastructure by November

- Support for SMEs

Financing using grants to support the business continuity of small enterprises, grants for shopping districts, disaster recovery loans, etc.

- Regional employment measures

Relaxation of the qualification standards for employment support grants

- Support for the agriculture, forestry, and fisheries industries

Support concerning the reopening of agricultural business, forestry-related damage, early recovery of agriculture, forestry, and fisheries-related facilities (such as farmlands and farming facilities), and early recovery of demand in the tourism industry
As measures for dairy and livestock farmers, financial support to cover expenses of the treatment and control of mastitis in dairy cows
Financial support for expenses of securing emergency power source during power outages

(4) Support for the Recovery of Tourism and the Distribution of Products from Hokkaido Prefecture

- Fundamental reinforcement of the emergency communication system for foreign tourists

Provision of multi-lingual services 24 hours a day, 365 days a year at the JNTO Call Center

- Introduction of the "Hokkaido Fukkouwari" special discount

[Scope] Expenses of travel packages bound for Hokkaido and accommodation
[Coverage] Up to 70% (50%-70%) or 20,000 yen per night

- Support for the dissemination of accurate information on affected areas and support for the promotion of travel packages

Communication using social and other media; promotion of products related to affected areas

- The "Welcome! HOKKAIDO, Japan" Campaign

Launching discount packages from airline companies, railway companies, and travel agencies
Discount campaigns and events at tourism facilities in Hokkaido

Source: Cabinet Office

Overview of the Supplementary Budget for FY2018

1. Recovery/reconstruction support for disasters: 727.5 billion yen

(1) Measures for the Heavy Rain Event of July 2018: 503.4 billion yen
- ① Livelihood rehabilitation: 36.7 billion yen
  - ○ Disposal of disaster waste/recovery of waste disposal facilities [29.2 billion yen]
  - ○ Support grants for reconstructing livelihoods of affected people [3.2 billion yen]
  - ○ Development of post-disaster public housing [1.6 billion yen]
- ② Reviving business: 198.5 billion yen
  - ○ Group grants [31.4 billion yen]
  - ○ JFC's financing support for affected SMEs [92.4 billion yen]
  - ○ Support for the reconstruction of agricultural greenhouses and farming facilities; support for transplanting of mandarin trees [3 billion yen]
  - ○ Support for the recovery of farmlands and irrigation facilities [61.8 billion yen]
- ③ Emergency recovery measures for disasters: 231.9 billion yen
  - ○ Recovery of public civil engineering works from the disaster [192.1 billion yen]
  - ○ Recovery of school facilities from the disaster [10.1 billion yen]
  - ○ Recovery of water facilities, medical facilities, and social welfare facilities [14.4 billion yen]
- ④ Disaster relief: 36.3 billion yen
  - ○ Disaster relief operation by the SDF [34.7 billion yen]

(2) Measures for the 2018 Hokkaido Eastern Iburi Earthquake: 118.8 billion yen
- ○ Disposal of disaster waste [0.5 billion yen]
- ○ Support for the group purchase of materials for agricultural greenhouses [0.5 billion yen]
- ○ Measures for large hillside collapses, etc. [12.8 billion yen]
- ○ Recovery of public civil engineering works from the disaster [76.6 billion yen (partly aforementioned)]
- ○ Disaster relief operation by the SDF [18.6 billion yen]

(3) Measures for Typhoon Jebi, the Northern Osaka Prefecture Earthquake, etc.: 105.3 billion yen
- ○ Support grants for reconstructing livelihoods of affected people [6.7 billion yen]
- ○ Support for group purchase of materials for agricultural greenhouses [1 billion yen]
- ○ Recovery of public civil engineering works from the disaster [43.3 billion yen]
- ○ Support for the restoration of the connecting bridge of the Kansai International Airport [5 billion yen]
- ○ Recovery of school facilities from the disaster [13.9 billion yen]
- ○ Disaster assistance expenses [4.8 billion yen]

2. Urgent and prioritized safety assurance measures in schools: 108.1 billion yen

(1) Installation of air conditioners as a measure against heat stroke: 82.2 billion yen
(2) Measures for concrete block walls with a risk of collapse: 25.9 billion yen

3. Additional contingency reserves: 100 billion yen
- ○ Increasing contingency reserves taking into account future disaster response measures, etc.

■ Additional expenditures: 935.6 billion yen

Overview of the Second Supplementary Budget for FY2018

1. Disaster prevention, disaster mitigation, and building national resilience (urgent measures specified in the Three-Year Plan for Disaster Risk Reduction and Resilience)**: 1,072.3 billion yen**
- ○ Disaster prevention and mitigation of rivers, erosion control facilities, roads, etc. [618.3 billion yen]
- ○ Seismic retrofitting of school facilities [61.1 billion yen]
- ○ Improvement of police equipment and communication infrastructure for disasters [54.5 billion yen]
- ○ Improvement of fire department vehicles and equipment for disasters [4.4 billion yen]
- ○ Improving the resilience of refinery plants and tank facilities [8.4 billion yen]
- ○ Seismic retrofitting of SDF facilities [13.1 billion yen]
- ○ Support for the introduction of power-regeneration and storage equipment in shelters [21 billion yen]

2. Measures to strengthen the agriculture, forestry, and fisheries industries in preparation for the early effectuation of the TPP Agreement: 325.6 billion yen
- ○ Further enlargement of farmland blocks [90.2 billion yen]
- ○ Assistance for capital investment for improving productivity in agriculture [40 billion yen]
- ○ Support for capital investment for strengthening profitability in dairy and livestock farming [56 billion yen]
- ○ Improvement of timer processing facilities to strengthen the industry's competitiveness [39.2 billion yen]
- ○ Support for the introduction of fishing vessels to strengthen the competitiveness of the fisheries industry [20.1 billion yen]

3. Support for SMEs 206.8 billion yen
- ○ Subsidies for manufacturers, IT introduction, and business sustainability [110 billion yen]
- ○ Support for business succession [5 billion yen]
- ○ Support for the introduction of cashiers capable of handling reduced tax rates [56.1 billion yen]

4. Measures for other urgent issues: 1,430.4 billion yen

(1) Ensuring security and safety of people's lives: 751.2 billion yen
- ○ Ensuring the preparedness of the SDF; improving the environment of the SDF by upgrading housing facilities [386.7 billion yen]
- ○ Development of day-care centers [42 billion yen]
- ○ Support for expenses of launching free preschool education and day-care services [31.6 billion yen]
- ○ Establishment of a strategic coast guard system [28.2 billion yen]
- ○ Development of information-gathering satellites [16.7 billion yen]

(2) Recovery from disasters, etc.: 213.6 billion yen
- ○ Disaster recovery projects for public civil engineering works [137.4 billion yen]
- ○ Reconstruction of agricultural greenhouses, equipment, and facilities [21.6 billion yen]
- ○ Recovery of school facilities from disasters [13.3 billion yen]
- ○ Post-disaster public housing development projects [4.1 billion yen]

(3) Others: 465.6 billion yen
- ○ Contributions and donations to international organizations [131.9 billion yen]
- ○ Impulsing Paradigm Change through Disruptive Technologies Program (ImPACT) [100 billion yen]
- ○ Establishment of bases for regional revitalization [60 billion yen]
- ○ Research and development of pharmaceuticals, etc. [25 billion yen]
- ○ Transition to the production phase of the Post-K computer [20.9 billion yen]

■ Additional expenditures: 3,035.1 billion yen

Source: Cabinet Office

[Column]

Economic Impact of Consecutive Disasters

Non-life insurance claims for Typhoon Jebi (1821) were the largest among those paid for disasters in 2018. The total claim was about 747.8 billion yen (the largest claims ever in fire insurance). In the earthquake insurance sector, claims for the Northern Osaka Prefecture Earthquake were the third largest ever, and those for the Hokkaido Eastern Iburi Earthquake were the fifth largest ever.

Insurance claims paid for each disaster that occurred during 2018

	Northern Osaka Prefecture Earthquake	Western Japan Torrential Rains (Heavy Rain Event of July 2018)	Typhoon Jebi (1821) (mainly in the Kansai region)	Hokkaido Eastern Iburi Earthquake	Typhoon Trami (1824) (nation-wide)
Date of occurrence	June 18	July 6	September 4 (date of landfall)	September 6	September 30 (date of landfall)
Scale	Maximum seismic intensity: 6 Lower	Total precipitation: Chugoku – 500 mm Shikoku – 1,800 mm	Maximum wind velocity: 55 m/s	Maximum seismic intensity: 7	Maximum wind velocity: 55 m/s
Number of cases	Approx. 179,000	Approx. 65,000	Approx. 881,000	Approx. 60,000	Approx. 429,000
Insurance claims paid	Approx. 103.3 billion yen (third largest ever in earthquake insurance)	Approx. 190.2 billion yen (seventh largest ever in fire insurance)	Approx. 747.8 billion yen (largest ever in fire insurance)	Approx. 33.8 billion yen (fifth largest ever in earthquake insurance)	Approx. 237.8 billion yen (sixth largest ever in fire insurance)

[Reference] Past major natural disasters and insurance claims paid

(Earthquake insurance)

Earthquake	2011 Great East Japan Earthquake	1,279.5 billion yen (largest ever)
	2016 Kumamoto Earthquake	382.4 billion yen (second largest ever)

(Fire insurance)

Typhoon	Typhoon Mireille (9119) (nation-wide)	568 billion yen (second largest ever)
	Typhoon Songda (0418) (nation-wide)	387.4 billion yen (third largest ever)

Note) The number of cases and insurance claims paid are based on the estimations by the General Insurance Association of Japan and are subject to change (as of December 11, 2018). “Fire insurance” includes automobile insurance and casualty and surety insurance (including accident insurance).

Source: Formulated by the Cabinet Office based on the website of the General Insurance Association of Japan (Reference: http://www.sonpo.or.jp/news/release/2018/1812_06.html)

1-6 Introduction of Scientific Disaster Response Measures in 2018

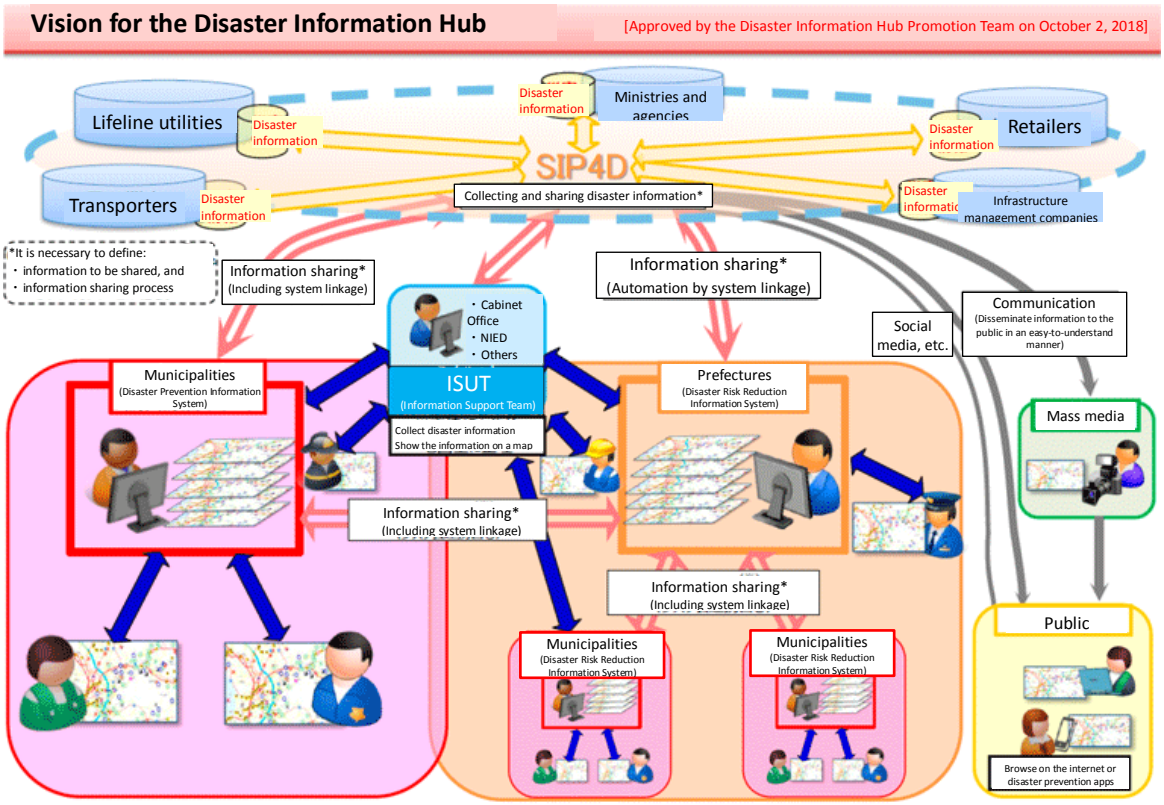
(1) Establishment of the Information Support Team (ISUT)

Experiences such as the Great East Japan Earthquake and the Kumamoto Earthquake have revealed that it is difficult for the affected local governments to grasp the damage extent and scope and/or share information with other administrative organizations, due to damages to local government offices and equipment among other reasons. In order to ensure smooth and effective disaster response activities carried out by different organizations, including the affected local governments, utilities and other private companies, the Self Defense Force and other relief units, medical institutions, supporting local governments, and government ministries and agencies, it is essential that each of such organizations grasps various information in an organized manner, for example, the extent of damage in each affected zone, locations of facilities that need to be recovered, necessary recovery operation, and ongoing activities of each organization.

In order to tackle this challenge, the Cabinet Office set up the Disaster Information Hub, an information sharing mechanism to streamline information-gathering routes of the national government, local governments, and private companies. The government has promoted this project since FY2017 and conducted demonstration experiments.

It had been pointed out that it would be useful if information or data held by each organization could be expressed on a single map. In order to do this, the National and Local Government Public-Private Disaster

Information Hub Promotion Team decided in April 2018 to establish the ISUT (Information Support Team) as a new joint team of the Cabinet Office, the National Research Institute for Earth Science and Disaster Resilience (NIED), and private companies. The ISUT collects, organizes, and maps information in the affected areas using disaster information sharing system SIP4D in order to help response organizations to grasp the situation. It was agreed that the ISUT would first operate on a trial basis.



Source: Cabinet Office website
(Reference: http://www.bousai.go.jp/kaigirep/saigaijyouhouhub/index.html)

(2) Activities of the ISUT

The ISUT was engaged in three disaster response operations in FY2018. For the Northern Osaka Prefecture Earthquake in June 2018, the ISUT worked in the Osaka Prefectural Government Office to collect, map and share information on the status of roads, shelters, and gas supply (operated from June 18 to 21). During the Heavy Rain Event of July 2018, the ISUT worked in the Hiroshima Prefectural Government Office to gather and share aerial images as well as information including water outages and hospitals. (operated from July 7 to August 9). Finally, during the Hokkaido Eastern Iburi Earthquake, the ISUT worked in the Hokkaido Prefectural Government Office to gather information on the status of mobile communication and helped response organizations to grasp the situation (operated from September 6 to 28). Based on the experiences in these affected areas, the ISUT is scheduled to start its full-scale nationwide operation in FY2019.

[Column]

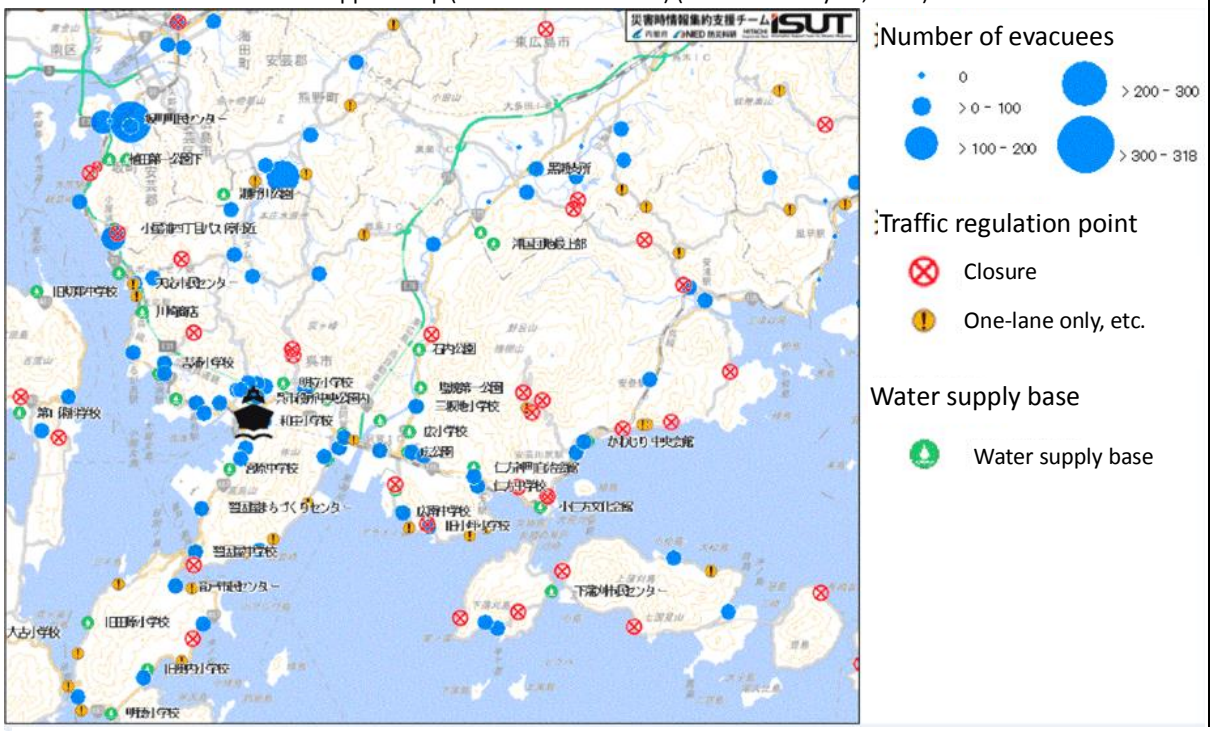
Future Challenges for the ISUT

The following is an example of a map created by the ISUT in the Hiroshima Prefectural Government Office during the Heavy Rain Event of July 2018. The Shelter Support Map shows the critical information for grasping the overall situation of the affected areas, such as the locations of shelters, traffic regulation points, and water supply bases. A single map showing both shelters and road information is useful in selecting the route from a relief supply distribution center to a shelter. The Emergency Management Division of the Hiroshima Prefectural Government, which was in charge of relief supplies, used this map and verified its practicality during the disaster. The map was also useful for support staff from across the country who were not familiar with the area in selecting patrol routes.

Through the trials, some issues were identified. For example, while the mapping of traffic regulation points went smoothly as the data was automatically obtained from Hiroshima Prefecture's system, the mapping of shelters required significant time and efforts as the information obtained from the system of Hiroshima Prefecture and local government staff had to be manually input into the mapping system.

In the future, it will be necessary to introduce a system to automate data acquisition and input as much as possible, for the quick creation and provision of maps. The Cabinet Office will review the challenges identified through the trials in FY2018 and strive to formulate the solutions in order to achieve effective operation of the ISUT.

Shelter Support Map (Hiroshima Prefecture) (Created on July 11, 2018)



Source: Cabinet Office

1-7 Support Activities by Volunteers and NPOs

(1) The Heavy Rain Event of July 2018

①Support by individual volunteers through disaster volunteer centers

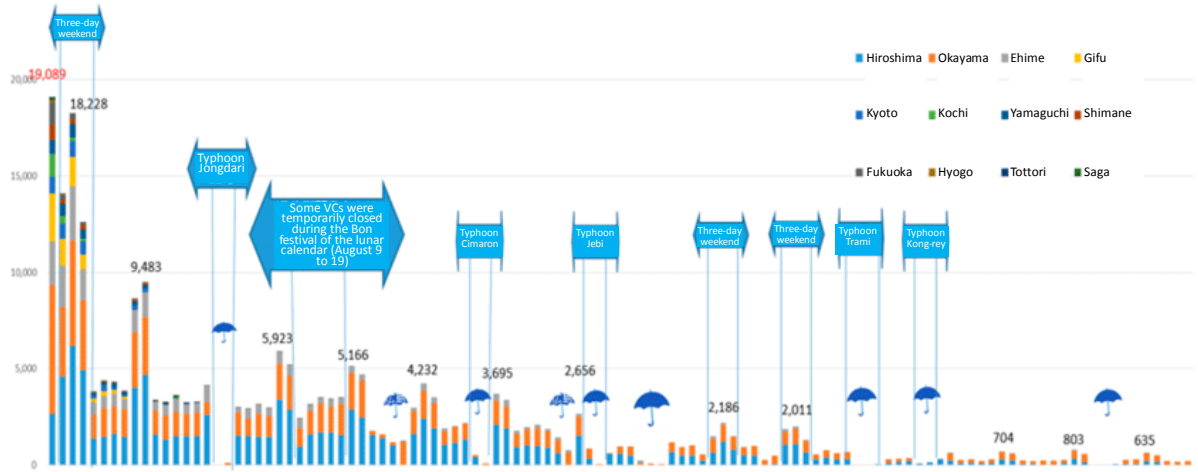
Many volunteers from all over the country came to disaster volunteer centers ("disaster VCs") established by the Social Welfare Councils in affected areas. Disaster VCs were established in 60 municipalities in 12 prefectures in western Japan, while permanent VCs run by the Social Welfare Council of 13 municipalities also accepted volunteers. In municipalities where large areas need to be covered, satellite bases were set up near the operation areas. A total of approximately 260,000 volunteers mainly worked on mud removal from houses and tidying up rooms and furniture (as of February 5, 2019). After these activities, the focus of volunteer activities shifted to community support coordinated by life support coordinators (e.g. dealing with various issues including, for example, watching over the elderly and disabled, holding social events, opening a children's playground). As of March 7, 2019, the disaster VC in Kurashiki City, Okayama Prefecture is still accepting volunteers.

The Number of Volunteer Activities

263,574 volunteers by February 5

Currently operating disaster VCs (as of March 7)
Kurashiki City

(Reference) NPOs and other private/civil entities that participated in information sharing meetings and volunteer activities: Approx. 230



Source: Cabinet Office

Volunteer activities following the Heavy Rain Event of July 2018

Support through disaster VCs follows processes from identifying the needs of the affected, receiving volunteers, matching the activities of volunteers with the needs of the affected, providing necessary materials

and equipment to volunteers, transporting volunteers to the operation site, and providing work orientation. Local municipality governments and Social Welfare Councils as well as many companies and NPOs, with their experience, expertise and skills, worked together to support disaster VCs in the abovementioned processes.

More than 9,000 support staff were dispatched from Social Welfare Councils from across the country to the affected areas. They mainly supported the establishment and management of disaster VCs, the identification of needs, the recovery and reconstruction of affected Social Welfare Councils, and consultation regarding life and welfare fund loans.

Following the review on disaster VCs for the Niigata Chuetsu Earthquake, the Disaster Volunteer Activity Support Project Council ("Shien-P") was established under the Central Community Chest of Japan in January 2005 as a joint council of private companies, NPOs, Social Welfare Councils, and community chest committees. Shipen-P supports disaster VCs in such aspects as human resources, materials and supplies, and funds. For the Heavy Rain Event of July 2018, Shien-P dispatched human resources to support the operation of disaster VCs. Also, in cooperation with the Keidanren 1% Club, which is a member of Shien-P, Shien-P procured equipment and vehicles for disaster VCs as donations from private companies, while also raising contributions from companies and the employees. Such support helped the operation of disaster VCs.

While many people participated in volunteer activities in the affected areas, some issues were identified, such as the proper dissemination of volunteer needs information to prevent the concentration of volunteer resources in areas covered by mass media, measures to prevent heat stroke and other safety measures for volunteers, volunteer insurance subscription, and the smooth operation of disaster VCs. Solutions for these challenges were discussed at information sharing meetings (described later) and other opportunities.

② Support by specialist NPOs

Specialist NPOs and other organizations carried out a wide range of support activities, including technical support for the affected housings such as removal of sediment and debris, the shelter management, support for the affected living in each house, support for temporary housing, and support for rebuilding livelihoods.

For example, in Kurashiki City, Okayama Prefecture, the government and NPOs had several meetings to coordinate NPO support in shelter management. In addition, NPOs and disaster VCs worked together to provide technical support for house maintenance and sediment removal from the floors of houses. In Okayama City, Okayama Prefecture and Saka-cho, Hiroshima Prefecture, NPOs conducted surveys to grasp the needs of the affected living in each house so that they could provide relevant support. In Uwajima City, Ehime Prefecture, NPOs supported mandarin farmers. Through these activities, NPOs provided meticulous support in the areas where public support tends to be difficult.

Local NPOs actively supported the affected areas. Uwajima Grandma in Uwajima City, Ehime Prefecture, secured and distributed drinking water to the areas affected by water outages due to the destruction of the water purification plant in Yoshida-cho, Uwajima City. They also gathered and shared information on soup kitchen spots, held events for the mental care of the affected and community rehabilitation, such as children's festivals and three-generation social events, and supported the disabled and mandarin farmers.

Uwajima Grandma staff working to support the affected areas

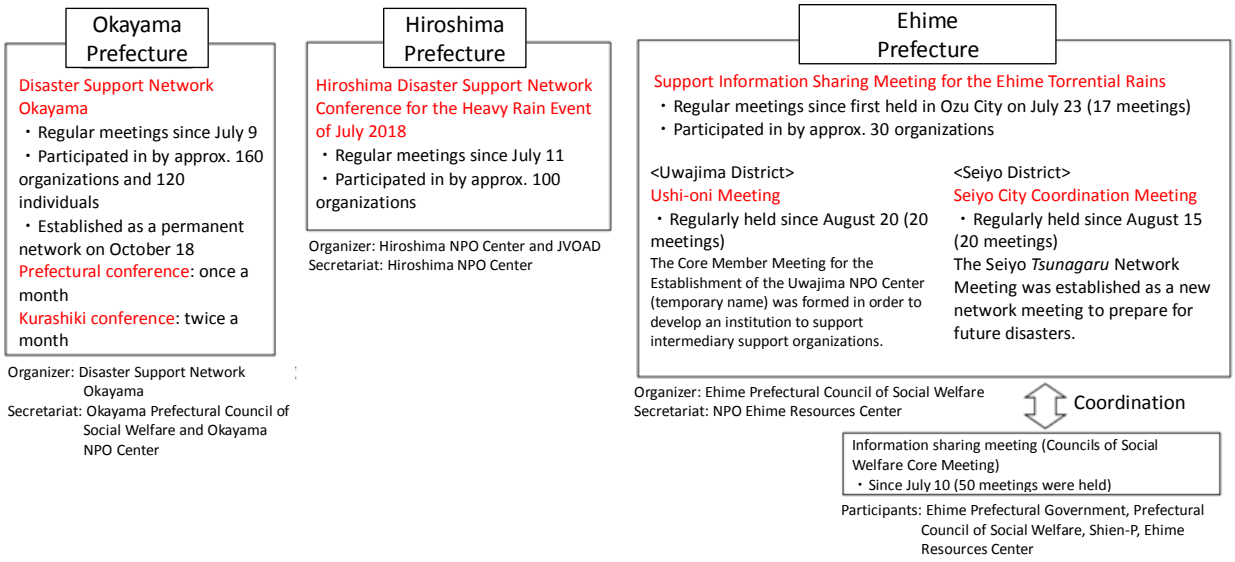
In order to support the activities of such volunteers and NPOs, the Central Community Chest of Japan raised a Disaster Volunteers/NPOs Activity Support Fund for each disaster. Volunteer and NPO activities for the Heavy Rain Event of July 2018 were supported by this fund. As of the end of March 2019, the fund has been used to support a total of 158 activities.

③ Tripartite collaboration among the government, volunteers, and NPOs through information sharing meetings

In order to coordinate support activities among the government, volunteers, and NPOs, information sharing meetings were held on a regular basis among local governments, social welfare corporations, and NPOs in Okayama, Hiroshima, and Ehime Prefectures. The information sharing meeting was launched with the support of the Japan Voluntary Organizations Active in Disaster (JVOAD) and local NPOs that provided intermediary support in the affected areas. This meeting was aimed at providing a platform for supporters to share information and ensuring seamless and smooth support activities.

For example, in Ehime Prefecture, information sharing meetings were held from soon after the disaster, tapping into the already established relationship among the prefectural government, the Prefectural Social Welfare Council and NPOs. On July 10, the Ehime Prefectural Social Welfare Council started a “core meeting” for information sharing and discussion with the Ehime Prefectural Government and Shien-P. On the 23rd, the Ehime Resources Center, a local coordinating organization, and the JVOAD jointly established the Support Information Sharing Meeting for the Ehime Torrential Rains as a meeting among NPOs and other support organizations operating in the prefecture. About 30 organizations from various fields joined this meeting to share information on the status of volunteer resources, support for home evacuees, and support for shelters, while coordinating their support activities with each other.

Cooperation network in each prefecture for the Heavy Rain Event of July 2018



Source: Cabinet Office

The second Support Information Sharing Meeting for the Ehime Torrential Rains

The swift establishment of these information sharing meetings was possible because of the lessons learned from the *Hinokuni* Meeting for Kumamoto Earthquake Support Organizations established in 2016 and the Information Sharing Meeting for Supporters of the July 2017 Northern Kyushu Torrential Rains.

In addition, since the Heavy Rain Event of July 2018 affected a wide area across Japan, the National Information Sharing Meeting for the Heavy Rain Event of July 2018 was established on July 17, 2018 as a meeting that coordinates with prefectural information sharing meetings. The national information sharing meeting was regularly held by the Cabinet Office, JVOAD and Shien-P, with the participation of relevant ministries and agencies, JVOAD-related organizations and Shien-P member organizations. At this meeting, participants mainly discussed challenges common to prefectures (for example, role sharing among administration, NPOs, and volunteers in the removal of sediment from houses), matters that required resources procurement on a national basis (*e.g.* management of disaster VCs), and messages that needed to be communicated to the public across the nation (*e.g.* the concentration of volunteer resources in certain areas, safety management). Based on the discussion in the meetings, the following activities were carried out.

・ Display the volunteer recruitment status of each disaster VC on the website of the Japan National Social Welfare Council

・ Call for donations to support the affected
・ Issue messages about the recruitment of volunteers and safety measures via leaflets (three issues (July 13 and 27, September 20)

Leaflet (issued on September 20)

H.E. Mr. OKONOGI, Then Minister of State for Disaster Management speaking at the second National Information Sharing Meeting (July 24)

(2) Other Response Measures Taken in the Affected Areas in a Series of Disasters in 2018

Volunteer activities through disaster VCs, and information sharing meetings were also conducted in the affected areas by the Northern Osaka Prefecture Earthquake and the Hokkaido Eastern Iburi Earthquake in the same manner as the Heavy Rain Event of July 2018.

	Northern Osaka Prefecture Earthquake	Hokkaido Eastern Iburi Earthquake
Number of disaster VCs	7	3
Number of volunteers	5,670 (as of July 31, 2018)	12,857 (as of March 24, 2019)
Name of the information sharing meeting (secretariat)	Osaka Disaster Support Network (9 organizations, including Osaka Prefectural Social Welfare Council)	NPO Information Sharing Meeting for the Hokkaido Eastern Iburi Earthquake (Hokkaido NPO Support Center)

Meeting in northern Osaka Prefecture

Meeting for the Hokkaido Eastern Iburi Earthquake

Section 2 Future Challenges Concerning Evacuation

After the torrential rains in July 1983, there had been no major heavy rain disaster that caused more than 100 deaths until the Heavy Rain Event of July 2018, which caused more than 200 people to die or go. The direct cause of this major disaster was the record-breaking rainfalls that hit over a wide area from western Japan to the Tokai region, leading to river floods and sediment disasters in many areas, especially in Okayama, Hiroshima, and Ehime Prefectures. It was reported that the damage was further extended because appropriate evacuation actions were not taken in spite of the announcement urging residents to evacuate.

Section 2 reflects evacuation during the Heavy Rain Event of July 2018 and discusses challenges for the future and how the government tackles these challenges.

2-1 Review of Government's Evacuation Measures after the Heavy Rain Event of July 2018

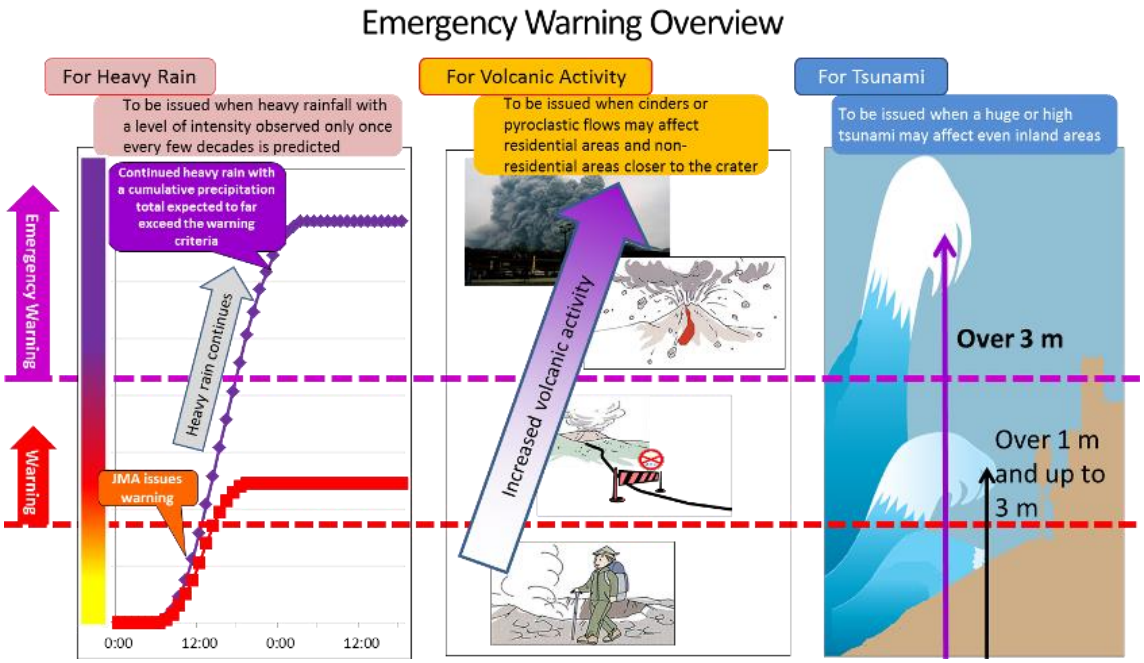
Before the start of the Heavy Rain Event of July 2018, the government proactively disseminated forecasts for the upcoming weather event through mass media, by holding emergency press conferences and announcing the possibility of the issuance of an emergency heavy rain warning. The JMA issued an emergency heavy rain warning for 11 prefectures (Gifu, Kyoto, Hyogo, Okayama, Tottori, Hiroshima, Ehime, Kochi, Fukuoka, Saga, and Nagasaki Prefectures) for the period from July 6 to 8, calling for maximum alert. An emergency warning is the most serious warning when there is a risk of a serious disaster that happens only once in a few decades. 11 prefectures was the largest number ever for which an emergency heavy rain warning was issued.

The local governments in Okayama, Hiroshima, and Ehime Prefectures, which was severely affected from the rainfalls, also issued evacuation recommendations before the disaster as the weather condition became worse, urging local residents to evacuate from the area.

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
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.

Source: Japan Meteorological Agency website
Reference: https://www.jma.go.jp/jma/kishou/know/tokubetsu-keiho/kizyun.html
<Refer to Fig. A-59 Emergency Warning Issuance Criteria (A-88)>



Source: Japan Meteorological Agency website
(Reference: https://www.jma.go.jp/jma/kishou/know/tokubetsu-keiho/index.html)

Evacuation include moving to shelters or safe places nearby and assuring indoor safety. While it is difficult to know the number of people who evacuated, the local government has confirmed that the proportion of people who evacuated to shelters was about 0.5% of those who lived in the areas for which evacuation recommendations were issued.

Based on the lessons learned from the Heavy Rain Event of July 2018, on August 31, 2018, the government established the Working Group on the Review of Evacuation from Flood and Sediment Disasters Caused by the Heavy Rain Event of July 2018 under the Disaster Management Implementation Committee (a committee established under the National Disaster Management Council to promote the implementation of various DRR

measures of ministries and agencies), in order to strengthen evacuation measures given the recent climate and social conditions. At the Director-General-Level Meeting held in September, it was agreed that "the Cabinet Office serves as the secretariat, while ministries and agencies work together on matters to be referred to the Working Group" and that "ministries and agencies cooperate with each other to carry out measures for the next flood season." The Working Group started discussion on these matters in September (Reference: http://www.bousai.go.jp/fusuigai/suigai_dosyaworking/index.html). The Working Group held three meetings by December 2018. It worked together with an expert panel and relevant ministries and agencies to identify issues that needed a review based on the on-site investigations concerning the Heavy Rain Event of July 2018. The Working Group submitted a report describing the challenges and measures to implement in the future.

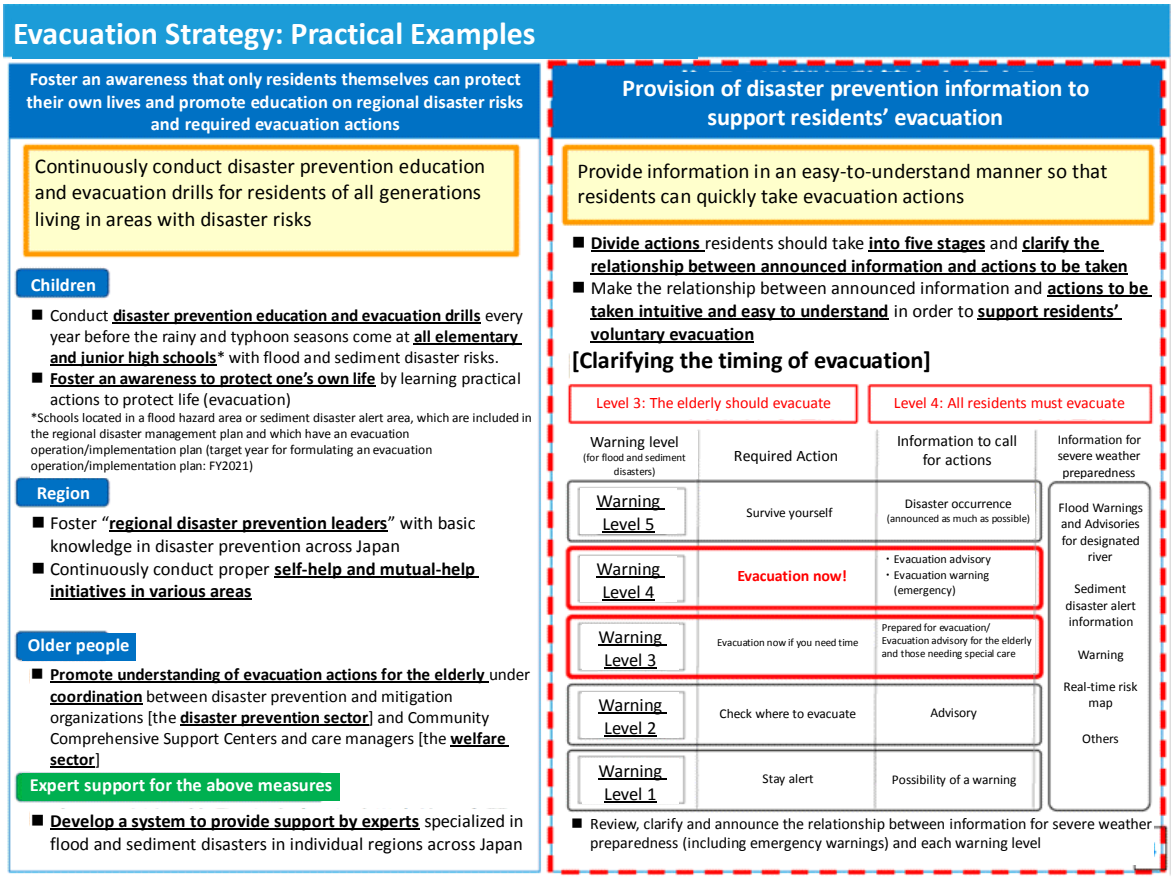
2-2 Report (Proposal) by the Working Group on the Review of Evacuation from Flood and Sediment Disasters Caused by the Heavy Rain Event of July 2018

(1) Overview of the Report

Based on the discussion of the Working Group, on December 26, 2018, the Cabinet Office published the Report on Evacuation from Flood and Sediment Disasters Reflecting the Heavy Rain Event of July 2018, which described challenges and measures to implement in the future.

Reference: http://www.bousai.go.jp/fusuigai/suigai_dosyaworking/index.html

Concerning future measures, the Report pointed out the need for DRR education and evacuation drills at all elementary and junior high schools that are at the risk of flood or sediment disasters as well as the capacity building of local DRR leaders across Japan. The government also classified warning levels into five levels to clearly define the timing of evacuation and actions that local residents need to take in each stage.



Source: Material provided at the 13th meeting of the Disaster Management Implementation Committee, National Disaster Management Council
(Reference: http://www.bousai.go.jp/kaigirep/chuobou/jikkoukaigi/13/index.html)

Based on the above Report and the lessons learned from the Heavy Rain Event of July 2018, the government published the Guidelines on Evacuation Advisory (Revised Version) on March 29, 2019. It describes a new five-level warning evacuation system that supports voluntary evacuation by ensuring that residents can intuitively understand required actions.

Reference: http://www.bousai.go.jp/oukyu/hinankankoku/h30_hinankankoku_guideline/index.html

In the future, the government intends to disseminate the Guidelines to local governments and the public, promote their understanding, and ensure the provision of DRR information in an easy-to-understand manner using the five-level evacuation warning system.

(March 2019) Major changes to the Guidelines on Evacuation Recommendations

- During the Heavy Rain Event of July 2018, residents were not able to utilize announced DRR information due to various kinds of difficult-to-understand information.
- Based on this lesson, **DRR information will be provided to the public in five stages so that residents can intuitively understand the meaning of information** and take appropriate evacuation actions.

Communication of DRR information using warning levels

(1) Classify **actions that residents need to take into five stages** according to the level of the risk of a disaster, and **clarify the relationship between information and required actions.**

- Clarify the timing of evacuation (**[Warning Level 3] Evacuation of the elderly; [Warning Level 4] Evacuation of all residents**)
  - Warning Level 3 is issued to urge the elderly to evacuate and other residents to prepare for evacuation.
  - Warning Level 4 is issued when all residents must evacuate.
  - An evacuation waring (emergency) is not always issued. It is used when there is an extremely high risk of a disaster and there is a need to urgently or repeatedly urge residents to evacuate. This is a Level 4 warning that urges all residents to evacuate.
- **Warning Level 5 is the announcement of the occurrence of a disaster. It urges all residents to take the best possible actions to protect their lives.**
  - Information on the occurrence of a disaster is extremely useful in urging actions to protect life. When the occurrence of a disaster is confirmed, the government will issue Warning Level 5 as much as possible to communicate the fact that a disaster has occurred and urge residents to take best possible actions to protect their lives.

(2) When issuing an evacuation advisory, the government clarifies the corresponding warning level in a way that **residents of each category can understand required evacuation actions** according to the warning level.

(3) **Support residents' voluntary evacuation** by clarifying corresponding relationships between various information for severe weather preparedness and the **five-level evacuation warnings.**

Warning level	Actions residents should take	Information to urge residents to take actions	
Warning Level 5	**A disaster has occurred.** Take **the best possible actions to protect life**	**Information on the occurrence of a disaster*** *Issued as far as possible when the occurrence of a disaster is confirmed.	Issued by municipalities
Warning Level 4	・**Evacuation** to designated shelters ・If the resident him/herself determines that it is more risky to go outside and evacuate to the designated shelter as **there is an extremely high risk of a disaster**, he/she must **urgently evacuate to a safer place nearby or a safer room in the building.**	**Evacuation advisory** **Evacuation warning (emergency)*** *Issued when there is a need to urgently or repeatedly urge residents to evacuate.	
Warning Level 3	**People who need special care, such as the elderly** who need more time to evacuate**, should start to evacuate to shelters**. Other people should prepare for evacuation or start evacuation voluntarily.	**Prepared for evacuation/ Evacuation advisory for the elderly and those needing special care**	
Warning Level 2	**Review evacuation processes**, i.e. check disaster risks using the hazard map, locations of shelters and routes, and the timing of evacuation, review means to obtain evacuation information, and stay alert	Advisory	Announced by the JMA
Warning Level 1	**Stay alert for a possible disaster** and pay attention to updates on disaster prevention and meteorological information.	Possibility of a warning	

Source: Cabinet Office website (Revision of the Guidelines on Evacuation Advisories (FY2018))

Reference: http://www.bousai.go.jp/oukyu/hinankankoku/h30_hinankankoku_guideline/index.html

Chapter 2 Measures for Disaster Prevention and Mitigation and National Resilience Reflecting Disasters in 2018

1-1 Emergency Inspection of Critical Infrastructure

Reflecting the impact of natural disasters in 2018 (e.g., Northern Osaka Prefecture Earthquake, the Heavy Rain Event of July 2018, Typhoon JEBI (1821), Hokkaido Eastern Iburi Earthquake) on people's lives, economic livelihoods and lives, the government held the Ministerial Meeting on Emergency Inspection of Critical Infrastructure on September 21, 2018 with an aim to discuss over continuous functionality of electricity, transportation and other critical infrastructure. At the meeting, it was agreed that the government would formulate measures to this end by the end of November (Reference: https://www.kantei.go.jp/jp/singi/jyuyouinfura/index.html). Under this project, 12 ministries and agencies carried out emergency inspections on 132 items concerning (1) critical infrastructure for securing power in the event of a disaster, and (2) critical infrastructure for protecting people's lives.

Example of an Emergency Inspection Item

Electricity **Emergency Inspection of Electricity Infrastructure** 国土強靭化

Overview

Overview: Learning from the major blackout affecting the entire Hokkaido Prefecture caused by the 2018 Hokkaido Eastern Iburi Earthquake, overall inspection of electricity infrastructure will be conducted across Japan, bearing in mind the inspection work for the major blackout conducted by the third party committee established under the Organization for Cross-regional Coordination of Transmission Operators (OCCTO).
Scope: Overall inspection of electricity infrastructure will be conducted across Japan, bearing in mind the aforementioned inspection work.
Ministry/agency in charge: Ministry of Economy, Trade and Industry (METI)

Issues Identified Following the Recent Disaster

A massive blackout occurred during the Hokkaido Eastern Iburi Earthquake in September 2018 due to multiple factors, including the shutdown of a major thermal power plant, electric line failures, and disruptions to renewable energy power generation (hydropower and wind power).

<The status of the electricity system (power transmission network) from the earthquake to the major blackout in the Hokkaido area>

Source: Prime Minister's Office of Japan website (Ministerial Meeting on Emergency Inspection of Critical Infrastructure)
(Reference: https://www.kantei.go.jp/jp/singi/jyuyouinfura/index.html)

At the second Ministerial Meeting on November 27, 2018, the government reviewed inspection results and formulated measures, which were grouped into the following two categories: (1) the maintenance of the functionality of critical infrastructure for disaster prevention (those that protect people's lives and property from floods, sediment disasters and other disasters and those related to rescue and relief activities and medical activities); and (2) the maintenance of the functionality of critical infrastructure to support people's economic livelihoods and lives (e.g., electricity, food supply and transportation infrastructure).

1-2 Approval of the Three-Year Emergency Response Plan for Disaster Prevention, Disaster Mitigation, and Building National Resilience

At the third Ministerial Meeting (jointly held with the National Resilience Promotion Office) on December 14, 2018, the Prime Minister said, "We will create a country that possesses strength and resilience, not giving in to disasters. We must continue on this path of national resilience as Japan's grand plan for the long-term future. In particular, in recent years, since disasters have grown in intensity, disaster prevention, disaster mitigation, and building national resilience for the protection of the lives and property of the people have become important and urgent issues, and we must continue to advance these efforts swiftly." With this view in mind, the members of the meeting formulated measures for critical infrastructure based on the results of emergency inspections, as well as those for concrete block walls and farm ponds reflecting the results of past inspections. At the meeting, the Cabinet approved the Three-Year Emergency Response Plan for Disaster Prevention, Disaster Mitigation, and Building National Resilience, which described urgent measures that required immediate action, such as the below.

Reference: https://www.kantei.go.jp/jp/singi/jyuyouinfura/index.html.

Example of Emergency Inspection Results and Response Measures

Rivers

Emergency Inspection
Concerning the Risk of Levee Breach in Rivers

国土強靭化

Overview: Learning from the Heavy Rain Event of July 2018, emergency inspections were carried out to examine the inundation depth during a flood caused by a backwater phenomenon, etc. As a result, it was found that some of the inspected rivers had sections with a risk of causing enormous casualties. To mitigate such risks, levee reinforcement and elevation and other response measures will be taken.
Ministry/agency in charge: Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Class A rivers: Approx. 14,000; Class B rivers: Approx. 7,000

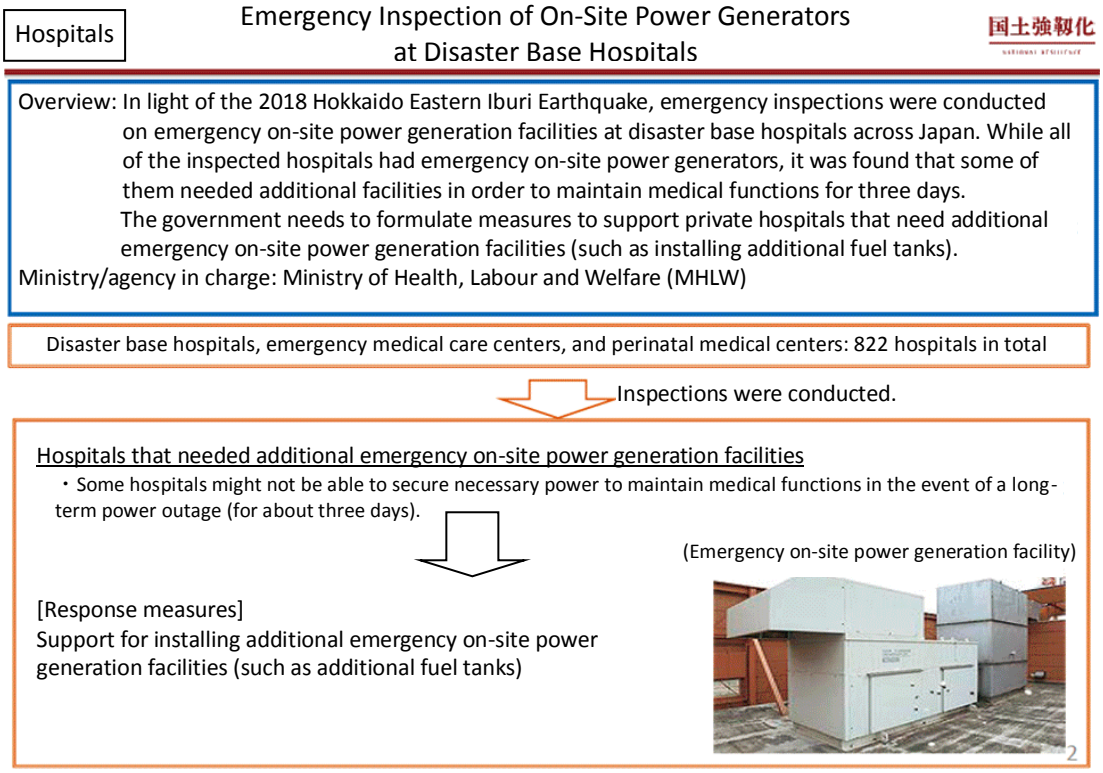
Inspections were conducted.

Sections with a risk of reaching a large inundation depth and causing enormous casualties

・It was found that important facilities were located in some of the areas with a risk of reaching a considerable inundation depth and causing damage to houses exceeding a certain number.

[Response measures]
Levee reinforcement and elevation to prevent or delay breaches

1



Source: Prime Minister's Office of Japan website (Ministerial Meeting on Emergency Inspection of Critical Infrastructure)
Reference: https://www.kantei.go.jp/jp/singi/jyuyouinfura/index.html

1-3 Implementation of the Three-Year Emergency Response Plan for Disaster Prevention, Disaster Mitigation, and Building National Resilience

The Three-Year Emergency Response Plan for Disaster Prevention, Disaster Mitigation, and Building National Resilience describes the goals, contents, expenditures and other information of 160 tangible and intangible measures to be urgently implemented over the three years from FY2018 to FY2020 from the perspectives of (1) the maintenance of the functionality of critical infrastructure for disaster prevention and (2) the maintenance of the functionality of critical infrastructure to support people's economic livelihoods and lives.

These emergency measures will be carried out with a fund of approximately 7 trillion yen utilizing the fiscal investment and loan program and contributions from the private sector with a view to achieving completion or significant advancement by the end of the period. In order to ensure the functionality of critical infrastructure, which protects people's lives and property from natural disasters and is essential for people's lives and economic livelihoods, the national government will promote these measures in cooperation with various entities, including local governments, private hospitals, airport terminal companies, communications companies, and railway companies.

Among these measures, expenditures for those to be commenced in the first fiscal year were covered by the FY2018 secondary supplementary budget. Additional funds will be allocated from the FY2019 and FY2020 budgets for temporary and special measures.

The government will conduct periodical follow-up assessments on the progress of these emergency measures to ensure steadily progress and attainment of the defined goals in three years.

Overview of the Three-Year Emergency Response Plan for Disaster Prevention, Disaster Mitigation, and Building National Resilience

1. Basic Principles

○Based on the Results of the Emergency Inspection of Critical Infrastructure and Response Measures (report from the Ministerial Meeting on Emergency Inspection of Critical Infrastructure on November 27, 2018) and the results of past inspections on concrete block walls and farm ponds, emergency measures were formulated for the following two purposes:

- the maintenance of the functionality of critical infrastructure for disaster prevention; and
- the maintenance of the functionality of critical infrastructure to support people's economic livelihoods and lives.

These emergency measures are tangible and intangible measures falling under 20 priority and other programs included in the 45 programs of the National Resilience Basic Plan. They will be promoted intensively over the next three years.

2. Categories of Measures and Estimated Budgets

○Emergency measures: 160 items

○Implemented with a fund of approximately 7 trillion yen (also utilizing the fiscal investment and loan program)*1, *2

I. Maintenance of the functionality of critical infrastructure for disaster prevention: Approx. 3.5 trillion yen

(1) Prevention and minimization of damage of major floods, sediment disasters, earthquakes, tsunamis, and other disasters: Approx. 2.8 trillion yen
(2) Securing disaster response capabilities, including those for rescue and relief activities and medical activities: Approx. 0.5 trillion yen
(3) Securing information necessary for evacuation: Approx. 0.2 trillion yen

II. Maintenance of the functionality of critical infrastructure to support people's economic livelihoods and lives: Approx. 3.5 trillion yen

(1) Securing electricity and energy supply: Approx. 0.3 trillion yen
(2) Securing food supply, lifeline utilities, supply chains, etc.: Approx. 1.1 trillion yen
(3) Securing land, sea, and air transportation networks: Approx. 2 trillion yen
(4) Securing information, communications, and information services necessary in daily life: Approx. 0.02 trillion yen

(*1) Includes 0.6 trillion yen from the fiscal investment and loan program and 0.4 trillion yen of contributions from the private sector. Includes 0.3 trillion yen in FY2018 1st supplementary budget.

(*2) Totals may not add up due to rounding.

3. Period and Goals

○Period: Three years from FY2018 to FY2020

○Goals: Complete or significantly advance emergency measures that require immediate action from the viewpoint of promoting disaster prevention and disaster mitigation and building national resilience

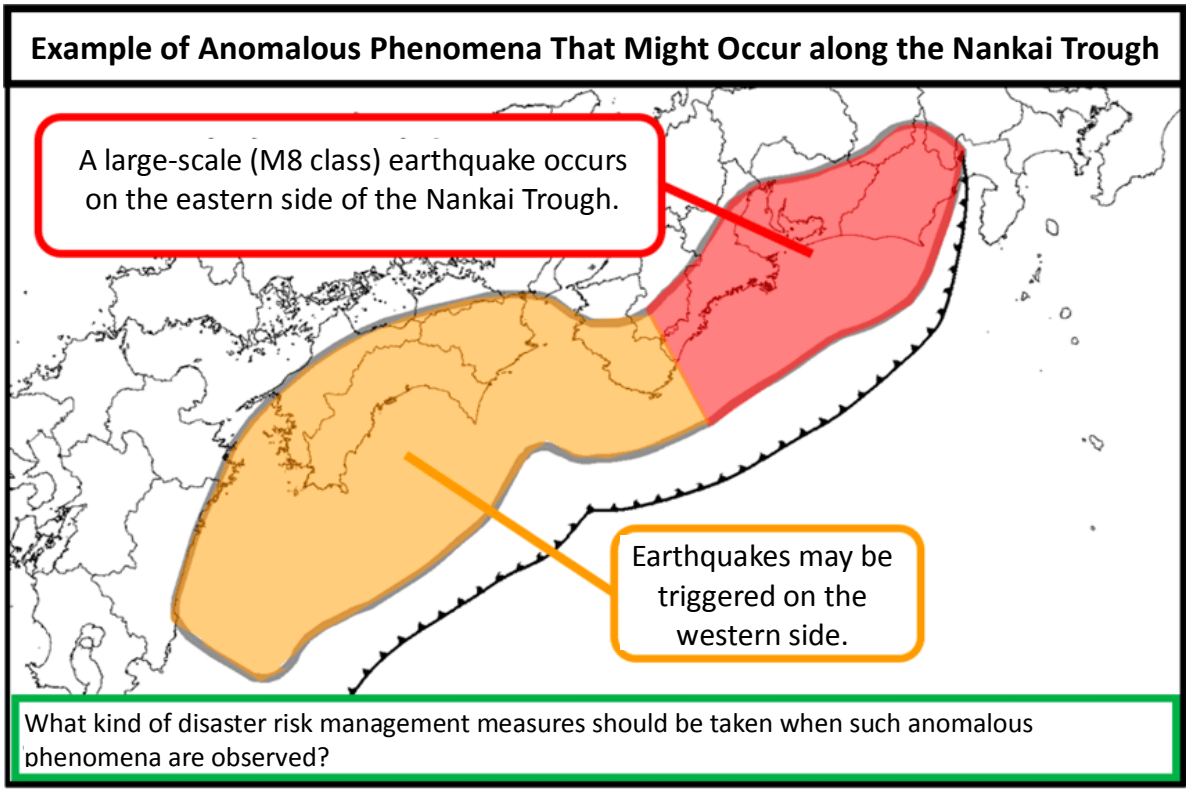
Source: Prime Minister's Office of Japan website (Ministerial Meeting on Emergency Inspection of Critical Infrastructure)
Reference: https://www.kantei.go.jp/jp/singi/jyuyouinfura/index.html

Chapter 3 Preparedness for Nankai Trough Major Earthquakes: Research on Disaster Risk Management for Anomalous Phenomena

1-1 Research on Disaster Risk Management for Anomalous Phenomena along the Nankai Trough

In March 2018, the Cabinet Office established the "Working Group on Disaster Risk Management for Anomalous Phenomena along the Nankai Trough" under the National Disaster Management Council's Disaster Management Implementation Committee. The purpose of the establishment of the working group is to study desirable disaster risk management for anomalous phenomena observed along the Nankai Trough and social mechanisms to conduct disaster risk management. The study was based on the basic policy of disaster risk management for such phenomena that has been indicated in "Implementation of Disaster Management Based on the Observation and Evaluation of Earthquakes along the Nankai Trough (Report)," which was released in September 2017. The working group started its research in FY2018.
Reference: http://www.bousai.go.jp/jishin/nankai/taio_wg/taio_wg_02.html

The working group held seven meetings in FY2018 while coordinating its study with the discussion at the Chubu Study Group on New Corporate Disaster Risk Management based on Earthquake Observation along the Nankai Trough, which has held a meeting every month in Nagoya City, Aichi Prefecture, since FY2017. At its meetings, the working group reviewed example cases of disaster management activities conducted by Shizuoka and Kochi Prefectures and the Chubu economic community in their model areas. The group then discussed and studied assumed cases of anomalous phenomena (three cases: a partial area rupture, a limited area rupture, and a slow slip) and the disaster management to be implemented in the event of each case of phenomenon. On December 25, 2018, "Regarding Desirable Disaster Risk Management for Anomalous Phenomena along the Nankai Trough (Report)," a report summarizing the working group's discussion and study, was released on the Cabinet Office's website.
Reference: http://www.bousai.go.jp/jishin/nankai/taio_wg/taio_wg_02.html



Source: Implementation of Disaster Management Based on the Observation and Evaluation of Earthquakes along the Nankai Trough (Report) (Summary)
(Reference: http://www.bousai.go.jp/jishin/nankai/taio_wg/taio_wg_02.html)

The report describes specifically how the national and local governments, companies and other organizations as well as residents should respond to each of the assumed three cases when the probability of the occurrence of an earthquake is assessed to have become relatively high. This is intended to mitigate damage by making use of information collected through the observation of anomalous phenomena in consideration of such factors as the severity of the estimated damage that could be caused by a large-scale earthquake along the Nankai Trough and the past earthquakes in the region. As it is impossible at present to precisely forecast when, where or on what scale an earthquake may occur, it has been decided to prescribe specifically how disaster management should be implemented and in which period in each case utmost caution is required.

Systems for implementation of disaster management

○ Planning of disaster management

In order to smoothly and appropriately implement disaster management, it is necessary for the national and local governments and other relevant organizations to formulate in advance plans for disaster management that should be implemented.

○ Specifics of earthquake information concerning the observation of anomalous phenomena

With respect to earthquake information, it is necessary to conduct studies on labeling of information and alert level assessment so that disaster management suited to each case of phenomenon and the alert level can be implemented.

○ A system for universal start of disaster management

It is necessary to make clear that it is essential for relevant organizations and residents to universally start implementing disaster management in accordance with the level of the required disaster management.

Matters of consideration for the study and disaster management by residents and companies

○ Promoting measures to deal with earthquakes that may occur without warning signs

Further promoting measures that should be implemented in preparation for earthquakes that may occur without warning signs would be most effective for dealing with a Nankai Trough Earthquake, which may take any of a great variety of forms.

○ Preventing social chaos and providing appropriate information

It is necessary to carefully disseminate information related to the Nankai Trough Earthquake so that the people can have an accurate understanding.

○ Guidelines for promoting the study of disaster management by residents and companies (tentative name)

The national government needs to compile guidelines that indicate the basic approach to disaster management, items that should be studied, procedures for the study, and points of attention, among other matters.

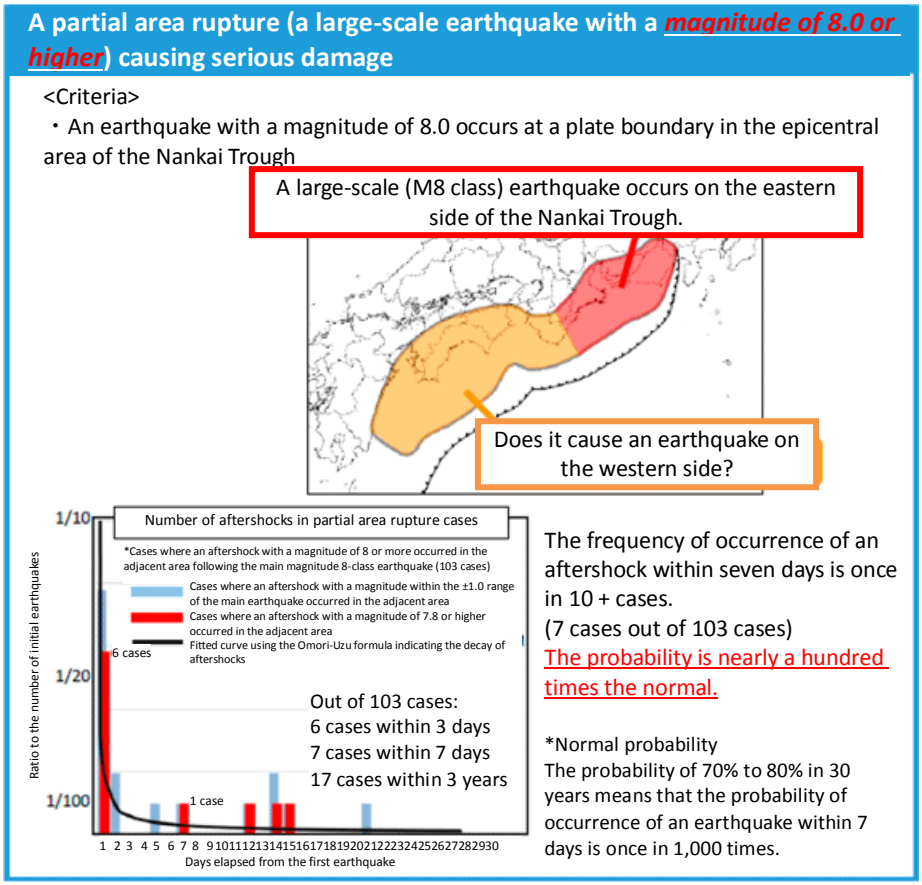
○ Matters of consideration for the study of disaster management in specific sectors

Following consultations with relevant ministries and agencies, it is necessary to make clear the principles for disaster management that should be implemented by organizations in specific sectors, including schools and hospitals, as well as by designated public organizations in such sectors as communication and logistics while taking into consideration the principles of disaster management by residents and companies.

Source: Implementation of Disaster Management Based on the Observation and Evaluation of Earthquakes along the Nankai Trough (Report) (Summary)
(Reference: http://www.bousai.go.jp/jishin/nankai/taio_wg/taio_wg_02.html)

1-2 Disaster Risk Management for the Case of a Partial Area Rupture

In the case of a partial area rupture (large-scale earthquake) causing serious damage (hereinafter referred to as the “partial area rupture case”), a large-scale earthquake occurs in a part of the expected epicentral area along the Nankai Trough, while the risk of multiple large-scale earthquakes occurring in the remaining area increases.



Source: Implementation of Disaster Management Based on the Observation and Evaluation of Earthquakes along the Nankai Trough (Report) (Summary)
(Reference: http://www.bousai.go.jp/jishin/nankai/taio_wg/taio_wg_02.html)

The frequency of occurrence of this case is once in 100 to 150 years. The scenario of this case was developed based on the most recent two cases where major earthquakes occurred in a row: one was the 1944 Tonankai Earthquake (Mw 8.2) and the 1946 Nankai Earthquake (Mw 8.4), and the other was the 1854 Tokai Earthquake (Mw 8.6) and the earthquake that occurred about 32 hours later, the 1854 Nankai Earthquake (Mw 8.6).

Note) The momentum magnitudes (Mw) are based on the Report of the Working Group on the Criteria of Anomalous Phenomena along the Nankai Trough for Disaster Risk Management (December 2018).

If a magnitude 8-class earthquake occurs along the Nankai Trough in this case, the following disaster risk management measures will be implemented over the following week to prepare for a subsequent earthquake that might occur in the area struck by the earthquake as well as in remaining areas.

The maximum alert will be maintained for a week in principle. In the following week, disaster management measures for the partial area rupture case will be carried out.

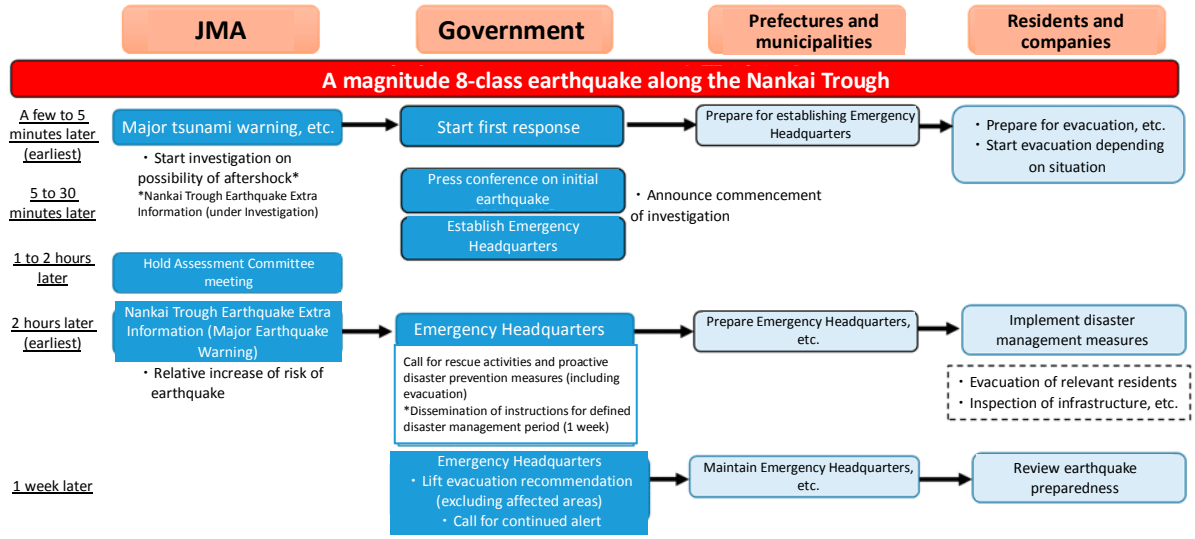
<Residents>
- Residents must evacuate if it is obvious that they would not be able to evacuate should an aftershock occur.
- Residents who need special care must evacuate if they might not have enough time for evacuation should an aftershock occur. Other residents should prepare for evacuation or voluntarily evacuate depending on the situation.
- Residents in other areas should stay alert and review earthquake preparedness

<Companies>
- Facilities used by many and unspecified people and facilities handling hazardous materials must make sure to carry out facility inspections and check fire control measures, etc.
- If there is an obvious risk of endangering employees' lives in the case of a large-scale earthquake, companies should take appropriate preventive measures.
- Other companies should also stay alert and review earthquake preparedness.
- Companies are encouraged to have a business continuity plan that would mitigate overall damage and allow them to recover as early as possible, even if it means that business activities would be temporarily limited and diminished.

Source: Implementation of Disaster Management Based on the Observation and Evaluation of Earthquakes along the Nankai Trough (Report) (Summary)
(Reference: http://www.bousai.go.jp/jishin/nankai/taio_wg/taio_wg_02.html)

Disaster Response Process When a Major Earthquake Warning Is Issued

○ The JMA reports to the government as early as two hours after the main earthquake when it judges that the risk of a subsequent earthquake is high.
○ The government gives instructions to local governments on disaster risk management measures over the next week.
○ If one week passes without a subsequent large earthquake, the government lifts evacuation recommendations, while encouraging residents to continue to stay alert



Source: Cited from the summary of the Guidelines for Formulating Disaster Risk Management Measures Based on Various Nankai Trough Earthquake Scenarios (1st Edition)
(Reference: http://www.bousai.go.jp/jishin/nankai/index.html)

1-3 Disaster Risk Management for the Case of a Limited Area Rupture or a Slow Slip

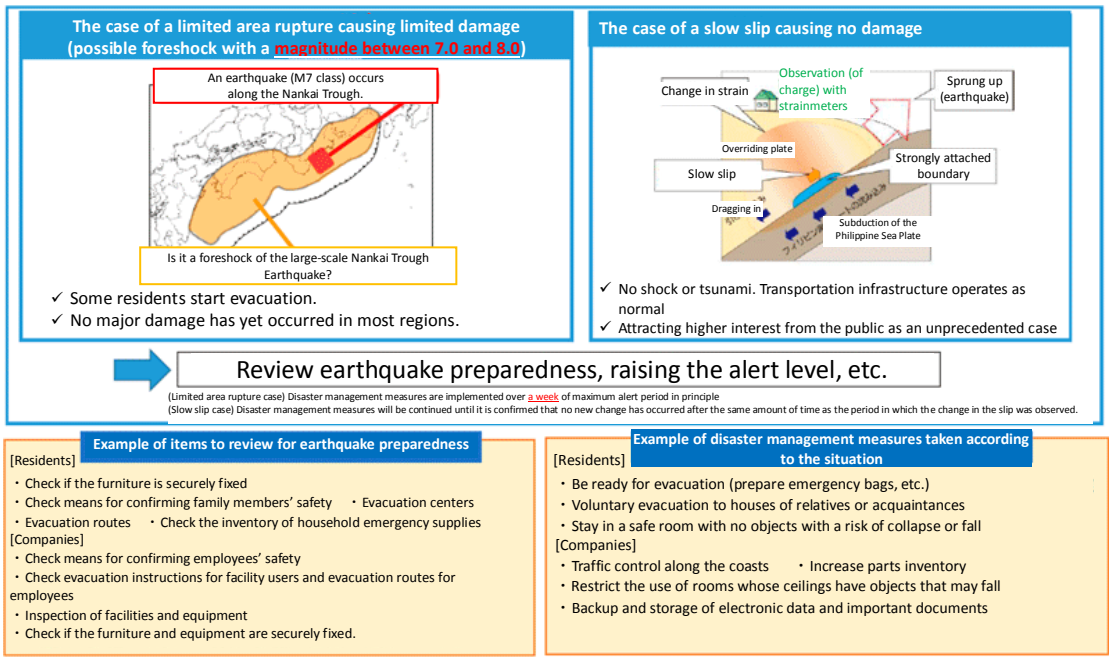
In the case of a limited area rupture causing limited damage (hereinafter referred to as the “limited area rupture case”), an earthquake that is one scale smaller than a major earthquake (*i.e.* a magnitude 7-class earthquake) occurs along the Nankai Trough.

The frequency of this case is once in 15 years. In the last seven cases, no major aftershock was observed (on a global level, the frequency that a magnitude 8-class earthquake occurs in the same area within a week following an earthquake with a magnitude of 7.0 or more is once in a few hundred times).

The slow slip case causing no damage (hereinafter referred to as the “slow slip case”) refers to the case where an anomalous slow slip is observed. A significant change is observed with a strainmeter and the state of fixation of plate boundaries obviously changes over a short period.

This case has never been observed before. While there is a way to conduct a qualitative assessment to see if the risk of a large-scale earthquake has increased, there is no established method or criteria to quantitatively assess the likeliness of occurrence of a large-scale earthquake.

Disaster risk management for these two cases will be centered on the review of earthquake preparedness.



Source: Disaster Risk Management for Anomalous Phenomena along the Nankai Trough (Report) (Summary)
(Reference: http://www.bousai.go.jp/jishin/nankai/taio_wg/taio_wg_02.html)

Disaster Response Process

	Earthquake with a magnitude of 8 or higher at a plate boundary*1	Earthquake with a magnitude of 7 or higher*2	Slow slip*3
Immediately after the earthquake (Only when deemed necessary in the case of a slow slip)	● Prepare for or start disaster management measures (such as evacuation) depending on the situation		● Prepare for or start disaster management measures depending on the situation
(Earliest) About 2 hours later 1 week later	Major earthquake warning ● Review earthquake preparedness, etc. ● Residents who need special care must evacuate if they might not have enough time for evacuation should an aftershock occur. Other residents should prepare for evacuation or voluntarily evacuate depending on the situation. ● Residents must evacuate if it is obvious that they would not be able to evacuate should an aftershock occur.	Major earthquake advisory ● Review earthquake preparedness, etc. (voluntary evacuation as needed)	Major earthquake advisory ● Review earthquake preparedness, etc.
2 weeks later*4	Major earthquake advisory ● Review earthquake preparedness, etc. (voluntary evacuation as needed)	● Return to normal life while staying alert for aftershocks and being aware that the risk of a large-scale earthquake has not been eliminated	
Until it is confirmed that the slip has stopped	● Return to normal life while staying alert for aftershocks and being aware that the risk of a large-scale earthquake has not been eliminated		
Until the occurrence of a large-scale earthquake			● Return to normal life while staying alert for aftershocks and being aware that the risk of a large-scale earthquake has not been eliminated

*1 When an earthquake with a magnitude of 8.0 or higher has occurred on a plate boundary in the expected epicentral area of the Nankai Trough (the partial area rupture case)
*2 When an earthquake with a magnitude between 7.0 and 8.0 has occurred on a plate boundary in the expected epicentral area of the Nankai Trough or when an earthquake with a magnitude of 7.0 or higher has occurred in a spot other than plate boundaries in the expected epicentral area of the Nankai Trough or within the 50 km radius of the trench axis of the expected epicentral area (the partial area rupture case)
*3 When an anomalous slow slip has been observed, during which a significant change was observed with a strainmeter and the state of fixation of plate boundaries has obviously changed over a short period (the slow slip case)
*4 The two weeks comprise of one week of the aftershock warning period and one week of aftershock advisory period.

The measures in the above table are mere guidelines. Actual response measures would vary depending on the situation.

Source: Cited from the summary of the Guidelines for Formulating Disaster Risk Management Measures Based on Various Nankai Trough Earthquake Scenarios (1st Edition)
(Reference: http://www.bousai.go.jp/jishin/nankai/index.html)

1-4 Announcement of Information

The JMA started to release Nankai Trough Earthquake-related Information in November 2017 as a transitional means until a new disaster risk management scheme is established. Based on the report of the Working Group on Disaster Risk Management for Anomalous Phenomena along the Nankai Trough published in December 2018, the JMA decided to release observation and analysis results of anomalous phenomena that occurred along the Nankai Trough under the titles of "Nankai Trough Earthquake Extra Information" and "Nankai Trough Earthquake Information".
Reference: http://www.jma.go.jp/jma/press/1903/29a/20190329_nankaijoho_name.html

Titles and Conditions of Announcement of Nankai Trough Earthquake-Related Information

Information issued by JMA	Conditions of announcement
Nankai Trough Earthquake Extra Information	○ When an anomalous phenomenon is observed along the Nankai Trough and investigation is started or continued to check the correlation of the phenomenon with large-scale earthquakes in this region. ○ When announcing investigation results on observed anomalous phenomena
Nankai Trough Earthquake Information	○ When announcing information on the situation after the announcement of investigation results on observed anomalous phenomena ○ When announcing investigation results shared at a regular meeting of the Nankai Trough Earthquake Assessment Committee (except when a Nankai Trough Earthquake Extra Information is to be made)

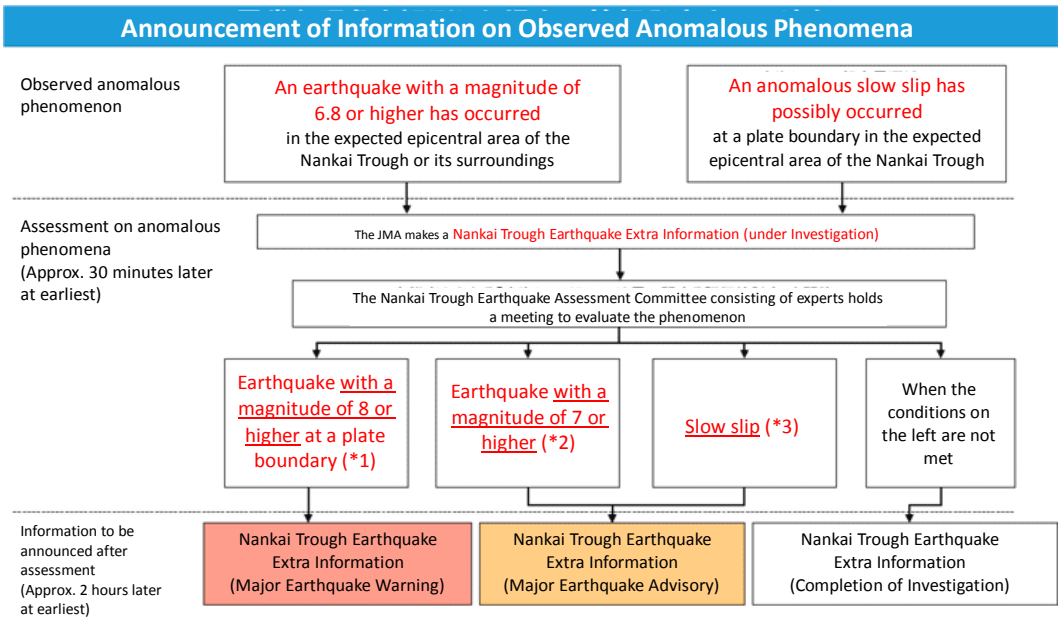
Source: Japan Meteorological Agency website
(Reference: http://www.jma.go.jp/jma/press/1903/29a/20190329_nankaijoho_name.html)

In the partial area rupture case, the JMA will make a Nankai Trough Earthquake Extra Information (Major Earthquake Warning), while the government calls for alert and evacuation, when the occurrence of the following phenomenon is confirmed:

- An earthquake of Mw 8.0 or higher has occurred at a plate boundary in the expected epicentral area of the Nankai Trough

In the limited area rupture case or the slow slip case, the JMA will make a Nankai Trough Earthquake Extra Information (Major Earthquake Advisory), while the government calls for caution and the review of earthquake preparedness, when the occurrence of one of the following phenomena is confirmed:

- An earthquake of Mw 7.0-8.0 has occurred at a plate boundary in the expected epicentral area of the Nankai Trough
- An earthquake of Mw7.0 or higher has occurred in a spot other than plate boundaries in the expected epicentral area of the Nankai Trough or within the 50 km radius of the trench axis in the expected epicentral area
- An anomalous slow slip has been observed, during which a significant change was observed with a strainmeter and the state of fixation of plate boundaries has obviously changed over a short period



*1 When an earthquake with a magnitude of 8.0 or higher has occurred on a plate boundary in the epicentral area along the Nankai Trough (the partial area rupture case)

*2 When an earthquake with a magnitude between 7.0 and 8.0 has occurred on a plate boundary in the expected epicentral area of the Nankai Trough or when an earthquake with a magnitude of 7.0 or higher has occurred in a spot other than plate boundaries in the expected epicentral area of the Nankai Trough or within the 50 km radius of the trench axis of the expected epicentral area (the partial area rupture case)

*3 When an anomalous slow slip has been observed, during which a significant change was observed with a strainmeter and the state of fixation of plate boundaries has obviously changed over a short period (the slow slip case)

Source: Cited from the summary of the Guidelines for Formulating Disaster Risk Management Measures Based on Various Nankai Trough Earthquake Scenarios (1st Edition)
(Reference: http://www.bousai.go.jp/jishin/nankai/index.html)

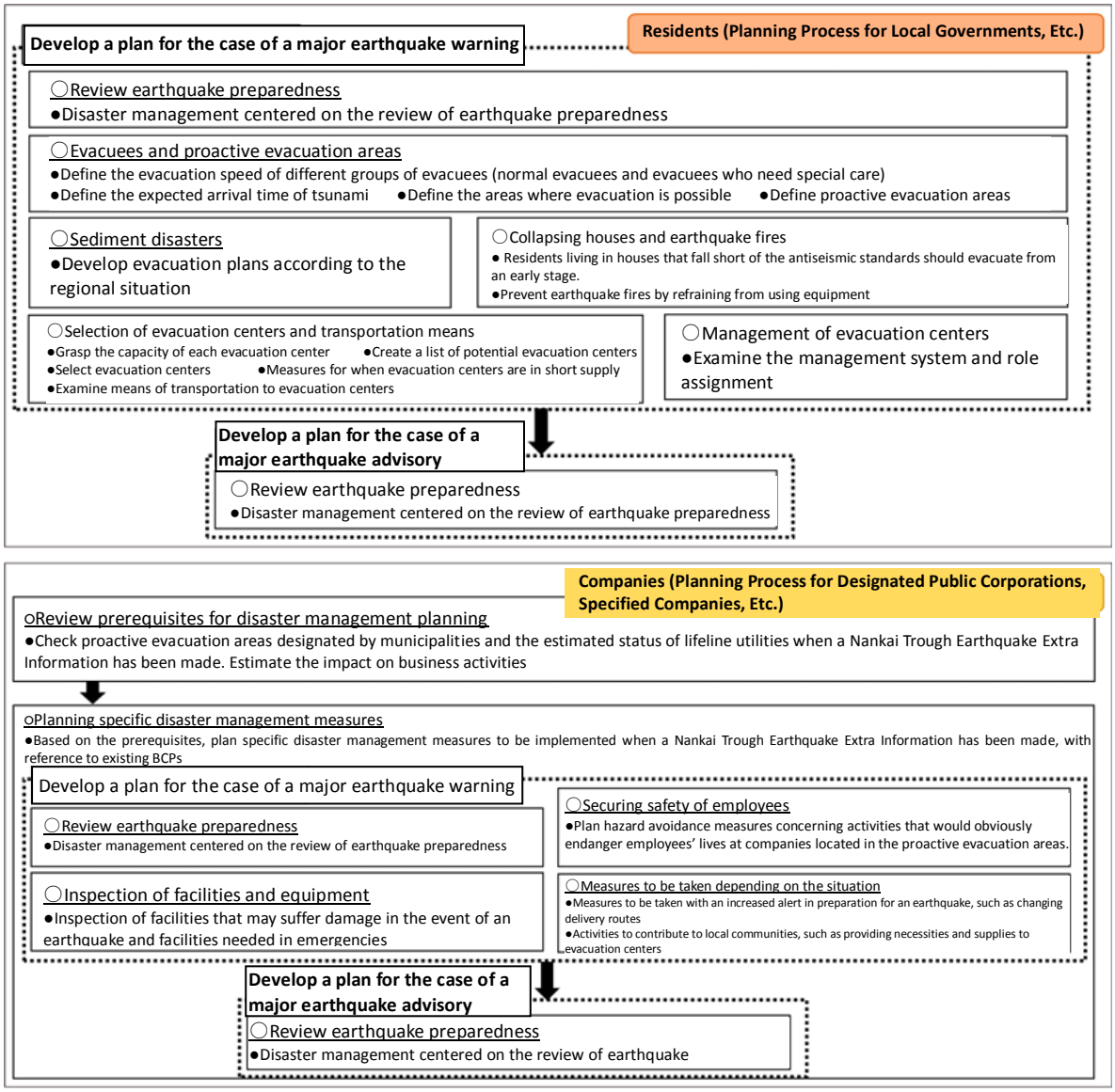
1-5 Guidelines and Future Steps

The abovementioned disaster risk management processes for the three cases are basic guidelines. Residents, communities, and companies need to take the best disaster risk management measures possible according to the situation.

The Cabinet Office and relevant ministries and agencies examined disaster risk management policies for each sector and published the Guidelines for Formulating Disaster Risk Management Measures Based on Various Nankai Trough Earthquake Scenarios (1st Edition) on March 29, 2019.
Reference: http://www.bousai.go.jp/jishin/nankai/index.html

The above Guidelines are intended to help local governments, designated public corporations, and companies with examining and formulating disaster risk management plans for cases in which the risk of a Nankai Trough large-scale earthquake is increasing. The Guidelines consist of three sections titled “General,” “Residents,” and “Companies” respectively. These are intended for use by local governments, designated public corporations, facilities used by many and unspecified people, and facilities handling hazardous materials that are located in the Nankai Trough earthquake measures promotion area. The Guidelines show the planning process for these entities based on the following basic ideas:

- It is important to choose safer disaster prevention actions, keeping in mind (1) the balance between the risk of an earthquake and the impact of disaster risk management measures on day-to-day life and business activities, and (2) the fact that it is difficult to accurately predict the timing of an earthquake and it is practically impossible to completely guarantee safety with disaster risk management measures.
- It is important to implement preparedness measures for a sudden earthquake in order to mitigate its impact on day-to-day life and enhance safety.



Source: Cited from the summary of the Guidelines for Formulating Disaster Risk Management Measures Based on Various Nankai Trough Earthquake Scenarios (1st Edition)
Reference: http://www.bousai.go.jp/jishin/nankai/index.html

Preparedness for a sudden earthquake is still important because anomalous phenomena are not necessarily always observed before a large-scale earthquake in the Nankai Trough. Since appropriate disaster risk management varies among regions, each community needs to find what kind of disaster risk management policies and solutions would work for it, while referring to the Guidelines and coordinating disaster risk management measures for individuals, households, communities, and organizations on a regional or district level. The disaster risk reduction capabilities of communities and companies can be improved by continuing to promote preparedness for a sudden earthquake and proactively formulating disaster risk reduction measures based on the Guidelines for the time at which the risk of a large-scale earthquake increases. The Guidelines are based on the current best knowledge and will be revised as needed to incorporate new insights.

Part I Current Disaster Risk Management Measures in Japan

Japan is prone to various natural disasters due to its natural conditions. In 2018, Japan was struck by various kinds of disasters, including the Heavy Rain Event of July 2018 (western Japan torrential rains). Part I looks at Japan's recent disaster risk management policies with a special focus on measures intensely promoted in FY2018.

Chapter 1 Current Disaster Risk Management Policies

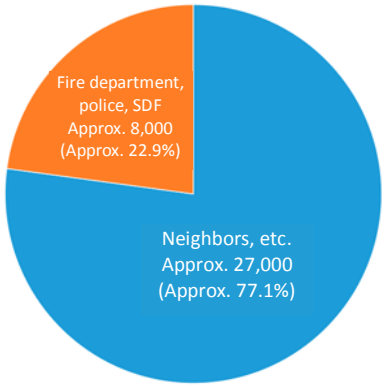
Section 1: Reducing Disaster Risk in Advance through Self-help and Mutual Support and Promotion of Disaster Risk Reduction Activities in Cooperation with Various Stakeholders

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

As Japan is a disaster prone country, the government has constantly promoted 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, public support extends to emergency rescue operations, support for human resources by dispatching supporting officials to affected areas, push-mode support (*i.e.* emergency delivery of necessities and relief supplies to evacuees at shelters, initiated without waiting for a request from affected communities), and financial support through the designation of a Disaster of Extreme Severity and pursuant to the Act on Support for Reconstructing Livelihoods of affected people.

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. A study showed that when an earthquake hit Southern Hyogo Prefecture in 1995 (hereinafter referred to as the "Great Hanshin-Awaji Earthquake"), about 80% of people were rescued through self-help (including help from their families) or mutual support (such as assistance of their neighbors), while only about 20% were rescued by public support such as public rescue squads (Fig. 1-1-1). Amid population decline, resulting in the depopulation of towns and villages and declining membership of voluntary disaster management organizations and volunteer fire corps, it is vital to foster communities with a strong disaster management awareness, which means that each community member takes specific disaster mitigation actions with a recognition that it is no one but themselves who can protect their life.

Fig. 1-1-1 Types of Rescuers and Number of People Rescued at the Time of the Great Hanshin-Awaji Earthquake

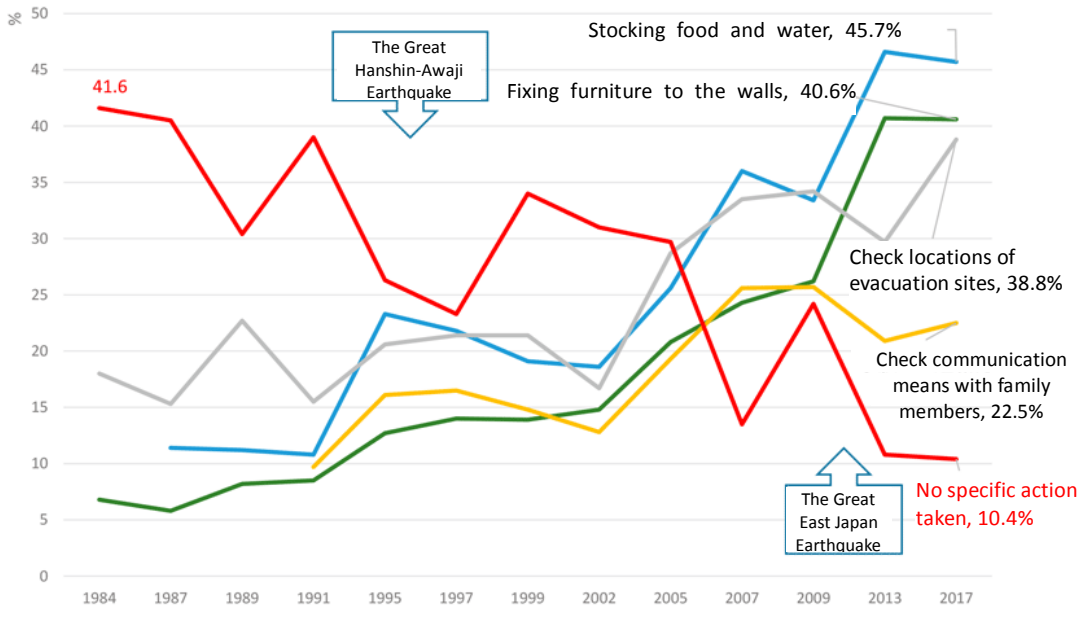


Source: Formulated by the Cabinet Office based on *Prediction of Loss of Human Lives Due to Catastrophic Earthquake Disaster* (Yoshiaki Kawada; 1997; Natural Disaster Sciences Vol. 16, No.1

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

People are becoming more aware of the importance of self-help efforts and are taking specific measures after having experienced major disasters, such as the Great Hanshin-Awaji Earthquake and the 2011 Tohoku Earthquake and Tsunami (hereinafter the "Great East Japan Earthquake") (Fig. 1-1-2). The importance of mutual support has also been recognized in recent years. For example, during the Heavy Rain Event of July 2018, residents of Miyoshi District, Ozu City, Ehime Prefecture were able to evacuate effectively because they had been promoting mutual support initiatives before the disaster, such as preparing evacuation plans and conducting evacuation drills under the direction of local disaster risk management leaders.

Fig. 1-1-2 Progress of Self-Help Initiatives



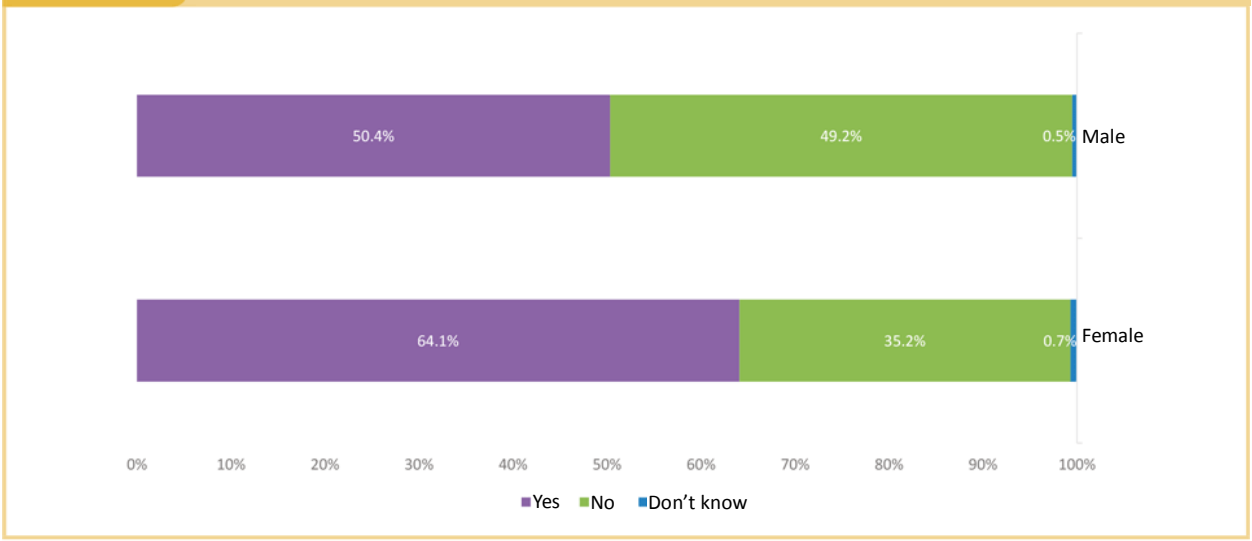
Source: Formulated by the Cabinet Office based on "Public Opinion Poll regarding Disaster Risk Reduction" conducted by the Cabinet Public Relations Office

Discussions with families and neighbors are important for self-help and mutual support approaches. In the 2017 survey, the proportion of people who had discussed with their families and surrounding people in the past couple of years over what to do in the event of a disaster was 50.4% for males and 64.1% for females (Fig. 1-1-3).

The most common topic of such discussion was “evacuation method, timing and location” (68.2%), followed by “communication means with family and relatives” (57.8%), “food and drinking water” (55.3%), and “contents of emergency bag” (41.7%).

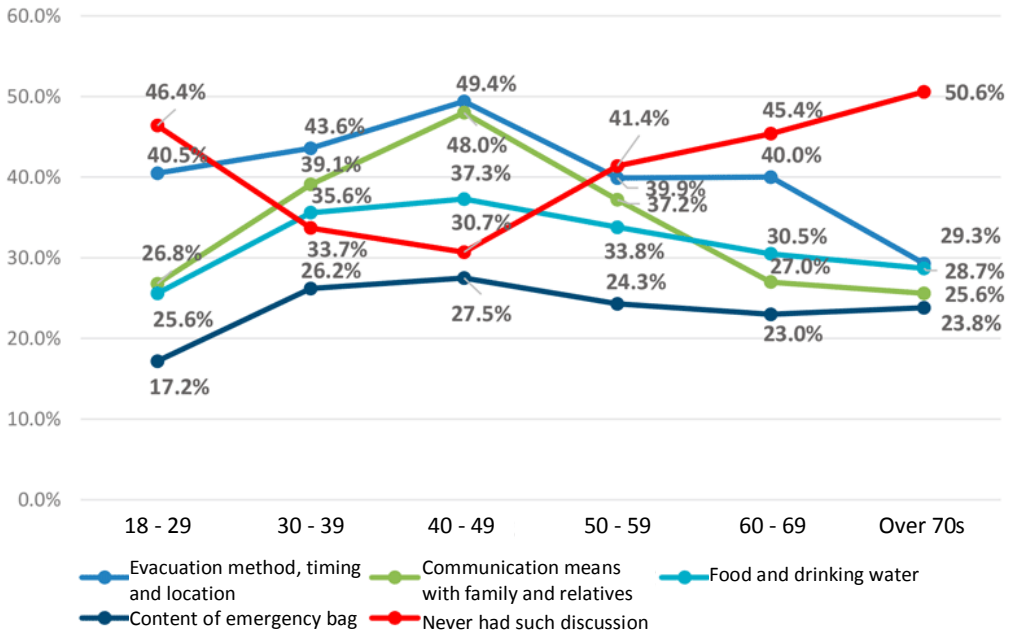
Looking at responses by age, the proportion of respondents who had never had a discussion about disaster response was highest at 50.6% in the age bracket of 70 years old or older. Only about 30% of respondents of this age group answered that they had discussed the evacuation method, timing and location (Fig. 1-1-4).

Fig. 1-1-3 Discussions about Disaster with Families and Neighbors (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)

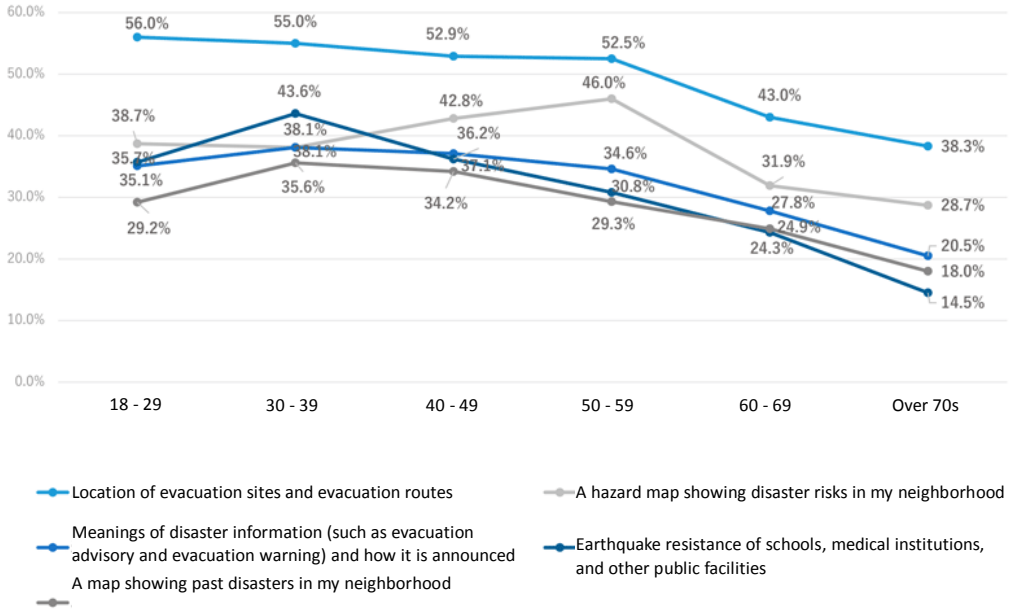
Fig. 1-1-4 **Top 5 Topics of Discussion about Disaster with Families and Neighbors (by Age)**



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)

In order to ensure that each individual can take disaster risk management actions through self-help and mutual support, it is important that they have access to necessary information for taking such actions. In a survey conducted in 2017 that asked respondents what type of disaster risk management information they would like to have more, the most common answer was "location of evacuation sites and evacuation routes" (47.5%), followed by "a hazard map showing disaster risks in my neighborhood" (36.4%), "meanings of disaster information (such as evacuation advisory and evacuation warning) and how it is announced" (30.4%), "earthquake resistance of schools, medical institutions, and other public facilities" (28.1%), and "a map showing past disasters in my neighborhood" (27.0%). Looking at responses by age, the percentage of people seeking more disaster information (such as those who responded "location of evacuation sites and evacuation routes" and "meanings of disaster information (such as evacuation advisory and evacuation warning) and how it is announced") was lower in older age brackets (Fig. 1-1-5).

Fig. 1-1-5 Disaster Information That Should Be Provided More Extensively (Top 5 Items) (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)

Although the government intends to spare no effort in enhancing public support, it is becoming more and more difficult to contain sudden severe disasters solely with existing disaster risk management facilities, other hard infrastructure or government-led non-structural means, for various reasons including the intensifying climate conditions accompanying global warming, the increasing number of older people who need support, and the increasing number of foreign nationals living in Japan due to globalization. It is important for Japanese people to shift away from solely depending on government-led disaster risk management and start to focus more on self-help and mutual support with a shared understanding. Today, there is a significant gap in disaster resilience among regions. It is vital to disseminate good practices from communities with strong disaster risk management awareness to other communities all across the country in order to build a society that can effectively manage disasters.

The Cabinet Office and relevant ministries and agencies need to enhance awareness raising campaigns and measures which may connect "awareness" to "preparedness" (specific actions) in the future based on the survey results. This section introduces various measures carried out in collaboration with different stakeholders, with a special focus on "disaster precautions" as self-help and mutual support efforts.

Column:

Disaster Management Coordinators: Fostering Female Leadership

The Tokyo Metropolitan Government (TMG) is working on the fostering of female disaster management leaders in communities and companies, aiming at bringing the number of such talents to about 3,000 by 2020.

To this effect, the TMG has held the Women's Seminar for Disaster Management from FY2017, which covers basic knowledge on disaster management. In addition, the TMG started the Disaster Management Coordinator Seminar in FY2018. Through these efforts, the government aims at fostering a total of 300 female disaster management leaders in three years in order to ensure that diverse perspectives (including women's) are to be reflected in preparedness measures for major disasters including a Tokyo inland earthquake, which is predicted to occur in the future. The Coordinator Seminar is intended for women living, working or going to college in Tokyo to have the basic knowledge equivalent to the content of Textbook for Female Disaster Management Leaders prepared by the TMG. Participants choose one from two courses; Community Life Course or Workplace Course. The Community Life Course mainly covers how to deal with various situations that may occur during evacuation and in the course of rebuilding life, and how to effectively communicate in order to solve various problems that may occur after a disaster. The Workplace Course focuses on how to deal with situations that may arise when a disaster occurs while working, how to respond to various needs that may arise at workplace, and how to effectively communicate in order to solve various problems that may occur after a disaster. In FY2018, both courses were held over two days for one time, respectively.

Source: Tokyo Metropolitan Government Disaster Prevention website
(Reference: https://www.bousai.metro.tokyo.lg.jp/kyojyo/1005416/index.html)

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

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 companies, academia, volunteers, community groups and media) should be encouraged to take disaster risk reduction (DRR) initiatives. In response, the National Council for Promoting Disaster Risk Reduction (NCPDRR),

comprising leaders of 39 groups working on disaster risk management, was set up in September 2015 under the leadership of Prime Minister ABE, who chairs the National Disaster Management Council. The mission of NCPDRR is to work in cooperation with the National Disaster Management Council and promote information sharing, opinion exchange and coordination across a wide range of sectors, in order to promote disaster risk reduction awareness among the public.

The NCPDRR and other organizations have promoted activities to enhance community preparedness for large-scale disasters, built on a combination of public support by the government, self-help by each member of the public, and mutual support among communities, companies, schools, and volunteers.

(1) The 3rd National Conference on Promoting Disaster Risk Reduction (2018 National Conference on Promoting Disaster Risk Reduction)

With the NCPDRR and the Council for Promoting Disaster Risk Reduction, which is mainly comprised of disaster risk management-related industrial groups, the Cabinet Office held the 2018 National Conference on Promoting Disaster Risk Reduction in Tokyo Big Sight and the Tokyo Rinkai Disaster Prevention Park (Sona Area) on October 13 and 14, 2018. Under the event theme, "Preparing for Large-scale Disasters: Enhancing Collaboration in Communities," the event was held with an aim to promote self-help and mutual support efforts, voluntary collaboration among people, and disaster risk management awareness.

H.E. Mr. YAMAMOTO, Minister of State for Disaster Management, delivered 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. Then, Governor of Tokyo Ms. Koike gave a welcome speech as a representative of the host city, stating the TMG's intention to make Tokyo a safe and secure city. In the organizer's speech, Vice-chairman of the NCPDRR Mr. Akimoto mentioned the importance of coordination among self-help, mutual support and public support and his expectation for enhanced disaster risk management awareness as a nation as a whole. At the subsequent High-Level Panel Discussion, opinions were exchanged on the importance of support for vulnerable people, fostering of disaster risk management leaders in companies, and collaboration with regional disaster risk management organizations to prepare for large-scale disasters.

During the event, a total of 35 sessions were held over two days in Tokyo Big Sight and Sona Area. In these sessions, hosted by the Cabinet Office and various other groups working on disaster risk management, panelists discussed specific self-help and mutual support efforts that need to be promoted in the fields such as disaster risk management activities, community disaster management planning, collaboration between academia and the public, disaster risk management industry, international cooperation. In particular, there were many sessions that focused on Tokyo inland earthquakes and large-scale floods, which are predicted to occur in Tokyo. Also, taking the opportunity of the International Day for Natural Disaster Reduction (October 13), international sessions were held to promote the Sendai Framework for Disaster Risk Reduction and the Sustainable Development Goals (SDGs). There were various other programs held by different groups, such as a booth for experiencing a disaster, 63 presentation booths, poster sessions and exhibition of large vehicles (*e.g.* fire engine).

In the closing session, Ms. Mikiko Ikegami, Executive at *Shimin Bosai Kenkyujo*, mentioned in her presentation that (1) the importance of taking specific actions that involve all members of society has been confirmed, (2) non-structural measures are the key driver of preparedness for Tokyo inland earthquakes and large-scale floods; and (3) young generations are promoting disaster risk management for the future.

Joined by 12,000 visitors and covered by TV programs and newspapers, the event successfully communicated to many people the importance of self-help, mutual support and collaboration among diverse stakeholders. According to the results of the questionnaire with visitors, 98% responded that the conference helped them

improve their disaster risk management awareness. The Conference highlighted the importance of accurately understanding disaster risks and taking specific actions with participation of all members of society form the perspective of self-help (*i.e.* protecting one's own life) and mutual support among residents, communities, and companies.

H.E. Mr. YAMAMOTO, Minister of State for Disaster Management, giving opening remarks

Mr. Akimoto, Vice-chairman of the National Council for Promoting Disaster Risk Reduction (President of the Japan Firefighters Association), giving organizer's speech

"Enhancing Regional Disaster Resilience ," a program by the Fire and Disaster Management Agency

"Rescue Workshop," a program by the Japanese Red Cross Society

Panel discussion in the closing session

(2) The 4th National Council for Promoting Disaster Risk Reduction

The 4th National Council for Promoting Disaster Risk Reduction was held at the Large Hall of the Prime Minister's Office on December 25, 2018. In his opening remarks, Prime Minister ABE thanked the participating groups as the host of this convention and expressed his hope for this Council, mentioning the importance of "coordinating public support, self-help, and mutual support efforts, enhancing disaster risk management awareness in communities, and building a 'disaster conscious society' to prepare for all kinds of natural disasters."

Next, the Cabinet Office reported on activities centering on the previously mentioned 2018 National Conference on Promoting Disaster Risk Reduction. Lastly, the Japan Medical Association and the Japan Disability Forum reported measures taken to enhance disaster risk management awareness from the viewpoint of self-help and mutual support.

The 4th 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 risk management must work as a unity 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 risk management implement disaster risk management drills

based on the Basic Act on Disaster Management, Basic Plan for Disaster Risk Reduction, and other regulations to check and confirm the emergency measures to be taken when a natural disaster occurs and to enhance residents' awareness of disasters.

In FY2018, the following drills were conducted in accordance with the 2018 Comprehensive Disaster Risk Management Drill Framework, which prescribed the basic policy on conducting disaster risk management drills and details of the government's comprehensive disaster risk management drills.

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

On September 1, 2018, which is Disaster Preparedness Day in Japan, a drill was conducted based on the scenario of operating government disaster headquarters. First, Prime Minister ABE and the rest of the Cabinet Office gathered at the Prime Minister's Office and conducted an operational drill of an 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). This included video-conferences with Governor KONO of Miyazaki 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, along with 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, self-help and mutual support in the event of a disaster and informed 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 Kawasaki City of Kanagawa Prefecture). Prime Minister ABE moved by helicopter from the Prime Minister's Office to the drill venue, where he saw a water-discharge exercise using fireboats and large water cannons based on a scenario of a fire at a refinery. Then, he joined local elementary and junior high school students for a drill in which participants hung yellow towels on house doors to let rescue units know that the residents have evacuated from the house safely, and a drill to make a makeshift stretcher using a blanket and laundry poles. Lastly, he joined rescue and relief drills participated by convoys dispatched from fire stations, police stations, SDF, and neighboring prefectures and cities.

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

Prime Minister ABE joining in an exercise to make a makeshift stretcher
(Prime Minister's Official Residence website)

(2) Government Tabletop Exercises

The government conducted a tabletop exercise for a Nankai Trough Earthquake in November 2018 and another exercise for a Tokyo Inland Earthquake in February 2019 to improve the knowledge and proficiency of officials from relevant ministries and agencies and enhance collaboration with relevant organizations. 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 exposed to hazard, specifically in the Kyushu region (Kumamoto Prefecture) in July 2018, Chubu region (Aichi Prefecture) in November 2018 and Shikoku region (Kagawa Prefecture) in January 2019. It also held a drill for the operation of the on-site extreme disaster management headquarters in Tokyo in February 2019 based on a Tokyo Inland Earthquake scenario.

Drills of the operations of an on-site extreme disaster management headquarters
(Aichi Prefecture)

State Minister of the Cabinet Office H.E. Mr. Nakane 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. On November 5, which is the Tsunami Preparedness Day in Japan and the World Tsunami Awareness Day, the

Cabinet Office, relevant ministries and agencies, local governments and private companies, among others, conducted nationwide initiatives to raise awareness of tsunami preparedness.

(1) Tsunami Evacuation Drills

Around the Tsunami Preparedness Day (November 5) in FY2018, the national government (12 ministries and agencies), local governments (180 government bodies) and private companies (74 organizations) held earthquake and tsunami preparedness drills nationwide, in which approximately 900,000 people took part.

These included drills for residents held by the Cabinet Office in partnership with local governments in 10 locations nationwide (Wakkanai City in Hokkaido, Takahama Town in Fukui Prefecture, Izu City in Shizuoka Prefecture, Yuasa Town in Wakayama Prefecture, Yanai City in Yamaguchi Prefecture, Matsumae Town in Ehime Prefecture, Shimanto City in Kochi Prefecture, Amakusa City in Kumamoto Prefecture, Nobeoka City in Miyazaki Prefecture and Naha City in Okinawa Prefecture). Approximately 13,000 citizens participated; 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). Various other drills were also held according to regional disaster management plans in order to practice skills such as setting up a shelter, installing disaster management headquarters, preparing and serving food to evacuees and first aid.

ShakeOut drill
(Takahama Town, Fukui Prefecture)

Tsunami evacuation drill for primary schoolchildren
(Shimanto City, Kochi Prefecture)

Evacuation drill for persons requiring special care
(Amakusa City, Kumamoto Prefecture)

Opening of shelter
(Wakkanai City, Hokkaido Prefecture)

(2) Public Awareness Campaigns Conducted by the Cabinet Office

(i) Public Awareness Campaign for Tsunami Preparedness

The campaign was deployed nationwide to boost public awareness of appropriate emergency evacuation in the event of a tsunami. The FY2018 campaign included displaying public awareness posters at various locations, including company and local government buildings and customer-facing cash registers at major convenience stores and supermarkets nationwide.

FY2018 public awareness poster

(ii) FY2018 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. In FY2018, the Special Tsunami Preparedness Day Event “Latest Science × Tsunami × Regional Disaster Risk Management” was held at the Kawasaki Chamber of Commerce and Industry KCCI Hall in Kawasaki City, Kanagawa Prefecture, in which companies, administrative bodies, and voluntary disaster risk management organizations participated.

The event programs included a special seminar presenting the latest scientific discoveries on tsunami and activities carried out according to community disaster management plans from across Japan, as well as a small workshop on tsunami disaster management education tools, which can be used in schools and by communities. At the opening ceremony, Mr. MAITACHI, Parliamentary Secretary of Cabinet Office and Mr. FUKUDA, Mayor of Kawasaki City gave speeches. Mr. MAITACHI said Japan should strive to develop effective tsunami preparedness measures by combining the latest scientific knowledge and community disaster management plans, pointing out that community disaster management plans and efforts made under such plans, which support self-help and mutual support, are highly effective in improving Japan’s total disaster resilience in his speech.

In the special seminar, Mr. IMAMURA Fumihiko, Director of the International Research Institute of Disaster Science (IRIDeS), led the on-site investigation on the damage of the earthquake and tsunami that hit Sulawesi, Indonesia on September 28, 2018, reported in his presentation that it took only six minutes after the earthquake for the tsunami to reach Palu, a city that suffered great damage from the disaster, while landslides, ground subsidence, and liquefaction also occurred concurrently. He pointed out that Japan needed to provide reconstruction support that also encompasses regional development.

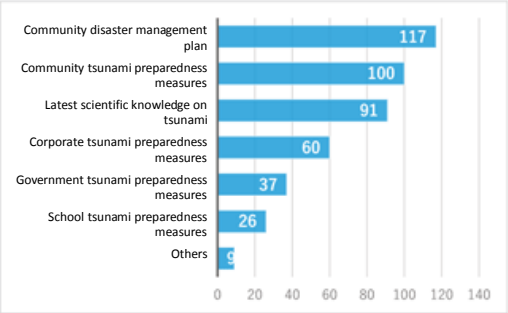
Moreover, communities working on community disaster risk management plans made presentations to give an interim report on specific activities carried out in FY2018. The Mori District, Tabe City, Wakayama Prefecture revised evacuation rules, including those for people who need special support in evacuation, while the Nakajima District, Matsuyama City, Ehime Prefecture examined evacuation sites and routes for tsunami using an evacuation simulator. In the panel discussion, panelists shared various opinions based on their experience. One of the panelists pointed out that it is important to deepen collaboration among various community members by securing opportunities for them to share honest opinions, as different people often have different opinions on tsunami preparedness. On the closing note, the panelists pointed out the importance of translating insights gained through this event into specific actions in communities and companies.

H.E. Mr. MAITACHI, Parliamentary Secretary of Cabinet Office, delivering opening remarks

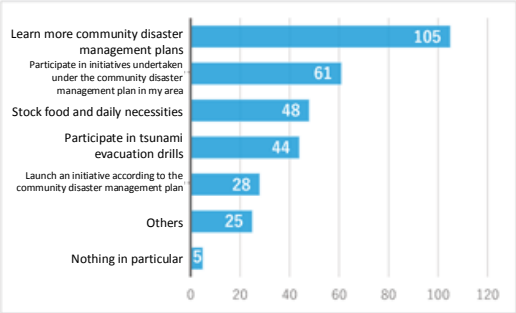
Special Tsunami Preparedness Day Event: Latest Science × Tsunami × Regional Disaster Risk Management

The survey conducted with the event participants (203 valid responses) showed their great interest in community disaster risk management plans. According to the survey results, the most common topic people hoped to learn about in the event (multiple answers allowed) was “community disaster risk management plan” (117), followed by “community tsunami preparedness measures” (100). Also, the most common action that participants hoped to take based on what they learned through the event was “to learn more about community disaster risk management plans” (105), followed by “to participate in initiatives undertaken under the community disaster risk management plan in my neighborhood” (61).

Q. What did you want to learn in this event? (Multiple answers allowed)



Q. What action would you like to take based on what you learned through this event? (Multiple answers allowed)



Source: Cabinet Office

Column:
Major Tsunami That Hit Indonesia

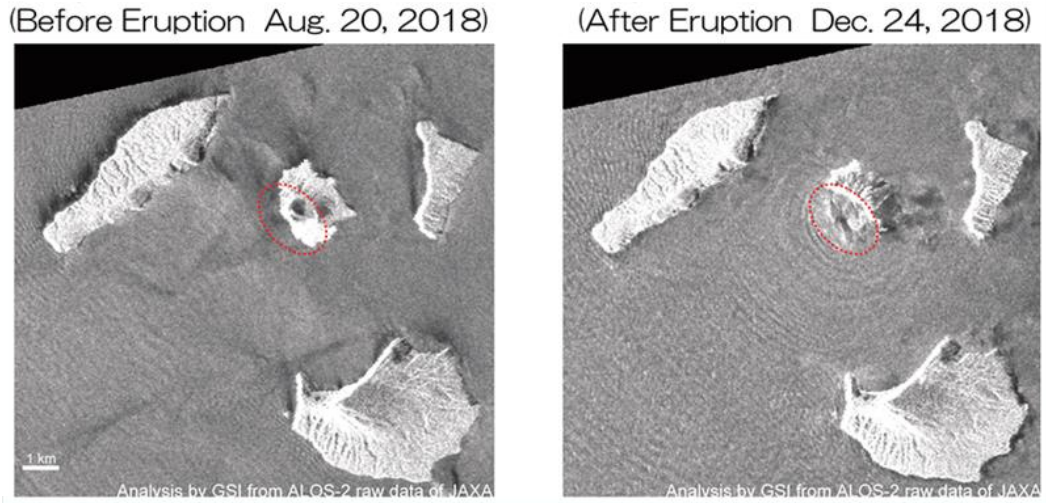
The overseas natural disaster that caused the most extensive damage in 2018 was the tsunami that hit Indonesia. The magnitude 7.5 earthquake that struck Sulawesi, Indonesia on September 28 caused more than 2,000 fatalities (as of October 2018). The bay of Palu, situated in the middle part of the island, suffered especially severe damage, including the liquefaction and ground failure at nine locations along the coast, which caused tsunamis. The landslides that occurred in these nine spots were caused by a phenomenon called “liquefied gravity flow.” This phenomenon caused a tsunami that reaches the shore in an extremely short time.

As a result of an on-site investigation by an expert team, the Japan International Cooperation Agency (JICA) found that the tsunami was caused by liquefaction in the coastal areas where the ground foundation was loose, such as the area near the river mouth. It assumes that the tsunami occurred when the sea level temporarily lowered due to landslides in the seabed. Liquefaction also occurred on the island as well, which caused mud flows that killed many people.

On December 22, 2018, there was another tsunami in the Sunda Strait in western Indonesia, which caused more than 400 fatalities. According to the analysis by the Earthquake Research Institute, the University of Tokyo, this major tsunami was not caused by an earthquake, but rather by a massive amount of mountain sediment (200 times the capacity of Tokyo Dome), which collapsed into the sea following a volcanic eruption in Anak Krakatoa. According to a satellite image analysis by the Geospatial Information Authority of Japan, nearly half of the island was lost in this disaster.

A similar catastrophic event happened in Japan, too. In 1972, a tremendous amount of sediment fell into the Ariake Sea as a result of the collapse of the Mayuyama Dome in front of Mt. Unzen in Shimabara City, Nagasaki Prefecture, which caused a massive tsunami toward Amakusa, Kumamoto Prefecture located on the opposite side of the sea. This major disaster, which is said to have killed about 15,000 people, is called “*Shimabara Taihen Higo Meiwaku*” in Japanese (meaning Shimabara suffers, Higo annoyed”). It is worthy of note that tsunamis caused by a factor other than earthquake, such as a collapse of a mountain, can happen not only overseas, but also in Japan.

Topographic Change Due to an Eruption of Krakatoa, Indonesia



Source: Geospatial Information Authority of Japan website
(Reference: https://www.gsi.go.jp/cais/topic181225-index-e.html)

1-5 Citizen-led Initiatives (Promoting Community Disaster Risk Management Plans)

The community disaster risk management planning system was established following the amendment of the Basic Act on Disaster Management in 2014 with an aim to enhance regional disaster resilience through the promotion of self-help and mutual support initiatives based on cooperation among residents (including companies operating in the area). This system allows community residents (including business operators with offices there) to draft a community disaster risk management plan and present it in the municipal council for disaster management to be reflected in the municipal disaster risk management plan.

According to a survey by the Cabinet Office, 3,206 communities have worked on developing community disaster risk management plans, of which those from 248 communities have been reflected in municipal disaster risk management plans as of April 1, 2018. Five years after the establishment of the system, formulating a community disaster management plan is becoming more and more common.

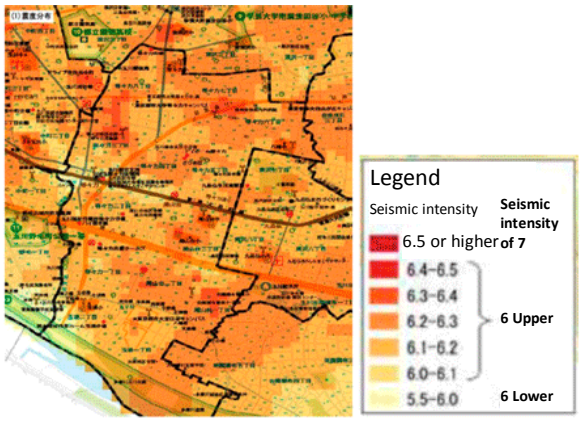
(1) Trends Concerning Community Disaster Risk Management Plans

The Cabinet Office analyzed 166 community disaster risk management plans that have been reflected in municipal disaster risk management plans. It was found that they have the following common characteristics.

①Activities for preparing a community disaster risk management plan were started at the initiative of the local (municipal) government in 69% of the communities. It is important to ensure the appropriateness of government-initiated activities for developing community disaster risk management plans, in order to encourage residents to engage in such activities, keeping in mind that a community disaster risk management plan should be prepared at the initiative of the residents in principle.

②In some communities, residents investigated disaster risks, hazard areas, and social characteristics of the area (such as the ratio of older people and day-time and night-time populations). For example, residents examined past disasters in the area (e.g. Ando District, Ozuchi Town, Iwate Prefecture; Taira Shiroyama District, Iwaki City, Fukushima Prefecture), checked hazard areas by laying a disaster map provided by the government over a detailed map of the area (*e.g.* Todoroki District, Setagaya-ku, Tokyo), mapped hazard spots and issues identified in field studies (*e.g.* Senju Motomachi District, Adachi-ku, Tokyo), and analyzed

the constitution, history, natural and social environment of the community (*e.g.* Shuzenji New Town, Izu City, Shizuoka Prefecture).



Distribution of seismic intensity

Distribution of liquefaction risks

Source: Todoroki District Community Disaster Risk Management Plan (Earthquake) (prepared in 2017)

③Most plans cover items the community considers necessary in each phase of a disaster, from pre-disaster to initial response immediately after the disaster, evacuation (actions to take and establishment of shelters), and a stay at an evacuation shelter (Fig. 1-5-1).

Fig. 1-5-1 Example of Items Included in Community Disaster Risk Management Plans

Preventive initiatives	101
Initial response (immediately after earthquake, wind, or flood disaster)	134
Evacuation, establishment of shelters	105
Stay at shelters, management (rules, etc.)	70

(n = 166)

*Items may be referred to in multiple phases.

Drills (based on the plan)	134
Awareness campaigns, education on disaster prevention (flyers, seminars, etc.)	97
Stock	62
Evacuation sites and routes	56
Measures for people who need special care (support for evacuation, making a list, etc.)	55
Map (inclusion in the plan/revision)	48
Establishing organizations	27
Checklist (measures for households, checking contact information, etc.)	26
Management of shelters (making a manual, consultation with schools, etc.)	19

(n = 166; items may fall under multiple categories)

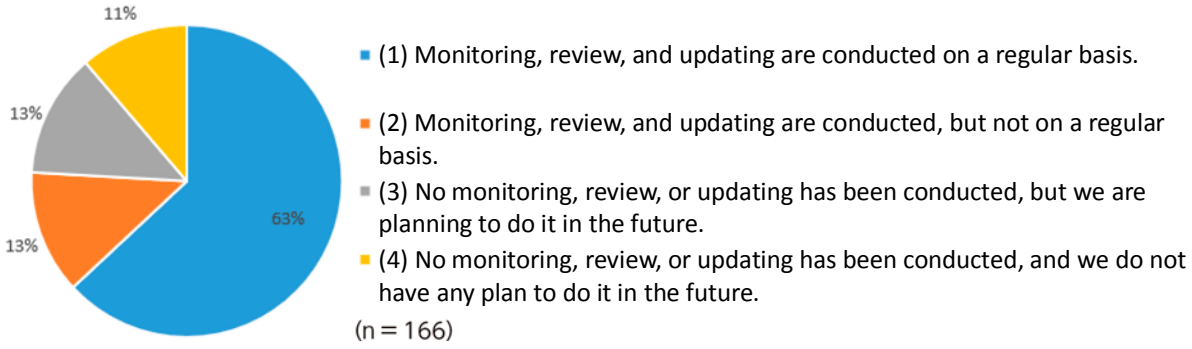
Source: Survey by the Cabinet Office (analysis of community disaster risk management plans that have been reflected in municipal disaster management plans; as of April 2018)

④Many community disaster risk management plans define neighborhood and community associations, voluntary disaster management organizations, and the like as implementing bodies of the plan. Some plans involved collaboration among neighborhood and community associations and volunteer organizations for elderly support (*e.g.* Uchigo Takasaka District, Iwaki City, Fukushima Prefecture), while others involved collaboration among PTAs, children's associations, social workers and children's social workers, and regional security organizations from the viewpoint that a disaster should be tackled by the entire community rather than by a voluntary disaster management organization alone (*e.g.* Fuji-eki Minami District, Fuji City, Shizuoka

Prefecture). There were also plans that included corporations located in the area. In some communities, residents started activities for developing a community disaster risk management plan for each apartment and housing complex (*e.g.* UR Oyamadai Housing Complex (Kamio City, Saitama Prefecture); Yonemoto Housing Complex (Yachiyo City, Chiba Prefecture)).

⑤Some communities conducted workshops by residents, disaster prevention drills, seminars, and surveys in the planning process in order to identify local challenges. From the viewpoint of enhancing the effectiveness of the plan, it is important to involve various local organizations (*e.g.* schools, welfare facilities, community development NPOs) in the planning process and share among various entities residing or operating in the area issues that may arise in the event of a disaster as well as what kind of support each member can offer to the community. It is vital to follow a careful preparation process and take as much time as it requires, rather than rushing to complete the plan.

⑥Community disaster risk management plans should be regularly revised and updated as necessary. According to the survey results, 63% of the communities revises the plan on a regular basis, and 13% on a non-regular basis.



Also, some communities held meetings, panel exhibitions, and disaster management programs at local events in order to raise residents' awareness on the community disaster risk management plan (*e.g.* Miyoshi District, Ozu City, Ehime Prefecture).

(2) Initiatives by the Cabinet Office

①Community Disaster Risk Management Plan Forum

In order to share examples and experience related to community disaster risk management plans and promote their formulation, the Cabinet Office held "the 2019 Community Disaster Risk Management Plan Forum: Various Approaches to Community Disaster Risk Management Planning" in Osaka City on March 16, 2019. In this forum, with the attendance of H.E. Mr. YAMAMOTO, Minister of State for Disaster Management, various participants shared case studies from their areas. Osaka City shared the example of the community disaster risk management plan of Miyoshi District, Ozu City, which proved to be remarkably effective during a disaster in 2018. Kurashiki City, Okayama Prefecture shared its intention to develop a community disaster risk management plan based on the lessons learned from disasters in 2018. The Urban Renaissance Agency, office buildings, and fire fighters also shared community disaster risk management plans they had been working on.

H.E. Mr. YAMAMOTO, Minister of State for Disaster Management, delivering opening remarks

Community Disaster Risk Management Plan Forum

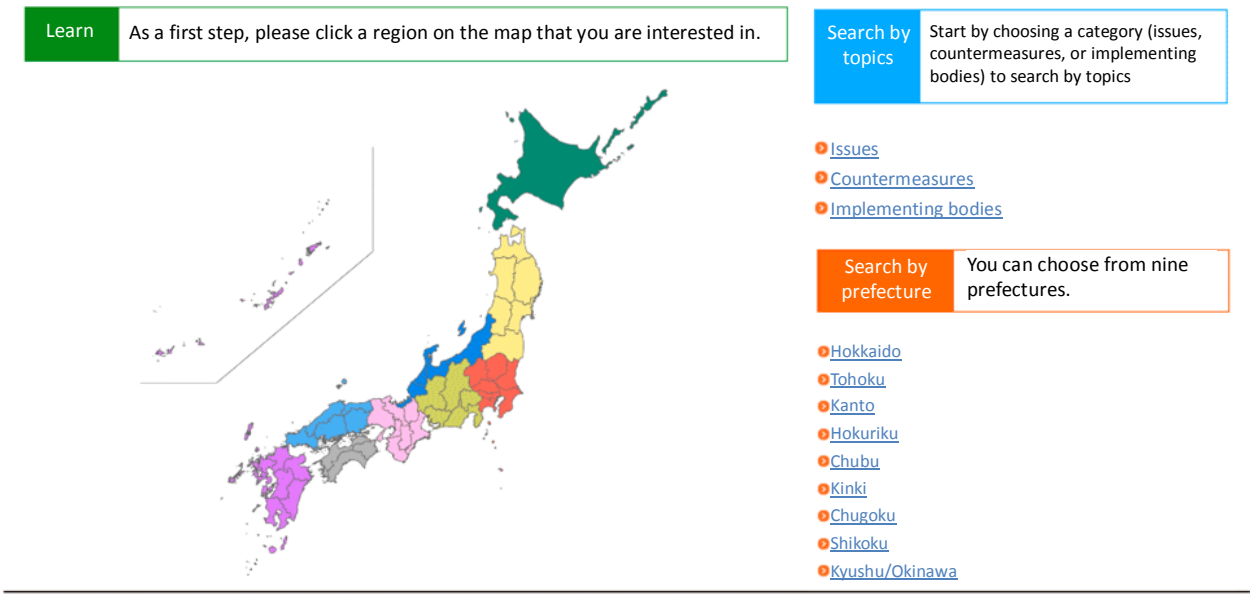
②Establishment of Chikubo'z, a Network of Local Government Officials Working on Community Disaster Risk Management Plans

During the closing ceremony of the above forum, a network of local government officials working on community disaster risk management plans, named Chikubo'z, was officially established. Chikubo'z is intended to help local government officials share with each other information, opinion, and experience concerning community disaster risk management plans more easily on a daily basis. As of the end of March 2019, 253 officials have joined the network. Full-fledged opinion exchange will be promoted from FY2019 onward.

Local government officials that participated in the forum (members of Chikubo'z)

③Establishment of the Community Disaster Risk Management Plan Library

In April 2019, the Cabinet Office opened an online library of community disaster risk management plans that have been reflected in municipal disaster risk management plans. The uploaded plans can be browsed on the Cabinet Office website and can be searched by index attached according to the content of the plan (*e.g.* issues covered, countermeasures, implementing body, etc.). This library is intended to help planners clearly understand what they should aim for in a community disaster risk management plan by providing an easy way to search plans across Japan.



Source: Cabinet Office website
(Reference: http://www.bousai.go.jp/kyoiku/chikubousai/chikubo/chikubo/index.html)

1-6 Development of an Enabling 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 affected areas have played an increasingly vital role. Individual volunteers, NPOs, and other organizations that gathered in the affected areas have provided support for affected people in the fields that are difficult for public support to reach. The Cabinet Office has strived to make an environment that facilitates volunteers' support for the affected people. As a result, it has become more common to address disasters under tripartite collaboration among the government, volunteers, and NPOs, as seen in the 2016 Kumamoto Earthquake, July 2017 Northern Kyushu Heavy Rain, and Heavy Rain Event of July 2018.

For the Heavy Rain Event of July 2018, the government, volunteers, and NPOs held regular information sharing meetings to coordinate operation areas and support activities for the affected people in the affected areas, including Okayama, Hiroshima, and Ehime Prefectures. Moreover, national information sharing meetings were held to share with other prefectures issues that a prefecture cannot solve on its own and to seek effective solutions through inter-regional collaboration. With the attendance of the Cabinet Office and organizations which support the affected people, various active discussions were held on such topics as the recruitment of volunteers and procurement of necessary materials and equipment according to the situation of the affected area. In order to prepare for major disasters, which are predicted to occur in the future, it is important for each region to have established a collaborative network among the government, volunteers, and NPOs before a disaster occurs.

Recent Trends Concerning DRR Volunteer Activities

<Major disasters and volunteer activities> (Year)	(Disaster)	(Total number of volunteers)	<Trends concerning volunteerism>	<Measures taken by the government>
1995	**The Great Hanshin-Awaji Earthquake**	**Approx. 1,377,000**	☆Volunteerism for affected people support became more active (beginning year of volunteerism). ★The situation became chaotic as many volunteers rushed to disaster affected areas.	■Amendment of the Basic Act on Disaster Management (1995) Stipulated that the government would strive to establish an environment for disaster volunteerism
1997	The marine accident involving the M.V. Nakhodka	Approx. 270,000		
2004	Typhoon Tokage (0423)	Approx. 56,000	☆It became common that Councils of Social Welfare establish and manage disaster volunteer centers (VCs).	■Investigative Committee on Volunteer Activities Launched by the Cabinet Office in 2004
2004	**The Mid Niigata Prefecture Earthquake**	**Approx. 95,000**		
2007	Noto Hanto Earthquake	Approx. 15,000		
2007	The Niigataken Chuetsu-oki Earthquake	Approx. 15,000		
2009	Typhoon Etau (0909)	Approx. 22,000		
2011	**The Great East Japan Earthquake**	**Approx. 1,500,000**	☆Volunteer activities by NPOs, NGOs, companies, etc. (approx. 4 million volunteers worked outside the management of disaster VCs) ☆Various needs were fulfilled by expert volunteers. ★Building a network became a challenge. ★The need for **intermediaries** to coordinate NPO volunteer activities was noted. ☆**Information sharing meetings** were held under **tripartite collaboration** among the government, NPOs, and volunteers (Hinokuni Meeting) ☆The JVOAD was established as an intermediary. ☆Information meetings were held in the affected areas. ☆Information meetings were held on prefectural and national levels.	■Amendment of the Basic Act on Disaster Management (2013) Stipulated that the government would strive for effective collaboration with volunteers The Basic Plan for Disaster Risk Reduction was also revised. ■Guidebook for tripartite collaboration (April 2018) ■Revision of the Basic Plan for Disaster Risk Reduction (2018) Stipulated that the government would strive to establish a collaborative network incorporating intermediaries
2014	Hiroshima Torrential Rain	Approx. 43,000		
2015	Torrential Rain in the Kanto and Tohoku Regions	Approx. 47,000		
2016	**The Kumamoto Earthquake**	**Approx. 118,000**		
2017	**Northern Kyushu Heavy Rain**	**Approx. 60,000**		
2018	**Heavy Rain Event of July 2018**	**Approx. 263,000**		
2018	Hokkaido Eastern Iburi Earthquake	Approx. 11,000		

Source: Formulated by the Cabinet Office based on materials provided by the Ministry of Health, Labour and Welfare, and documents and reports by the Japan National Council of Social Welfare

(1) Coordination and Collaboration of 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 in April 2018 the Guidebook for the Government in Collaboration and Coordination with NPOs and Volunteers, which mainly covered tasks assigned to administrative officers before and after a disaster, with a view to promoting 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, under both normal times and disasters accordingly (Reference: http://www.bousai.go.jp/kaigirep/kentokai/bousai_volunteer_kankyoseibi/index.html).

With a view to further promoting collaboration and coordination among the government, NPOs, and volunteers, a meeting of the Study Group on Collaboration and Coordination of DRR Volunteer Activities was held in FY2018. Based on what was discussed in this meeting, the government held Seminars for Collaboration and Coordination among the Government, NPOs, and Volunteers in the Event of a Disaster in six locations. Each seminar had approximately 100 participants from the government, Councils of Social Welfare, and NPOs. The seminars revealed the importance of building a face-to-face relationship among the government, volunteers, and NPOs from before a disaster in order to ensure that they can smoothly work in coordination to support affected people in the event of a disaster. There was also a workshop aimed at building a collaborative network with various support entities, which helped participants gain clearer understanding on such collaboration.

<Seminar Venues>

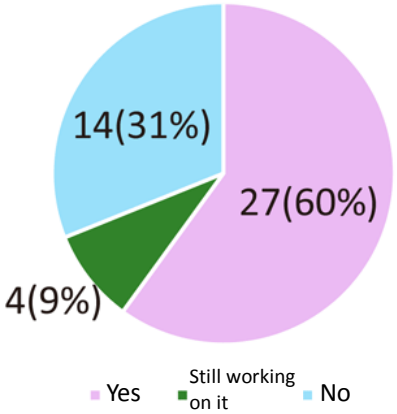
- Gifu Prefecture (November 30, 2018): 103 participants (34 from the government, 27 from Councils of Social Welfare, and 42 from NPOs)

- Miyazaki Prefecture (December 17, 2018): 114 participants (41 from the government, 31 from Councils of Social Welfare, and 42 from NPOs)
- Yamaguchi Prefecture (December 21, 2018): 68 participants (24 from the government, 17 from Councils of Social Welfare, and 27 from NPOs)
- Oita Prefecture (February 4, 2019): 126 participants (26 from the government, 30 from Councils of Social Welfare, and 70 from NPOs)
- Chiba Prefecture (February 11, 2019): 75 participants (20 from the government, 24 from Councils of Social Welfare, and 31 from NPOs)
- Hokkaido Prefecture (March 9, 2019): 46 participants (17 from the government, 16 from Councils of Social Welfare, and 13 from NPOs)

Seminars for Collaboration and Coordination among the Government, NPOs, and Volunteers in the Event of a Disaster

The government also conducted a survey with prefectures on the establishment of a council or network incorporating NPOs, Social Welfare Council and various other entities. 60% of the prefectures responded that they had such a network, while 31% did not. It is important to further promote the establishment of such DRR network, while clarifying the functions and roles of existing networks and expanding the circle of collaboration.

Has a prefectural DRR network with various entities been established? (As of April 1, 2018)



Source: Cabinet Office (2 prefectures did not respond)

(2) Drills in collaboration with government and volunteers

In order to ensure smooth collaboration and coordination among the government, NPOs, and volunteers in the event of a disaster, it is important to promote mutual interaction and understanding before the disaster through drills and workshops. The Cabinet Office holds such events in order to provide opportunities for the government, NPOs, and volunteers to meet face-to-face and gain deeper mutual understanding on various

challenges concerning collaboration and coordination.

For FY2018, a drill was conducted in Fukuoka Prefecture in March 2019. During the July 2017 Northern Kyushu Heavy Rain, information sharing meetings were launched in the affected areas, including Asakura City, Fukuoka Prefecture, under tripartite collaboration among the government, volunteers, and NPOs. In the drill, a practical exercise simulating the establishment of an information sharing meeting was conducted with the attendance of the member of the information sharing meeting for the July 2017 Northern Kyushu Heavy Rain, with a view to reviewing the disaster and ensuring the swift setup of a meeting for future disasters.

The drill effectively promoted participants' understanding of tripartite collaboration. One of the participants said, "I would like to start with what I can do to solve various issues identified in the drill. I think it is important to build a network with local companies and various other entities before a disaster."

<Drill Venue>

- Fukuoka Prefecture (March 5, 2019): 52 participants (16 from the government, 11 from Councils of Social Welfare, and 25 from NPOs)

Drill on collaboration among the government, NPOs and volunteers
(Fukuoka Prefecture)

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) formulated by the Cabinet in March 2014. Based on the Plan, the Cabinet Office conducts annual assessment on its BCP with experts. It also held 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 December 2018. The government service continuity system will be implemented in the event of a potential Metropolitan Inland Earthquake through these initiatives to smoothly continue administrative operations.

(2) Development of Business Continuity Systems by Local Governments

Local governments need to maintain their administrative function and continue to work even when a disaster occurs. Therefore, it is extremely important for them to have their own BCP in place and establish its implementation system before a disaster occurs. The BCP preparation rate of local governments had reached

100% by the end of FY2016. In terms of municipalities (including special zones), this ratio increased from the previous survey by 17 points to 81% in June 2018 (Fig. 1-7-1).

The Cabinet Office published the Business Continuity Plan Formulation Guidelines for Municipalities in FY2015, aiming to make BCP planning easier for all municipalities, including small municipalities and special zones. In addition, the Cabinet Office amended the Business Continuity Manual for Local Governments During Earthquake Disasters to take account of past disasters, published the revised version in February 2016 under the title Business Continuity Manual for Local Governments During Major Disasters, and distributed it to local governments.

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 FY2016, based on an understanding that local governments should have a BCP in place and establish a system to smoothly and effectively receive assistance from the national government, other local governments, private companies, volunteer organizations and others.

Moreover, since FY2015, the Cabinet Office has held workshops (co-organized by the Cabinet Office and the Fire and Disaster Management Agency) to train relevant municipal employees in order to support the establishment of a system for business continuity in local governments.

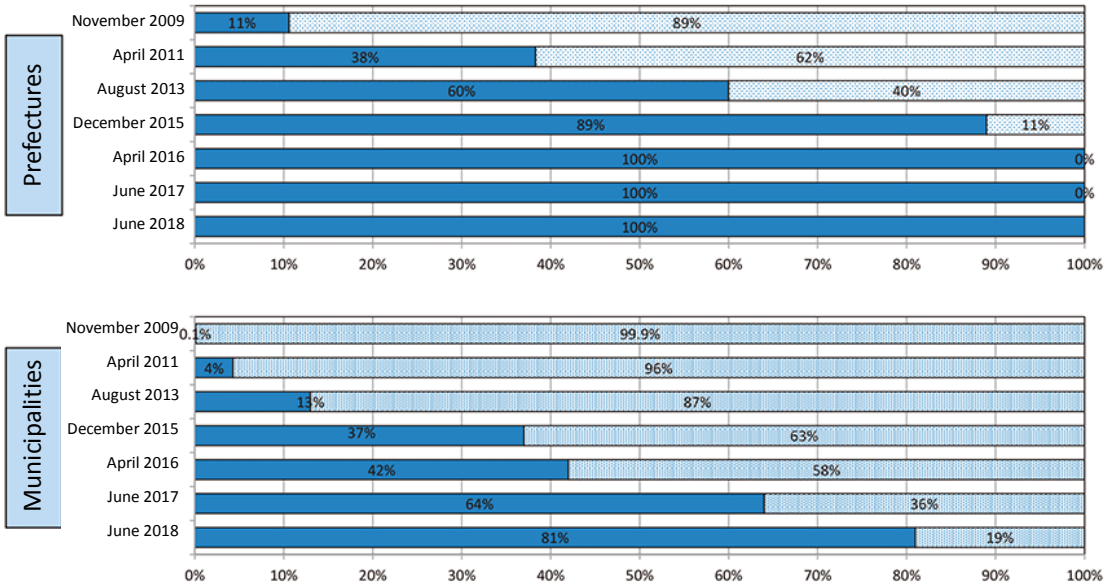
Together with the Ministry of Internal Affairs and Communications (MIC) and the Fire and Disaster Management Agency, the Cabinet Office will continue to promote through the above initiatives the establishment of business continuity systems in local governments, which involves the formulation of BCPs, enhancement of the Six Critical Factors* in formulated BCPs, and the establishment of a structure to receive support.

Note) Six Critical Factors: (1) clearly defined leadership structure in the case of absence of the mayor, and a system to gather employees; (2) specification of an alternative building to use when the local government's main building has become unavailable; (3) procurement of electricity, water, food, etc. (which are necessary for employees to perform their duties); (4) various communication means that tend to be available even in the event of a disaster; (5) backup of important administrative data; and (6) priority duties in the event of a disaster.

Reference: Guidelines for Business Continuity of Local Governments in the Event of a Major Disaster; Cabinet Office; http://www.bousai.go.jp/taisaku/chihogyoumukeizoku/index.html

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

The BCP preparation rate reached 100% in prefectures and 81% in municipalities as of June 1, 2018.



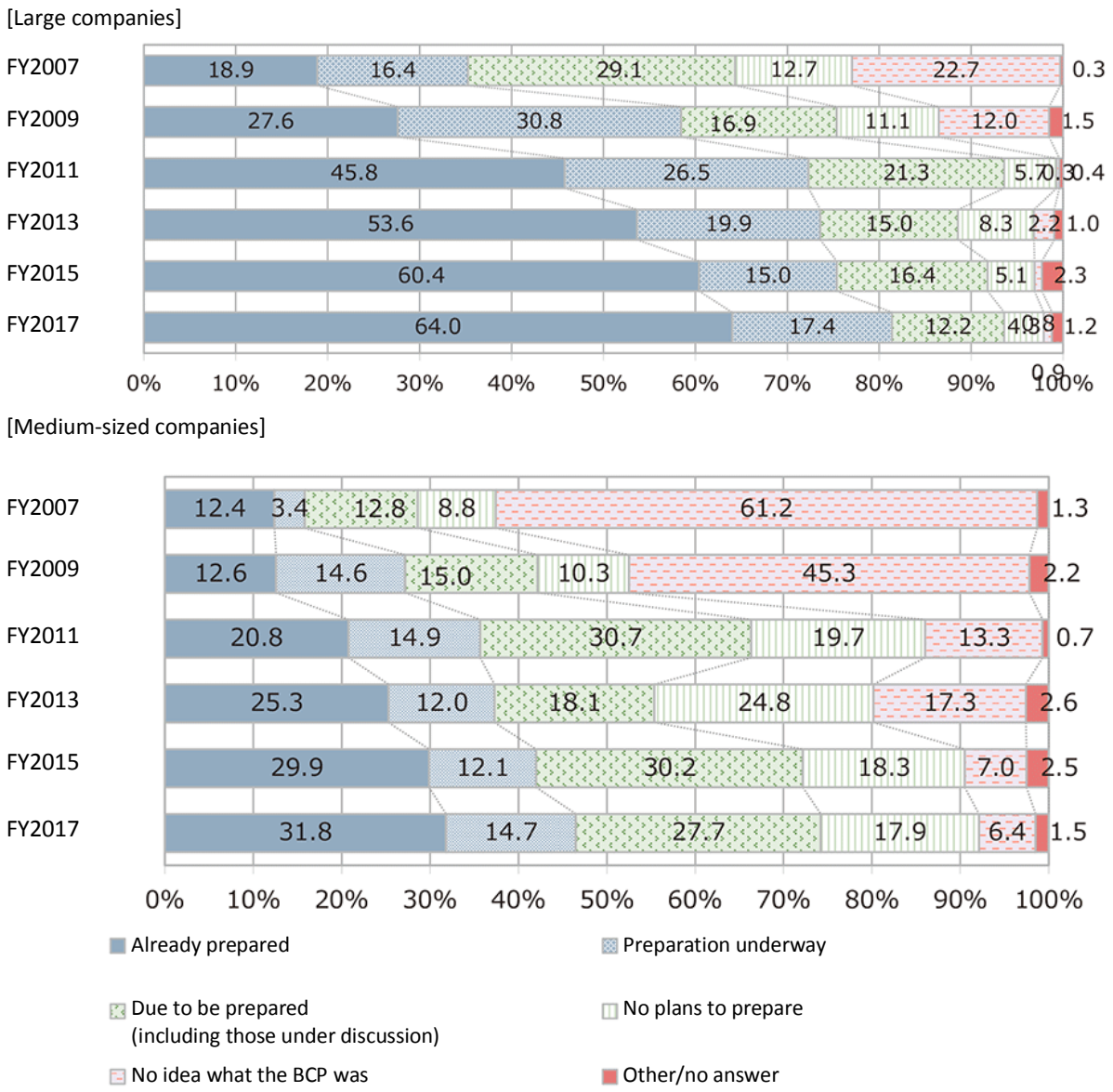
Source: November 2009 Survey of Business Continuity Plans Based on an Earthquake Disaster (Cabinet Office and Fire and Disaster Management Agency Survey)
April 2011 Local Government Information Management Report (March 2012) Ministry of Internal Affairs and Communications Local Administration Bureau 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 Advisories 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)
June 2018 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 –“. Companies are encouraged to build a business continuity system in accordance with these Guidelines.

In terms of specific government targets, the Action Plan for National Resilience 2018 sets a goal of ensuring that 100% (nationwide) of large companies and 50% (nationwide) of medium-sized companies have prepared BCPs by 2020. The Cabinet Office conducts a 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 Survey on Company Business Continuity and Disaster Preparedness Initiatives, which was conducted in March 2018, showed that formulation 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). When companies currently in the process of formulating a BCP are also included, these figures rise to approximately 80% and just under 50%, respectively (Fig. 1-7-2).

Fig. 1-7-2 Preparation of BCPs by Large and Medium-sized Companies (No. of companies: 1,985)



Source: Cabinet Office website (Release of the Results of the Fact-Finding Survey on Company Business Continuity and Disaster Preparedness Initiatives; June 2018)
(Reference: http://www.bousai.go.jp/kyoiku/kigyou/topics/index.html)

The Cabinet Office conducted “the Survey on Corporate Response Measures to Prepare for Natural Disasters“ targeting companies located in the areas that suffered significant damage from major disasters in FY2018 in order to grasp their status of BCP formulation and the implementation or development of preparedness measures and post-disaster response measures (Fig. 1-7-3).

Fig. 1-7-3 Collection Rate of Questionnaires in FY2018 Company Survey (No. of companies: 1,613)

Industry	Number of respondents	Industry	Number of respondents	Industry	Number of respondents
Fisheries, agriculture, and forestry	11	Non-ferrous metals	8	Information and communications	82
Mining	1	Metals	35	Wholesale trade	157
Construction	174	Machine manufacturing	80	Retail trade	149
Food manufacturing	50	Electrical equipment manufacturing	66	Real estate	50
Textile	23	Transportation equipment manufacturing	51	Service	202
Pulp and paper	15	Precision equipment manufacturing	19	Banking	45
Chemicals	70	Other manufacturing industry	44	Securities, commodity futures trading	7
Pharmaceuticals	20	Electricity and gas	24	Insurance	8
Oil and coal	11	Land transportation	86	Other financial business	8
Rubber product manufacturing	10	Marine transportation	8	Others	39
Glass, soil and stone	23	Air transportation	2		
Iron and steel	14	Warehouse/transportation-related business	21	Total	1,613

Item \ Number of employees of the respondent company	Total	301 or more	51-300	50 or less	No response
Number of respondents	1,613	678	557	329	49
Number of respondents that have formulated a BCP	699	489	177	33	-
Proportion of companies that have formulated a BCP*	43.3%	30.3%	11.0%	2.0%	

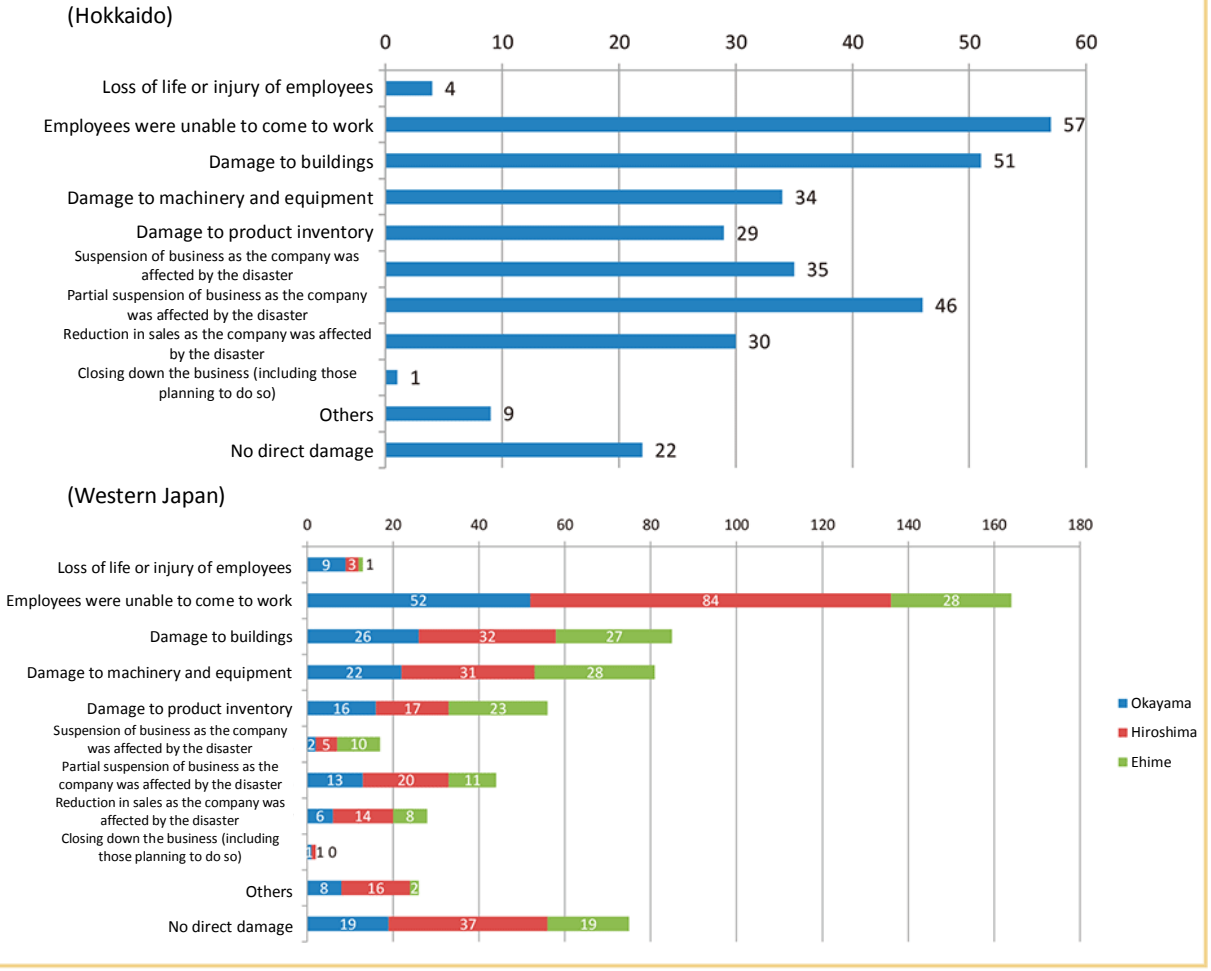
*The divisor is 1,613, which also includes non-respondents.

Note) The number of respondents by area struck by natural disasters in FY2018 is as follows:
- Area affected by the Hokkaido Eastern Iburi Earthquake: 198 (Hokkaido Prefecture)
- Area affected by the Northern Osaka Earthquake: 216 (Osaka Prefecture)
- Areas affected by the Heavy Rain Event of July 2018 (western Japan torrential rains), Typhoons Jebi (1821) and Trami (1824): 173 (Okayama Prefecture), 199 (Hiroshima Prefecture), 153 (Ehime Prefecture)
- Business clusters (area that was free of disasters): 383 (Tokyo)
- Other prefectures: 291

Source: Formulated by the Cabinet Office based on the Survey on Corporate Response Measures to Prepare for Natural Disasters

The survey results showed that the proportion of companies that had formulated a BCP was higher among larger companies, which was also observed in the FY2017 Survey on Company Business Continuity and Disaster Preparedness Initiatives. For the question of what kind of direct damage respondents suffered from the disaster, the most common answer was that “employees were unable to come to work” in both affected areas, namely Hokkaido and western Japan (Ehime, Okayama, and Shimane Prefectures). Therefore, existing BCPs should be revised to see if they include a scenario where not all of the employees can come to work (Fig. 1-7-4).

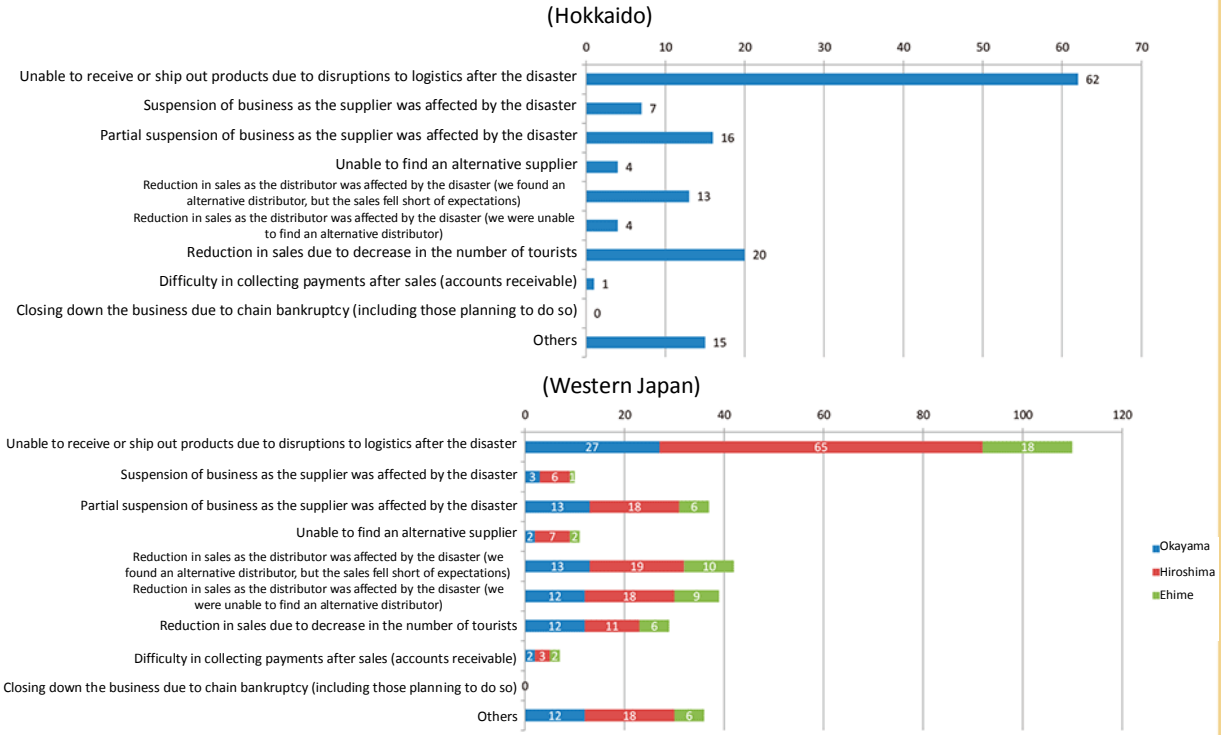
Fig. 1-7-4 **Direct Damage Companies Suffered from Natural Disasters That Occurred in FY2018 (Multiple Answers Allowed)**



Note) The number of respondents by prefecture is as follows: Hokkaido Prefecture - 318 in total; Okayama Prefecture – 174 in total; Hiroshima Prefecture – 260 in total; Ehime Prefecture – 157 in total.
Source: Formulated by the Cabinet Office based on the Survey on Corporate Response Measures to Prepare for Natural Disasters

When asked about indirect damage from disasters, the most common answer was that they were “unable to receive or ship out products due to disruptions to logistics after the disaster,” followed by the second most common response that they were “affected by suppliers and distributors that were affected by the disaster” (Fig. 1-7-5). Therefore, companies should be prepared for the case in which they themselves are not directly affected by a disaster, and incorporate such a scenario in the BCP (such as including measures to prevent indirect damage).

Fig. 1-7-5 **Indirect Damage Companies Suffered from Natural Disasters That Occurred in FY2018 (Multiple Answers Allowed)**



Note) The number of respondents by prefecture is as follows: Hokkaido Prefecture - 142 in total; Okayama Prefecture – 96 in total; Hiroshima Prefecture – 165 in total; Ehime Prefecture – 60 in total.
Source: Formulated by the Cabinet Office based on the Survey on Corporate Response Measures to Prepare for Natural Disasters

As seen above, a BCP solely focused on the company itself would not be able to mitigate direct and indirect damage sufficiently in the event of a disaster. When asked about inter-company collaboration (meaning that different companies share the BCP in part or in whole or that the BCP includes measures to be carried out under collaboration of different companies), 309 respondents answered that they were working on a BCP involving group companies and partners. Among these respondents, 290 companies were developing a BCP encompassing the entire company group. The number of companies involved in a BCP was mostly a few, while some BCPs included more than a few 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.

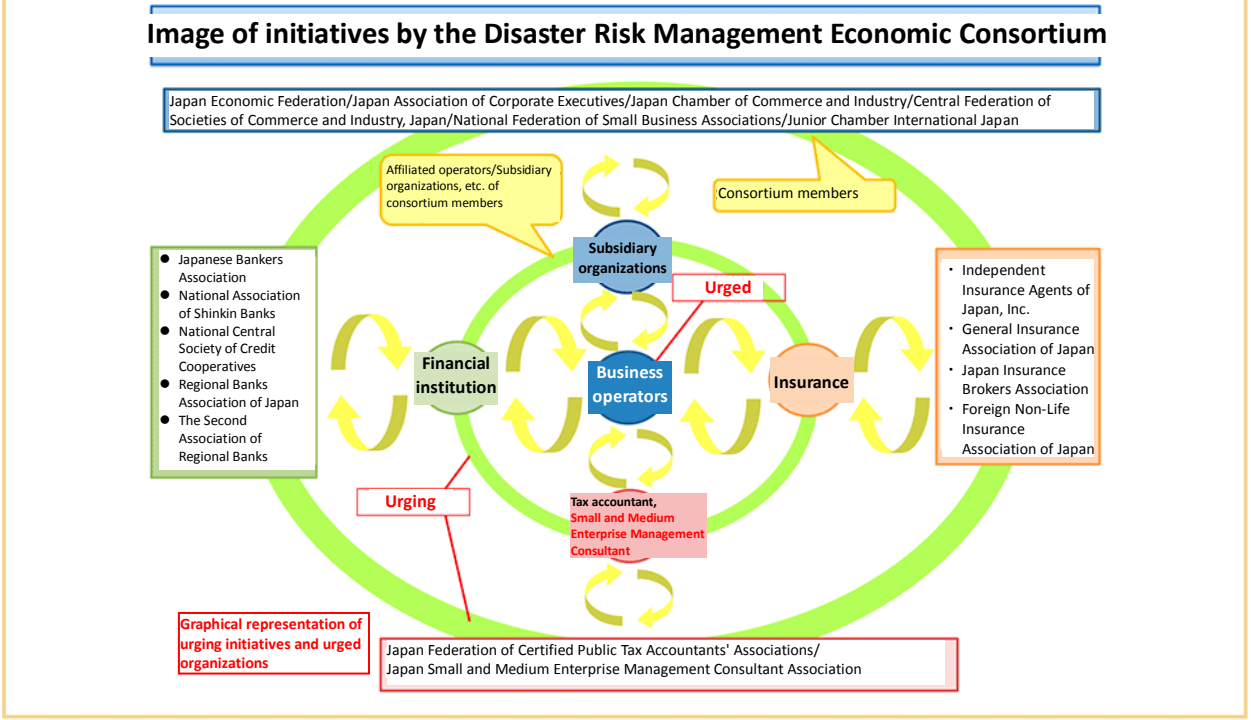
1-8 Partnerships with Private Sector

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 Risk 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).

The Cabinet Office promotes such private initiatives by sharing information under the framework of public-private collaboration. In FY2018, the Cabinet Office published a simulation of earthquake damage (losses estimation tool) on its website for corporate use.

Reference: http://www.bousai.go.jp/kyoiku/consortium/index.html

Fig. 1-8-1 Disaster Risk Management Economic Consortium



Source: Cabinet Office

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

In FY2018, the members of the 13 economic groups carried out awareness raising activities to ensure that the Principles are known and understood by their subordinate groups. Through activities to promote the Principles, various entities developed a structure to thoroughly and continuously promote corporate disaster risk management. Also, four secretariat meetings were held for information sharing and interaction among the consortium members. Each member shared its disaster preparedness and response measures, while government organizations shared information on disaster risk management. Four new organizations plan to join the Consortium in FY2019. The Cabinet Office intends to promote the total disaster resilience of society using an SME-based approach, working in collaboration with the Small and Medium Enterprise Agency on the SME Resilience Enhancement Measures (support measures concerning the formulation of business continuity capacity enhancement plans and support measures for companies whose plans were approved).

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

Principles of Disaster Risk Management Economic Action

March 23, 2018
Disaster Management Economic Consortium

[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 Risk 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 Risk Management Economic Action]

1. The members of the Disaster Risk Management Economic Consortium must strive to achieve the preparations (1) to (4) as described in the Preface.

2. The members of the Disaster Risk Management Economic Consortium must strive to the 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 Risk 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 risk management, including hazards such as earthquakes, tsunamis, volcanoes, and meteorological phenomena; civil engineering; buildings; seismic proof 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 risk 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 (JANDR) was established to serve as a network of academic societies involved in disaster risk management, mitigation, and reconstruction. The network comprised 47 academic societies among its membership at the time of its launch in January 2016, but this figure had grown to 57 by the end of March 2019.

With an aim to strengthen pre-disaster and emergency collaboration between academia and the government, the JANDR held the first Liaison Conference on Disaster Risk Management among the Science Council of Japan, Academic Societies, and Government Ministries and Agencies on June 5, 2018, which was participated by 56 member academic societies, the JANDR, Science Council of Japan (SCJ), and the representatives of ministries and agencies engaged in DRR. In the Heavy Rain Event of July 2018 (western Japan torrential rains), the JANDR issued the Emergency Message to People in Japan Regarding the Western Japan Torrential Rains on July 22, 2018. It also co-hosted the Emergency Reporting Session on the Western Japan Torrential Rains with the SCJ on September 10, 2018. Lastly, on March 12, 2018, the JANDR held the Conference for Academic Studies on Consecutive Natural Disasters That Occurred in the Summer of 2018.

First Liaison Conference on Disaster Risk Management among the Science Council of Japan, Academic Societies, and Government Ministries and Agencies

1-10 Initiatives from the Perspective of Gender Equality

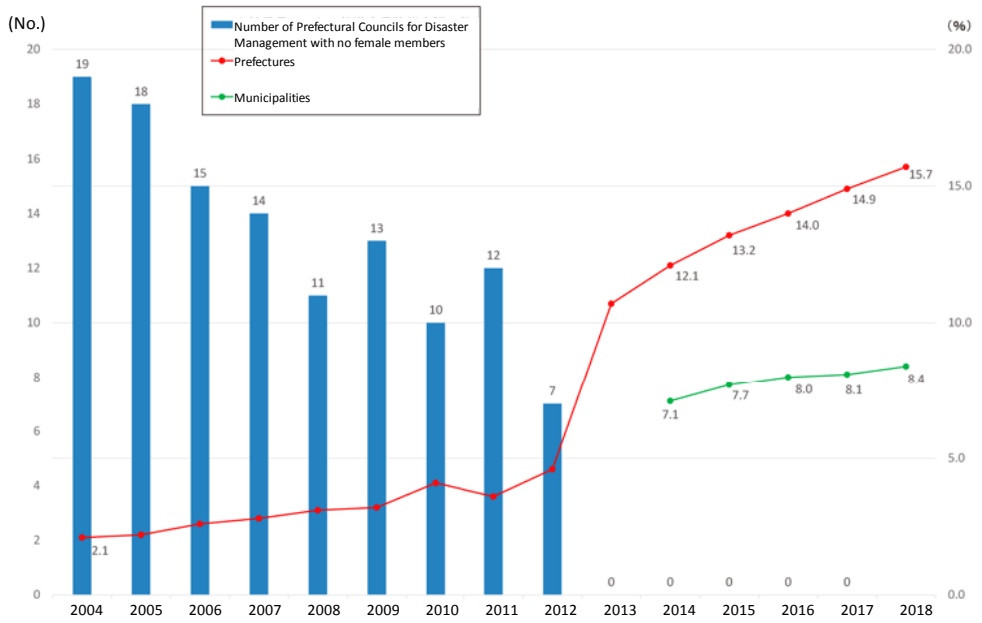
In the Fourth Basic Plan for Gender Equality (approved by the Cabinet on December 25, 2015) and the Basic Plan for Disaster Risk Reduction (approved by the National Disaster Management Council on February 16, 2016), the Cabinet Office has specified that consideration must be given to the differing needs of men and women in all aspects of disaster risk 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 risk 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 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 shelter operation. Among the issues raised were the lack of specific supplies for women and

a failure to provide breastfeeding or changing places.

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. Following the 2016 Kumamoto Earthquake and the Heavy Rain Event of July 2018, the Cabinet Office made a request to affected local governments for adopting a gender equality perspective based on these guidelines, especially in the shelter operation.

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.

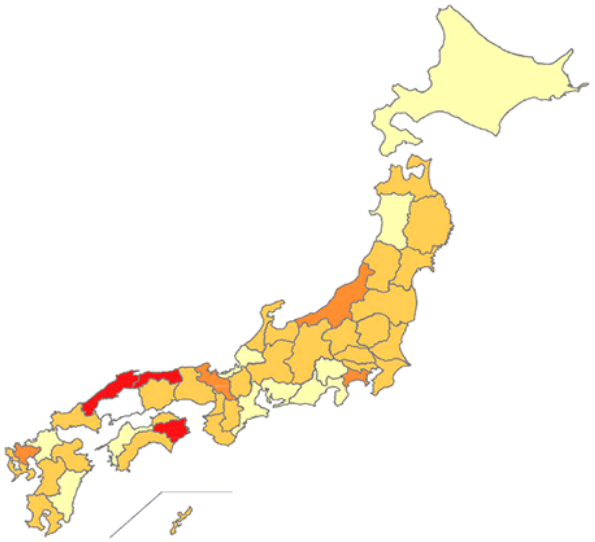
Notes: 1. Figures for April 1 each year, in principle.

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 in Prefectural Councils for Disaster Management

Prefecture	Total No. of members	No. of female members	Percentage of female (%)	
Tokushima	81	39	48.1	40% or more, 3 councils
Shimane	73	35	47.9	
Tottori	65	28	43.1	
Saga	68	19	27.9	20% - 30%, 4 councils
Niigata	71	19	26.8	
Kyoto	66	14	21.2	
Kanagawa	57	12	21.1	
Gifu	61	12	19.7	10% - 20%, 29 councils
Shiga	58	11	19.0	
Aomori	60	11	18.3	
Miyagi	56	10	17.9	
Tochigi	53	9	17.0	
Yamagata	60	10	16.7	
Kagawa	60	10	16.7	
Nagasaki	68	11	16.2	
Okayama	57	9	15.8	
Toyama	66	10	15.2	
Nagano	67	10	14.9	
Chiba	61	9	14.8	
Iwate	74	10	13.5	
Nara	60	8	13.3	
Okinawa	54	7	13.0	
Gunma	47	6	12.8	
Hyogo	55	7	12.7	
Tokyo	66	8	12.1	
Kochi	58	7	12.1	
Saitama	69	8	11.6	
Ibaraki	52	6	11.5	
Fukushima	54	6	11.1	
Wakayama	54	6	11.1	
Kagoshima	63	7	11.1	
Kumamoto	56	6	10.7	
Osaka	58	6	10.3	
Oita	58	6	10.3	
Ishikawa	70	7	10.0	
Yamaguchi	60	6	10.0	
Hokkaido	68	6	8.8	5% - 10%, 10 councils
Shizuoka	59	5	8.5	
Mie	59	5	8.5	
Ehime	61	5	8.2	
Yamanashi	62	5	8.1	
Miyazaki	53	4	7.5	
Aichi	68	5	7.4	
Akita	60	4	6.7	
Fukuoka	61	4	6.6	
Fukui	56	3	5.4	
Hiroshima	59	2	3.4	5% or less, 10 councils
Total	2,882	453	15.7	



(Note) 1. Formulated based on the Progress of Local Government Measures Focused on Women or the Promotion of a Gender-Equal Society (FY2018) (Cabinet Office).
2. The data is as of April 1, 2018, in principle. However, the date may vary depending on the situation of each local government.
3. The percentage of females is rounded to the nearest tenth.
4. Some islands are omitted for editorial reasons.

Source: Formulated from the Progress of Local Government Measures Focused on Women or the Promotion of a Gender-Equal Society (2018) by the Cabinet Office
<Refer to Fig. A-44 Female Representation in Local Disaster Management Councils (by Prefecture, 2018) (A-67) >

Fig. 1-10-3 Targets 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 in Prefectural Councils for Disaster Management	13.2% (2015)	30% (2020)
Female Representation in Municipal Councils for Disaster Management	・Number of bodies with no female as members: 515 (2014) ・Female as a proportion of the membership: 7.7% (2015)	・Number of bodies with no female as members: 0 (2020) ・Female 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

Column:

Empowerment of Female Fire Corps Volunteers

The Momoishi 10th Fire Corps in Oirase Town, Aomori Prefecture is a rare all-women fire corps in Japan, consisting of 12 female volunteers. The predecessor of the 10th Fire Corps was the Hitokawame Female Fire Corps formed in 1923. The women-only fire corps was formed as many men were working away from home in those days. The records show that these women have kept operating manual fire water pumps for three hours to extinguish fires.

The number of female fire corps volunteers has been increasing year by year. Today, there are approximately 26,000 female fire corps volunteers (approximately 500 are in Aomori Prefecture). The National Conference of Female Fire Corps Volunteers, which started in 1994, will hold its 25th round in September 2019. Female fire corps volunteers across the country will gather in Aomori City to interact and share opinions with each other.

Source: Fire and Disaster Management Agency website
(Reference: https://www.fdma.go.jp/relocation/syobodan/ladies/index.html)

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

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

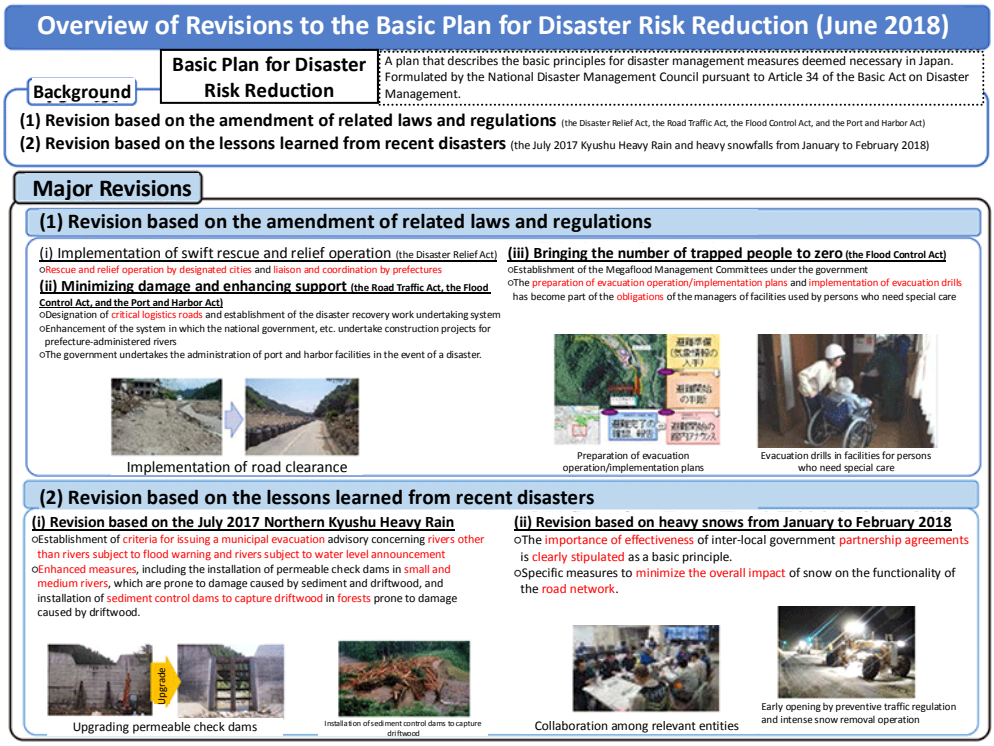
The Basic Plan for Disaster Risk Reduction is decided by the National Disaster Management Council in accordance with Article 34 of the Basic Act on Disaster Management. It is reviewed annually and revised when deemed necessary, to take account of the findings from scientific research concerning disasters and their prevention, as well as disasters that have occurred and the effects of emergency disaster management 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 FY2018, the Basic Plan for Disaster Risk Reduction was revised in June 2018 (Fig. 2-1-1). The revision included (1) change to systems in relation to the amendment of the Disaster Relief Act and other relevant laws and regulations, and (2) the addition of countermeasures for challenges identified in the July 2017 Northern Kyushu Heavy Rain and heavy snows from January to February 2018. More specifically, the revised version of the Basic Plan refers to disaster relief activities by cities and liaison and coordination by prefectures, which are to be conducted based on the amended Disaster Relief Act.

Reference: http://www.bousai.go.jp/taisaku/keikaku/kihon.html

The revised Basic Plan describes measures based on the July 2017 Northern Kyushu Heavy Rain, including the installation of permeable check dams in small and medium rivers and sediment control dams to capture driftwood, as well as measures based on the lessons learned from the heavy snowfalls from January to February 2018, including a measure to minimize the overall impact of snow on the functionality of the road network.

Fig. 2-1-1 Overview of Revisions to the Basic Plan for Disaster Risk Reduction (June 2018)



Source: Cabinet Office

2-2 Establishment of the System for Designating Cities Conducting Relief Operations Pursuant to the Amended Disaster Relief Act

The Disaster Relief Act provides that the governor of a prefecture is responsible for commanding relief operations pursuant to the Act, such as setting up shelters and supplying temporary housing, on behalf of the mayor of municipality (including the mayor of special zone) in the event of disaster on a certain scale. The Act also provides that expenses for such relief operations are to be partly aided by the national government.

Regarding this relief operation system, the report from the Working Group for Studying Emergency Responses and Livelihood Support Measures (an organization established with the aim of discussing tactics to improve responses to earthquake nationwide based on the lessons learned from the Kumamoto Earthquake in April 2016) stated, "a practical system of implementing rescue operations under the current laws and an effective approach to regional coordination must be developed from the viewpoint of ensuing faster and more accurate rescue operations and smoother execution of disaster rescue-related administrative work" (Reference: http://www.bousai.go.jp/updates/h280414jishin/h28kumamoto/okyuseikatu_wg.html).

In readiness for upcoming large-scale disasters, the Cabinet Office has held meetings of 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 public 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, alongside the current commissioning system, to expedite and streamline administrative 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/saigaikyujo/index.html).

For further discussions, the Cabinet Office launched a meeting involving representatives from Miyagi, Aichi, Hyogo and other prefectures in February 2018 with a view to strengthening collaboration in disaster relief administrative work in the event of a large-scale and widespread disaster. The members of the meeting discussed a system to facilitate the procurement and distribution of disaster relief supplies based on wide-area coordination on a prefectural level, as well as measures for collaboration with relief supplies-related industries (Reference: http://www.bousai.go.jp/kaigirep/kyuujorenkei/index.html).

Based on what was discussed in the above meetings, the government amended the Disaster Relief Act in 2018 (entered into force on April 1, 2019) to create a system for disaster relief operations conducted by city mayors designated by the Prime Minister and thereby ensure smooth and swift implementation of relief operations in the event of a sudden disaster. (Fig. 2-2-1)

Fig. 2-2-1 **Act Partially Amending the Disaster Relief Act (Entered into Force on April 1, 2019)**

Overview of the Act Partially Amending the Disaster Relief Act

Disaster Relief Act

Promulgated on June 15, 2018

Provides that the governor of a prefecture is responsible for commanding relief operations pursuant to the Act, such as setting up shelters and supplying temporary housing, on behalf of the mayor of municipality in the event of disaster on a certain scale and that expenses for such relief operations are to be partly aided by the state

Outline of the amended Act

The amended Act established a system, which allowed cities to carry out relief operations on their own discretion, with an aim to ensure smooth and swift implementation of relief operations.

1. Designation of cities conducting relief operations

The Prime Minister shall designate cities conducting relief operations* when requested, taking into account each city's disaster preparedness and financial capabilities. The Prime Minister shall hear opinions of the governor of the relevant prefecture prior to such designation.

*Designated cities. The criteria for the designation of a city conducting relief operations are to be provided in a Cabinet Office Order.

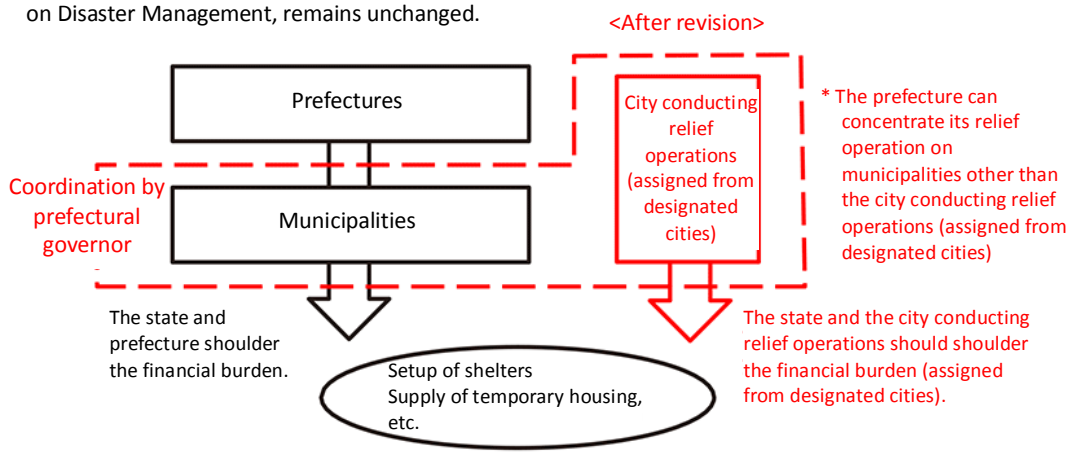
2. Coordination by Prefectures

The governor of the prefecture encompassing the city conducting relief operations shall be responsible for liaison and coordination with the city mayor, relief supply manufacturers, and other relevant parties in order to ensure the appropriate and smooth delivery of relief supplies (food, materials for housing, etc.)

3. Disaster relief fund

A city conducting relief operations shall reserve a disaster relief fund to aid relief operations, in the same manner as a prefecture.

* The right of the prefectural governor to give instructions, etc., stipulated in Article 72 (1) of the Basic Act on Disaster Management, remains unchanged.



Impact of the amendment

The amended Act will promote swift and smooth relief operations for 270 million people (the total population of 20 designated cities across Japan), while also ensuring faster rescue for other municipalities.

Date of entry into force	April 1, 2019

Source: Cabinet Office

The amended Act stipulates that cities that fulfill the criteria provided in the Cabinet Office Order and are designated by the Prime Minister are to conduct relief operations for affected people who need rescue in their jurisdiction. If a disaster occurs in a designated city conducting relief operations or other areas in the same prefecture, the governor of the prefecture is responsible for liaison and coordination with the city mayor, relief

supply manufacturers, and other relevant parties in order to ensure the appropriate and smooth delivery of relief supplies.

Moreover, when the total expenses of relief operations conducted by a designated city exceed 1 million yen, part of such expenses is covered by the national treasury under the amended Act. In addition, a city conducting relief operations has an obligation to reserve a disaster relief fund to aid expenses of relief operations. The minimum amount a city needs to reserve is calculated based on the closing accounts of general tax income as provided under the Local Tax Act applicable to the prefecture encompassing the designated city conducting relief operations. When the disaster relief fund has not yet reached the required minimum amount, the city needs to reserve an amount as provided in a Cabinet Order.

In August 2018, the Cabinet Office established the Review Meeting on the Criteria for Designating Cities Conducting Relief Operations as a platform for prefectures, designated cities, the Japanese Red Cross Society, and other relevant entities to discuss the criteria for designating cities conducting relief operations, a system for smooth procurement and distribution of relief supplies based on wide-area coordination on a prefecture level, and collaborative measures with relevant entities. In October 2018, after the members reached a broad agreement on the designation criteria, the Report of the Review Meeting on the Criteria for Designating Cities Conducting Relief Operations was published.

Reference: http://www.bousai.go.jp/kaigirep/shishiteikijun/index.html

Based on the above Report, the Cabinet Office issued on December 28, 2018 the Order on Cities Conducting Relief Operations under the Disaster Relief Act, which provided for the criteria for the designation of cities conducting relief operations.

As the designation criteria, the Cabinet Office Order provides that a city conducting relief operations must be an ordinance-designated city (as provided under the Local Autonomy Act) that fulfills the following four requirements:

- The city that intends to become a city operating relief operations (ordinance-designated city) has an established collaborative system with the prefecture encompassing it.
- The city has organizational structures required of a city conducting relief operations
- The city has a financial foundation required of a city conducting relief operations
- Coordination with related administrative and other organizations has been done.

To be more specific, the first requirement refers to the following matters, for example:

- Clearly defined liaison and coordination channels between the city and the prefecture
- A communication system that allows the city to share information with the prefecture on the special standards applied to it
- Developing a draft resource distribution plan of the prefecture encompassing the city

As the amended Disaster Relief Act entered into force on April 1, 2019, nine cities (Sendai, Yokohama, Kawasaki, Sagamihara, Kobe, Okayama, Kita-Kyushu, Fukuoka, and Kumamoto Cities) were designated as cities conducting relief operations (as of April 1, 2019).

2-3 Publication of the Case Studies on the Formulation of Evacuation Plans for Volcanic Eruptions, Etc.

Following the amendment of the Act on Special Measures for Active Volcanoes in 2015, the Cabinet Office revised the Guide to Develop Concrete and Practical Evacuation Plans for Volcanic Eruption (hereinafter referred to as the “Guide”) in 2016 with a view to supporting local governments with the formulation of evacuation plans. Also, the Cabinet Office has worked with local governments composing Volcanic Disaster

Management Councils on reviewing evacuation plans since FY2016.

In order to provide reference materials to refer to when formulating or revising evacuation plans based on the Guide, the Cabinet Office released in October 2018 the Case Study on the Formulation of Evacuation Plans for Volcanic Eruptions (Fig. 2-3-1), which summarized the insights and results of the abovementioned reviews for the following three categories:

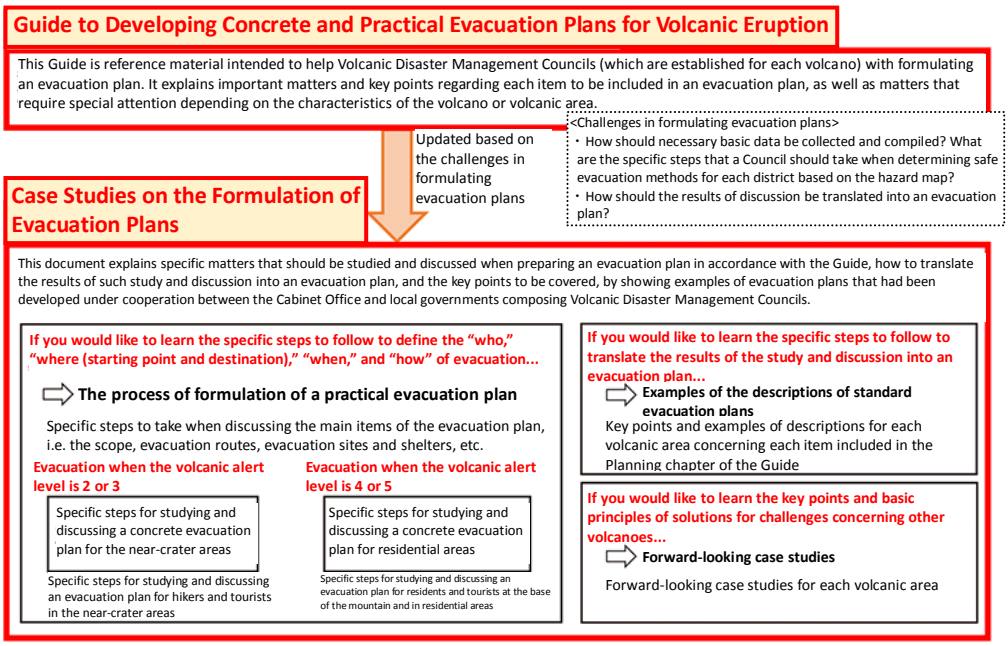
(1) The process of formulation of a practical evacuation plan (explanation on specific steps that should be taken)

(2) Examples of the descriptions of standard evacuation plans (explanation on how to translate what has been discussed into an evacuation plan)

(3) Forward-looking case studies (explanation on the points that should be addressed in relation to unique challenges for volcanic areas).

Reference: http://www.bousai.go.jp/kazan/tebikisakusei/jireisyu/index.html

Fig. 2-3-1 Overview of the Case Studies on the Formulation of Evacuation Plans



Source: Cabinet Office website
Reference: http://www.bousai.go.jp/kazan/tebikisakusei/jireisyu/index.html

2-4 Enhancement of the Training Contents 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 build capacity to respond swiftly and accurately to crises and to develop networks of national and local government organizations.

With a view to promoting the fostering of disaster management human resources among local government officers, the content of one of the above courses, the Training Course at the Ariake-no-Oka Core Wide-area Disaster Prevention Base, was greatly enhanced in FY2018, such as introducing lectures incorporating the latest insights on disaster risk reduction based on the experience of the Heavy Rain Event of July 2018 and an e-learning program that helped participants prepare for the lectures and effectively learn the knowledge.

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 capacity 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 FY2018, which specifically encouraged those newly in office, 221 new mayors joined and learned about the proper initial responses 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 over two days in April 2019 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.

The Training Course at the Ariake no Oka Core Wide-area Disaster Prevention Base in FY2018

The National Seminar on Disaster Prevention and Crisis Management for Heads of Local Government in FY2018

2-5 Securing Designated Emergency Evacuation Sites and Designated Shelters

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 shelters 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 shelters was not entirely clear at the time of the Great East Japan Earthquake, which was a factor that increased the 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 shelters, and issue a public notice to notify citizens of details of these facilities. Fig. 2-5-1 shows the designation status of designated emergency evacuation sites as of April 1, 2018.

Fig. 2-5-1 Designated Emergency Evacuation Sites

	Number of designated emergency evacuation sites by type of anomalous phenomenon								Total
	Flood	Sediment disaster	Storm surge	Earthquake	Tsunami	Widespread fire	Rain inundation	Volcanic phenomena	
Number of designated evacuation sites (sites)	65,185	60,209	18,375	77,609	35,155	36,349	35,190	9,688	106,956
Expected capacity (10,000 people)	12,129	12,205	5,139	21,535	8,059	14,490	6,934	2,185	

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)
Reference: https://www.fdma.go.jp/publication/bousai/

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 in March 2016 to enable evacuees to clearly identify such facilities (Fig. 2-5-2).

Reference: http://www.bousai.go.jp/kyoiku/zukigo/index.html

- Symbol indicating an evacuation site (required)
- General disaster symbols (required)
- Marks indicating compatibility ("○" for compatible disaster types; "×" for non-compatible disaster types)

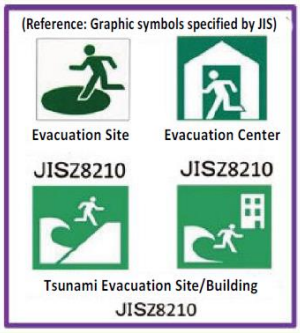
- Indicate that it is an evacuation site (indicate the name of the site)
- Multiple languages are preferred (the example uses English)

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

Fig. 2-5-2 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 Debris flow Landslide	Slope failure Landslide
	Debris flow
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, which are then reported to the Minister of Economy, Trade and Industry.
  →The graphic symbols were standardized by JIS on March 22, 2016.
- Discussion for international standardization is ongoing based on the proposal from Japan to the ISO.



Source: Cabinet Office

The number of shelters designated pursuant to Article 49-7 of the Basic Act on Disaster Management increased from 48,014 as of October 1, 2014 to 75,895 as of October 1, 2018, as a result of the government's effort to urge municipalities (including special zones) to swiftly complete designation, which had been continued since the establishment of the designation system in April 2014. As of October 1, 2018, the number of designated welfare shelters was 8,064, but the number of available welfare shelters, including facilities with which a partnership agreement has been concluded, was 22,579.

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 shelters, 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 a shelter, it is important to improve the quality of life in shelters 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 Shelters and Improving their Quality, to consider and take the necessary steps to deal with a wide range of issues, including encouraging municipalities to designate shelters and welfare shelters, improving toilet facilities at shelters, 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 Shelters (published by the Cabinet Office in August 2013) were partially revised in April 2016. At the same time, based

on these revised guidelines, the Cabinet Office published three other sets of guidelines: the shelter Management Guidelines; the Guidelines for Securing and Managing Toilets at shelters; and the Guidelines for Securing and Managing Welfare Shelters (Fig. 2-5-3).

In addition, the FY2016 Report on Case Examples of Support for Affected People at shelters was compiled and published in FY2017. The Report on the Study on Measures for Ensuring Satisfactory Living Conditions at Designated Shelters was published in FY2018 as supplementary documents to the Shelter Management Guidelines (Fig. 2-5-3) (Reference: http://www.bousai.go.jp/taisaku/hinanjo/index.html).

Fig. 2-5-3 Guidelines on Shelters

Evacuation Shelter 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 Shelters (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 Shelters (April 2016)

These guidelines are the updated version of the Guidelines on the Establishment and Management of Welfare Shelters (June 2008) revised based on the lessons learned from the Great East Japan Earthquake. Based on an understanding that preparedness efforts are essential in bringing about effective response operations in the event of a disaster, these Guidelines stress the importance of promoting welfare shelters-related initiatives under the initiative of municipalities (including special zones) before a disaster occurs.

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

This report is based on the results of surveys with local governments, social welfare facilities, persons with disabilities, and evacuees from the Kumamoto Earthquake, as well as interviews with NPOs, disabled people's groups, persons with disabilities, and local government employees who were in charge of managing shelters. Based on the results of these surveys, the Report summarized facts and challenges concerning support for the affected people at shelters, as well as advanced examples of countermeasures promoted in various areas.

Report on the Study on Measures for Ensuring Satisfactory Living Conditions at Designated Shelters (August 2018)

Based on the experience of the July 2017 Northern Kyushu Heavy Rain and opinions from local governments, the government carried out a survey concerning the needs of affected people, interviews with experts, a survey and interviews with local governments. The Report summarizes measures to ensure good living conditions in designated shelters based on the results of the above surveys.

Source: Cabinet Office website
Reference: http://www.bousai.go.jp/taisaku/hinanjo/index.html

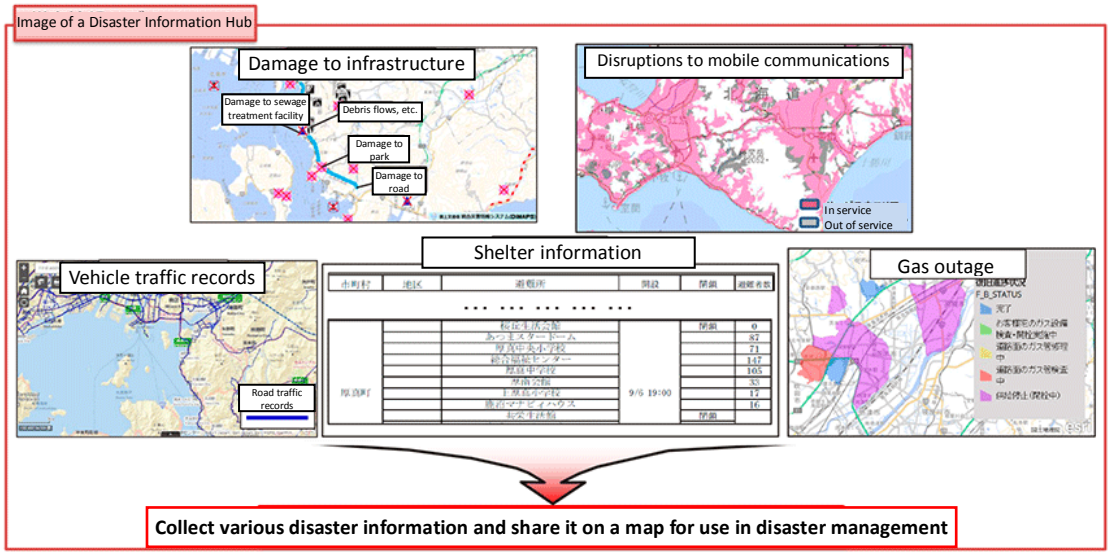
2-6 Use of ICT in Disaster Risk Management

As seen at the Kumamoto Earthquake in 2016, many of affected people would stay in their cars or elsewhere but not in shelters. This may hinder efforts to integrate information, including understanding the action of these people, the needs of evacuees at shelters 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. 2-6-1)).

Reference: http://www.bousai.go.jp/kaigirep/saigaijyouhouhub/index.html

Fig. 2-6-1 Image of a Disaster Information Hub



Source: Cabinet Office

In FY2018, the Cabinet Office continued the previous year's effort to expand the scope of information to be shared among the national and local governments and private companies responding to disasters, while also discussing the use of big data to grasp the evacuation activities of affected people and the use of satellite data for disaster management. The government also deployed the ISUT (Information Support Team) to Disaster Management Headquarters in affected prefectures. During these deployments, the Shared Information Platform for Disaster Management (SIP4D) was used on a pilot basis to determine the situation of the local governments, private entities, and other organizations responding to the disasters.

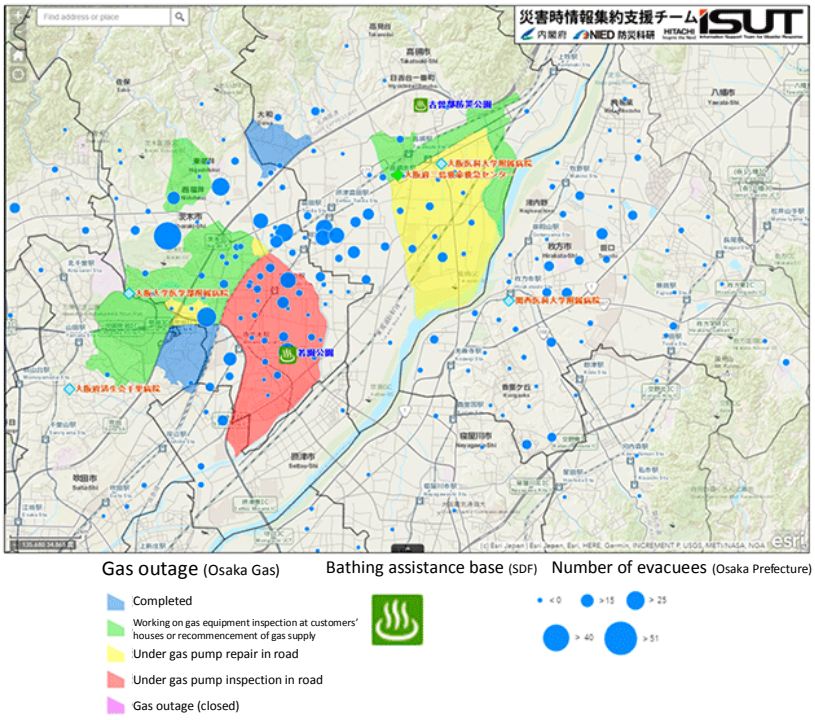
In post-disaster settings, certain types of information (such as the damage and shelters) change from hour to hour (dynamic information) and thus are hard to share in an organized manner. In order to ensure relevant decision making by disaster response organizations, it is very important to indicate such dynamic information on the map and make sure that these organizations can grasp the overall situation of the disaster. If the ISUT could collect, organize and map such information and share it with disaster response organizations, it would greatly help their swift and relevant decision making.

The ISUT have engaged in relief operations for three disasters to date, namely, the earthquake that hit the northern part of Osaka Prefecture on June 18, 2018 (Fig. 2-6-2), the Heavy Rain Event of July 2018, and the 2018 Hokkaido Eastern Iburi Earthquake. Especially, for the Heavy Rain Event of July 2018, the ISUT operated in the building of the Hiroshima Prefectural Government from July 7 (the day following the day of issuance of the emergency warning) to August 9, using the SIP4D for information gathering and organization and explaining the situation using the formulated map to the senior prefectural government officials, response organizations, and supported government employees deployed from other prefectures. This operation proved the effectiveness of the ISUT to a certain level.

On the other hand, there were also some challenges, such as the time-consuming manual data input, information gathering and organization processes, which delayed the sharing of map information with local government and other relevant organizations. To address this issue, the government held orientations on the ISUT for prefectures and ordinance-designated cities across Japan to explain the types of information the ISUT can provide, the types of information the ISUT needs, and the importance of compiling a database before a disaster.

The ISUT will start its full-fledged operation across Japan in FY2019. The government intends to work toward more effective operation of the ISUT and swift preparation and sharing of map information. Specifically, it plans to develop a system to automate as much data input work as possible, while also working with relevant organizations toward the expansion of the scope of information to be shared among disaster response organizations.

Fig. 2-6-2 **Example of a Map Made by the ISUT for the Earthquake Centered in Northern Osaka Prefecture (Map for Bathing Assistance Planning)**



Source: Cabinet Office

Section 3 Responding to Disasters Anticipated to Occur

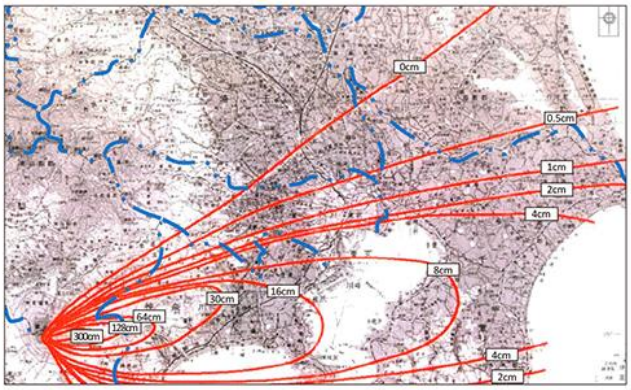
3-1 Development of Countermeasures against Wide-Area Ash Falls from Major Volcanic Eruptions

A major volcanic eruption may cause considerable disruptions to the life and social and economic activities of people living around the base of the mountain and those living afar alike, as volcanic ashes fall over an extensive area. In this view, the Working Group on Countermeasures for Wide-Area Ash Falls from Major Volcanic Eruptions (established in August 2018 under the Disaster Management Implementation Committee, National Disaster Management Council) has discussed approaches to emergency response measures for major volcanic eruptions affecting an extensive area encompassing urban areas, in which city functions are concentrated.

Reference: http://www.bousai.go.jp/kazan/kouikikouhaiworking/index.html

As a first step to developing effective countermeasures for wide-area ash falls, the Working Group studied the conditions of ash falls that can cause disruptions to road and railway traffic, electricity and other lifeline utilities, and buildings and facilities. In the future, it intends to discuss emergency response measures for wide-area ash falls from major eruptions with a focus on the impact on urban areas, using model cases. Specifically, the distribution of ash falls from major eruptions of Mt. Fuji and their damage will be studied using the data of the 1707 Hoei Eruption (Fig. 3-1-1) and a model simulating the chronological change of ash fall distribution until the end of the eruption event. Then, based on the simulated damage situation, the Working Group will study measures each entity (*i.e.* facility managers, residents, etc.) should take and basic principles for emergency response measures, including the ash removal process and securing of ash disposal sites (Fig. 3-1-2).

Fig. 3-1-1 **Ash Fall Distribution during the 1707 Hoei Eruption of Mt. Fuji (Records)**



Source: Cabinet Office

Fig. 3-1-2 Discussion Process

1. Understand the overall situation of the damage (what kind of event happens in each region?)
   - **(i) Define the conditions of ash falls based on which countermeasures should be discussed**
     - ✓ As a first step, study the distribution of ash falls during the Hoei Eruption of Mt. Fuji
     - ✓ Then, study other cases with different conditions as necessary
   - **(ii) Define the conditions of ash falls that would cause disruptions to road and railway traffic, electricity, and other infrastructure**
     - ✓ Study the damage directly caused by volcanic ashes, as well as ripple effects from the damage to infrastructure, such as traffic and lifeline utility outage
   - (iii) Define the extent and duration of the impact of the ash fall event using (i) and (ii) above. **Describe the overall picture of the damage.**
2. Establish basic principles for emergency response measures
   - (i) **Develop mitigation measures** based on the simulated damage
     - ✓ Study emergency response measures each entity (facility managers, residents, etc.) should take in order to sustain their social and economic life
     - ✓ Study relevant approaches to the ash removal process and securing of ash disposal sites
   - (ii) **Develop basic principles for countermeasures for ash falls from major eruptions**

Discussion and formulation of a report (FY2018 to FY2019)

Each entity (facility manager, etc.) reflects the content of the report in their disaster management plans and BCPs.

Source: Cabinet Office

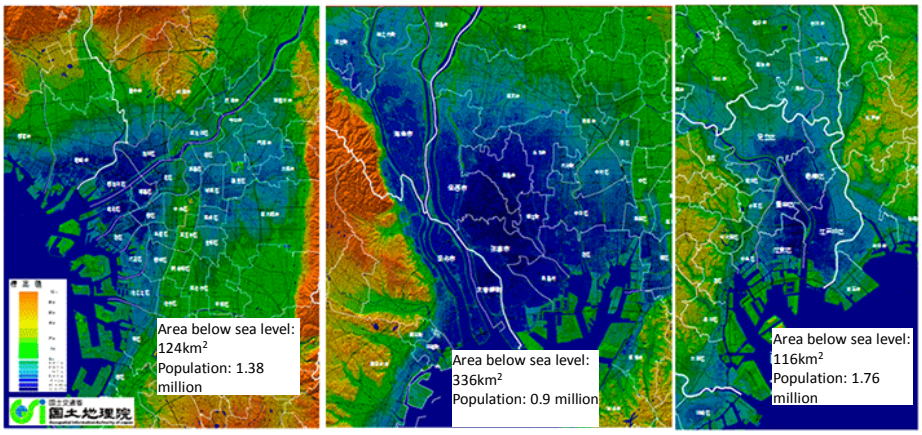
3-2 Deliberations on Large-scale, Extensive Evacuation from Flooding or Storm Surge Inundation in the Tokyo Metropolitan Area

Experts predict that there will be risks of major flood disasters that would require large-scale, extensive evacuation, as typhoons may increase their intensity into the future with global warming. Extensive portions of Japan's three major metropolitan areas are located below sea level (Fig. 3-2-1). 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

Fig. 3-2-1 Areas below Sea Level in the Three Major Metropolitan Areas



Source: Formulated by the Cabinet Office based on materials from the Geospatial Information Authority of Japan (GSI)

In order to identify initiatives that administrative and other organizations should promote for large-scale,

extensive evacuation from major floods and discuss collaboration and role sharing among these organizations based on the above report, the Cabinet Office has hosted three sessions of the Study Group on Extensive Evacuation from Large-Scale Flood Disasters in Urban Areas from June 2018 to March 2019 in cooperation with the Tokyo Metropolitan Government. The main topics of the meetings were the securing of extensive evacuation sites, evacuation means and guidance.
Reference: http://www.bousai.go.jp/fusuigai/suigaiworking/suigaiworking.html

As for the first topic (*i.e.* securing of extensive evacuation sites), the meeting members will work to identify challenges by the end of FY2019 concerning the matching of evacuee communities and accepting communities using the regional block system, which groups multiple communities into one block. As for the second topic (*i.e.* securing of evacuation means and guidance), the evacuation means and destinations will be discussed based on the estimated transportation capacity of railway companies. Also, as common measures that would serve both topics ((1) securing extensive evacuation sites and (2) securing evacuation means and guidance), the members will work on developing measures to mitigate the number of region-wide evacuees, a model that shows how related organizations should share their roles, and a timeline for inter-organizational collaboration in normal times and in times when the risk of a disaster is heightening.

Section 4: International Cooperation for 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 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 (UNDRR)

The United Nations Office for Disaster Risk Reduction (UNDRR) 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: Catalyze action through Member States and Partners

As well as playing a leading role in the activities of UNDRR, 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 FY2018.

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. Accordingly, various countries have submitted their indicators to date. The UNISDR plans to conduct follow-ups on these indicators.

Ms. MIZUTORI Mami, Special Representative of the UN Secretary-General (SRSG) for Disaster Risk Reduction , visited the Cabinet Office on May 17, 2018 and had a discussion with H.E. Mr. OKONOGI, then Minister of State for Disaster Management. The SRSG expressed her gratitude to Japan for its international contribution and leadership in disaster risk management and established a shared understanding of closer collaboration between the Government of Japan (Cabinet Office) and UNDRR in promoting the SFDRR.

(2) 8th Asia Ministerial Conference on Disaster Risk Reduction (AMCDRR)

The 8th Asia Ministerial Conference on Disaster Risk Reduction (AMCDRR) hosted by the Mongolian government and the UNDRR was held in Ulaanbaatar, Mongolia from July 3 to 5, 2018. Once in every two years since 2005, Ministers in charge of disaster risk reduction from Asia gather to report the progress of each

country's initiatives under the Hyogo and Sendai Frameworks, exchange opinions on measures to promote such initiatives, share the results and challenges of DRR efforts, and discuss preparedness measures for disasters that may occur in the future. The 8th Conference was attended by approximately 3,000 people from about 50 countries and regions.

From Japan, H.E. Mr. AKAMA, State Minister of Cabinet Office, attended the Conference and delivered a speech in the Ministerial Session, in which he expressed Japan's support for the Sendai Framework and presented Japan's efforts for implementing initiatives under the Sendai Framework. He also chaired the Technical Session regarding "disaster governance" to enhance DRR management measures.

H.E. Mr. AKAMA, State Minister of Cabinet Office, giving a speech in the Ministerial Session

(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 Kobe 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 FY2018 was held in Kobe on January 18, 2019 focusing on the theme "Attaining the Build Back Better Dividend." It was attended by 168 people from 32 countries, including the Deputy Director General for Disaster Management of Cabinet Office, Mr. KANAZAWA Kazuo, Vice Governor of Hyogo Prefecture, and Mr. HAYASHI Haruo, President of the National Research Institute for Earth Science and Disaster Resilience (NIED). At the forum, the participants shared case studies of recovery from past disasters and the lessons learned, and discussed strategies to extend the benefits of "Build Back Better."

The International Recovery Forum

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

The 12th Asia-Pacific Economic Cooperation (APEC) Senior Disaster Management Officials Forum (SDMOF) was held in Papua New Guinea (Kokopo) on September 25-26, 2018. The Chairman of the Asian Disaster Reduction Center (ADRC) attended the forum from Japan and presented recent Japanese initiatives for the development of an early warning platform in the session about warning communication, using the quasi-zenith satellite technology.

(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 July 1998 to share the lessons of the Great Hanshin-Awaji Earthquake in January 1995 and other disasters in Japan with the rest of Asia. FY2018 marked its 20th anniversary. With Turkey joining in October 2018, the number of members became 31 (Fig. 4-1-1). The ADRC's activities center on four key areas: sharing information about disasters, human resource development in member countries, improving the disaster resilience 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 2019, the ADRC had hosted a total of 111 such researchers, thereby helping to foster personnel who contribute to policymaking in the field of disaster risk reduction in member countries. The ADRC also gathers information about disaster risk 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. Reference: https://www.adrc.asia/

Fig. 4-1-1 **Asian Disaster Reduction Center member countries and advisory countries**

Source: Asian Disaster Reduction Center

The ADRC convenes the Asian Conference on Disaster Reduction (ACDR) jointly by the Cabinet Office every year and invited persons in charge of disaster risk management from member countries and international organizations to share information on disaster risk management and mitigation, exchange opinions and strengthen collaboration in Asia, which is prone to frequent disasters. Celebrating the 20th anniversary of the ADRC, the 14th round of the ACDR was held on Awaji Island, Hyogo Prefecture from October 30 to November 1, 2018, based on the themes of “cross-border collaboration to tackle disasters” and “enhancement of a global disaster database.” More than 110 people attended the conference from member countries (25 out of 31 countries) and international organizations such as the ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre) and JICA. 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, the Cabinet Office 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.

(1) Partnership between the Cabinet Office and the U.S. Federal Emergency Management Agency (FEMA)

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 FY2018, the Cabinet Office visited the U.S. to see a drill held in May, conducted an investigation on areas affected by Hurricane Harvey, and held a Japan-U.S. Video Conference on Cooperation in Disaster Risk Reduction in December 2018.

(2) Partnership between the Cabinet Office and the Ministry of Home Affairs in India

In September 2017, the Cabinet Office concluded an MOC with the Ministry of Home Affairs in India, aiming to develop and extend bilateral cooperation and relationships in disaster risk management. Based on this MOC, the Cabinet Office and the Indian Ministry of Home Affairs jointly held the 2nd Japan-India Conference on Cooperation for Disaster Risk Reduction in Tokyo on October 15, 2018. At the Conference which was attended by about 70 people including H.E. Mr. YAMAMOTO, Minister of State for Disaster Management, H.E. Mr. P. K. Mishra, Additional Principal Secretary to the Prime Minister of India, officers from government agencies, experts and private companies in both countries, efforts for strengthening bilateral cooperation were discussed in the sessions concerning disaster preparedness drills, flood measures, and the early warning system technology.

On March 18, 2019, the 3rd Japan-India Conference on Cooperation in Disaster Risk Reduction was held in New Delhi, the capital city of India. Japan led by the Vice-Minister for Policy Coordination and India led by H.E. Mr. P. K. Mishra, Additional Principal Secretary to the Prime Minister of India, discussed mutual exchange among research institutions including the National Research Institute for Earth Science and Disaster Resilience (NIED) and the International Centre for Water Hazard and Risk Management under the auspices of UNESCO (ICHARM), cities including Nagoya and Kumamoto Cities, and twenty private companies including the members of the Japan Bosai Platform (JBP).


2nd Japan-India Conference on Cooperation in Disaster Risk Reduction

(3) Partnership between the Cabinet Office and the Disaster and Emergency Management Presidency of Turkey (AFAD)

Through the Japan-Turkey Summit in September 2017 and the visit to Japan by H.E. Mr. Akdag, Deputy Prime Minister of the Republic of Turkey in April 2018, the two countries agreed to promote cooperation in disaster management. In October 2018, Turkey joined the ADRC as its 31st member.

H.E. Mr. OKONOGI, Minister of State for Disaster Management, and H.E. Mr. Akdag, Deputy Prime Minister of the Republic of Turkey

(4) DRR Exchange with Chile and Peru

From February 27 to March 1, 2018, the Japan-Peru Public-Private Disaster Risk Reduction Seminar and the Japan-Chile Public-Private Disaster Risk Reduction Seminar were held in Peru (APEC Chair in 2017) and in Chile (APEC Chair in 2019), respectively. From Japan, the representatives of the Cabinet Office, Senior Research Fellow at Tohoku University, and Japanese private companies (25 companies in Peru, and 18 companies in Chile) attended the seminars. The bilateral public-private exchange was promoted through sessions in which the participants shared Japan's DRR policies, BCPs, and DRR technologies and know-how of Japanese companies. Bilateral meetings were also held with Mr. Carranza, General Secretary of the National Institute of Civil Defense (INDECI), and Mr. TORO, National Director of the Oficina Nacional de Emergencia del Ministerio del Interior (ONEMI), to exchange opinions on bilateral cooperation in disaster risk management.

(5) DRR Exchange with the Western Balkans

In the Western Balkans Cooperation Initiative announced by Prime Minister ABE in January 2018, DRR is defined as the core of cooperation between Japan and the Western Balkans. In February 2019, the Japan-Western Balkans Conference on Cooperation in Disaster Risk Reduction was held in Sofia, the capital of the Republic of Bulgaria. The Conference was attended by the Republic of Bulgaria, the Republic of Serbia, Montenegro, Bosnia and Herzegovina, Republic of Kosovo, Republic of North Macedonia, and Republic of Albania. The discussion was focused on flood disasters, which happen especially frequently in the Western Balkans.

4-3 Development of the Overseas Expansion Strategy in Disaster Risk Management

In the 40th Meeting on the Infrastructure Export and Economic Cooperation Strategy (chaired by H.E. Mr. SUGA, Chief Cabinet Secretary) held in the Prime Minister's Official Residence on December 17, 2018, the members discussed the strategy and direction of overseas expansion in disaster risk management. The strategy was developed based on the Infrastructure System Export Strategy (revised in FY2018).

The government ministries will collaborate with each other in promoting initiatives to ensure that Japan's technologies and know-how on infrastructure planning, development, and renovation and mitigation will be well-understood and utilized across the globe for disaster prevention and mitigation.

Column:

USNS Mercy Visits the Port of Tokyo

In June 2018, the Cabinet Office invited hospital ship USNS Mercy, which conducts humanitarian assistance and disaster relief (HA/DR) operations, to make a call at the Port of Tokyo. During the port call, various events were held, including a ship tour, bilateral HA/DR exercises for medical transportation, and a seminar and a symposium for people involved in disaster medicine and disaster management, in order to make opportunities for a wide range of people to learn from the response capability of Mercy against large-scale disasters and widely disseminate information to Japanese citizens.

About 5,000 people applied for the ship tour on June 16, of which about 400 were able to join the tour. On the following day, bilateral HA/DR exercises for medical transportation and a seminar were held on Mercy, which were attended by about 100 Japanese people working in the fields of disaster medicine and disaster management. The exercises included the transportation of patients by the Japan Maritime Self-Defense Force (JMSDF) helicopters and Japanese medical team to Mercy, as well as demonstrations by medical staff on Mercy. Then, the Japanese participants and Mercy staff exchanged their opinions. These events were great opportunities to learn Mercy's capability to respond to injured persons in large-scale disasters.

On June 19, a commemorative symposium was held with Japanese and U.S. participants. In this symposium, the results of the foregoing seminar on the 17th were presented to the public and discussion was held to gain insights into disaster medicine for large-scale disasters in Japan.

The above seminar and symposium were a great learning experience for Japanese participants working in the disaster medicine and disaster management as they could directly see the scale of Mercy as a hospital, the rich medical human resources, the patient transportation process, the clearly defined instruction order structure for ship operation and medical activities, the relief supplies procurement process, and other various know-how specific to hospital ships.

USNS Mercy calling at the Port of Tokyo

Bilateral disaster medical transportation exercise

On-board surgical operation

Commemorative symposium

Section 5: Initiatives to Promote National Resilience

5-1 Approval of the Action Plan for National Resilience 2018

On June 5, 2018, the Action Plan for National Resilience 2018 (hereinafter "Action Plan 2018") was approved by the National Resilience Promotion Office. The Action Plan 2018 sought to enhance existing measures based on the lessons learned from the July 2017 Northern Kyushu Heavy Rain and subsequent typhoons, the eruption of Mt. Kusatsu-Shirane (Mt. Motoshirane) in January 2018, and heavy snowfalls from January to February 2018. It also sought to 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.

The Action Plan also provides that the government would review the progress of the measures under the Fundamental Plan for National Resilience when four years have passed since its establishment. The results of the review will be reflected in the updated version of the Fundamental Plan in the fifth year.

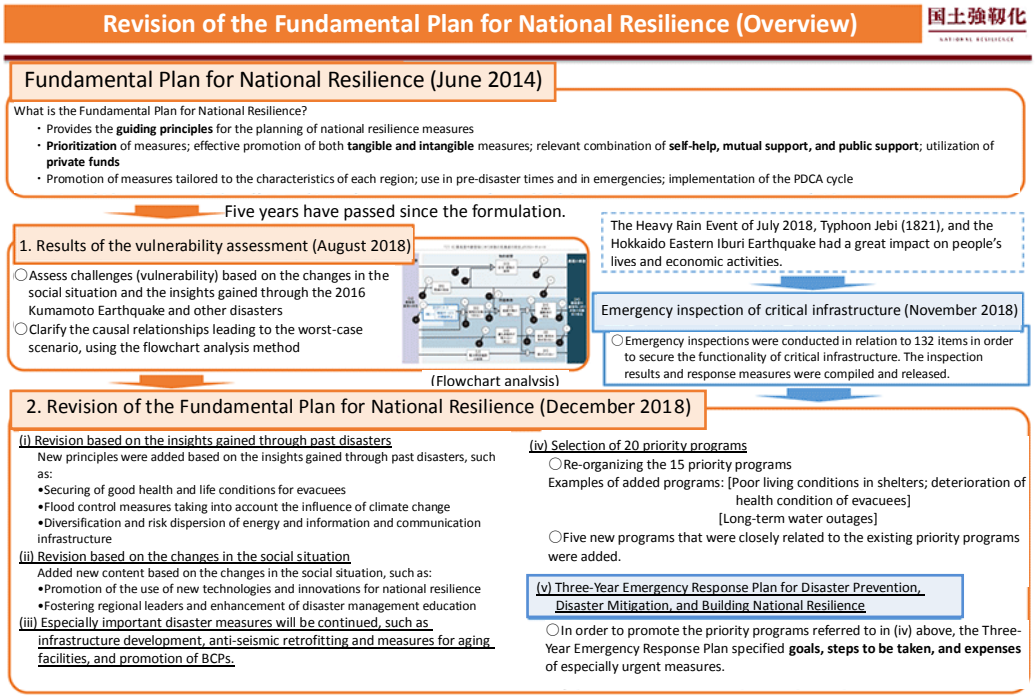
5-2 Revision of the Fundamental Plan for National Resilience

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 the government is "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 Fundamental Plan was formulated in June 2014 and revised in FY2018, taking the opportunity of the fifth anniversary of the Fundamental Plan.

In revising the Fundamental Plan, the government conducted a vulnerability assessment to determine the current status and progress of the measures (programs) aimed at avoiding the worst-case scenarios, while also determining and analyzing necessary improvement measures for each program and field using the flowchart analysis method. In December 2018, the Cabinet approved the revised Fundamental Plan based on the results of the vulnerability assessment and lessons learned from the disasters that occurred after the assessment.

The key changes to the Fundamental Plan included the reflection of the insights gained through past disasters (such as maintaining a hygiene environment at shelters, a lesson learned from the 2016 Kumamoto Earthquake, during which the deterioration of the health condition of long-term evacuees was observed), revisions based on the changes to the social situation (such as the promotion of innovations for national resilience using ICT), prioritizing measures and programs (revising the 15 priority programs and selecting five new programs that are closely related to the existing priority programs), and the formulation of the Three-Year Emergency Response Plan, which describes goals, steps to be taken, and expenses of DRR measures (Fig. 5-2-1).

Fig. 5-2-1 Overview of the Revision of the Fundamental Plan for National Resilience (December 2018)



Source: Cabinet Secretariat website
Reference: https://www.cas.go.jp/jp/seisaku/kokudo_kyoujinka/kihon.html

5-3 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 (hereinafter "Regional Plan"). As of April 1, 2019, 47 prefectures and 94 municipalities had already formulated the Regional Plan while 92 municipalities were in the process of doing so (Fig. 5-3-1). Government officials held briefings to support local governments in formulating the Regional Plan. In addition, 30 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. 5-3-1 The Formulation of the Fundamental Plan for Regional Resilience (Nationwide)

The Formulation of the Fundamental Plan for Regional Resilience in Prefectures

As of April 1, 2019

Prefectures	Status of formulation of regional plan	
	Month and year of formulation	Month and year of most recent revision
Hokkaido	Mar. 2015	Mar. 2018
Aomori	Mar. 2017	
Iwate	Feb. 2016	Jun. 2017
Miyagi	Apr. 2017	
Akita	Mar. 2017	
Yamagata	Mar. 2016	May 2018
Fukushima	Jan. 2018	
Ibaraki	Feb. 2017	
Tochigi	Feb. 2016	
Gunma	Mar. 2017	Mar. 2019
Saitama	Mar. 2017	
Chiba	Jan. 2017	
Tokyo	Jan. 2016	
Kanagawa	Mar. 2017	
Niigata	Mar. 2016	Mar. 2018
Toyama	Mar. 2016	
Ishikawa	Mar. 2016	
Fukui	Oct. 2018	
Yamanashi	Dec. 2015	
Nagano	Mar. 2016	Mar. 2018
Gifu	Mar. 2015	
Shizuoka	Apr. 2015	
Aichi	Aug. 2015	Mar. 2016
Mie	Jul. 2015	

Prefectures	Status of formulation of regional plan	
	Month and year of formulation	Month and year of most recent revision
Shiga	Dec. 2016	
Kyoto	Nov. 2016	
Osaka	Mar. 2016	
Hyogo	Jan. 2016	
Nara	May 2016	
Wakayama	Sep. 2015	
Tottori	Mar. 2016	Mar. 2019
Shimane	Mar. 2016	
Okayama	Feb. 2016	
Hiroshima	Mar. 2016	
Yamaguchi	Mar. 2016	
Tokushima	Mar. 2015	Mar. 2018
Kagawa	Dec. 2015	
Ehime	Mar. 2016	
Kochi	Aug. 2015	
Fukuoka	Mar. 2016	
Saga	Nov. 2015	Feb. 2019
Nagasaki	Dec. 2015	Dec. 2017
Kumamoto	Oct. 2017	
Oita	Nov. 2015	
Miyazaki	Dec. 2016	
Kagoshima	Mar. 2016	
Okinawa	Mar. 2019	

*All prefectures have formulated a Fundamental Plan for Regional Resilience.

Source: National Resilience Promotion Office, Cabinet Secretariat

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

Since FY2016, there has been 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.

Meanwhile, in order to address a large-scale disaster, it is important to maximize the functionality of mutual support in society as a whole, rather than focusing solely on the self-help efforts by individual companies. In this view, a new system was established in July 2018 to certify Organizations Contributing to National Resilience that have made outstanding social contribution as Organizations Contributing to National Resilience (+ Mutual Support). By the end of March 2019, a total of 162 organizations received the certification (of which 40 organizations have been certified as Organizations Contributing to National Resilience (+ Mutual Support)).

Chapter 2 Progress of 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 is to take national responsibility for verifying based on the Nuclear Emergency Response Guidelines the concreteness and practicality of the emergency response plans drawn by each Local Nuclear Disaster Management Council, which is comprised of representatives of the Cabinet Office and other related ministries and agencies and local governments. 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 the Nuclear Emergency Preparedness, and the Chairman of the NRA as Vice Chairpersons, and all Ministers of State and the Deputy Chief Cabinet Secretary for Crisis Management, and others, serving as Council Members (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 the 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).

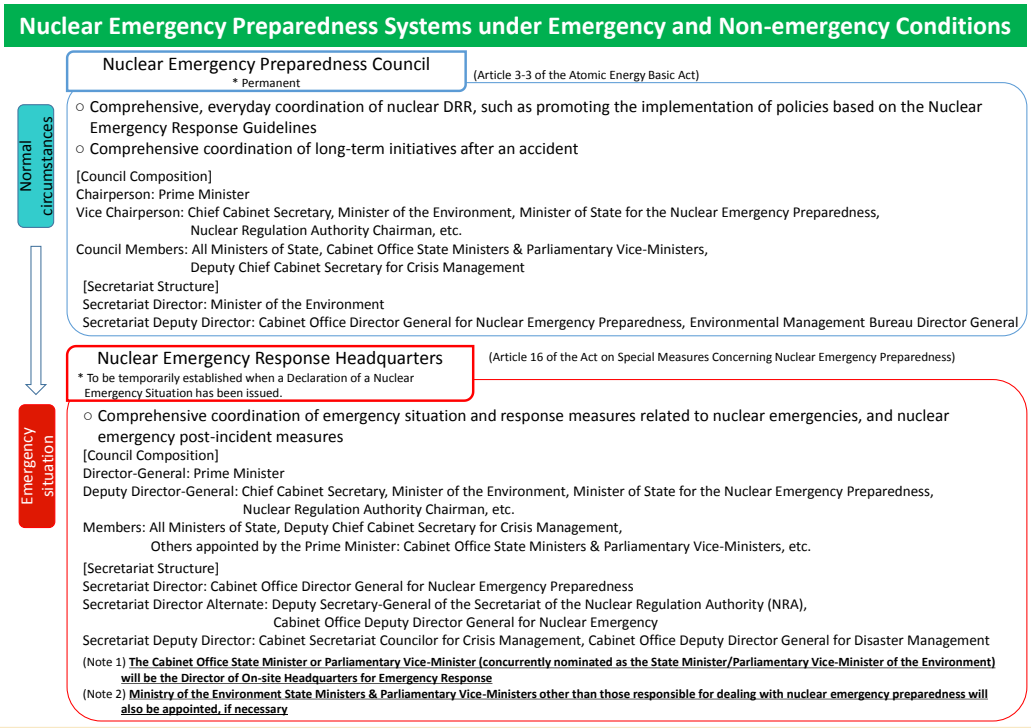
In the Headquarters, the NRA holds primary responsibility for decisions on technical and specialized matters (urgent area), while matters relating to the procurement of equipment and supplies required to deal with the nuclear facilities and all matters associated with the response outside the facilities (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 2018 Comprehensive Nuclear Emergency Response Exercise, which was held on August 25 and 26, 2018, was based on the scenario of a complex disaster involving a combination of a natural disaster and a nuclear disaster. The exercise included decision making concerning the evacuation of residents according

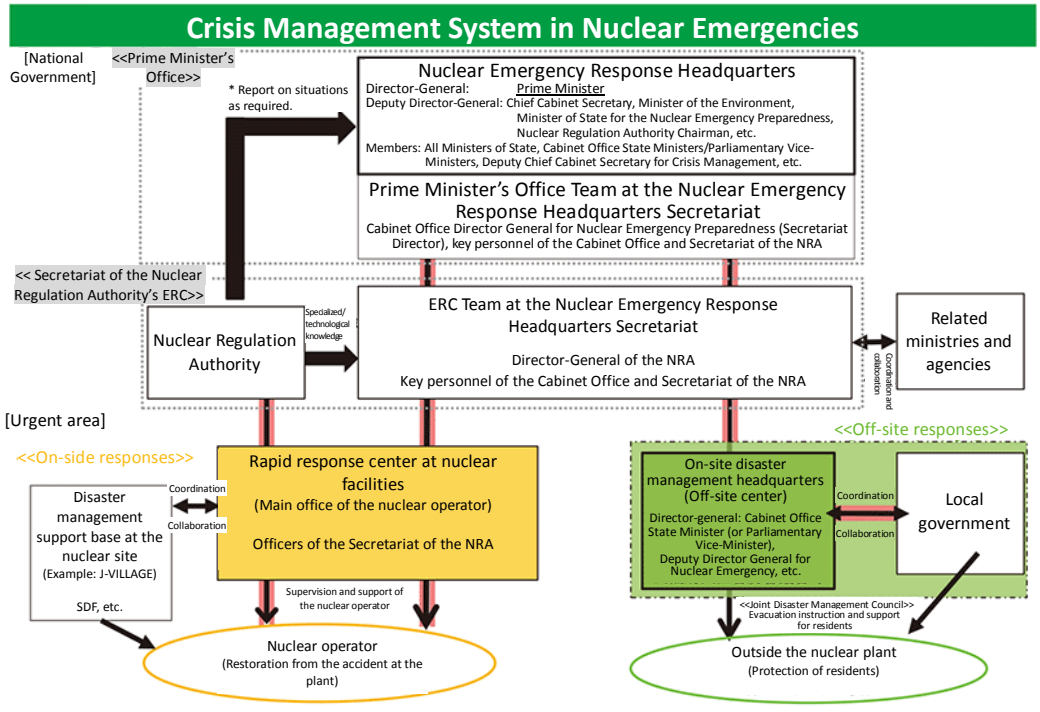
to the development of the situation as well as field drills (see Section 4).

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



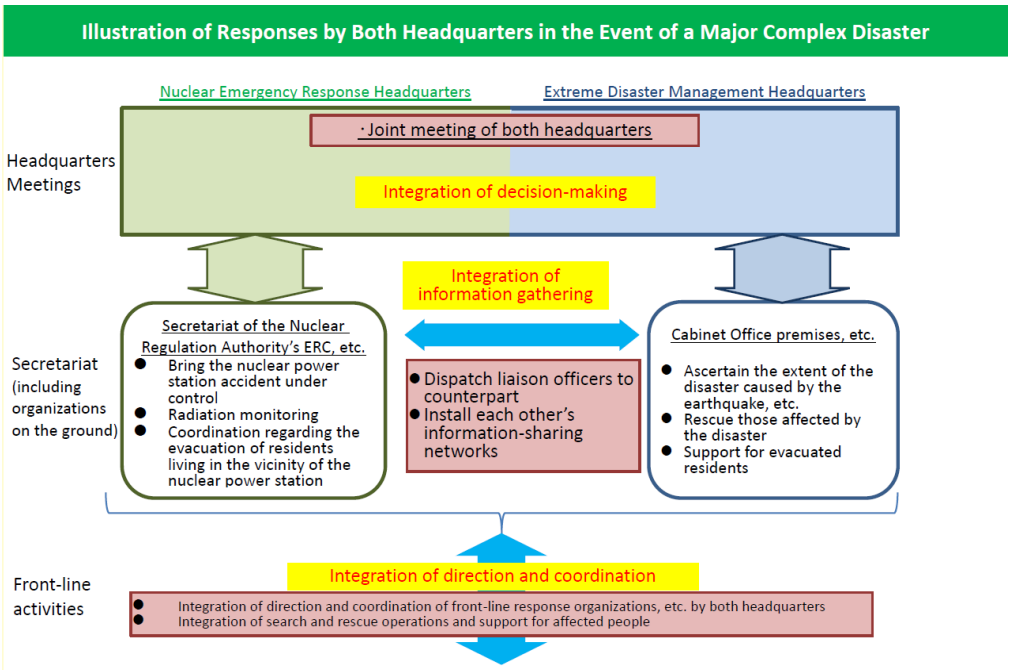
Source: Cabinet Office

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**



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. On July 25, 2018, the NRA revised the Guidelines to add a provision on the establishment of the Core Advanced Radiation Emergency Medical Support Center, with the objective of nuclear emergency response consistent with the international standards. In addition, the Facility Requirements to Medical Institutions for Nuclear Emergency were also revised on the same day. In March 2019, the National Institutes for Quantum and Radiological Science and Technology was designated as a Core Advanced Radiation Emergency Medical Support Center (Reference: https://www.qst.go.jp/).

In October 2018, the NRA published the Reference dose to be referred in formulating proactive nuclear emergency response program (Reference: http://www.nsr.go.jp/activity/bousai/measure/index.html).

Steady progress is being made in developing a medical care system for nuclear emergency, and support for designation of Nuclear Emergency Core Hospitals.

2-2 Emergency Response Initiatives

The NRA established the “Rules on Nomination of Staff to be Engaged in Emergency Response Operations” on October 1, 2018, in order to facilitate smooth implementation of emergency response operations based on nuclear emergency response manuals. With that, the NRA clarified the duties of emergency response staff at normal times and in emergencies and nominated staff members to carry out clearly defined emergency response duties.

The NRA also participated in the Emergency Drills by Nuclear Operators, as in FY2017, seeking further improvement of emergency preparedness and response such as a smoother approach to sharing information with the plant team of the NRA’s Emergency Response Center (ERC) and immediate situational response centers for nuclear facilities.

In addition, at the Debriefing Session of Emergency Drills by Nuclear Operators in FY2018, the NRA reported the evaluation results for the Emergency Drills by Nuclear Operators in commercial power reactor facilities. For nuclear fuel facilities, the NRA decided to apply evaluation similar to that for commercial power reactors on a trial basis, to develop performance indicators for nuclear fuel facilities taking into account the results of the trial operation, and to start full implementation when the Emergency Drills by Nuclear Operators in FY2018 are conducted. Furthermore, on the basis of the results of the Emergency Drills in FY2017, the Training Scenario Development Working Group set up under the Debriefing Session of Emergency Drills by Nuclear Operators examined the implementation plan for FY2018 and developed scenarios, conducted these Drills, and evaluated the results. In FY2018, the Nuclear Operators conducted this implementation plan for commanders judging the ability at three nuclear operators and courses for response capabilities at two nuclear operators.

2-3 Emergency Radiation Monitoring Initiatives

To conduct effective emergency monitoring in accordance with the Nuclear Emergency Response Guidelines, the NRA established emergency monitoring centers in all areas in which nuclear power reactor facilities are located. The NRA has maintained necessary equipment and materials at each emergency monitoring center in order to secure their functionality in the event of a nuclear disaster. It also intends to enforce and reinforce the emergency monitoring systems by deploying personnel in charge of radiation monitoring at the NRA office.

Following the 2018 Hokkaido Eastern Iburi Earthquake, there were disruptions to the operation of monitoring posts and signal transmission, which were necessary for emergency protective measures against nuclear disasters. These disruptions were caused by a power outage. Therefore, the NRA conducted inspections on the power sources of prefecture-owned monitoring posts, the composition of the communication equipment system, and the status of installation of alternative monitoring posts that can be used in the case of a long-term power outage. The NRA decided to improve monitoring posts with problems, using measures for securing multiple power sources and communication means, such as installing emergency power generators or portable monitoring posts and introducing various communication means, in order to maintain the monitoring function in the event of a disaster (Three-Year Emergency Response Plan for Disaster Prevention, Disaster Mitigation, and Building National Resilience (Cabinet decision on December 14, 2018)).

2-4 Accidents and Failures

The Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material, and Reactors requires nuclear licensees, etc. to report accidents and failures that occur at nuclear power facilities to the NRA, while the Act on Prevention of Radiation Hazards due to Radioisotopes, etc. requires permission or notification users, etc. to report accidents and failures that occur at radio isotope facilities. Of the reports received in FY2018, five came from nuclear licensees, etc. and seven 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, 2019)

	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	7	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	116	

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.

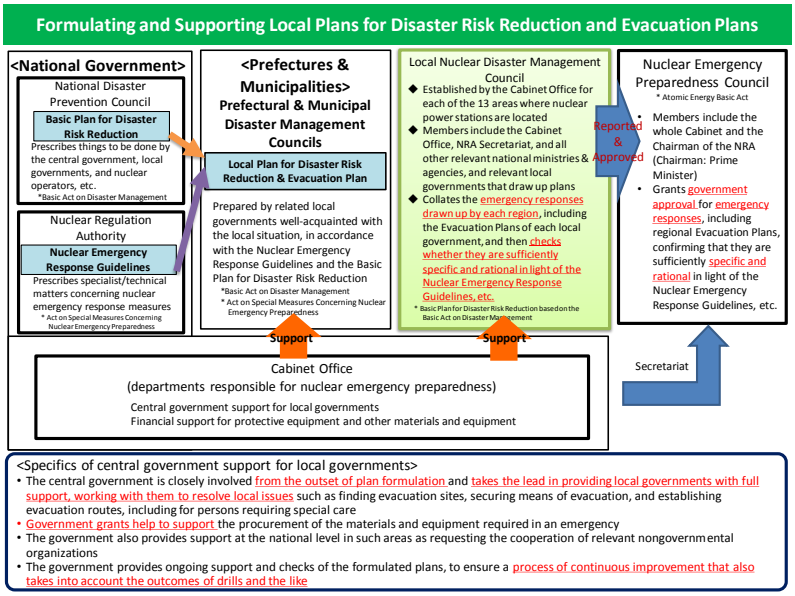
Source: Cabinet Office

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.

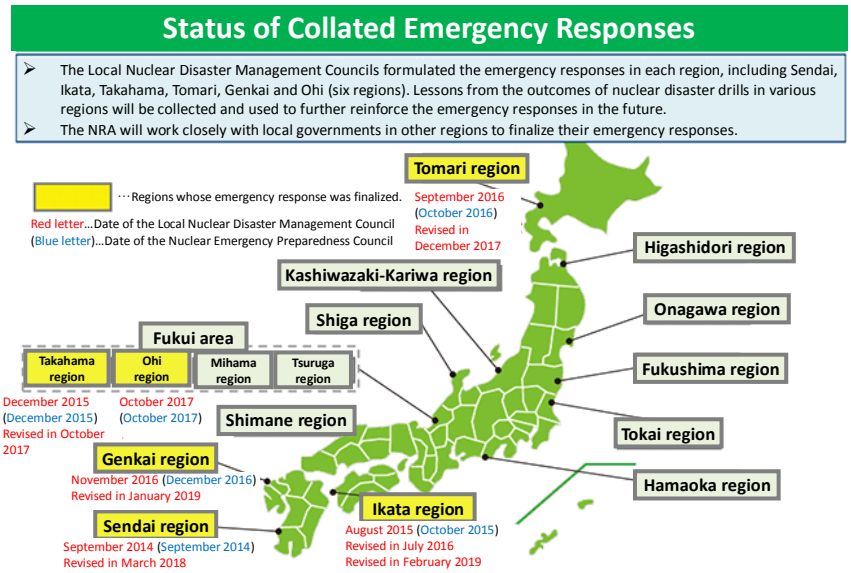
Fig. 3-1-2 Formulating and Supporting Local Plans for Disaster Risk Reduction and Evacuation Plans



Source: Cabinet Office

In FY2018, the Genkai Local Nuclear Disaster Management Council amended the Genkai Region Emergency Response in its 2nd meeting, while the Ikata Local Nuclear Disaster Management Council amended the Ikata Region Emergency Response in its 3rd meeting (Fig. 3-1-3).

Fig. 3-1-3 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 each region.

(1) Genkai region

The Genkai Local Nuclear Disaster Management Council reviewed the Genkai Region Emergency Response in November 2018, and reported the results of the review and approved said Emergency Response in December 2018. In September 2017, a National Comprehensive Nuclear Emergency Response Exercise was held in order to verify the effectiveness of the above Emergency Response. Subsequently, in order to further concretize and enhance the Emergency Response based on the lessons learned from the exercise pointed out in the Report on the Report on the Findings from the Comprehensive Nuclear Emergency Response Exercise that came out in March 2018, the Genkai Local Nuclear Disaster Management Council amended the Genkai Region Emergency Response in its second meeting on January 9, 2019.
Reference: https://www8.cao.go.jp/genshiryoku_bousai/keikaku/02_genkai.html

The key changes to the Genkai Region Emergency Response are as follows:

(i) Clarification of the bus evacuation routes for people who need special care in the event of a site area emergency;
(ii) Designation of multiple transfer airports for the emergency delivery of personnel and relief supplies by the national government;
(iii) Concretization of the ideas of response measures in a scenario where indoor evacuation becomes impossible due to a complex disaster involving an earthquake, etc.; and
(iv) Enhancement of evacuation monitoring measures and traffic congestion measures using the video transmission system of helicopters.

Other changes included: (1) clarification of response measures for tourists and temporary visitors; (2) enhancement of the medical system in the case of a nuclear disaster; (3) increasing the stock of stable iodine

agents; and (4) clarification of response measures for Unit 1 of the Genkai Nuclear Power Plant, for which a decommissioning plan pursuant to the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors has been approved and which is subject to the scope of the public notice on fuel cooling (those specified by the NRA in the public notice as nuclear power generation facilities in which irradiated fuel assemblies have been cooled for a sufficient period of time).

At the second meeting of the Genkai Local Nuclear Disaster Management Council, Saga, Nagasaki, and Fukuoka Prefectures shared a view that there would be neither end to nuclear disaster preparedness efforts nor such thing as a perfect nuclear disaster preparedness plan, while other participants pointed out the need for establishing a collaborative system to ensure smooth evacuation in the event of a complex disaster. The Local Council also announced its intention to continue the efforts to enhance the effectiveness of nuclear disaster preparedness measures by conducting exercises based on the amended Emergency Response, while also striving to promote the public understanding for nuclear disaster preparedness through drills and distribution of booklets. The national government announced its intention to continue to conduct exercises under cooperation with the Genkai Local Nuclear Disaster Management Council, while also working with the relevant local governments in further concretizing and enhancing the Genkai Region Emergency Response, keeping in mind the results of the drills. Through the above process, the Genkai Local Nuclear Disaster Management Council confirmed in its meeting that the above amendment was aimed at the further concretization and enhancement of the Emergency Response based on the lessons learned through the Comprehensive Nuclear Emergency Response Exercises in FY2017.

(2) Ikata region

In the Ikata region, the Ikata Local Nuclear Disaster Management Council finalized the Ikata Region Emergency Response in August 2015; the report confirming the final outcome was submitted to and approved by the Nuclear Emergency Preparedness Council in October that year. In November the same year, a National Comprehensive Nuclear Emergency Response Exercise was held to verify the effectiveness of the Emergency Response. In July 2016, the Ikata Region Emergency Response was amended based on the lessons learned through the exercise. Subsequently, in order to further enhance the effectiveness of the Emergency Response, Ehime Prefecture Nuclear Emergency Response Exercises were held in September and November 2016, November 2017, and October 2018. The Ikata Local Nuclear Disaster Management Council amended the Ikata Region Emergency Response in its third meeting held on February 12, 2019 in order to further concretize and enhance the Emergency Response based on the lessons learned through the above exercises.

Reference: https://www8.cao.go.jp/genshiryoku_bousai/keikaku/02_ikata.html

The key changes to the Ikata Region Emergency Response are as follows:

(i) Enhancement of the system to collect information on evacuation routes using drones in the PAZ (Precautionary Action Zones: Areas where precautionary measures are in place; within a radius of approximately 5 km from the nuclear power generation facility) and PEA (Precautionary Evacuation Areas: Areas in which evacuation and other protective measures similar to those for PAZ are in place);
(ii) Development of an information sharing system with Oita Prefecture, which is a potential marine evacuation destination for the residents of the PEAs;
(iii) Clarification of marine and air evacuation routes, destinations, and means for when land evacuation from the PEAs is difficult; and
(iv) Clarification of protective measures in the event of a complex disaster involving a typhoon, earthquake, etc.

Other changes included: (1) enhancement of the capability of temporary disaster information broadcasting stations for communicating information to the residents; (2) enhancement of the medical system in the case of a nuclear disaster; (3) increasing the stock of stable iodine agents; and (4) clarification response measures for Unit 1 of the Ikata Nuclear Power Plant, for which a decommissioning plan pursuant to the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors has been approved and which is subject to the scope of the public notice on fuel cooling.

At the third meeting of the Ikata Local Nuclear Disaster Management Council, the members shared an understanding that there would be no end to nuclear disaster preparedness efforts. Ehime Prefecture announced that it would create an educational DVD on region-wide evacuation for use in seminars and streaming to promote the understanding of the residents, while also promoting more practical exercises and the use of drones. In addition, Ehime, Yamaguchi, and Oita Prefectures expressed their intention to work with relevant municipalities and disaster prevention organizations in enhancing and strengthening nuclear disaster preparedness measures. The national government announced its intention to continue to conduct exercises under cooperation with the Ikata Local Nuclear Disaster Management Council, while also working with the relevant local governments in further concretizing and enhancing the Ikata Region Emergency Response, keeping in mind the results of the drills.

Through the above process, the Ikata Local Nuclear Disaster Management Council confirmed in its meeting that the above amendment was aimed at the further concretization and enhancement of the Emergency Response based on the lessons learned through the Ehime Prefecture Nuclear Emergency Response Exercises.

3-2 Support and Initiatives for Other Prefectures

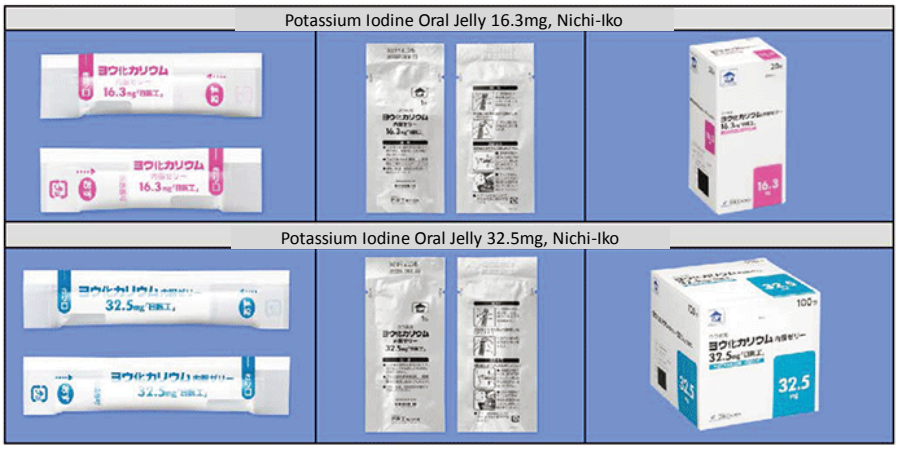
(1) Stockpiling and Distribution of a Stable Iodine Agent in Jelly Form

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. For this reason, agents suitable for such children could not be distributed in advance, which had been 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 (Urgent Protective Action Planning Zone: Areas in which urgent protective measures are in place; within a radius of approximately 5 to 30 km from the nuclear power generation facility) stockpiled stable iodine agents in jelly form and distributed them to residents in advance with financial support by the national government. The necessary amount had been stocked by the end of FY2018 (Fig. 3-2-1).

In addition, the manufacturer announced that the expiration of potassium iodide pills (50 mg) shipped from April 1, 2019 onward would be extended from three years to five years.

Fig. 3-2-1 **Stable iodine agent in jelly form**



[Usage and dosage]
Potassium iodine 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 g/time for infants aged at least 1 month but under 3; and 16.3 mg for newborn infants.

Source: Provided by the pharmaceutical manufacturer

(2) Designation of Off-site Centers

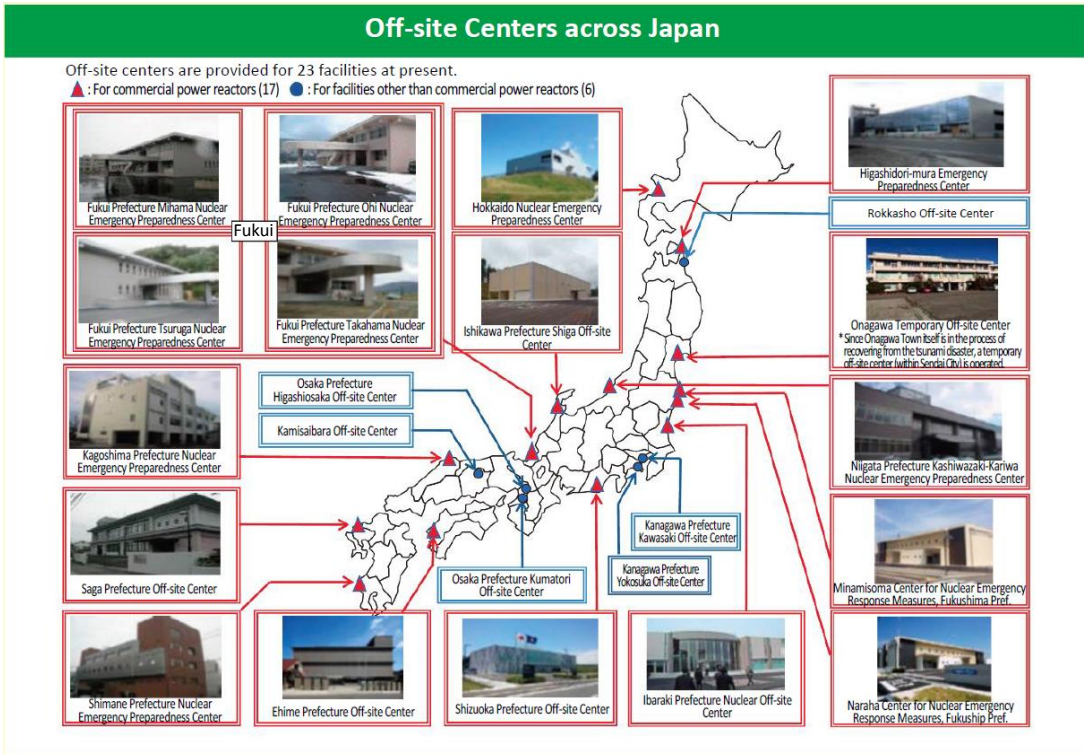
Under Article 12 (1) of the Act on Special Measures Concerning Nuclear Emergency Preparedness, the Prime Minister is required to designate an emergency response base facility (known as “an off-site center”) for each nuclear site, for the coordination of emergency response measures (Fig. 3-2-2).

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 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. 3-2-2 Off-site Centers across Japan (as of March 31, 2019)

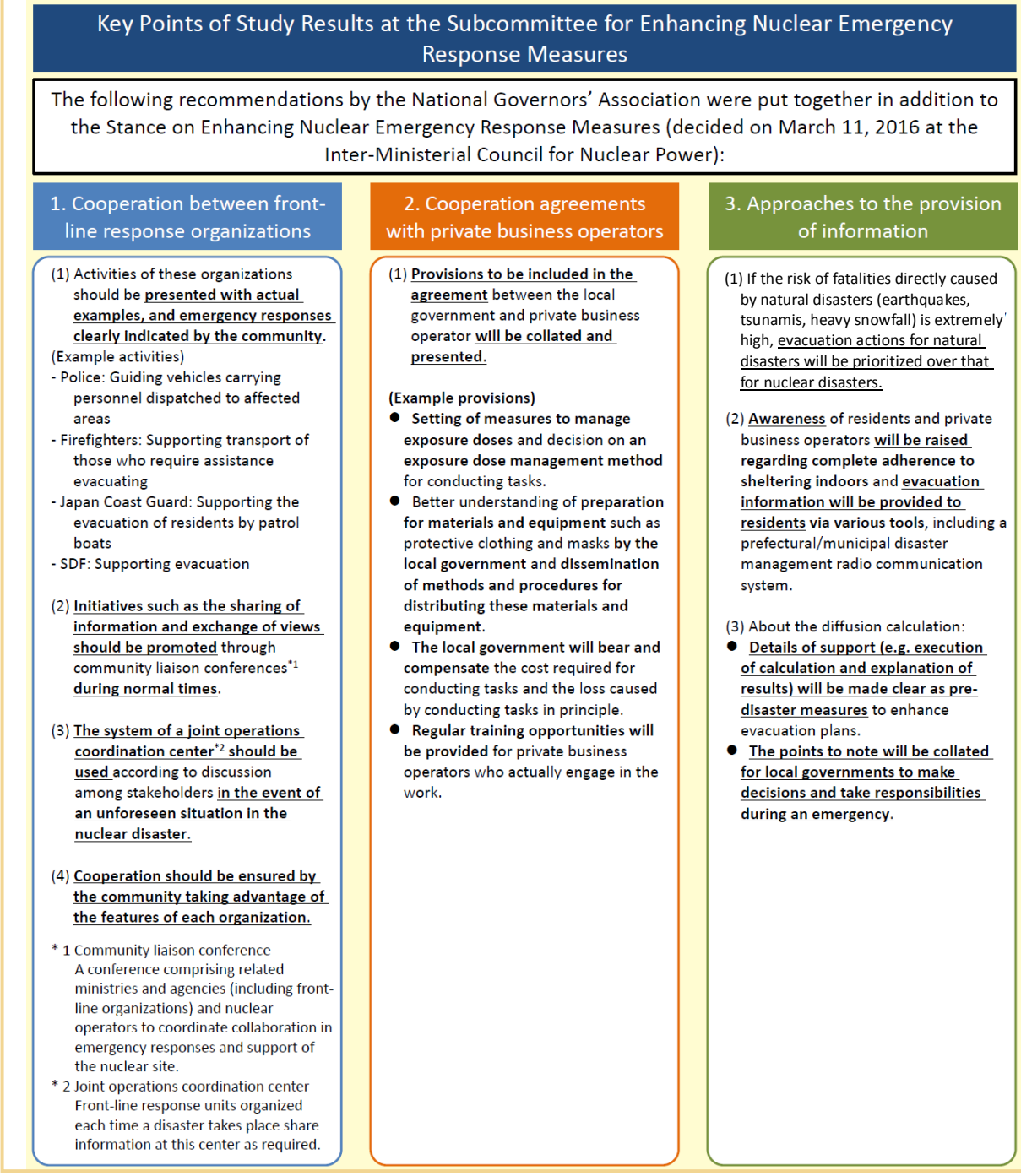


Source: Cabinet Office

(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 resilience. 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. 3-2-3)

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



Source: Cabinet Office

3-3 Training and Seminars on Regional Nuclear Emergency Preparedness

(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, each 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 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 in March 2018 as basic guidance for the prefectures which operate the entire drills from planning, implementation to evaluation.

Reference: https://www8.cao.go.jp/genshiryoku_bousai/kunren/kunren.html

Fig. 3-3-1 Nuclear Emergency Response Exercises Held by Local Governments in FY2018

Region	Name of Drill	Date
Tomari	Hokkaido Nuclear Emergency Response Exercise	October 22, 2018 and February 4, 2019
Higashidori	Aomori Prefecture Nuclear Emergency Response Exercise	November 10 and 11, 2018
Onagawa	Miyagi Prefecture Nuclear Emergency Response Exercise	January 24, 2019
Fukushima	Fukushima Prefecture Nuclear Emergency Response Exercise	January 21 and 26, 2019
Shika	Ishikawa Prefecture Nuclear Emergency Response Exercise Toyama Prefecture Nuclear Emergency Response Exercise	November 11, 2018
Fukui	(i) Fukui Prefecture Nuclear Emergency Response Exercise (ii) Kyoto Prefecture Nuclear Emergency Response Exercise (iii) Shiga Prefecture Nuclear Emergency Response Exercise ((i) to (iii) are conducted as part of the National Comprehensive Nuclear Emergency Response Exercise) (iv) Gifu Prefecture Nuclear Emergency Response Exercise	(i) - (iii) August 25 and 26, 2018 (iv) November 25, 2018
Hamaoka	Shizuoka Prefecture Nuclear Emergency Response Exercise	February 5 and 6, 2019
Shimane	Shimane Prefecture Nuclear Emergency Response Exercise Tottori Prefecture Nuclear Emergency Response Exercise	October 26 and 30, 2018
Ikata	Ehime Prefecture Nuclear Emergency Response Exercise Yamaguchi Prefecture Nuclear Emergency Response Exercise	October 12, 2018
Genkai	Saga Prefecture Nuclear Emergency Response Exercise Nagasaki Prefecture Nuclear Emergency Response Exercise Fukuoka Prefecture Nuclear Emergency Response Exercise	February 2, 2019
Sendai	Kagoshima Prefecture Nuclear Emergency Response Exercise	February 9, 2019

Source: Cabinet Office

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

(Training Programs by the National Government)

The Cabinet Office has organized 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.

The new programs that started in FY2018 included the Core Personnel Training aimed at promoting the understanding of the core roles among the nuclear emergency response personnel concerning the management of the national headquarters according to the development of the situation of a nuclear disaster, and the Practical Capacity Building Training aimed at improving various skills that are necessary for smoothly conducting resident evacuation in the event of a nuclear disaster, such as skills for formulating implementation plans.

(i) 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 Daiichi Nuclear Power Station. These training sessions were held on 36 occasions in FY2018. The main topics covered in the training are as follows.

· Overview of legislation concerning nuclear emergency preparedness (classroom learning)
· Approaches to radiation protection in accordance with the Nuclear Emergency Response Guidelines (classroom learning)
· Lessons from the accident at Fukushima Nuclear Power Station (classroom learning), etc.

(ii) Tabletop Exercises for Nuclear Emergency Response Headquarters

Tabletop Exercises for Nuclear Emergency Response Headquarters are organized for key disaster response personnel at the national and 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 FY2018. The main topics covered in the training are as follows.

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

(iii) Core Personnel Training

The Core Personnel Training is conducted for those who play leading roles among key disaster response personnel at the national and local governments, with an aim to equip them with necessary knowledge and skills. The training was conducted on a pilot basis in FY2018. After that, two rounds of the training were held, bearing in mind the opinions and requests heard after the pilot training program. The main topics covered in the training are as follows.

・Emergency situation concerning power generation reactors (lecture)
・Nuclear emergency and health hazards (lecture)
・Protective measures against nuclear emergencies (lecture)
・Tabletop exercise

(iv) Practical Capacity Building Training

a. Inspection of evacuation and relocation areas, etc.

The Practical Capacity Building Training was conducted for local government employees in charge of developing plans for temporary decontamination and inspection of evacuation and relocation areas, in order to strengthen their skills to formulate specific plans, manuals, etc. This training was held seven times in FY2018. The main topics covered in the training are as follows.

・Basic principles for the inspection of evacuation and relocation areas (lecture)
・Exercise concerning the planning of the inspection of evacuation and relocation areas

b. Evacuation by bus

The Practical Capacity Building Training was conducted for local government employees in charge of planning evacuation by bus, in order to strengthen their skills to formulate specific bus evacuation plans, manuals, etc. This training was held twice on a trial basis in FY2018. The main topics covered in the training are as follows.

・Challenges concerning bus resident evacuation following the Fukushima nuclear disaster; planning skills required to solve the challenges (lecture)

・Status of preparation of a bus evacuation plan in each prefecture

(Training Programs by Local Governments)

From FY2018, each prefecture took initiative in planning and implementing the training for disaster response personnel and basic training in nuclear emergency preparedness, with support from the Cabinet Office as necessary.

(i) Training for disaster response personnel

Training was 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.

(ii) Basic training in nuclear emergency preparedness

Basic training in nuclear emergency preparedness was 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.

Lecture
(Training of key nuclear emergency response personnel)

Exercise
(Tabletop Exercises for Nuclear Emergency Response Headquarters)

Exercise
(Core Personnel Training)

Exercise
(Practical Capacity Building Training: Inspection of evacuation and relocation areas, 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 mutual invitation to 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).

Specifically, Japan participated in the National Radiological Emergency Preparedness Conference held in Washington, the United States in April 2018 to make a presentation on Japan's Comprehensive Nuclear Emergency Response Exercises and join the panel discussion. In August 2018, Japan shared the EMWG's initiatives and the roadmap for the future at the fifth meeting of the U.S.-Japan Bilateral Commission on Civil Nuclear Cooperation. In the same month, 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 Kansai Electric Power Company's Ohi and Takahama Nuclear Power Stations. After the exercise, representatives of the two countries held an exchange of views.

(ii) Cooperation with France

The Memorandum of Cooperation Between the Parliamentary Vice-Minister of the Cabinet Office of Japan and the Director-General for Civil Security and Crisis Management, Ministry of the Interior of France on Emergency Management related to Nuclear Accidents was signed in 2015. Based on this memorandum, the Cabinet Office is pursuing closer collaboration with the French Ministry of the Interior and other relevant French organizations in the area of nuclear disaster preparedness through regular opinion exchange and reciprocal invitations to exercises. Specifically, Mr. ITO, then State-Minister of Cabinet Office, visited the Ministry of the Interior of France in May 2018 to exchange views on the efforts for the enhancement of emergency response plans in the two countries based on the lessons learned from the nuclear disaster at TEPCO's Fukushima Daiichi Nuclear Power Plant.

(iii) 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 Cooperation and Development (OECD/NEA), as well as countries including Germany, China, and Lithuania.

Specifically, then State-Minister of Cabinet Office Ito visited the OECD/NEA in May 2018 to exchange opinions on the enhancement and strengthening of nuclear disaster preparedness in Japan.

Opinion exchange with the IAEA

In addition, Japan invited 18 representatives of international organizations and nuclear emergency preparedness organizations in various countries to observe the Comprehensive Nuclear Emergency Response Exercise held at Ohi and Takahama Nuclear Power Stations. 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 the 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. The Cabinet Office attended the meeting (the 6th meeting from June 12 to 14, 2018 and the 7th meeting from October 30 to November 1, 2018), and participated in discussions with experts from the IAEA and other member countries.

Section 4: 2018 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 2018 Comprehensive Nuclear Emergency Response Exercise was held at the Ohi and Takahama Nuclear Power Stations with the objectives as listed below (Reference: https://www8.cao.go.jp/genshiryoku_bousai/kunren/h30sg.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 Ohi Region Emergency Response and the Takahama 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 Priority Zones for Nuclear Emergency Response in the Ohi and Takahama Regions

Note) PAZ: Precautionary Action Zone
Note) UPZ: Urgent Protective Action Planning Zone
<Some residents living in Oura Peninsula in Maizuru City must evacuate in the same manner as the PAZ, as their evacuation routes are located near the PAZ borders.>

Source: Cabinet Office

(2) Subject Power Plants and Dates

The exercise was held on August 25 and 26, 2018 at Ohi Power Station and Takahama Power Station.

(3) Participants, etc.

(Number of participating organizations: 191; number of participants, including local citizens: approximately 21,200)

· Governmental organizations: Cabinet Secretariat, Cabinet Office, NRA, and other related ministries and agencies
· Local governments: Fukui Prefecture, Kyoto Prefecture, Shiga Prefecture, Ohi Town, Takahama Town, Maizuru City, 10 cities and towns within the UPZ and related cities and towns
· Nuclear operator: Kansai Electric Power Co., Inc.
· Related organizations: National Institutes for Quantum and Radiological Science and Technology, Japan Atomic Energy Agency, etc.

(4) Accident Scenario

After the external power source is shut down following an earthquake centered on northern Kyoto Prefecture, reactor coolant leaks from Unit 3 of the Ohi Nuclear Power Station. In addition, water injection to the reactor

becomes impossible due to the failure of the emergency core cooling system (ECCS), leading to the state of General Emergency.

Meanwhile, the Takahama Nuclear Power Station suffered no direct damage from the earthquake. However, water supply to the vapor generator of Unit 4 is shut down following the loss of external power source due to an electric line failure, while water injection to the rector becomes impossible due to the failure of the ECCS, leading to the state of General Emergency.

(5) Content of Exercise

This exercise was held with the aim of further improving the effectiveness of the Evacuation Plan based on the Ohi Region Emergency Response and Takahama 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, which involved a combination of a natural disaster and a 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
(Ohi 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. In addition, according to the escalation of the situation, the functions of the local headquarters were unified at the central headquarters for integrated management. At the Prime Minister's Official Residence, Prime Minister Abe 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 with the participation of relevant ministers. 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.

Meeting of the Nuclear Emergency Response Headquarters (drill) participated in by Prime Minister Abe and relevant ministers

(3) Field training exercise on inter-prefectural evacuation, indoor evacuation, etc.

Following the site area emergency and general emergency, evacuation sites were arranged and transportation means were provided for residents in the PAZ and in the areas where protection measures similar to the PAZ are taken, based on the extent of the damage caused by the natural disaster. The residents were evacuated within or to outside the prefecture after having taken stable iodine agents. In addition, indoor evacuation was conducted to promote the understanding of the residents concerning the meaning of such evacuation. Also, the scenario assuming that radioactive materials had been released involved the urgent distribution of stable iodine agents, temporary relocation, and inspections of evacuation areas. For each evacuation, video footage transmitted by Japan Ground Self-Defense Forces and Fukui Prefectural Police helicopters was used to gain an understanding of the situation on the ground.

Evacuation exercise for persons who need special assistance (persons suffering acute disease)
(Ohi Town, Fukui Prefecture)

Video explaining the meaning of indoor evacuation
(Ine Town, Kyoto Prefecture)

4-3 Post-exercise Initiatives

Following the 2018 Comprehensive Nuclear Emergency Response Exercise, the Cabinet Office identified areas for improvement based on 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 2018 Comprehensive Nuclear Emergency Response Exercise in March 2019.

Reference: https://www8.cao.go.jp/genshiryoku_bousai/kunren/h30sg.html

Going forward, the Fukui Local Nuclear Disaster Management Council will make improvements to the Ohi Region Emergency Response and Takahama 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.

APPENDIX

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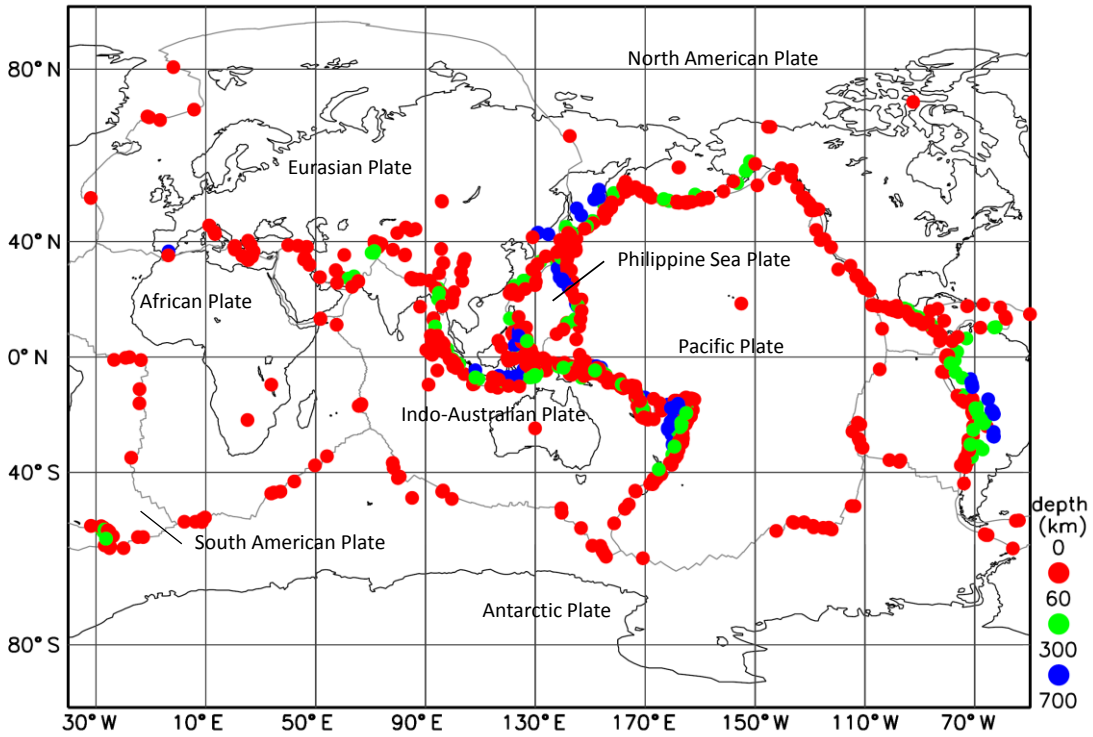
9. Japan's International Cooperation

10. Others

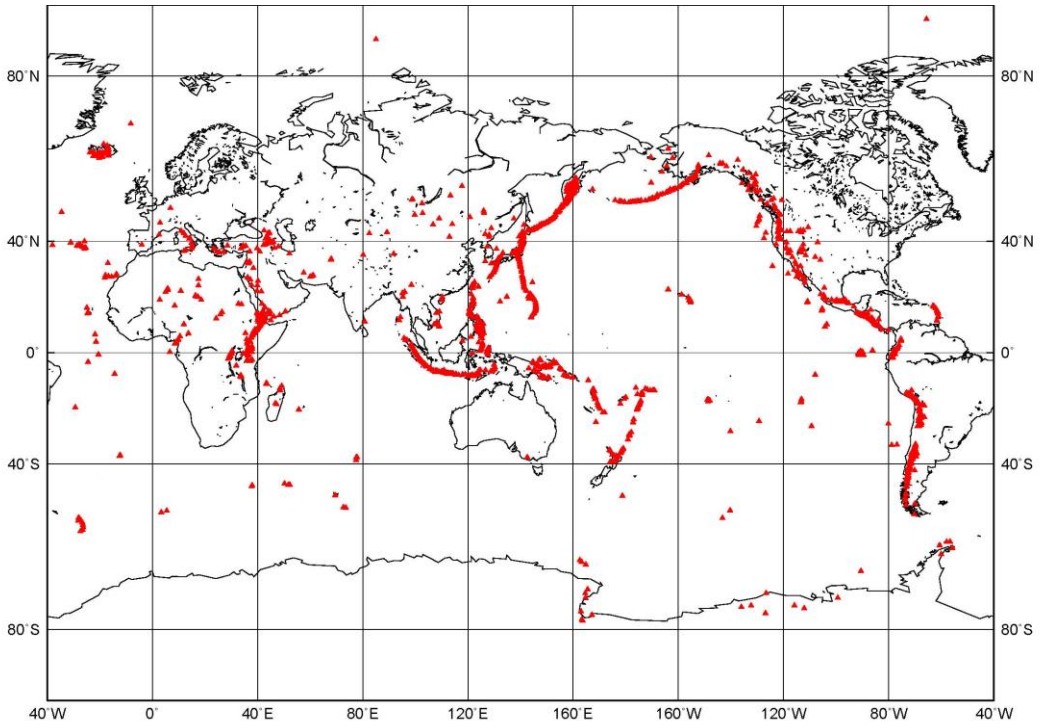
1. Overview of Japan's National Land

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



Note: 2009–2018
Source: Formulated by the Japan Meteorological Agency based on earthquake data from the U.S. Geological Survey

Fig. A-2 **Distribution of Volcanoes Worldwide**

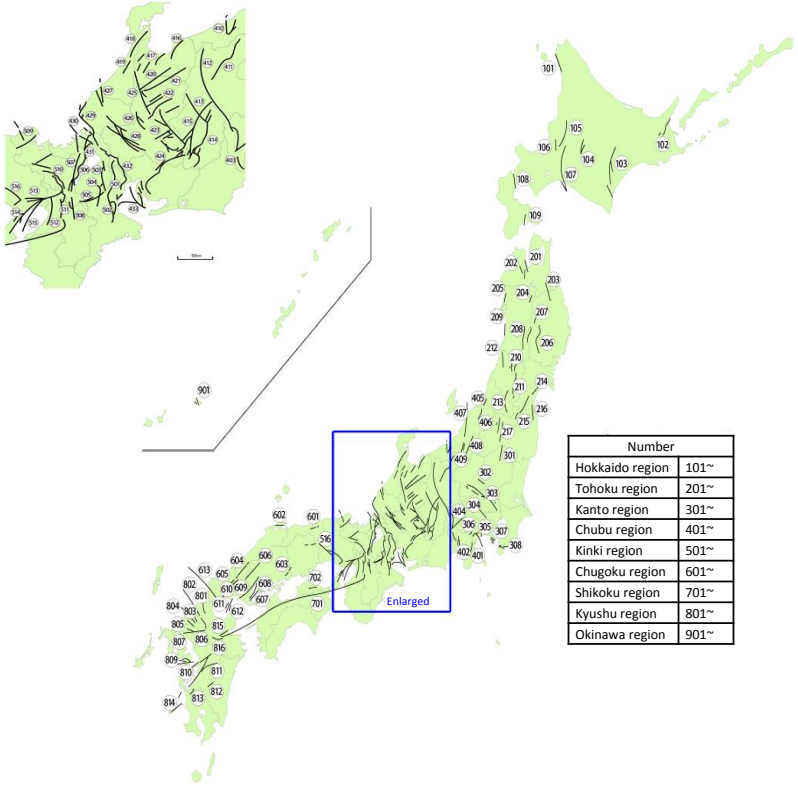


Source: Japan Meteorological Agency

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

Subduction Zone Earthquake Areas

Major Active Faults



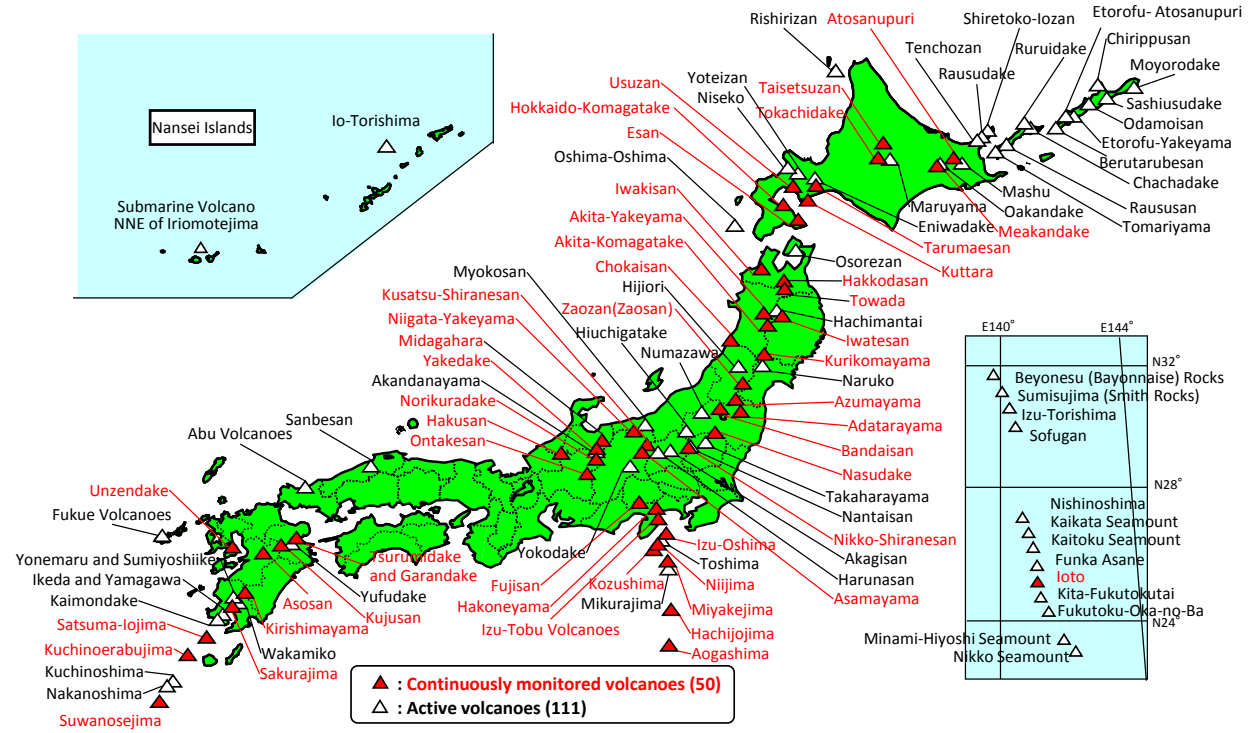
Number	
Hokkaido region	101~
Tohoku region	201~
Kanto region	301~
Chubu region	401~
Kinki region	501~
Chugoku region	601~
Shikoku region	701~
Kyushu region	801~
Okinawa region	901~

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	Sourthern 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	22,252
The 2016 Kumamoto Earthquake	(M6.5) (M7.3)	April 14, 2016 April 16	273
The 2018 Hokkaido Eastern Iburi Earthquake	(M6.7)	September 6, 2018	42

*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 May 19, 2006. 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, 2019.
5. The details given for the 2016 Kumamoto Earthquake is the current figure as of April 12, 2019 (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 Disasters in Japan Since 1945

Date	Disaster	Main Affected Areas	Number of Fatalities 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 Ione	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 (5115)	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 MARIE (5415)	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 IDA (5822)	East of Kinki (Especially in Shizuoka)	1,269
September 26-27, 1959	Typhoon VERA (5915)	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 SHIRLEY (6523), TRIX (6524), VIRGINIA (6525)	Nationwide (Especially in Tokushima, Hyogo, Fukui)	181
September 23-25, 1966	Typhoons HELEN (6624), IDA (6626)	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 PHYLLIS (7206), RITA (7207), TESS (7209) 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 FRAN (7617) 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 TIP (7920)	Nationwide (Especially Tokai, Kanto, Tohoku)	115
December 1980 - March 1981	Snow Disasters	Tohoku, Hokuriku	152
July to August 1982	Torrential Rains and Typhoon BESS (8210)	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 TOKAGE (0423)	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
December 2010 - March 2011	Snow disaster	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)	22,252
August 30 - September 5, 2011	Typhoon TALAS (1112)	Kinki, Shikoku	98

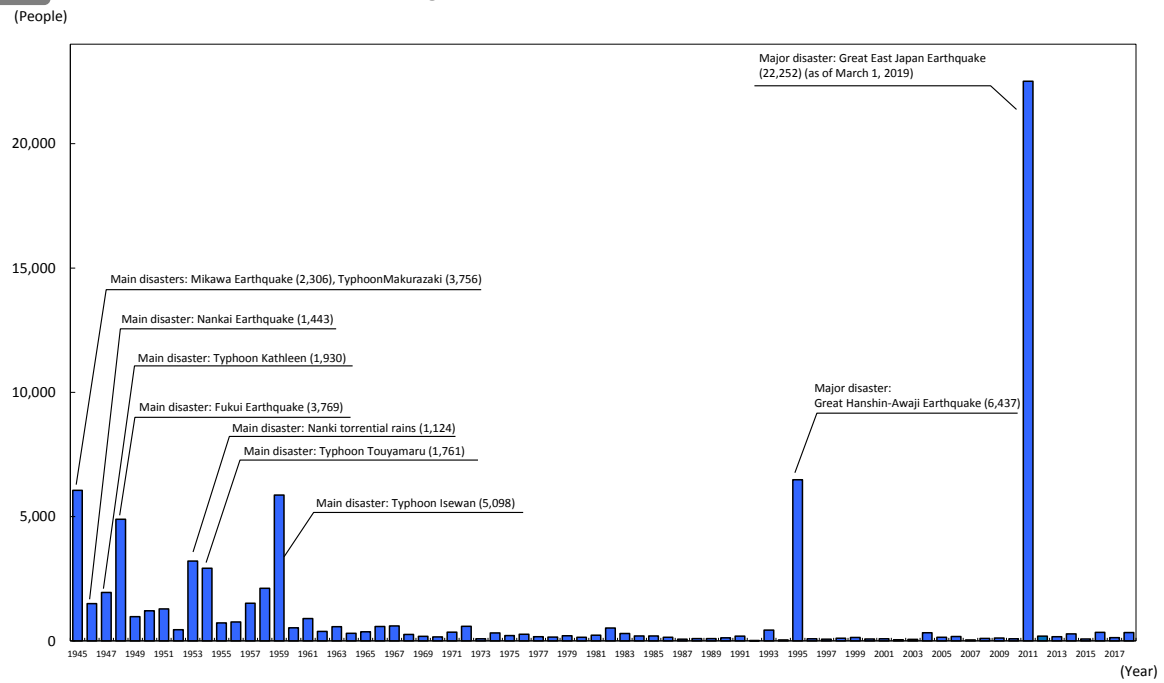
Date	Disaster	Main Affected Areas	Number of Fatalities and Missing
November 2011 - March 2012	Heavy Snow in 2011	From Northern Japan through into West Japan on the Japan Sea Coast	133
November 2012 - March 2013	Heavy Snow in 2012	From Northern Japan through into West Japan on the Japan Sea Coast	104
November 2013 - May 2014	Heavy Snow 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 (Especially in Kumamoto)	273
June 28 - July 8, 2018	The Heavy Rain Event of July 2018	Nationwide (Especially in Hiroshima, Okayama, Ehime)	245
September 6, 2018	The 2018 Hokkaido Eastern Iburi Earthquake (M6.7)	Hokkaido	42

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 from the Southern Hyogo Prefecture Earthquake (Great Hanshin-Awaji Earthquake) is the current figure as of May 19, 2006. 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, 2019 (including disaster-related fatalities).
5. The number of fatalities and missing persons from the 2016 Kumamoto Earthquake is the current figure as of April 12, 2018.
6. The number of fatalities and missing persons from the Heavy Rain Event of July 2018 is the current figure as of January 9, 2019.

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 Number of Fatalities and Missing Persons Due to Natural Disasters



Year	People	Year	People	Year	People	Year	People	Year	People
1945	6,062	1962	381	1979	208	1996	84	2013	173
1946	1,504	1963	575	1980	148	1997	71	2014	283
1947	1,950	1964	307	1981	232	1998	109	2015	77
1948	4,897	1965	367	1982	524	1999	141	2016	344
1949	975	1966	578	1983	301	2000	78	2017	129
1950	1,210	1967	607	1984	199	2001	90	2018	337
1951	1,291	1968	259	1985	199	2002	48		
1952	449	1969	183	1986	148	2003	62		
1953	3,212	1970	163	1987	69	2004	327		
1954	2,926	1971	350	1988	93	2005	148		
1955	727	1972	587	1989	96	2006	177		
1956	765	1973	85	1990	123	2007	39		
1957	1,515	1974	324	1991	190	2008	101		
1958	2,120	1975	213	1992	19	2009	115		
1959	5,868	1976	273	1993	438	2010	89		
1960	528	1977	174	1994	39	2011	22,515		
1961	902	1978	153	1995	6,482	2012	190		

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 2018 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-8 Fatalities and Missing Persons by Hazard

(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	22,252	0	125	2	22,515
2012	52	0	0	138	0	190
2013	75	0	0	92	6	173
2014	112	0	63	108	0	283
2015	22	0	0	49	0	77
2016	38	228	0	6	0	344
2017	60	0	0	68	1	129
2018	261	46	1	23	6	337

Notes: This table shows the number of fatalities and missing persons between Jan. 1 and Dec. 31.
Fatalities and missing persons in 2018 are based on flash bulletins from the Cabinet Office.
(The earthquake/tsunami disaster figures for 2011 include 22,252 fatalities (including disaster-related fatalities) and missing persons from the 2011 Tohoku Earthquake and Tsunami (Great East Japan Earthquake) (March 1, 2019).)

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

Fig. A-9 Recent Major Natural Disasters (Since the Great Hanshin-Awaji Earthquake)

(Total: As of April 12, 2019)

Name of Disaster	Major Events	Human Casualties (persons)		Houses Damaged (houses)			Remarks
		Fatalities/ Missing Persons	Injured	Completely Destroyed	Half Destroyed	Above-floor Flooding	
The 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	—	・Establishment of Extreme Disaster Management Headquarters[*1] ・Establishment of Major Disaster Management Headquarters ・Site inspection by Prime Minister ・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Special Measures Act for Specified Disaster ・Designation as an extremely severe disaster
The 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.	22,252	6,233	121,995	282,939	1,628	・Establishment of Extreme Disaster Management Headquarters ・Establishment of On-site Extreme Disaster Management Headquarters ・Site inspection by Prime Minister ・Dispatchment of government investigation team ・Site inspection by Minister of State for Disaster Management ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・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	—	・Establishment of Major Disaster Management Headquarters ・Establishment of On-site Major Disaster Management Headquarters ・Site inspection by Prime Minister ・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
2000 Miyake Is. Eruption and Niijima 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	—	・Establishment of Major Disaster Management Headquarters ・Site inspection by Prime Minister ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Typhoon TOKAGE (0423) (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	・Establishment of Major Disaster Management Headquarters ・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・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	—	・Establishment of Major Disaster Management Headquarters ・Site inspection by Prime Minister ・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Fukuoka-ken-Seihouoki 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	—	・Site inspection by Prime Minister ・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Invocation of Remote Islands Development Act
Typhoon NABI (0514) (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	・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
2006 Heavy Snows (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	・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	・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Typhoon SHANSHAN (0613) (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	・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・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	—	・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster

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	—	・Site inspection by Prime Minister ・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
2007 Heavy Rains from Typhoon MAN-YI (0704) and Seasonal Rain Front (July 5-31, 2007)	The typhoon made landfall in Japan in July with the strongest intensity in 57 years from 1951 to 2007. Record rainfalls in various regions.	7	75	33	33	434	・Dispatchment of government investigation 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 causalities due to homes collapsing. Damage to homes, lifelines, transportation, and nuclear power plants.	15	2,346	1,331	5,710	—	・Site inspection by Prime Minister ・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・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 causalities due to landslides and other sediment disasters. Many river channels became blocked (natural dams) in rivers in mountainous areas.	23	426	30	146	—	・Site inspection by Prime Minister ・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・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	—	・Dispatchment of government investigation 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	・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・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	・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster
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	・Site inspection by Prime Minister ・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Typhoon ETAU (0909) (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	・Site inspection by Prime Minister ・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・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	—	
Typhoon MELOR (0918) (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	・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	・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	・Site inspection by Prime Minister ・Site inspection by Minister of State for Disaster Management ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・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	・Site inspection by Minister of State for Disaster Management ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Heavy Snow 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	・Cabinet meeting ・Site 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 (Do not approach the volcano). 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	-	・Cabinet meeting (twice) ・Site 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
Typhoon MA-ON (1106) (July 12-24, 2011)	The typhoon made landfall on the southern part of Tokushima Prefecture around 11:00 p.m. on July 19, maintaining its strong intensity, with maximum winds of 40m/s, and its large scale. 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	・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	・Dispatchment of government investigation team (twice) ・Site inspection by Minister of State for Disaster Management ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Typhoon TALAS (1112) (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	・Establishment of Major Disaster Management Headquarters ・Site inspection by Prime Minister ・Dispatchment of government investigation team (twice) ・Site inspection by Minister of State for Disaster Management ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster (national)
Typhoon ROKE (1115) (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	・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Heavy Snow 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	・Cabinet meeting (twice) ・Site inspection 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	—	・Dispatchment of government investigation team ・Site inspection by Minister of State for Disaster Management ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster
Typhoon GUCHOL (1204) (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 track 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	・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)	・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・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)	・Site inspection by Prime Minister ・Dispatchment of government investigation team (twice) ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Heavy Snow from November2012 (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	・Cabinet meeting held ・Dispatchment of government investigation 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 high-pressure ridge flowed in even after the rainy season ended. During this time, Typhoons LEEPI (1304) and SOULIK (1307) approached Japan, causing heavy rains in various regions.	17	50	73	222	1,845	・Site inspection by Prime Minister ・Dispatchment of government investigation team (seven times) ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・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	・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Tornadoes on September 2 and 4, 2013 (September 2, 4, & 7, 2013)	・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	・Dispatchment of government investigation team (twice) ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster
Heavy Rains from Typhoon MAN-YI (1318) (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	・Dispatchment of government investigation team (five times) ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Typhoons WIPHA (1326) & FRANCISCO (1327) (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	・Site inspection by Prime Minister ・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Heavy Snow from 2013 (November 2013 - March 2014)	・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	・Establishment of Major Disaster Management Headquarters ・Establishment of On-site Major Disaster Management Headquarters ・Site inspection by Prime Minister ・Dispatchment of government investigation team (five times) ・Invocation of Disaster Relief Act
Typhoon NEOGURI (1408) (July 6-11, 2014)	・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	・Dispatchment of government investigation team (three times) ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster
Torrential Rains of August 2014							
Typhoons NAKRI (1412) & HALONG (1411) (July 30 - August 11, 2014)	<Typhoon NAKRI (1412)> ・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. <Typhoon HALONG (1411)> 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.	5	93	22	374	1,529	・Dispatchment of government investigation team (twice) ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・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	・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	・Dispatchment of government investigation team (twice) ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・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)	・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	・Establishment of Major Disaster Management Headquarters ・Establishment of On-site Major Disaster Management Headquarters ・Site inspection by Prime Minister ・Dispatchment of government investigation team (three times) ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
2014 Eruption of Mt. Ontake (September 27, 2014)	・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 (Do not approach the volcano) was issued. ・Entry within 4 km of the crater was restricted. ・Many mountain climbers suffered casualties due to this eruption.	63	69	0	0	0	・Establishment of Major Disaster Management Headquarters ・Establishment of On-site Major Disaster Management Headquarters ・Dispatchment of government investigation 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	—	・Site inspection by Prime Minister ・Dispatchment of government investigation team (twice) ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Heavy Snow 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	・Dispatchment of government investigation team ・Invocation of Disaster Relief Act
Kuchinoerabu-jima Eruption [Volcanic Alert Level 5] (May 29, 2015)	・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 (Mukaehama 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			・Installation of government on-site communications office (Yakushima Town, Kagoshima) ・Site inspection by Prime Minister ・Dispatchment of government investigation team ・Invocation of Disaster Relief Act
Eruption of Mt. Hakone [Volcanic Alert Level 3] (June 30, 2015)	・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 Sounkyo Bessochi areas, as well as evacuating residents, etc. from those areas	0	0	0	0	0	・Deployment of a Cabinet Office advance information-gathering team
Typhoon NANGKA (1511) (July 16-18, 2015)	・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	・Appeal to the public by the Minister of State for Disaster Management

Name of Disaster	Major Events	Human Casualties (persons)		Houses Damaged (houses)			Remarks
		Fatalities/ Missing Persons	Injured	Completely Destroyed	Half Destroyed	Above-floor Flooding	
Volcanic activity at Sakurajima [Volcanic Alert Level 4] (August 15, 2015)	・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	・Site inspection by Parliamentary Vice Minister ・Deployment of a Cabinet Office liaison team
Typhoon GONI (1515) (August 22-26, 2015)	・The typhoon that made landfall near Arao City in Kumamoto Prefecture after 06:00 on the 25th moved northward to northern Kyushu, maintaining its strong intensity, and reached 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	・Designation as an extremely severe disaster
Torrential Rain of September 2015 in the Kanto and Tohoku Regions [Including Typhoon ETAU (1518)] (September 9-11, 2015)	・After making landfall near Nishio City, Aichi Prefecture at around 09:30 on September 9, 2015 Typhoon ETAU (1518) moved on to the Sea of Japan and transformed into an extra-tropical cyclone at 15:00 that day. ・As a result of Typhoon ETAU (1518) 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 extra-tropical cyclone into which Typhoon ETAU (1518) transformed and, subsequently, a southeasterly wind from the vicinity of Typhoon KILO (1517) supplied flows of moist air that triggered a succession of line-shaped precipitation systems, 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	・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 ・Dispatchment of government investigation team ・Cabinet meeting (twice) ・Site inspection by Prime Minister (once) ・Site inspection by Minister of State for Disaster Management (twice) ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Typhoon DUJUAN (1521) (September 27-28, 2015)	・Typhoon DUJUAN (1521) approached the Ishigaki and Yonaguni island areas with violent 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	・Dispatchment of government investigation team ・Invocation of Disaster Relief Act
The 2016 Kumamoto Earthquake (April 14 and 16, 2016)	・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	273	2,809	8,667	34,719	0	・Establishment of Major Disaster Management Headquarters ・Establishment of On-site Major Disaster Management Headquarters ・Site inspection by Prime Minister (three times) ・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・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)	・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
Typhoon CHANTHU (1607) (August 16-18, 2016)	・Typhoon CHANTHU (1607) 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 transformed into an extra-tropical cyclone near Sakhalin island at 03:00 on the 18th. ・The passage of the cold front of the extra-tropical cyclone that was formerly Typhoon CHANTHU (1607) 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
Typhoons KOMPASU (1611) & MINDULLE (1609) (August 20-23, 2016)	・Typhoon KOMPASU (1611) formed as a tropical storm over the sea 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 transformed into an extra-tropical cyclone over the Sea of Okhotsk at 03:00 on the 22nd. ・Typhoon MINDULLE (1609) 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 on the central part of Hidaka District of Hokkaido Prefercture before 06:00 on the 23rd. It then continued up through Hokkaido before transforming into an extra-tropical cyclone over 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	・Dispatchment of government investigation team ・Designation as an extremely severe disaster
Typhoon LIONROCK (1610) (August 26-31, 2016)	・Typhoon LIONROCK (1610) approached the Kanto region in the morning of August 30 and made landfall near Ofunato City, Iwate Prefecture around 17:30 on the 30th, accompanied by a storm area. It then accelerated on a peculiar course that saw it pass through the Tohoku region and enter the Sea of Japan, and it transformed into an extra-tropical cyclone on the 31st. ・This was the first time that a typhoon had made landfall on the Pacific coast of the Tohoku region since the Japan Meteorological Agency began recording statistics in 1951.	29	14	518	2,281	279	・Installation of government on-site communications office ・Appeal to the public by the Minister of State for Disaster Management ・Site inspection by Prime Minister (twice) ・Dispatchment of government investigation team (twice) ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Typhoon MALAKAS (1616) (September 16-20, 2016)	・With strong intensity, Typhoon MALAKAS (1616) made landfall on the Osumi Peninsula, Kagoshima Prefecture after 00:00 on September 20 and then headed northeast across the waters off the coast of Shikoku before making landfall once more near Tanabe City, Wakayama Prefecture around 13:30 the same day. After making landfall yet again after 17:00 that day near Tokoname City, Aichi Prefecture, it transformed into an extra-tropical cyclone at 21:00 the same day off the coast of the Tokai region.	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	—	・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・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, 2017and Typhoon NANMADOL (1703) (including Northern Kyushu Heavy Rain) (June 30 - July 10, 2017)	Localized intense rain caused by a seasonal rain front and Typhoon NANMADOL (1703) 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	39	338	1,101	223	・Cabinet meeting (three times) ・Site inspection by Prime Minister (once) ・Deployment of a Cabinet Office advance information gathering team ・Dispatchment of government investigation team (twice) ・Installation of government on-site communications office ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・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	618	・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Typhoon TALIM (1718) (September 13 - 18, 2017)	Typhoon TALIM (1718), heading north near Miyako Island from September 13 to 14, crossed the Satsuma Peninsula, Kagoshima Prefecture around 11:30 on 17th and made landfall on Tarumizu City, Kagoshima Prefercture around 12:00 the same day. It continued to move north along the Japanese islands with a storm area and transformed into an extra-tropical cyclone at 03:00 on 18th around Sado Island. The typhoon and active rain front caused driving rains from Western to Northern Japan.	5	73	5	615	1,553	・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Typhoon LAN (1721) (October 21 - 23, 2017)	Typhoon LAN (1721) moved northward over the sea south of Japan during October 21-22 and made landfall around Kakegawa City in Shizuoka Prefecture around 03:00 on the 23rd with its strong intensity and its very large scale. After crossing the Kanto region with a storm area. It transformed into an extra-tropical cyclone around the sea east of Japan at 09:00 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	245	13	485	2,794	・Dispatchment of government investigation team ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Heavy Snow from 2017 (November 2017 - March 2018)	Due to the effects of a strong winter air-pressure pattern, heavy snowfalls were observed in some areas on the Japan Sea side. Especially large amounts of well-developed snow clouds flowed in from the Japan Sea side from early to mid-February. In Fukui, Fukui Prefecture, the daily maximum snow depth exceeded 140 cm for the first time in 37 years. The Hokuriku region observed heavy snowfalls overall, with some areas recording snow exceeding six times the average.	116	1,539	9	18	13	・Dispatchment of government investigation team ・Invocation of Disaster Relief Act
Eruption of Kusatsu-Shiranesan (January 23, 2018)	・An eruption occurred at 10:02 a.m., January 23. Volcanic rocks travelled farther than 1 km from the crater near Kagami-ike, Motoshiranesan. ・At 11:05 a.m., the volcanic alert level was raised from 1 to 2 (Do not approach the crater). ・At 11:50 a.m., the volcanic alert level was raised from 2 to 3 (Do not approach the volcano) (caution required within a 2 km radius from the crater near Kagami-ike).	1	11	0	0	0	
Earthquake centered in the western Shimane Prefecture (April 9, 2018)	Maximum seismic intensity of Upper 5	0	9	17	58	0	・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster
Sediment Disaster in Nakatsu, Oita Prefecture (April 14, 2018)	A landslide in Yabakeimachi, Nakatsu City	6	0	4	0	0	

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 Osaka Prefecture (June 18, 2018)	Maximum seismic intensity of Lower 6	6	462	21	454	0	・Deployment of a Cabinet Office advance information gathering team ・Cabinet meeting (once) ・Site inspection by Prime Minister (once) ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster
The Heavy Rain Events of July 2018 (June 28 – July 8, 2018)	Due to the effects of the rain front and Typhoon PRAPIROON (1807), warm and highly humid air was continuously supplied into the vicinity of Japan, resulting in record rainfalls in western Japan and other areas. The rains caused some serious disasters, including river overflows, floods, and landslides, leaving more than 200 people dead or missing. The lifelines were also affected, with water and electricity outages occurring in various areas across Japan, while rail and road transportation was also disrupted.	245	433	6,767	11,243	7,173	・Establishment of Major Disaster Management Headquarters ・Cabinet meeting (once) ・Deployment of a Cabinet Office advance information gathering team ・Dispatchment of government investigation team ・Site inspection by Prime Minister (four times) ・Site inspection by Minister of State for Disaster Management (three times) ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Invocation of Special Measures Act for Specified Disaster ・Designation as an extremely severe disaster
Volcanic activity at Kuchinoerabu-jima [Volcanic Alert Level 4] (August 15, 2018)	From around August 8, many volcanic earthquakes and large amounts of volcanic gases were observed. From around midnight on August 15, an increasing number of volcanic earthquakes were observed at deeper spots. In the small hours of the same day, an earthquake with a maximum magnitude of 1.9 (preliminary) was observed. At 10:30 a.m., the volcanic alert level was raised to 4 (prepare to evacuate).	—	—	—	—	—	
Typhoon JEBI (1821) (September 3 - 5, 2018)	With very strong intensity, Typhoon JEBI (1821) made landfall on the southern part of Tokushima Prefecture before noon on September 4. It then made landfall again around Kobe City, Hyogo Prefecture before 2 p.m. and continued up through the Kinki region while accelerating. At 9 a.m. on the 5th, it transformed into an extra-tropical cyclone off the coast of the Russian Primorsky Krai. During the approach and passage of the typhoon, very intense winds and rains hit western to northern Japan. The Shikoku and Kinki regions experienced particularly strong winds and rains, with some areas observing record high waves.	14	1,011	59	627	64	・Cabinet meeting (once) ・Dispatchment of government investigation team ・Designation as an extremely severe disaster
The 2018 Hokkaido Eastern Iburi Earthquake (September 6, 2018)	Maximum seismic intensity of 7 A major power outage occurred across the prefecture.	42	762	462	1,570	—	・Deployment of a Cabinet Office advance information gathering team ・Cabinet meeting (nine times) ・Installation of government on-site communications office ・Dispatchment of government investigation team ・Site inspection by Prime Minister (once) ・Site inspection by Minister of State for Disaster Management (once) ・Invocation of Disaster Relief Act ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to Disaster ・Designation as an extremely severe disaster
Typhoon TRAMI (1824) (September 28 – October 1, 2018)	From September 28 to dawn on the 30th, Typhoon TRAMI (1824) approached the Okinawa region with very strong intensity. It made landfall near Tanabe City, Wakayama Prefecture around 8 p.m. on the 30th while rapidly accelerating. After crossing eastern and northern Japan, it transformed into an extra-tropical cyclone over the sea east of Japan at 9 a.m. on October 1.	4	227	53	384	316	・Designation as an extremely severe disaster ・Invocation of Act on Support for Reconstructing Livelihoods of the Affected due to 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 12, 2019.

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

Fig. A-10 Establishment of Extreme Disaster Management Headquarters and Major Disaster Management Headquarters

As of March 31, 2019

	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	Typhoons SHIRLEY (6523), TRIX (6524), and VIRGINIA (6525) Major Disaster Management Headquarters	Sep. 17 - Dec. 17, 1965	Minister of State
4	Typhoons HELEN (6624) and IDA (6626) 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	Typhoon FRAN (7617) 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	Typhoon TIP (7920) 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	Prime Minister
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 ↓ Minister of State for Disaster Management
	2000 Miyake Island Eruption Major Disaster Management Headquarters*3	May 16, 2002 - Mar. 31, 2005	
25	Typhoon TOKAGE (0423) 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	Typhoon TALAS (1112) 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	Apr. 14, 2016 - Nov. 30, 2018	Minister of State for Disaster Management
33	Emergency Response Headquarters for the Heavy Rain in July 2018	Jul. 8 - Nov. 30, 2018	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-11 Dispatchment of Government Investigation Teams (Since the Great Hanshin-Awaji Earthquake)

As of March 31, 2019

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 Typhoon BART (9918) 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
	2003Tokachi-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
	Typhoon MEARI (0421)	Oct. 1	Mie	Minister of State for Disaster Management
	Typhoon MA-ON (0422)	Oct. 14	Shizuoka	State Minister of the Cabinet Office
	Typhoon TOKAGE (0423)	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
	Typhoon NABI (0514)	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
	Typhoon SHANSHAN (0613)	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 MAN-YI (0704) 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
	Typhoon ETAU (0909)	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
	Typhoon TALAS (1112)	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 Snow in2012	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 MAN-YI (1318)	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
		Sep. 19-20	Aomori, Iwate, Akita	Special Advisor to the Prime Minister
	Typhoon WIPHA (1326)	Oct. 19	Oshimacho (Tokyo)	Minister of State for Disaster Management
2014	Heavy Snow 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
		Mar. 15	Nagano, Gunma	State-Minister of the Cabinet Office
	Typhoon NEOGURI (1408) and Seasonal Rain Front	Jul. 11	Nagano	Parliamentary Vice-Minister of Cabinet Office
		Jul. 12	Yamagata	Parliamentary Vice-Minister of Cabinet Office
		Jul. 14-15	Okinawa	Parliamentary Vice-Minister of Cabinet Office
	Typhoons NAKRI (1412) & HALONG (1411)	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 Snow 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 DUJUAN (1521)	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
	Typhoons KOMPASU (1611) & MINDULLE (1609)	Aug. 28-29	Hokkaido	Parliamentary Vice-Minister of Cabinet Office
	Typhoon LIONROCK (1610)	Aug. 31-Sep. 1	Iwate	Parliamentary Vice-Minister of Cabinet Office
		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 Typhoon NANMADOL (1703)	Jul. 7	Fukuoka	State-Minister of the Cabinet Office
		Jul. 9	Oita, Fukuoka	Minister of State for Disaster Management
	Typhoon LAN (1721)	Oct. 27	Osaka, Wakayama	Minister of State for Disaster Management
2018	Heavy Snow in 2017	Feb. 24	Fukui	Minister of State for Disaster Management
	The Heavy Rain Event of July 2018	Jul. 9	Okayama, Hiroshima	Minister of State for Disaster Management
	Typhoon JEBI (1821)	Sep. 11	Hyogo Osaka	Minister of State for Disaster Management
	The 2018 Hokkaido Eastern Iburi Earthquake	Sep. 19	Hokkaido	Minister of State for Disaster Management

Source: Cabinet Office

Fig. A-12 Application of the Disaster Relief Act (Since the Great Hanshin-Awaji Earthquake)

As of March 31, 2019

Year	Name of Disaster	Date of Invocation	Prefecture	No. of Municipalities to which the Act was applied
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	Niigata	2
		Jul. 11, Jul. 12	Nagano	2
	Heavy Rain Starting on August 10	Aug. 10	Niigata	1
1996	Typhoon VIOLET (9617)	Sep. 22	Saitama	1
		Sep. 22	Chiba	2
1997	July 1997 Seasonal Rain Front Torrential Rains	Jul. 10	Kagoshima	1
	Typhoon OLIWA (9719)	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	Fukushima	3
		Aug. 28	Ibaraki	1
		Aug. 27, Aug. 30	Tochigi	4
		Aug. 28	Saitama	1
		Aug. 3	Shizuoka	1
	Typhoon STELLA (9805)	Sep. 16	Saitama	1
	Typhoon VICKI (9807)	Sep. 22	Fukui	1
			Hyogo	1
			Nara	1
	Heavy Rains of September 23–25, 1998	Sep. 25	Kochi	6
	Typhoon ZEB (9810)	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 Typhoon BART (9918) 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
	Typhoon KIROGI (0003)	Jul. 8	Saitama	1
	Heavy Rains from 2000 Autumn Rain Front and Typhoon SAOMAI (0014)	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
	Typhoon NARI (0116)	Sep. 8, Sep. 11	Okinawa	2
2002	Typhoon CHATAAN (026)	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
	Typhoon ETAU (0310)	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
	Typhoon NAMTHEUN (0410), Typhoon MALOU (0411), and Related Heavy Rains	Jul. 31	Tokushima	2

Year	Name of Disaster	Date of Invocation	Prefecture	No. of Municipalities to which the Act was applied
2004	Typhoon MEGI (0415) and Heavy Rains from Rain Front	Aug. 17	Ehime	1
			Kochi	1
	Typhoon CHABA (0416)	Aug. 30	Okayama	9
			Kagawa	13
			Ehime	1
			Miyazaki	2
	Typhoon SONGDA (0418)	Sep. 7	Hiroshima	2
	Typhoon MEARI (0421)	Sep. 29	Mie	5
			Ehime	4
			Hyogo	2
	Typhoon MA-ON (0422)	Oct. 9	Shizuoka	1
	Typhoon TOKAGE (0423)	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
	Typhoon NABI (0514)	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
	Typhoon SHANSHAN (0613)	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 MAN-YI (0704) and Seasonal Rain Front	Jul. 6	Kumamoto	1
	2007 Niigataken Chuetsu-oki Earthquake	Jul. 16	Niigata	10
	Typhoon USAGI (0705)	Aug. 2	Miyazaki	1
	2007 Heavy Rains from Typhoon NARI (0711) 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
	Typhoon ETAU (0909)	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 Snow 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 to which the Act was applied
2011	2011 Great East Japan Earthquake	Mar. 11	Aomori	2
			Iwate	34
			Miyagi	35
			Fukushima	59
			Ibaraki	37
			Tochigi	15
			Chiba	8
			Tokyo	47
	July 2011 Niigata and Fukushima Torrential Rains	Jul. 29	Niigata	15
			Fukushima	9
	Typhoon TALAS (1112)	Sep. 2	Mie	3
			Nara	10
			Wakayama	5
			Okayama	1
		Sep. 3	Tottori	2
	Typhoon ROKE (1115)	Sep. 21	Aomori	1
			Fukushima	1
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
		Jul. 13	Fukuoka	7
	Heavy Rains Starting August 13	Aug. 14	Kyoto	1
	Typhoon SANBA (1216)	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
	Typhoon MAN-YI (1318)	Sep. 16	Saitama	1
			Kyoto	2
	Typhoon WIPHA (1326)	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 to which the Act was applied
2014	Heavy Rains from Typhoon NEOGURI (1408)	Jul. 9	Nagano	1
			Yamagata	1
	Typhoon NAKRI (1412)	Aug. 3	Kochi	1
	Typhoon HALONG (1411)	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 Snow 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
	Typhoon DUJUAN (1521)	Sep. 28	Okinawa	1
2016	2016 Kumamoto Earthquake	Apr. 14	Kumamoto	45
	Typhoon LIONROCK (1610)	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
	Typhoon TALIM (1718)	Sep. 17	Oita	2
	Typhoon LAN (1721)	Oct. 22	Mie	2
		Oct. 22	Kyoto	1
		Oct. 21	Wakayama	1
2018	Heavy Snow Starting February 4, 2018	Feb. 6	Fukui	8
		Feb. 13	Fukui	1
	Heavy Snowfall in FY2017	Feb. 14	Niigata	5
	2018 Earthquake centered in the northern Osaka Prefecture	Jun. 18	Osaka	13
	The Heavy Rain Event of July 2018	Jul. 5	Kyoto	9
		Jul. 5	Hyogo	6
		Jul. 5	Okayama	19
		Jul. 5	Hiroshima	15
		Jul. 5	Ehime	7
		Jul. 5	Fukuoka	2
		Jul. 6	Gifu	17
		Jul. 6	Hyogo	5
		Jul. 6	Tottori	10
		Jul. 6	Shimane	2
		Jul. 6	Okayama	2
		Jul. 6	Yamaguchi	1
		Jul. 6	Kochi	3
		Jul. 7	Hyogo	4
		Jul. 7	Kochi	1
		Jul. 8	Gifu	4
		Jul. 8	Kochi	3
	Heavy Rain Starting on August 30, 2018	Aug. 31	Yamagata	7
	The 2018 Hokkaido Eastern Iburi Earthquake	Sep. 6	Hokkaido	179

Source: Cabinet Office

Fig. A-13 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 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 NEOGURI (1408)	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 HALONG (1411)/ Typhoon NAKRI (1412)/ 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 VONGFONG (1419)	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 CHAN-HOM (1509)/ Typhoon ANGKA (1511)/ Typhoon HALOLA (1512)	Kumamoto Pref.	●	○							○ *1	
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 GONI (1515)	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 ETAU (1518), 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 CHANTHU (1607)/ Typhoon MINDULLE (1609)/ Typhoon LIONROCK (1610)/ Typhoon KOMPASU (1611), 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 MALAKAS (1616)	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 NANMADOL (1703)	Fukuoka and Oita 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 Rainstorms and Torrential Rains on September 15 - 19, 2017	Typhoon TALIM (1718)	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 LAN (1721)	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	—	●	●							●	
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Torrential Rains and Rainstorms from May 20 to July 10, 2018	Seasonal Rain Front (The Heavy Rain Event of July 2018, etc.)/ Typhoon MALIKSI (1805)/ Typhoon GAEMI (1806)/ Typhoon PRAPIROON (1807)/ Typhoon MARIA (1808)	Okayama, Hiroshima and Ehime Pref.	○	○	○		○	○	○	○	○	○
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for the Districts of Awashimaura Village, Iwafune-gun, Niigata Prefecture Due to Rainstorms and Torrential Rains from August 20 to September 5, 2018	A series of disasters caused by 2018 Typhoons SOULIK (1819), CIMARON (1820), and JEBI (1821)	Wakayama, Nara, Osaka, Nagano and Niigata Pref.	●	●	●						●	●
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for the 2018 Hokkaido Eastern Iburi Earthquake	The 2018 Hokkaido Eastern Iburi Earthquake	Hokkaido	○	○	○		●	○	○	○	○	○
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Rainstorms from September 28 to October 1, 2018	Typhoon TRAMI (1824)	Tottori, Miyazaki and Kagoshima Pref.	●	○	○						○ *1	
Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Specified Regions in 2018	2018 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

Source: Cabinet Office

Fig. A-14 Response of Government Ministries and Agencies to Major Disasters Since 2018

14-1 Heavy Snow Starting February 4, 2018

(1) Damage

From February 3 to 8, a strong winter pressure pattern prevailed, resulting in a continuous supply of extremely cold air and intermittent snowfall over the Japan Sea side of northern to western Japan. In the Hokuriku region, heavy snow fell on the mountains and mountainous areas as well as in the plains. In particular, in Fukui City, Fukui Prefecture, the maximum snow depth reached 147 cm (3:00 p.m. on the 7th), which was the largest snowfall in 37 years since the heavy snow of 1961 (maximum snow depth: 196 cm).

Casualties due to falling and accidents during snow removal amounted to 22 fatalities and 102 seriously injured as of February 16, 2018, with many houses completely or half destroyed. The heavy snows also caused traffic hazards, such as road closures and railroad outages. In particular, a maximum of 1,500 vehicles were trapped near the Fukui-Ishikawa prefectural border on National Route 8. It took three days for the road to reopen. The traffic disruptions caused school and company closures and shortages of kerosene and gasoline and other daily necessities, disturbing lives and economic activities of local residents.

(2) Response from Government Ministries and Agencies

On February 2, an Inter-Agency Disaster Alert Meeting was held in order to prepare for upcoming heavy snows. On February 6, the government held another Inter-Agency Disaster Alert Meeting, which was attended by then Minister of State for Disaster Management Okonogi, then State-Minister of the Cabinet Office Akama, and then Parliamentary Vice-Minister of Cabinet Office Yamashita, and gave instructions to relevant ministries and agencies to take necessary response measures.

On February 24, a government investigation team led by then Minister of State for Disaster Management Okonogi was sent to Fukui Prefecture to identify the situation of trapped traffic on National Route 8, damage to agricultural fields, and the status of snow disposal sites. The investigation team also met the Governor of Fukui Prefecture and leaders of 10 municipalities to exchange opinions. Based on the facts and issues identified through these direct investigations, the government took emergency disaster control measures and promoted recovery support.

The SDF carried out the following disaster relief operations in the areas concerned, in response to requests from the Governor of Fukui Prefecture.

A. Overview of Disaster Relief Operations
- On Tuesday, February 6, numerous vehicles were trapped on National Route 8 in Awara City, Fukui Prefecture, due to heavy snow. In response, at 2:00 p.m. that day, the Governor of Fukui Prefecture contacted the Commander of the GSDF 14th Infantry Regiment to request a disaster relief deployment for the purpose of saving lives (request for withdrawal: 10:49 on Saturday, February 10).

B. Scale of Deployment
- Personnel: Approx. 4,925 people in total; vehicles: Approx. 805 in total

A. Overview of Disaster Relief Operations
- Although Fukui Prefecture had established more than 100 snow disposal sites, more of such sites were needed in order to contain record snow accumulation from intermittent snowfall starting Tuesday, February 6. At 4:47 p.m. on Thursday, February 15, the Governor of Fukui Prefecture contacted the Commander of the GSDF 14th Infantry Regiment to request a disaster relief deployment for the purpose of removing snow (request for withdrawal: 17:32 on Sunday, February 18).

B. Scale of Deployment
- Personnel: Approx. 35 people in total; vehicles: Approx. 15 in total

Due to the heavy snowfalls in FY2017, including one that started on February 4, the Disaster Relief Act was invoked in respect of five municipalities in Niigata Prefecture and nine municipalities in Fukui Prefecture.

[Invocation of the Disaster Relief Act (Heavy Snowfall in FY2017, Heavy Snow Starting February 4, 2018)]
Niigata Prefecture: Nagaoka City, Ojiya City, Tokamachi City, Uonuma City, Aga Town in Higashikanbara-gun (Date of invocation: February 14)
Fukui Prefecture: Fukui City, Ono City, Katsuyama City, Sabae City, Awara City, Sakai City, Eiheiji Town in Yoshida-gun, Echizen Town in Nyu-gun (Date of invocation: February 6)
Echizen City (Date of invocation: February 13)

14-2 Earthquake centered in the northern Osaka Prefecture [Maximum seismic intensity of Lower 6]

(1) Damage

At 7:58 a.m. on June 18, 2018, the Kinki region was struck by a 6.1-magnitude earthquake centered in the northern part of Osaka Prefecture. Strong intensities were recorded across the region, with five municipalities in Osaka Prefecture (Kita-ku, Takatsuki City, Hirakata City, Ibaraki City, and Minoh City) registering a lower 6.

Casualties of the earthquake included 6 fatalities and 462 injured as well as damage to houses, including 21 completely destroyed, 454 half-destroyed, and 56,873 partially damaged as of February 12, 2019. The impact on the lives of local residents was enormous. Damage relating to lifeline infrastructure encompassed blackouts affecting a maximum of approximately 170,000 households, disruptions to gas supply affecting a maximum of approximately 110,000 households, and water outages affecting approximately 94,000 households, as well as disruptions to train services during commuting hours.

(2) Response from Government Ministries and Agencies

Following the earthquake, at 8:03 a.m. on June 18, the Prime Minister issued the following instructions to the related ministries and agencies:

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.
3. Ensure timely and accurate provision of information to the public regarding evacuation and the extent of the damage

Under the direction of Prime Minister Abe, the government immediately took various emergency disaster control measures, including convening an Emergency Meeting Team and holding a Cabinet meeting and an Inter-Agency Disaster Management Meeting. It also sent a Cabinet Office advance information-gathering team to the Osaka Prefectural Government and supported the governments of the affected municipalities in carrying out emergency disaster control measures. SDF units, which received a deployment request from the Governor of Osaka Prefecture, supported emergency water supply, bathing, and the sealing of damaged houses using blue tarps. In particular, the government strived hard together with the Japan Gas Association and other entities for restoration from gas outages, which had affected vast areas.

On June 21, Prime Minister Abe and then Minister of State for Disaster Management Okonogi visited a school in Osaka Prefecture to mourn children whose lives were taken by collapsing concrete-block walls. They also visited evacuation sites and SDF's bathing support facilities and shared opinions with the Governor of Osaka Prefecture and the Mayors of Takatsuki City and Ibaraki City.

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

- A water outage occurred at the National Cerebral and Cardiovascular Center (NCVC) in Suita City, Osaka Prefecture. At 12:00 p.m. on Monday, June 18, the Governor of Osaka Prefecture contacted the Commander of the GSDF 3rd Division to request a disaster relief deployment for the purpose of securing water supply at the NCVC. The GSDF then received additional deployment requests for the purpose of securing water supply in Minoh City and Takatsuki City and for the purpose of bathing support in Ibaraki City. After that, the GSDF received additional deployment requests for the purpose of bathing support in Takatsuki City and emergency response support (sealing damaged houses with blue tarps) in Takatsuki City and Ibaraki City. (Request for withdrawal: 21:30 on Tuesday, June 26)

B. Scale of Deployment

- Personnel: Approx. 1,145 people in total; vehicles: Approx. 280 in total; aircraft: approx. 12 in total

Due to the earthquake disaster, the Disaster Relief Act was invoked in respect of twelve cities and one town, while the Act on Support for Reconstructing Livelihoods of the Affected due to Disaster was invoked in respect of one city in Osaka Prefecture.

[Invocation of the Disaster Relief Act]

[Osaka Prefecture] Osaka City, Toyonaka City, Suita City, Takatsuki City, Moriguchi City, Hirakata City, Ibaraki City, Neyagawa City, Minoh City, Settsu City, Shijonawate City, Katano City, Shimamoto Town in Mishima-gun (Date of invocation: June 18)

[Invocation of the Act on Support for Reconstructing Livelihoods of the Affected due to Disaster]
[Osaka Prefecture] Takatsuki City (Date of occurrence: June 18)

14-3 The Heavy Rain Event of July 2018

(1) Damage

Due to the effects of the rain front and Typhoon PRAPIROON (1807), warm and very moist air continued to flow into the vicinity of Japan from June 28, which caused record-breaking rainfalls in western Japan and other areas across the country. The total precipitation from June 28 to July 8 was over 1,800 mm in the Shikoku region and over 1,200 mm in the Tokai region, two to four times the average monthly rainfall in July.

The heavy rains caused river flooding and sediment disasters in Okayama Prefecture, Hiroshima Prefecture, and Ehime Prefecture. Human casualties amounted to 237 fatalities and 8 missing persons, while damage to houses encompassed 6,767 completely destroyed, 11,243 half-destroyed, 3,991 partially damaged, 7,173 with above-floor flooding, and 21,296 with below-floor flooding as of January 9, 2019. There were also significant disruptions to the lifeline utilities, including electricity outages affecting a maximum of about 80,000 households and water outages affecting a maximum of about 263,000 households. Traffic hazards included the suspension of 115 lines of 32 railway operators and the closure of 24 expressways as of 5 a.m. on July 7.

(2) Response from Government Ministries and Agencies

On July 2, prior to the heavy rains, the government held an Inter-Agency Disaster Alert Meeting to share information about the weather outlook and the steps being taken by ministers and agencies in response, confirming that they would take appropriate response measures. On July 5, another Inter-Agency Disaster Alert Meeting was held where the Minister of State for Disaster Management made an appeal to all members of the public to take active initiatives for ensuring the safety of their lives.

At the Cabinet meeting held on July 7, the Prime Minister issued the following instructions, making sure that the government would spare no effort in responding to the disaster.

1. The utmost priority is human lives. Deploy rescue units with no delay and spare no effort in the rescue and relief of affected people.
2. Proactively take all possible preventive measures to minimize the damage.
3. Work closely with affected prefectures and municipalities to evacuate local residents, support the lives of affected people, and restore lifeline utilities.

In the following days, the government sent Cabinet Office advance information-gathering teams to Okayama Prefecture, Hiroshima Prefecture, and Aichi Prefecture, in order to set up a system to coordinate with local governments in the affected areas.

On July 8, the Emergency Response Headquarters for the Heavy Rain in July 2018 was established in accordance with the Basic Act on Disaster Management. On the same day, its first meeting was held (a total of 23 meetings were held after that). The Headquarters worked on the determination of the extent of the damage, total coordination of emergency disaster control measures, and development of prevention measures for secondary disasters. In addition, ministries and agencies sent a total of 79 senior officials (officials with titles equivalent to statutory designated official or division or office manager) to affected local governments in order to facilitate prompt decision-making, cross-departmental support, and coordination between ministries and agencies and the leaders and managers of the local governments.

Immediately after the disaster, the police, the fire department, the SDF, and the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) deployed response units from across the country to the disaster area to carry out rescue and relief activities, secondary disaster prevention activities, and life support. The total number of rescue workers deployed was about 19,400 from the Police, about 15,300 from the Fire and Disaster Management Agency, and about 858,800 from the SDF, and about 10,800 from TEC-FORCE.

On July 9, the government established the Team to Support the Daily Lives of Affected People of the Heavy Rain Event of July 2018 consisting of administrative vice-minister-level officials, headed by the Deputy Chief Cabinet Secretary, in order to provide life support to solve the issues and needs in the affected areas determined based on information from deployed government officials.

The disaster forced many people to live in shelters, while also causing significant disruptions to logistics due to damage to roads and railways. On July 8, the government decided to implement the "push-mode support," which means the government proactively procure and deliver relief supplies without waiting for requests from affected areas. In order to robustly promote push-mode support, the government established in Central Government Building No. 8 the Emergency Supplies Procurement and Delivery Team consisting of the Disaster Management under the Cabinet Office, the Ministry of Agriculture, Forestry and Fishery (MAFF), Ministry of Economy, Trade and Industry (METI), MLIT, Ministry of Defense (MOD), and designated public corporations. Using reserve funds, the Team procured and sent necessities that would affect human life, such as water, food, and air conditioners, in order to improve the environment of the shelters. The push-mode support was carried out until July 26. A total of about 2.57 million items were supplied.

At the eleventh meeting of the Emergency Response Headquarters held on July 22, Prime Minister Abe issued an instruction to formulate a package for the recovery of affected people's lives and livelihoods. Following this instruction, the government identified necessary measures to help affected local governments smoothly carry out disaster recovery activities, disposal of disaster debris, and restoration of agriculture, forestry, and fisheries, and local small and medium-sized businesses. To support these activities, the Cabinet approved the contribution of the approximately 105.8 billion yen from reserve funds on August 3 and an additional contribution of 61.6 billion yen on September 7. Moreover, from the FY2018 supplementary budget under the general account approved on November 7, approximately 503.4 billion yen was allocated to recovery and restoration from the torrential rain disaster.

The SDF carried out the following disaster relief operations in the areas concerned, in response to requests from the governors of Kyoto, Kochi, Fukuoka, Hiroshima, Okayama, Ehime, Yamaguchi and Hyogo Prefectures.

A. Overview of Disaster Relief Operations

- A river in Kyoto Prefecture rose to a dangerous level on Thursday, July 5. At 1:10 a.m. on Friday, July 6, the Governor of Kyoto Prefecture contacted the Commander of the GSDF 7th Infantry Regiment to request a disaster deployment for the purpose of flood control activities (sandbagging to reinforce the levees). (Request for withdrawal: 7:05 on Friday, July 6)
- On Friday, July 6, a river in Kochi Prefecture breached the levees, isolating some residents in Aki City, Kochi Prefecture. At 3:30 a.m. that day, the Governor of Kochi Prefecture contacted the Commander of the GSDF 50th Infantry Regiment to request a disaster deployment for the purpose of rescuing the isolated residents. (Request for withdrawal: 9:07 on Monday, July 16)
- On Friday, July 6, a landslide occurred in Kita-Kyushu City, Fukuoka Prefecture. Sediment flowed into houses, leaving two persons missing. At 9:56 a.m. that day, the Governor of Fukuoka Prefecture contacted the Commander of the GSDF 4th Division to request a disaster deployment for the purpose of saving lives. Later, the Governor made additional disaster deployment requests for the purpose of rescuing isolated residents in Iizuka City and Chikuzen Town. (Request for withdrawal: 8:24 on Monday, July 9)
- As a river in Kyoto Prefecture rose to a dangerous level, the Governor of Kyoto Prefecture contacted the Commander of the GSDF 7th Infantry Regiment to request a disaster deployment for the purpose of flood control activities (sandbagging to reinforce the levees) on Friday, July 6. After the completion of the activities, due to the release of a dam upstream, additional flood control activities became necessary. For this reason, at 6:35 p.m. on the same day, the Governor of Kyoto Prefecture contacted the Commander of the GSDF 7th Infantry Regiment to request another disaster deployment for the purpose of flood control activities. (Request for withdrawal: 23:30 on Friday, July 6)
- On Friday, July 6, a landslide occurred in Hiroshima Prefecture. Sediment flowed into houses, leaving several persons missing. At 9:00 p.m. that day, the Governor of Hiroshima Prefecture contacted the Commander of the GSDF 13th Division to request a disaster deployment for the purpose of saving lives. (Request for withdrawal: 10:30 on Tuesday, August 14)
- On Friday, July 6, residents in Takahashi City, Okayama Prefecture became isolated. At 11:11 p.m. that day, the Governor of Okayama Prefecture contacted the Commander of the GSDF 13th Artillery Unit to request a disaster deployment for the purpose of saving lives. (Request for withdrawal: 12:00 on Saturday, August 18)
- On Saturday, July 7, a landslide occurred in Uesugi-cho, Ayabe City, Kyoto Prefecture. Sediment flowed into houses, leaving several persons missing. In response, at 6:10 a.m. that day, the Governor of Kyoto Prefecture contacted the Commander of the GSDF 7th Infantry Regiment to request another disaster deployment for the purpose of saving lives. (Request for withdrawal: 17:05 on Sunday, July 8)
- On Saturday, July 7, a landslide occurred in Joya, Maizuru City, Kyoto Prefecture. Sediment flowed into houses, leaving several persons missing. In response, at 9:42 a.m. that day, the Governor of Kyoto

Prefecture contacted the Commander of the MSDF Maizuru District Fleet to request a disaster deployment for the purpose of saving lives. (Request for withdrawal: 10:02 on Thursday, July 12)

- On Saturday, July 7, a landslide occurred in Uwajima, Ehime Prefecture. Sediment flowed into houses, leaving several persons missing. In response, at 6:10 a.m. that day, the Governor of Ehime Prefecture contacted the Commander of the GSDF Middle Army Artillery Unit to request a disaster deployment for the purpose of saving lives. (Request for withdrawal: 21:00 on Wednesday, August 15)
- On Saturday, July 7, a landslide occurred in Osogoe, Shuto-cho, Iwakuni City, Yamaguchi Prefecture. Sediment flowed into houses, leaving several persons missing. In response, at 7:35 a.m. that day, the Governor of Yamaguchi Prefecture contacted the Commander of the GSDF 13th Brigade to request a disaster deployment for the purpose of saving lives. (Request for withdrawal: 14:55 on Saturday, July 7)
- On Sunday, July 8, a landslide occurred in Shiso City, Hyogo Prefecture. Sediment flowed into houses, leaving several persons missing. In response, at 5:00 a.m. that day, the Governor of Hyogo Prefecture contacted the Commander of the GSDF 3rd Artillery Unit to request a disaster deployment for the purpose of saving lives. (Request for withdrawal: 17:45 on Sunday, July 8)

B. Scale of Deployment

- Personnel: A maximum of approx. 33,100; Ships: A maximum of 28 (including private ship Hakuo); Aircraft: A maximum of 38; LO: A maximum of approx. 300 LOs to 74 locations

Due to the torrential rains-related disasters, the Disaster Relief Act was invoked in respect of 110 municipalities in 11 prefectures, while the Act on Support for Reconstructing Livelihoods of the Affected due to Disaster was invoked in respect of 88 municipalities in 12 prefectures.

[Invocation of the Disaster Relief Act]

[Kochi Prefecture] Aki City, Konan City, Motoyama Town in Nagaoka-gun (Date of invocation: July 6)
Sukumo City (Date of invocation: July 7)
Tosashimizu City, Otsuki Town in Hata-gun, Mihara Town in Hata-gun (Date of invocation: July 8)

[Tottori Prefecture] Tottori City, Wakasa Town in Yazu-gun, Chizu Town in Yazu-gun, Yazu Town in Yazu-gun, Misasa Town in Tohaku-gun, Nanbu Town in Seihaku-gun, Houki Town in Seihaku-gun, Nichinan Town in Hino-gun, Hino Town in Hino-gun, Kofu Town in Hino-gun (Date of invocation: July 6)

[Hiroshima Prefecture] Hiroshima City, Kure City, Takehara City, Mihara City, Onomichi City, Fukuyama City, Fuchu City, Miyoshi City, Shobara City, Higashihiroshima City, Etajima City, Fuchu Town in Aki-gun, Kaita Town in Aki-gun, Kumano Town in Aki-gun, Saka Town in Aki-gun (Date of invocation: July 5)

[Okayama Prefecture] Okayama City, Kurashiki City, Tamano City, Kasaoka City, Ibara City, Soja City, Takahashi City, Niimi City, Setouchi City, Akaiwa City, Maniwa City, Asakuchi City, Hayashima Town in Tsukubo-gun, Satosho Town in Asakuchi-gun, Kagamino Town in Tomata-gun, Nishiawakura Village in Aida-gun, Kibichuo Town in Kaga-gun (Date of invocation: July 5)

[Kyoto Prefecture] Fukuchiyama City, Maizuru City, Ayabe City, Miyazu City, Kyotango City, Nantan City, Kyotamba Town in Funai-gun, Ine Town in Yosa-gun, Yosano Town in Yosa-gun (Date of invocation: July 5)

[Hyogo Prefecture] Toyooka City, Sasayama City, Asago City, Shiso City, Kamigori Town in Ako-gun, Kami Town in Mikata-gun (Date of invocation: July 5)
Himeji City, Nishiwaki City, Tamba City, Taka Town in Taka-gun, Sayo Town in Sayo-gun (Date of invocation: July 6)
Yabu City, Tatsuno City, Ichikawa Town in Kanzaki-gun, Kamikawa Town in Kanzaki-gun (Date of invocation: July 7)

[Ehime Prefecture] Imabari City, Uwajima City, Yawatahama City, Ozu City, Seiyo City, Matsuno Town in Kitauwa-gun, Kihoku Town in Kitauwa-gun (Date of invocation: July 5)

[Gifu Prefecture] Takayama City, Seki City, Nakatsugawa City, Ena City, Minokamo City, Kani City, Yamagata City, Hida City, Motosu City, Gujo City, Gero City, Sakahogi Town in Kamo-gun, Hichiso Town in Kamo-gun, Yaotsu Town in Kamo-gun, Shirakawa Town in Kamo–gun, Higashishirakawa Village in Kamo-gun, Shirakawa Village in Ono-gun (Date of invocation: July 6)
Gifu City, Mino City, Tomika Town in Kamo-gun, Kawabe Town in Kamo-gun (Date of invocation: July 8)

[Okayama Prefecture] Tsuyama City, Mimasaka City (Date of invocation: July 5)
Yakage Town in Oda-gun, Wake Town in Wake-gun (Date of invocation: July 6)

[Fukuoka Prefecture] Iizuka City, Kurume City (Date of invocation: July 5)

[Shimane Prefecture] Gotsu City, Kawamoto Town in Ohchi-gun (Date of invocation: July 6)
[Yamaguchi Prefecture] Iwakuni City (Date of invocation: July 6)

[Invocation of the Act on Support for Reconstructing Livelihoods of the Affected due to Disaster]
[Gifu Prefecture] Seki City (Date of occurrence: July 8)
[Kyoto Prefecture] Fukuchiyama City, Ayabe City (Date of occurrence: July 5)
[Hyogo Prefecture] Kobe City, Shiso City (Date of occurrence: July 5)
[Shimane Prefecture] Gotsu City, Kawamoto Town in Ohchi-gun (Date of occurrence: July 6)
[Okayama Prefecture] All areas (Date of occurrence: July 5)
[Hiroshima Prefecture] All areas (Date of occurrence: July 5)
[Yamaguchi Prefecture] Iwakuni City, Hikari City (Date of occurrence: July 6)
[Tokushima Prefecture] Miyoshi City (Date of occurrence: July 5)
[Ehime Prefecture] All areas (Date of occurrence: July 5)
[Kochi Prefecture] Konan City (Date of occurrence: July 6)
Sukumo City, Otsuki Town in Hata-gun (Date of occurrence: July 8)
[Fukuoka Prefecture] Kitakyushu City, Kurume City, Iizuka City, Kama City (Date of occurrence: July 5)
[Saga Prefecture] Kiyama Town in Miyaki-gun (Date of occurrence: July 6)

In addition, in accordance with the Act on Special Measures for the Preservation of Rights and Interests of the Affected of Specified Disasters (Act No. 85 of 1996), the Heavy Rain Events of July 2018-related disasters were designated as specified disasters in the Cabinet Order on the Designation of the Heavy Rain Event of July 2018-Related Disasters as Specified Extraordinary Disasters and Measures to Be Applied. The applied special measures included the extension of expirations of administrative rights and interests, exemption from obligations that were not fulfilled in the designated periods, a special measure on orders to commence corporate bankruptcy proceedings due to insolvency, a special measure on the period for the acceptance or renunciation of inheritance, and a special measure on fees for filing a petition for conciliation under the Civil Conciliation Act (approved by the Cabinet, promulgated and enforced on July 14).

The status of the extremely severe disaster designation for this disaster is as follows:
Disasters due to torrential rains and destructive storms between May 20 and July 10, 2018
(A series of disasters due to Typhoons MALIKSI (1805), GAEMI (1806), PRAPIROON (1807), and MARIA (1808), the Heavy Rain Events of July 2018, and the seasonal rain front)
Announcement of potential designation on July 15, approved by the Cabinet on July 24
Partial revisions of the Cabinet Order approved by the Cabinet on January 25, 2019 (*1)

Area	Applicable Measures
Nationwide	Special financial support for disaster recovery projects for public works facilities Special measures on subsidies for disaster recovery projects for agricultural land Special cases of subsidies for disaster recovery projects for agricultural, forestry, and fisheries shared-used facilities 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)) Subsidies for disaster recovery projects for public social and educational facilities Subsidies for disaster recovery projects for private school facilities Special cases of cost coverage for projects implemented by municipalities to prevent infectious diseases Special cases of government loans based on the Act for the Welfare of Fatherless Families, motherless families and Widows Special cases of subsidies for public housing construction projects for victims Inclusion of funds for the redemption of principal and interest related to small disaster bonds in the standard budget request Special cases of paying job seeker benefits based on the Employment Insurance Act

Note) “LO” stands for Liaison Officer. In military terms, they are referred to as “renraku shoko” or “renraku-in.”

14-4 Typhoon JEBI (1821)

(1) Damage

Before noon on September 4, Typhoon JEBI (1821) made landfall on southern Tokushima Prefecture with very strong intensity and crossed the Kinki region while accelerating. It moved northward over the Japan Sea and transformed into an extra-tropical cyclone off the coast of the Russian Primorsky Krai at 9:00 a.m. on September 5. During the approach and passage of the typhoon, very intense winds and rains hit western to northern Japan. The Shikoku and Kinki regions experienced particularly strong winds and rains, with some areas observing record high storm surges.

Casualties of the typhoon included 14 fatalities, 46 seriously injured, 965 lightly injured and damage to houses, including 59 completely destroyed, 627 half-destroyed, 85,715 partially damaged, 64 with above-floor flooding, and 452 with below-floor flooding as of February 12, 2019. The typhoon also severely affected local residents' lives and economic activities of SMEs and the agriculture, forestry, and fishery industry and the tourism industry. There was an electricity outage affecting approximately 1.7 million households in the area served by the Kansai Electric Power due to power pole collapses from strong winds and landslides. It took about two weeks to recover from it. Also, Kansai International Airport had to suspend its service due to inundation from record-breaking storm surges.

(2) Response from Government Ministries and Agencies

On September 3, an Inter-Agency Disaster Alert Meeting attended by then Minister of State for Disaster Management Okonogi was held to share information about the weather outlook and the steps being taken by ministers and agencies in response. On September 5, after the passage of the typhoon, an Inter-Agency Disaster Management Meeting was held to share information about the transition of weather, weather outlook, and the steps being taken by ministers and agencies in response, and discussed measures for an early recovery from power outage, which was an urgent issue in the heat.

On September 11, a government investigation team led by then Minister of State for Disaster Management Okonogi was sent to Osaka and Hyogo Prefectures to ascertain the extent of the damage to Kobe Port from storm surges and the damage to the connecting bridge at Kansai International Airport. The investigation team also met the leaders of the affected local governments. Through these efforts, the government strived to directly grasp the extent of the damage. On September 28, the Cabinet held a meeting and formulated support measures for recovery and reconstruction from damage from the typhoon and strong winds. On the same day, the Cabinet approved the use of 15.3 billion yen from the reserves in order to support recovery from the typhoon and the 2018 Hokkaido Eastern Iburi Earthquake. In addition, from the FY2018 supplementary budget under the general account approved on November 7, approximately 105.3 billion yen was allocated to recovery and restoration from the typhoon (includes funds for recovery from the 2018 Osaka Earthquake).

The status of the extremely severe disaster designation for this disaster is as follows:

Disasters in Awashimaura Village, Iwafune County, Niigata Prefecture due to destructive storms and torrential rains between August 20 to September 5, 2018 (A series of disasters due to Typhoons SOULIK (1819), CIMARON (1820), and JEBI (1821))

Announcement of potential designation on September 21, approved by the Cabinet on September 28
Additional announcement of potential designation on November 15
Partial revisions of the Cabinet Order approved by the Cabinet on November 30, 2018 (*1) and March 15, 2019 (*2)

Area	Applicable Measures
Awashimaura Village, Niigata Prefecture Toshima Village, Kagoshima Prefecture Ooshika Village, Nagano Prefecture Kozagawa Town, Wakayama Prefecture	Special financial support for disaster recovery projects for public works facilities Inclusion of funds for the redemption of principal and interest related to small disaster bonds in the standard budget request
Ooshika Village, Nagano Prefecture Kozagawa Town, Wakayama Prefecture Sakegawa Village, Yamagata Prefecture Nanao City, Hodatsushimizu Town and Nakanoto Town, Ishikawa Prefecture Neba Village, Shimojo Village, Urugi Village and Yasuoka Village, Nagano Prefecture	Special measures on subsidies for disaster recovery projects for agricultural land Inclusion of funds for the redemption of principal and interest related to small disaster bonds in the standard budget request

Toyone Village, Aichi Prefecture Toyono Town, Osaka Prefecture Tenkawa Village, Nosegawa Village, Totsukawa Village and Kamikitayama Village, Nara Prefecture Shingu City, Koya Town and Shirahama Town, Wakayama Prefecture Kamiyama Town, Tokushima Prefecture Shiiba Village, Miyazaki Prefecture	
Shirahama Town, Wakayama Prefecture	Special cases of subsidies for disaster recovery projects for agricultural, forestry, and fisheries shared-used facilities
Takatsuki City, Osaka Prefecture (Addition of applicable measures and areas by the Cabinet Order for partial revisions (*1))	Subsidies for disaster recovery projects for forests

(*The underlined municipalities were added in accordance with the Cabinet Order on the Extremely Severe Disaster Designation and Identification of Essential Response Measures for Specified Regions in 2018(*2).)

14-5 The 2018 Hokkaido Eastern Iburi Earthquake [Maximum seismic intensity of 7]

(1) Damage

At 3:07 a.m. on September 6, 2018, a magnitude 6.7 earthquake occurred at 37 km deep in Eastern Iburi, Hokkaido Prefecture (42.7 degrees north latitude and 142.0 degrees east longitude). The earthquake registered a seismic intensity of 7 in Atsuma Town, of 6 Upper in Abira Town and Mukawa Town, and of 6 Lower in Higashi-ku, Sapporo City.

Casualties of this earthquake amounted to 42 fatalities and 762 injured and damage to houses, including 462 completely destroyed, 1,570 half-destroyed, and 12,600 partially damaged as of January 28, 2019.

At 3:25 a.m., approximately 20 minutes after the earthquake, a major blackout occurred due to faults at power stations, including the Tomatoh-Atsuma Thermal Power Station, the largest power plant operating in the Hokkaido Prefecture which is located near the epicenter. This was the first power outage in Japan in which power supply was disrupted across the entire servicing area. The earthquake greatly affected local residents' lives and economic activities in the prefecture, including logistics and other activities of companies, the agriculture, forestry, and fisheries industry, and the tourism industry.

(2) Response from Government Ministries and Agencies

At 3:10 a.m. on September 6, 2018, immediately after the earthquake, the Prime Minister issued the following instructions to relevant ministries and agencies.

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.
3. Fully implement measures to prevent further harm.

Immediately after the earthquake, the government summoned a meeting of an emergency team at the Cabinet Intensive Information Center. Following the Prime Minister's instructions, at 6:10 a.m., the government deployed a Cabinet Office advance information-gathering team to Hokkaido in order to ascertain the extent of the damage. From this day onward, a series of Cabinet meetings and Inter-Agency Disaster Management Meetings were held to ascertain the extent of the damage and share and confirm steps to be taken by the government. On the day of the earthquake, a local liaison and coordination office was established in order to facilitate close coordination among relevant ministries and agencies and local governments in tackling various issues that occurred in Hokkaido Prefecture due to a major blackout.

On September 7, a Push-Mode Support Coordination Meeting was held by the Cabinet Office, the Ministry of Health, Labour and Welfare (MHLW), the Ministry of Agriculture, Forestry and Fishery (MAFF), Ministry of Economy, Trade and Industry (METI), the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Ministry of Defense (MOD), and the Japan Trucking Association. At this meeting, the members formulated and agreed on a plan for relief supplies support using contingency reserves (approximately 540 million yen; approved by the Cabinet on September 10). In accordance with this plan, the government carried out push-mode support to procure and deliver daily necessities to save affected people's lives, such as foods, water, and blankets, tapping into the

transportation power of the SDF. Until the push-mode support was closed on September 21 (delivery date), a total of approximately 330,000 items were procured and delivered.

On September 9, Prime Minister Abe visited Hokkaido Prefecture to examine the extent of the damage from soil liquefaction and sediment disasters, as well as the status of evacuation. He also met the leaders of affected local governments to share opinions. On September 19, a government investigation team led by then Minister of State for Disaster Management Okonogi was sent to Hokkaido Prefecture to ascertain the extent of the damage and identify the issues faced by the affected areas in order to develop emergency disaster control measures.

On September 28, a Cabinet meeting was held. The Cabinet decided support measures for the 2018 Hokkaido Eastern Iburi Earthquake and approved the use of contingency reserves. From the FY2018 supplementary budget under the general account approved on November 7, approximately 118.8 billion yen was allocated to recovery and restoration from the earthquake.

The SDF carried out the following disaster relief operations in the areas concerned, in response to a request from the Governor of Hokkaido Prefecture.

A. Overview of Disaster Relief Operations

・At 6:00 a.m. on Thursday, September 6, the Governor of Hokkaido Prefecture contacted the Commander of the GSDF 7th Division to request a disaster relief deployment for the purpose of saving life and securing water supply. At 9:00 a.m. the same day, the Governor also contacted the Commander of the GSDF 11th Division to request a disaster relief deployment for the purpose of securing water supply. (Request for withdrawal: 23:00 on Sunday, October 14)

B. Scale of Deployment

Personnel: A maximum of approx. 25,100; Aircraft: 46; Ships: A maximum of 9 (including private ships Hakuo and Natchan World); LO deployment: A maximum of 29 locations

Due to the earthquake disaster, the Disaster Relief Act and the Act on Support for Reconstructing Livelihoods of the Affected due to Disaster were invoked in respect of 179 municipalities in Hokkaido Prefecture.

[Invocation of the Disaster Relief Act]

[Hokkaido Prefecture] Sapporo City, Hakodate City, Otaru City, Asahikawa City, Muroran City, Kushiro City, Obihiro City, Kitami City, Yubari City, Iwamizawa City, Abashiri City, Rumoi City, Tomakomai City, Wakkanai City, Bibai City, Ashibetsu City, Ebetsu City, Akabira City, Mombetsu City, Shibetsu City, Nayoro City, Mikasa City, Nemuro City, Chitose City, Takikawa City, Sunagawa City, Utashinai City, Fukagawa City, Furano City, Noboribetsu City, Eniwa City, Date City, Kitahiroshima City, Ishikari City, Hokuto City, Tobetsu Town in Ishikari-gun, Shinshinotsu Village in Ishikari-gun, Matsumae Town in Matsumae-gun, Fukushima Town in Matsumae-gun, Shiriuchi Town in Kamiiso-gun, Kikonai Town in Kamiiso-gun, Nanae Town in Kameda-gun, Shikabe Town in Kayabe-gun, Mori Town in Kayabe-gun, Yakumo Town in Futami-gun, Oshamambe Town in Yamakoshi-gun, Esashi Town in Hiyama-gun, Kaminokuni Town in Hiyama-gun, Assabu Town in Hiyama-gun, Otobe Town in Nishi-gun, Okushiri Town in Okushiri-gun, Imakane Town in Setana-gun, Setana Town in Kudo-gun, Shimamaki Town in Shimamaki-gun, Suttsu Town in Suttsu-gun, Kuromatsunai Town in Suttsu-gun, Rankoshi Town in Isoya-gun, Niseko Town in Abuta-gun, Makkari Village in Abuta-gun, Rusutsu Village in Abuta-gun, Kimobetsu Town in Abuta-gun, Kyogoku Town in Abuta-gun, Kutchan Town in Abuta-gun, Kyowa Town in Iwanai-gun, Iwanai Town in Iwanai-gun, Tomari Village in Furu-gun, Kamoenai Village in Furu-gun, Shakotan Town in Shakotan-gun, Furubira Town in Furubira-gun, Niki Town in Yoichi-gun, Yoichi Town in Yoichi-gun, Akaigawa Village in Yoichi-gun, Nanporo Town in Sorachi-gun, Naie Town in Sorachi-gun, Kamisunagawa Town in Sorachi-gun, Yuni Town in Yubari-gun, Naganuma Town in Yubari-gun, Kuriyama Town in Yubari-gun, Tsukigata Town in Kabato-gun, Urausu Town in Kabato-gun, Shintotsukawa Town in Kabato-gun, Moseushi Town in Uryu-gun, Chippubetsu Town in Uryu-gun, Uryu Town in Uryu-gun, Hokuryu Town in Uryu-gun, Numata Town in Uryu-gun, Takasu Town in Kamikawa-gun, Higashikagura Town in Kamikawa-gun, Tohma Town in Kamikawa-gun, Pippu Town in Kamikawa-gun, Aibetsu Town in Kamikawa-gun, Kamikawa Town in Kamikawa-gun, Higashikawa Town in Kamikawa-gun, Biei Town in Kamikawa-gun, Kamifurano Town in Sorachi-gun, Nakafurano Town in Sorachi-gun, Minamifurano Town in Sorachi-gun, Shimukappu Village in Yufutsu-gun, Wassamu Town in Kamikawa-gun, Kembuchi Town in Kamikawa-gun, Shimokawa Town in Kamikawa-gun, Bifuka Town in Nakagawa-gun, Otoineppu Village in Nakagawa-gun, Nakagawa Town in Nakagawa-gun, Horokanai Town in Uryu-gun, Mashike Town in Mashike-gun, Obira Town in Rumoi-gun, Tomamae Town in Tomamae-gun, Haboro Town in Tomamae-gun, Shosanbetsu Village in Tomamae-gun, Embetsu Town in Teshio-gun, Teshio Town in Teshio-gun, Sarufutsu Village in Soya-gun, Hamatonbetsu Town in Esashi-gun, Nakatonbetsu Town in Esashi-

gun, Esashi Town in Esashi-gun, Toyotomi Town in Teshio-gun, Rebun Town in Rebun-gun, Rishiri Town in Rishiri-gun, Rishirifuji Town in Rishiri-gun, Horonobe Town in Teshio-gun, Bihoro Town in Abashiri-gun, Tsubetsu Town in Abashiri-gun, Shari Town in Shari-gun, Kiyosato Town in Shari-gun, Koshimizu Town in Shari-gun, Kuneppu Town in Tokoro-gun, Oketo Town in Tokoro-gun, Saroma Town in Tokoro-gun, Engaru Town in Mombetsu-gun, Yubetsu Town in Mombetsu-gun, Takinoue Town in Mombetsu-gun, Okoppe Town in Mombetsu-gun, Nishiokoppe Village in Mombetsu-gun, Oumu Town in Mombetsu-gun, Ozora Town in Abashiri-gun, Toyoura Town in Abuta-gun, Sobetsu Town in Usu-gun, Shiraoi Town in Shiraoi-gun, Atsuma Town in Yufutsu-gun, Toyako Town in Abuta-gun, Abira Town in Yufutsu-gun, Mukawa Town in Yufutsu-gun, Hidaka Town in Saru-gun, Biratori Town in Saru-gun, Niikappu Town in Niikappu-gun, Urakawa Town in Urakawa-gun, Samani Town in Samani-gun, Erimo Town in Horoizumi-gun, Shinhidaka Town in Hidaka-gun, Otofuke Town in Kato-gun, Shihoro Town in Kato-gun, Kamishihoro Town in Kato-gun, Shikaoi Town in Kato-gun, Shintoku Town in Kamikawa-gun, Shimizu Town in Kamikawa-gun, Memuro Town in Kasai-gun, Nakasatsunai Village in Kasai-gun, Sarabetsu Village in Kasai-gun, Taiki Town in Hiroo-gun, Hiroo Town in Hiroo-gun, Makubetsu Town in Nakagawa-gun, Ikeda Town in Nakagawa-gun, Toyokoro Town in Nakagawa-gun, Honbetsu Town in Nakagawa-gun, Ashoro Town in Ashoro-gun, Rikubetsu Town in Ashoro-gun, Urahoro Town in Tokachi-gun, Kushiro Town in Kushiro-gun, Akkeshi Town in Akkeshi-gun, Hamanaka Town in Akkeshi-gun, Shibecha Town in Kawakami-gun, Teshikaga Town in Kawakami-gun, Tsurui Village in Akan-gun, Shiranuka Town in Shiranuka-gun, Betsukai Town in Notsuke-gun, Nakashibetsu Town in Shibetsu-gun, Shibetsu Town in Shibetsu-gun, Rausu Town in Menashi-gun (Date of invocation: September 6)

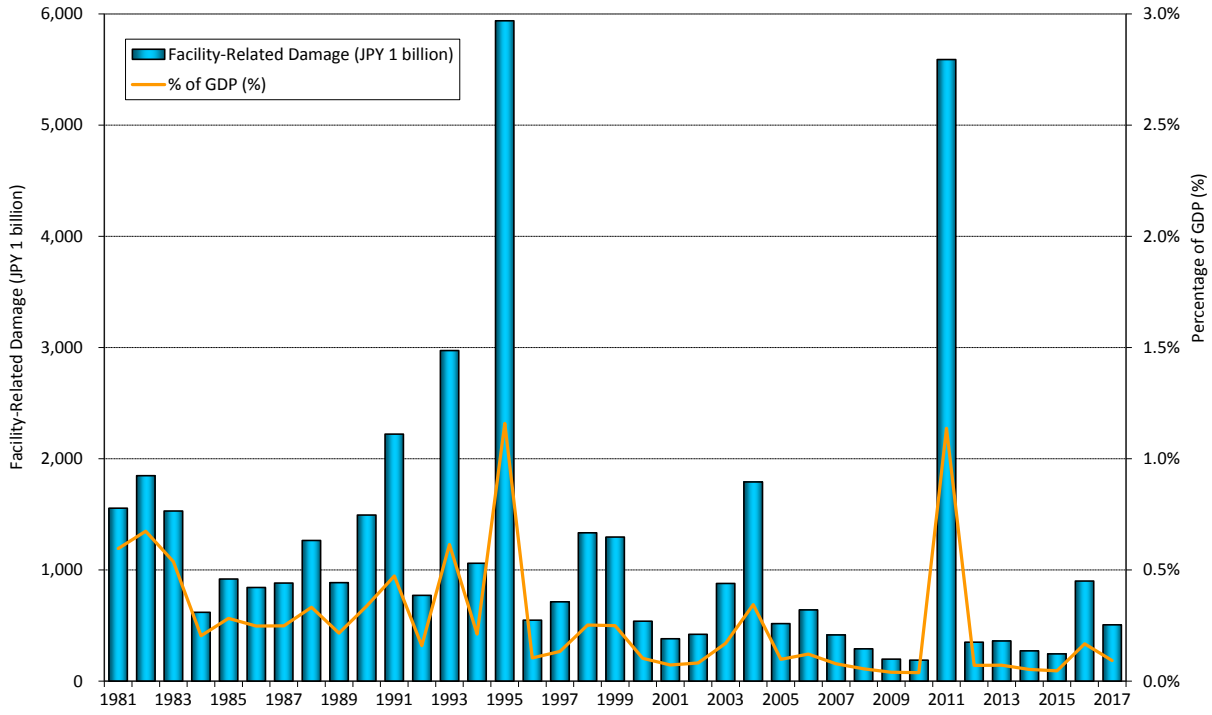
[Invocation of the Act on Support for Reconstructing Livelihoods of the Affected due to Disaster]
[Hokkaido Prefecture] All areas (Date of occurrence: September 6)

The status of the extremely severe disaster designation for this disaster is as follows:
Disasters due to the 2018 Hokkaido Eastern Iburi Earthquake
Announcement of potential designation on September 13 and 21, approved by the Cabinet on September 28
Partial revisions of the Cabinet Order approved by the Cabinet on March 22, 2019 (*1)

Area	Applicable Measures
Nationwide	Special financial support for disaster recovery projects for public works facilities Special measures on subsidies for disaster recovery projects for agricultural land Special cases of subsidies for disaster recovery projects for agricultural, forestry, and fisheries shared-used facilities Subsidies for disaster recovery projects for public social and educational facilities Subsidies for disaster recovery projects for private school facilities Special cases of cost coverage for projects implemented by municipalities to prevent infectious diseases Special cases of government loans based on the Act for the Welfare of Fatherless Families, motherless families and Widows Inclusion of funds for the redemption of principal and interest related to small disaster bonds in the standard budget request
Atsuma Town, Abira Town and Mukawa Town, Hokkaido Prefecture	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))

Note) “LO” stands for Liaison Officer. In military terms, they are referred to as “renraku shoko” or “renraku-in.”

Fig. A-15 Trends in Facility Damage and the Amount 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-16 Facility Damage Due to Disasters in 2017, by Hazard

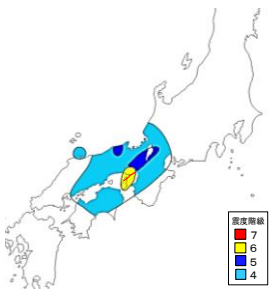
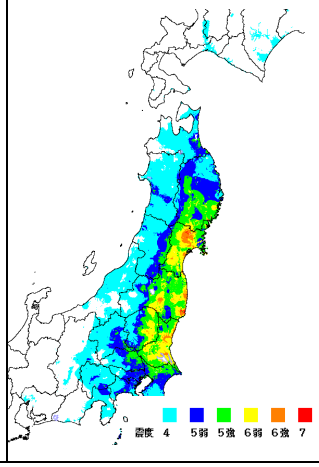
(Unit: JPY 1 million)

Facility type	Typhoon	Torrential rain	Earthquake	Heavy snowfall	Other	Total	Notes
Public works	119,525	167,966	6	0	16,198	303,695	Rivers, forestry conservation facilities, ports, etc.
Agriculture, forest, and fisheries industry	66,528	108,314	134	310	8,959	184,245	Farmland, agricultural facilities, forestry roads, fishing facilities, etc.
Educational facilities	1,376	459	216	23	123	2,197	School facilities, cultural heritages, etc.
Public welfare facilities	1,433	5,251	0	0	9	6,693	Social welfare facilities, waterworks facilities, etc.
Other facilities	2,564	5,856	601	1	0	9,023	Nature parks, telegraph/telephone, urban facilities, etc.
Total	191,426	287,846	958	334	25,290	505,854	

Note: Totals may not agree due to rounding.

Source: Formulated by the Cabinet Office based on materials from various ministries and agencies

Fig. A-17 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 Nagata-ku	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: 19,689 Missing persons: 2,563 (as of March 1, 2019)	Fatalities: 126,732 Missing persons: 93,662 (as of March 30, 2005)
Homes damaged (totally destroyed)	104,906	121,995 (as of March 1, 2019)	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 in2011	—
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-18 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.

Source: Cabinet Office

Fig. A-19 Main Volcanic Eruptions and Volcanic 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

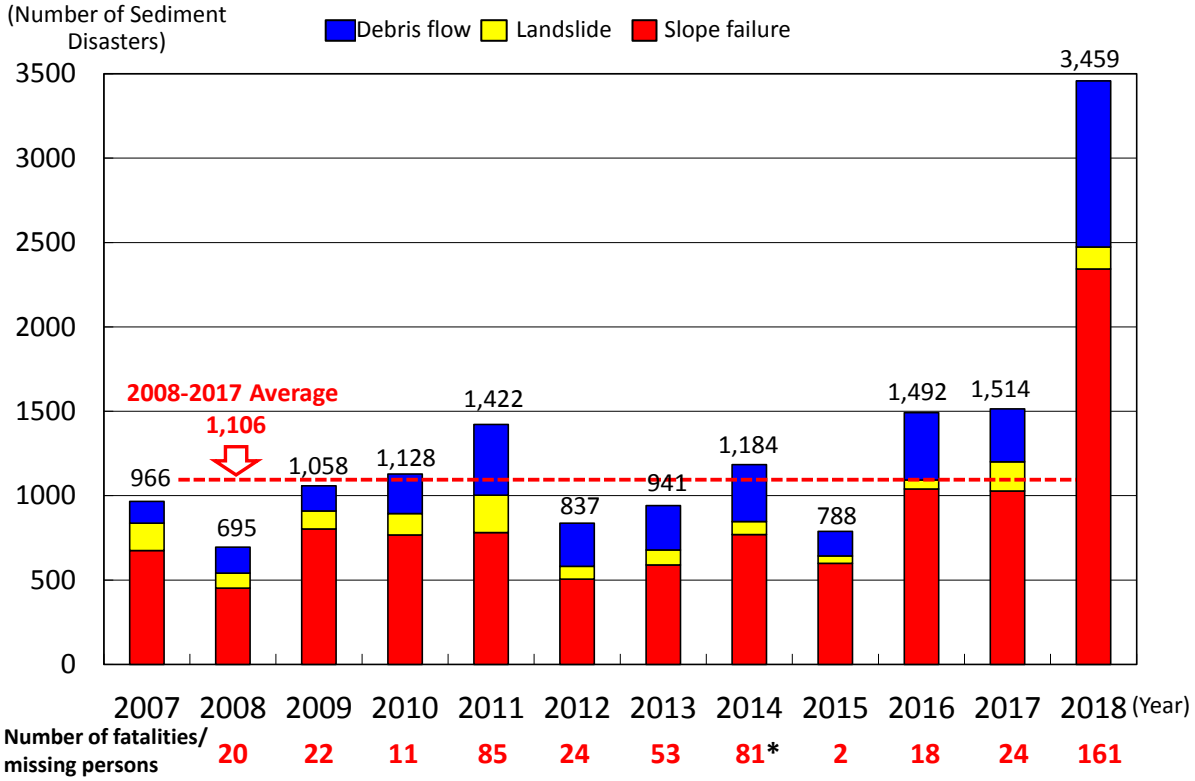
*Indicates eruptions with apparent volume of ejecta of more than 1 km^3

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 km^3 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-20 Number of Sediment Disasters

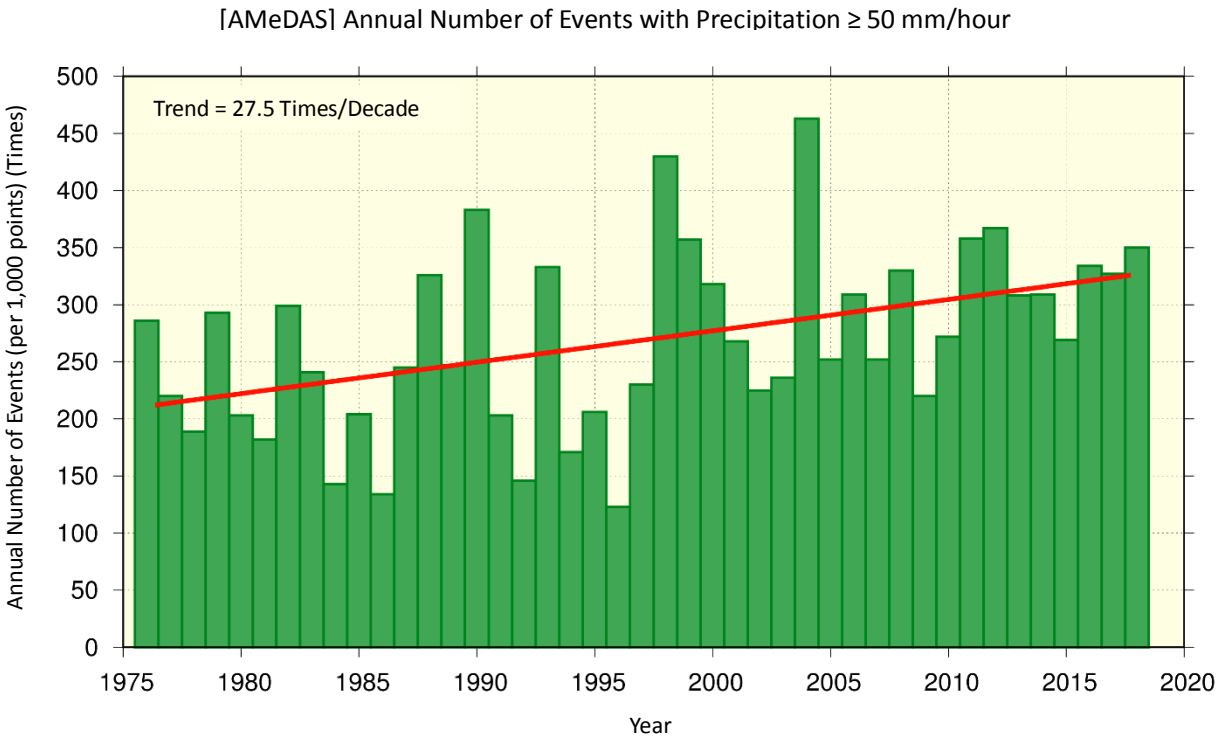
As of December 31, 2018



*In addition, there were 3 disaster-related deaths due to the Hiroshima Sediment Disaster

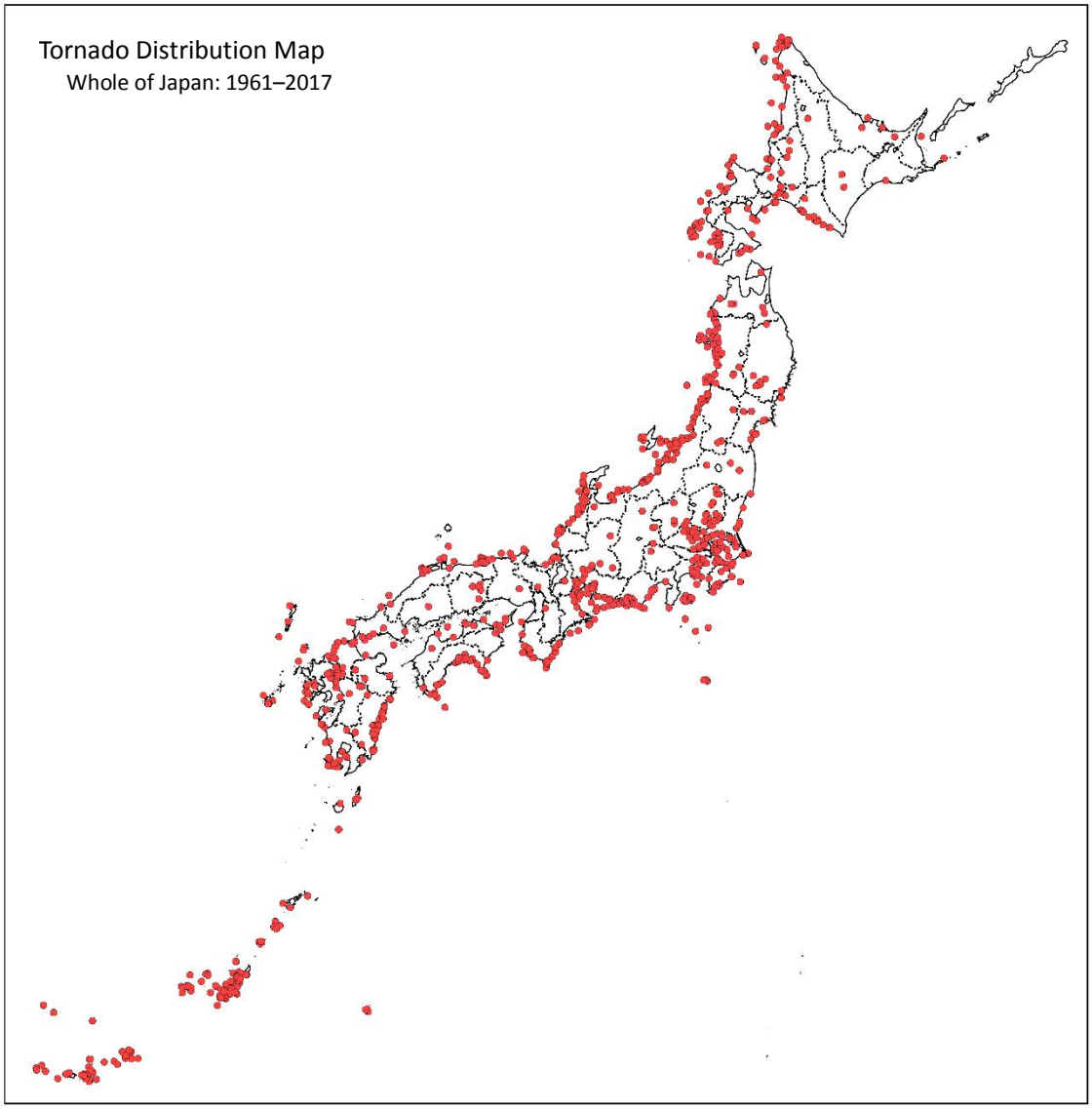
Source: Ministry of Land, Infrastructure, Transport and Tourism

Fig. A-21 Increase in the frequency of short-duration downpours



Source: Japan Meteorological Agency (website)

Fig. A-22 Number of Tornados



Source: Japan Meteorological Agency.

Fig. A-23 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)		Baltistan, 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 MARIE (5415))		Japan	1,700
1959	Flood		China	2,000,000
1959	Typhoon (Typhoon VERA (5915))		Japan	5,100
1960	Flood		Bangladesh	10,000
1960	Earthquake		Southwestern Morocco	12,000
1960	Earthquake/Tsunami		Chile	6,000

Year	Disaster Type	GLIDE number	Country (Areas)	Fatalities/Missing Persons (approx.)
1961	Cyclone		Bangladesh	11,000
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 (9125)		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 (9726)	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

Year	Disaster Type	GLIDE number	Country (Areas)	Fatalities/Missing Persons (approx.)
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
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 (0615)	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 (1121)	TC-2011-000189-PH	Mindanao, Philippines	1,400
2012	Typhoon BOPHA (1224)	TC-2012-000197-PHL	Mindanao, Philippines	1,900
2013	Flood	FL-2013-000070-IND	Northern India	1,500
2013	Typhoon HAIYAN (1330)	TC-2013-000139-PHL	Leyte, Philippines	6,200
2015	Earthquake (Nepal Earthquake)	EQ-2015-000048-NPL	Nepal	9,000
2018	Earthquake, Tsunami	EQ-2018-000156-IDN	Sulawesi, Indonesia,	3,400

Source: Formulated by the Cabinet Office based on the OFDA/CRED International Disaster Database (EM-DAT) (www.emdat.be), Université Catholique de Louvain, Brussels (Belgium), and Chronological Scientific Tables

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.

Fig. A-24 Top 10 Largest Earthquakes Since 1900

(As of March 1, 2019)

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 magnitude (Mw) of 2011 Great East Japan Earthquake is based on materials from JMA.

Source: US Geological Survey

Fig. A-25 Major Natural Disasters Since 2018

Date	Country	Disaster Type	Fatalities	Affected People	Direct Damages (USD 1,000)
Jan. 2018	Pakistan	Drought	0	2,807,350	0
Jan.-Feb. 2018	Mongolia	Cold wave	0	264,000	0
Jan.-Mar. 2018	Argentina	Drought	0	0	3,400,000
Jan. 2-5, 2018	China	Rainstorms	21	2,503,700	854,000
Jan. 5-8, 2018	Madagascar	Tropical cyclone	73	161,318	0
Jan. 13-17, 2018	Philippines	Flood	11	180,000	0
Feb. 12, 2018	Philippines	Tropical cyclone	0	254,859	3,070
Feb. 26, 2018	Papua New Guinea	Earthquake	145	544,300	61,000
Mar. 1-3, 2018	USA	Rainstorms	9	0	2,250,000
Mar.-Aug. 2018	Mauritania	Drought	0	350,600	0
Mar. 3-5, 2018	Rwanda	Flood	116	26,051	0
Mar. 3, 2018	China	Rainstorms	14	177,000	147,000
Mar. 14-Apr. 30, 2018	Kenya	Flood	72	211,188	350,000
Apr. 1-30, 2018	Somalia	River flooding	0	700,000	0
Apr.-Dec. 2018	Madagascar	Drought	0	1,260,000	0
May 1-10, 2018	India	Rainstorms	143	200	24,000
May 3-30, 2018	USA	Volcanic eruption	0	2,500	0
May 7-30, 2018	China	Flood	77	225,000	373,000
May 18-22, 2018	Pakistan	Heat wave	180	0	0
May 19-26, 2018	Sri Lanka	Flood	20	153,712	0
May 21, 2018	Somalia	Tropical cyclone	53	228,000	0
Jun.-Aug. 2018	Guatemala	Drought	0	1,500,000	44,669
Jun.-Aug. 31, 2018	Niger	Flood	36	130,468	0
Jun.-Aug. 2018	Nicaragua	Drought	0	300,000	0
Jun.-Aug. 2018	Honduras	Drought	0	360,000	0
Jun.-Aug. 2018	El Salvador	Drought	0	386,610	37,000
Jun. 3, 2018	Guatemala	Volcanic eruption	425	1,714,414	0
Jun. 29-Jul. 8, 2018	Japan	Flood	230	1,500,102	9,500,000
Jul. 1-15, 2018	Japan	Heat wave	119	49,000	0
Jul. 5-7, 2018	China	Flood	108	450,000	1,300,000

Date	Country	Disaster Type	Fatalities	Affected People	Direct Damages (USD 1,000)
Jul. 7, 2018	China	Flood	3	1,381,000	781,283
Jul. 10-11, 2018	China	Flood	16	1,519,000	530,689
Jul. 13-16, 2018	Nigeria	Flood	101	15,872	0
Jul. 15-Aug. 10, 2018	Myanmar	Flood	16	109,650	0
Jul. 17-21, 2018	Philippines	Tropical cyclone	0	1,677,993	25,944
Jul. 18-19, 2018	Laos	Tropical cyclone	0	120,000	0
Jul. 23, 2018	Laos	Flood	136	13,100	0
Jul. 23-24, 2018	Greece	Forest fire	126	69	0
Jul. 27-Aug. 31, 2018	USA	Forest fire	14	3,237	1,000,000
Jul. 29, 2018	Indonesia	Earthquake	14	102,852	23,000
Aug. 2018	Australia	Drought	0	0	1,200,000
Aug.-Oct. 2018	Afghanistan	Drought	0	2,200,000	0
Aug. 1-Nov. 24, 2018	Congo	Plague	236	412	0
Aug. 5, 2018	Indonesia	Earthquake	564	516,927	509,000
Aug. 7-20, 2018	India	Flood	504	23,220,000	2,852,480
Aug. 13-16, 2018	Laos	Tropical cyclone	0	660,000	0
Aug. 15-17, 2018	China	Tropical cyclone	53	39,600	5,360,000
Aug. 24-Sep.6, 2018	North Korea	Flood	146	581,268	0
Aug. 31-Oct. 2, 2018	Ghana	Flood	34	100,000	0
Sep. 4-5, 2018	Japan	Tropical cyclone	17	3,900	12,500,000
Sep. 12-18, 2018	USA	Tropical cyclone	53	1,500,000	14,000,000
Sep. 16, 2018	Philippines	Tropical cyclone	84	3,800,138	32,033
Sep. 20-Oct.2, 2018	Nigeria	Flood	199	1,922,332	275,000
Sep. 28, 2018	Indonesia	Earthquake/ Tsunami	3,400	210,894	1,000,000
Sep. 28-Oct. 1, 2018	Japan	Tropical cyclone	4	18,200	1,000,000
Oct. 2-11, 2018	Costa Rica	Flood	1	125,190	0
Oct. 10-11, 2018	USA	Tropical cyclone	45	5,000	16,000,000
Oct. 11-12, 2018	India	Tropical cyclone	85	300,200	920,000
Oct. 19-23, 2018	Trinidad and Tobago	Flood	0	150,000	3,700
Oct. 29-Nov. 4, 2018	Italy	Rainstorms	12	2,200	1,100,000
Oct. 30, 2018	Philippines	Tropical cyclone	12	253,300	2,402
Nov. 8-16, 2018	USA	Forest fire	85	250,000	16,500,000
Nov. 8, 2018	USA	Forest fire	2	3	5,200,000
Nov. 16, 2018	India	Tropical cyclone	45	249,000	0
Dec. 2018	Nigeria	Flood	0	2,000,000	0
Dec. 22, 2018	Indonesia	Volcanic eruption	453	47,778	0
Dec. 28-31, 2018	Philippines	Tropical cyclone	182	926,690	169,914
Jan. 4, 2019	Thailand	Tropical cyclone	7	720,885	0

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) India: Floods (FL-2018-000134-IND)

Heavy rains during the monsoon season in June 2018 and torrential rains from August 1 to 19, which exceeded 758 mm, caused massive floods and landslides in Kerala, India. The intense rains that hit a wide area across the nation caused floods in eight states, including Kerala. The number of fatalities and missing persons exceeded 500 and the number of affected people exceeded 23 million people.

The National Disaster Response Team, national disaster WATSAN response teams, state disaster response teams, and the Indian Red Cross Society provided emergency medical services and carried out hygiene control measures. The safety of well water was also checked, as almost a half of residents in Kerala use it as drinking water. The Japanese Red Cross Society also supported disaster control measures and reconstruction and recovery from the disaster through the International Federation of Red Cross and Red Crescent Societies.

(2) Indonesia: Earthquake, Tsunami (EQ-2018-000156-IDN)

Around 5:02 p.m. on September 28, 2018 (around 7:02 p.m. on the 28th Japan time), a magnitude 7.5 earthquake occurred with the epicenter located 78 km north of Palu, Donggala Regency, Central Sulawesi Province on Sulawesi Island, Indonesia. The earthquake left approximately 3,400 people dead or missing, while also causing massive damage to approximately 68,000 houses and 45 medical facilities in Palu, the provincial capital, Donggala, Donggala Regency, and other areas.

It was pointed out that one of the causes that expanded the extent of the damage was landslides caused by inland and coastal soil liquefaction and tsunamis generated by it. The Japan International Cooperation Agency (JICA) carried out detailed analyses of the tsunami and liquefaction phenomena and created an elaborate hazard map. JICA is providing ongoing support for formulating a reconstruction basic plan based on the hazard map.

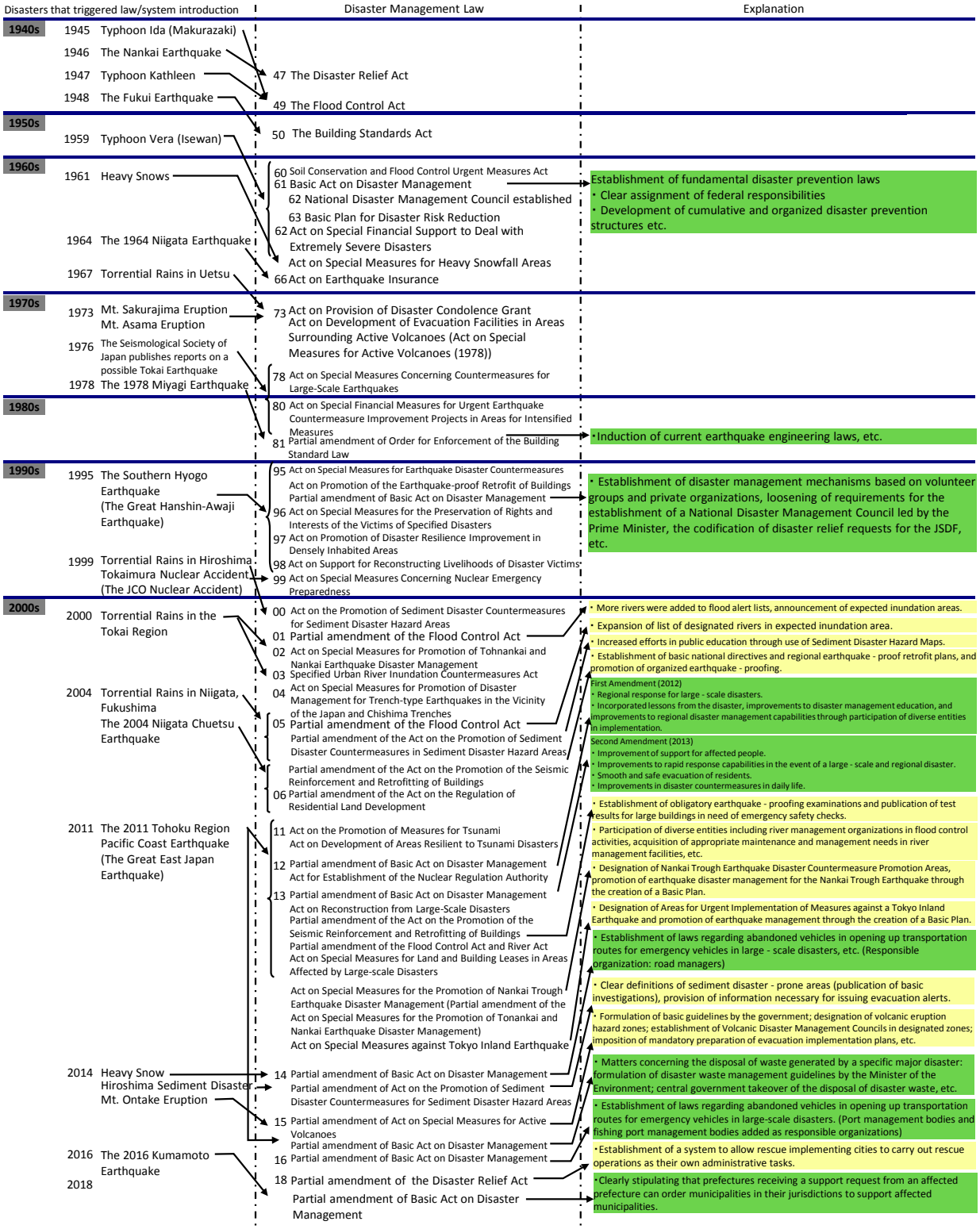
(3) United States: Wildfire (WF-2018-000421-USA)

On November 8, 2018, the wildfire that occurred in northern Butte County, California (the Camp Fire) left 85 people dead and approximately 14,000 houses damaged and burned approximately 62,000 hectares. It was reported that there were some people caught in fire while evacuating in cars, as the fire extended at a high speed while the main roads were jammed.

There were other wildfires in California on the same day. Together with the Hill in southern California and Woolsey in the suburbs of Los Angeles, the total insured losses were estimated to be more than 9 billion dollars, record-high losses from wildfires in the history of the United States. California often has extremely hot and dry weather conditions that can cause wildfires. It has had many wildfires in recent years.

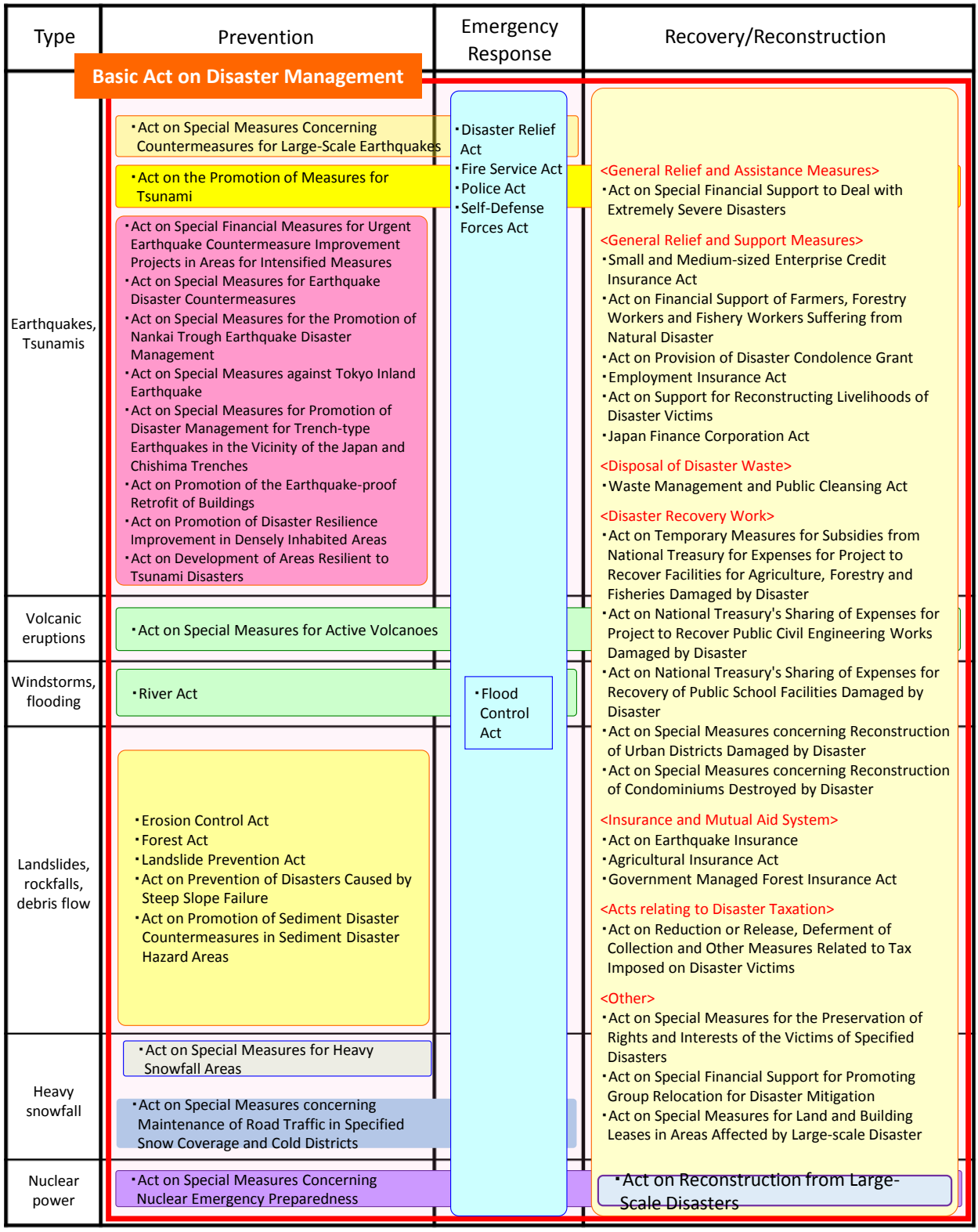
3. Laws and Systems

Fig. A-26 Evolution of Disaster Management Laws and Systems Since 1945



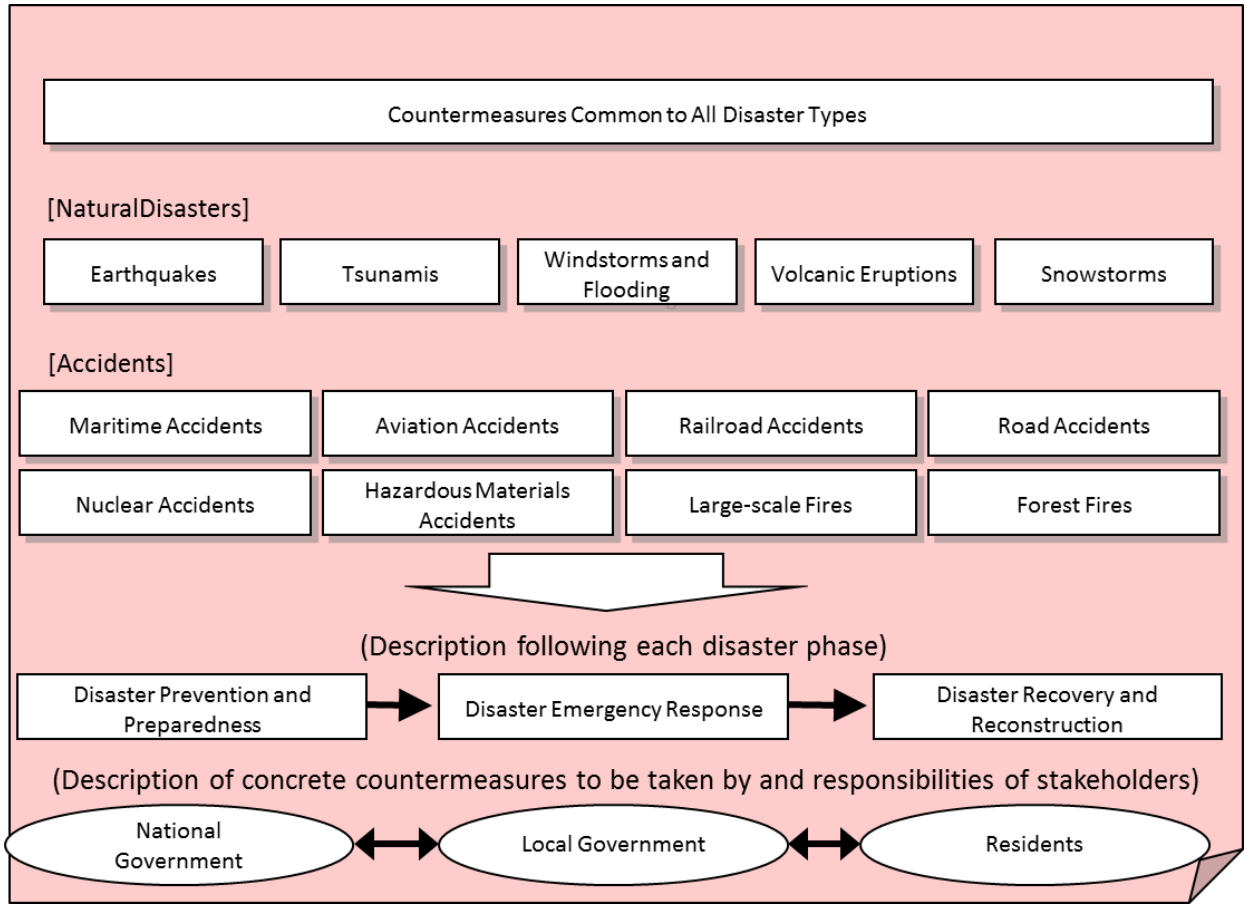
Source: Cabinet Office

Fig. A-27 Major Disaster Management Laws by Type of Disaster



Source: Cabinet Office

Fig. A-28 Structure of the Basic Plan for Disaster Risk Reduction



Source: Cabinet Office

Fig. A-29 Revisions to the Basic Plan for Disaster Risk Reduction

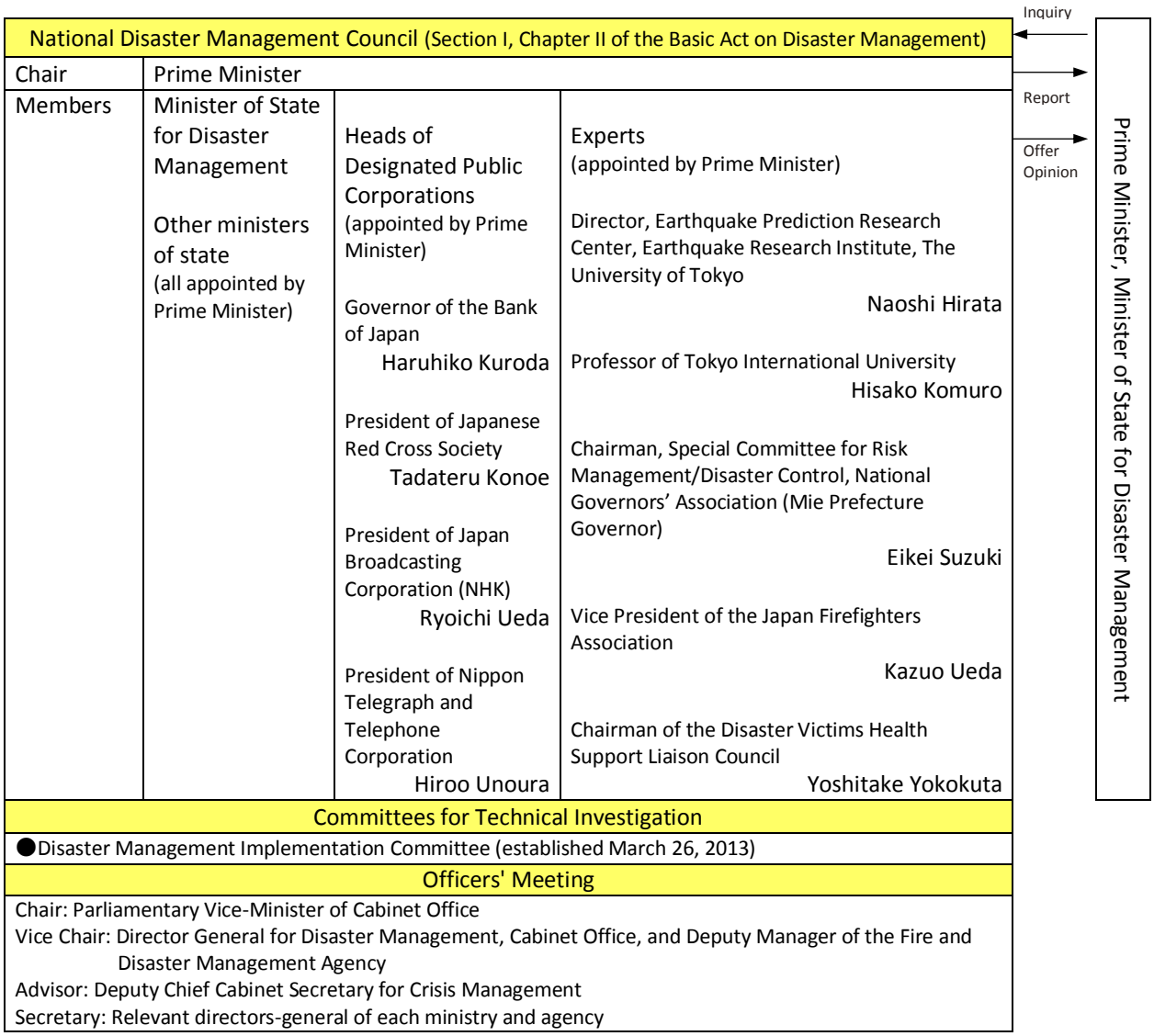
Revision Date	Outline of Revision	Background
June 1963	- The Basic Plan for Disaster Risk Reduction formulated based on the Basic Act on Disaster Management - Stipulations regarding various measures to prevent natural disasters, mitigate damage, and promote disaster reconstruction	Sep. 26, 1959: Typhoon VERA (5915) 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 Tohnankai 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 Amendment of 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 Amendment of 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 Amendment of 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 Amendment of 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 Amendment of 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 Typhoon LIONROCK (1610) 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
June 2018	Partial revision -Revisions resulting from the strengthening of measures in light of the revision of laws, including the Disaster Relief Act, the Road Act, and the Flood Control Act, etc. (each section) - Revisions resulting from the strengthening of measures in light of lessons learned from the 2017 July Northern Kyushu Heavy Rain and the heavy snow from January to February 2018 (each section)	Dec. 8, 2017: Report of the Study Group on Evacuation from the 2017 July Northern Kyushu Heavy Rain May 16, 2018: Interim Report on Measures to Secure Road Traffic in Heavy Snow June 15, 2018: Partial Amendment of the Disaster Relief Act

Source: Cabinet Office

4. Organizations

Fig. A-30 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 Other ministers of state (all appointed by Prime Minister)	Heads of Designated Public Corporations (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	Experts (appointed by Prime Minister) 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)			
Officers' Meeting			
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			

[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

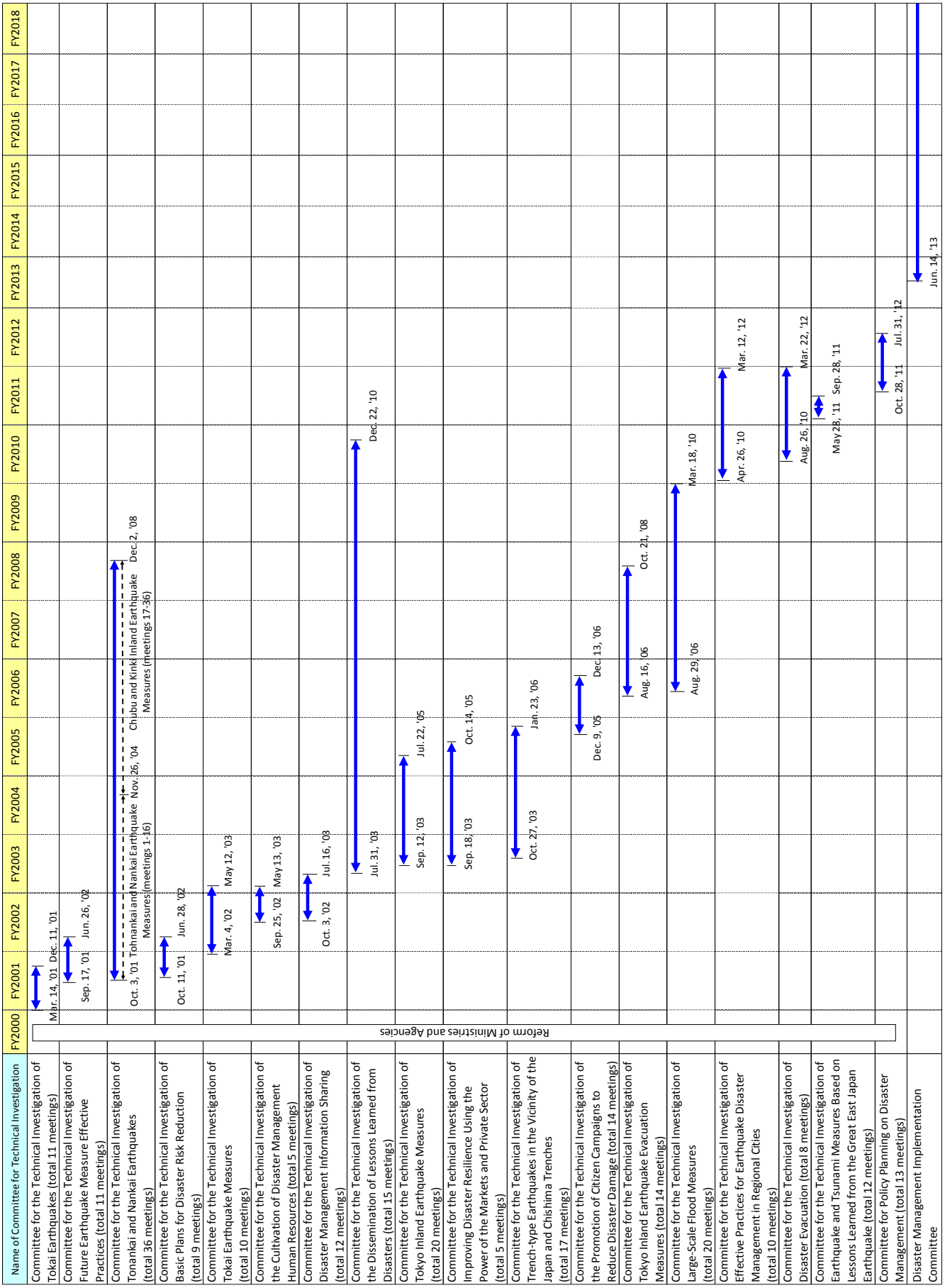
Source: Cabinet Office

Fig. A-31 Recent Meetings of the National Disaster Management Council (Since 2010)

FY2010	
Apr. 21, 2010	• 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	• Great East Japan Earthquake: Characteristics and Challenges • Conventional earthquake and tsunami policies
Oct. 11, 2011	• 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	• 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	• 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	• 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	• 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	• 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	• 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	• Revisions to the Basic Plan for Disaster Risk Reduction
Mar. 31, 2015	• 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	• Revisions to the Basic Plan for Disaster Risk Reduction
Feb. 16, 2016	• 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	• FY2016 Comprehensive Disaster Management Drill Framework • Revisions to the Basic Plan for Disaster Risk Reduction
FY2017	
Apr. 11, 2017	• Revisions to the Basic Plan for Disaster Risk Reduction • FY2017 Comprehensive Disaster Management Drill Framework
FY2018	
Jun. 29, 2018	• Revisions to the Basic Plan for Disaster Risk Reduction • Partial amendment of the Disaster Relief Act
FY2019	
May 31, 2019	• Revisions to the Basic Plan for Disaster Risk Reduction • Revisions to the Basic Plan for the Promotion of Nankai Trough Earthquake Disaster Risk Reduction Countermeasures • FY2019 Comprehensive Disaster Management Drill Framework • Promotion of Earthquake Research (third period)

Source: Cabinet Office

Fig. A-32 **Status of the Establishment of National Disaster Management Council Committees for Technical Investigation**



Source: Cabinet Office

Fig. A-33

Fig. A-33 Disaster Risk Management Budgets by Year

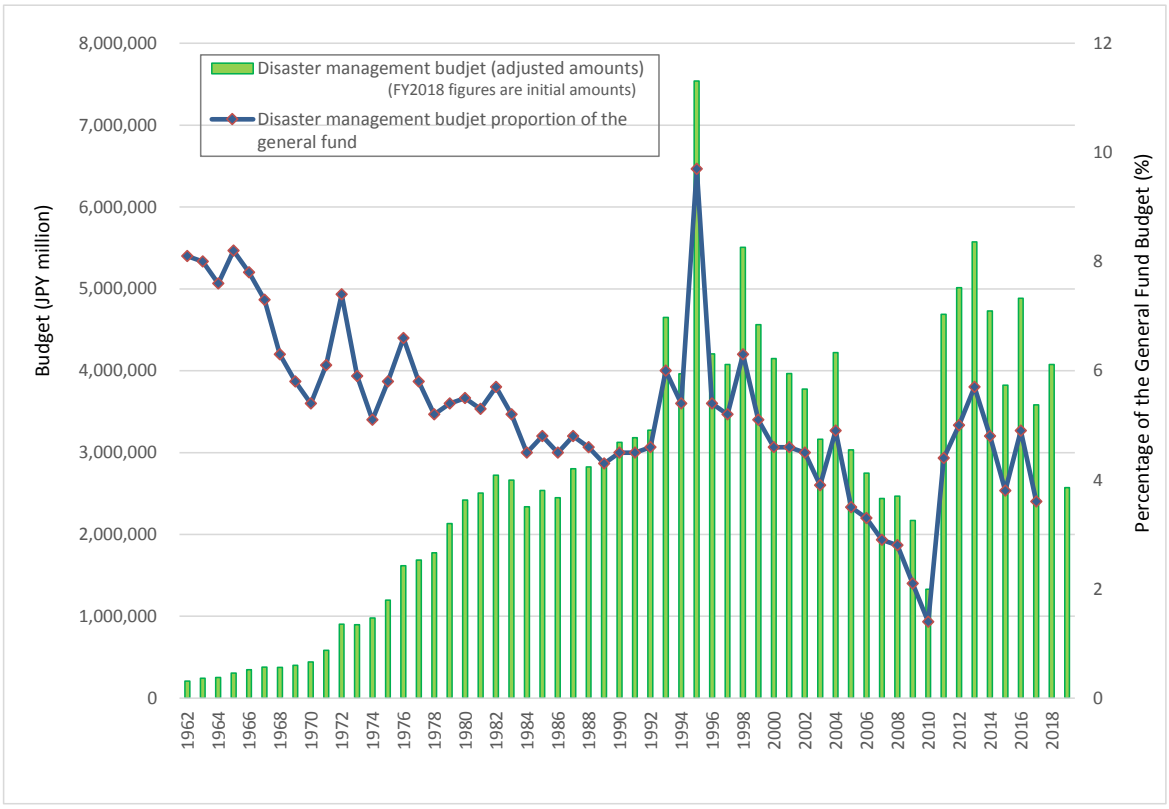
Fiscal Year	Science and Technology Research		Disaster Prevention		Land Conservation		Disaster Reconstruction		Total
	(JPY million)	Share (%)	(JPY million)	Share (%)	(JPY million)	Share (%)	(JPY million)	Share (%)	(JPY million)
1962	751	0.4	8,864	4.3	97,929	47.1	100,642	48.3	208,006
1963	1,021	0.4	8,906	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
2006	11,627	0.4	689,505	25.1	1,439,129	52.3	610,302	22.2	2,750,563

Fiscal Year	Science and Technology Research		Disaster Prevention		Land Conservation		Disaster Reconstruction		Total
	(JPY million)	Share (%)	(JPY million)	Share (%)	(JPY million)	Share (%)	(JPY million)	Share (%)	(JPY million)
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	22,781	0.8	737,429	16.3	482,711	4.0	2,834,284	78.8	4,077,205
2019	11,233	0.4	602,574	23.4	114,907	4.5	1,842,652	71.7	2,571,366

Notes:

1. These are adjusted budget (national expenditures) amounts. However, the FY2019 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.

Source: Formulated by the Cabinet Office based on materials from various ministries and agencies



Source: Formulated by the Cabinet Office based on materials from various ministries and agencies

Fig. A-34 Earthquake Emergency Development Project Plans

(As of the end of FY2017; Unit: JPY million)

Category	FY1980 - FY2019		
	Planned Amount (a)	Implemented Amount (b)	Rate of Progress (b)/(a)
1 Evacuation sites	177,539	167,775	94.5%
2 Evacuation roads	93,983	84,986	90.4%
3 Firefighting facilities	141,230	128,583	91.0%
4 Emergency transport routes	951,838	860,516	90.4%
4-1 Emergency transport routes	840,671	757,891	90.2%
4-2 Emergency transport ports	59,631	56,784	95.2%
4-3 Emergency transport fishing ports	51,536	45,841	88.9%
5 Telecommunications facilities	17,514	16,545	94.5%
6 Public medical institutions	54,012	50,900	94.2%
7 Social welfare facilities	55,586	55,586	100.0%
8 Public elementary and junior high schools	446,226	428,962	96.1%
9 Tsunami countermeasures	272,080	188,655	69.3%
9-1 River management facilities	104,233	61,952	59.4%
9-2 Coastal preservation facilities	167,847	126,703	75.5%
10 Landslide prevention	540,827	513,556	95.0%
10-1 Erosion control facilities	103,265	99,536	96.4%
10-2 Security facilities	171,243	161,232	94.2%
10-3 Landslide facilities	84,622	79,363	93.8%
10-4 Steep slope facilities	160,067	156,748	97.9%
10-5 Ponds	21,630	16,677	77.1%
Total	2,750,835	2,496,064	90.7%

Notes:
1. The content of Earthquake Emergency Development Project Plans (FY1980-2019) is as of the end of FY2017.
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-35 Estimated Budgets of 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, heath, and assets from earthquake-related damage. This law allows prefectural governors to create a Five-Year Plan for Emergen 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.
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. T these plans have been created by the prefectural governors over fifth terms, and earthquake disaster projects have begun to be implemented.

Project budgets for these plans over fifth terms are shown in the table below.

(All prefectures, as of FY2017. Unit: J

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)				Fifth Five-Year Plan (FY 2016-2020)		
	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)
1. Evacuation sites	1,462,542	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%	1,043 ha	275,005	92,501
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	625,957	65.7%	897 km	1,336,465	781,628	58.5%	597 km	830,575	234,317
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%	18,239 sites	431,517	127,582
4. Roads for firefighting activities	168,387	128,163	76.1%	161 km	119,329	92,958	77.9%	102 km	46,719	49,136	105.2%	56 km	23,506	19,998	85.1%	29 km	24,095	6,854
5. Emergency transport roads, etc.	6,067,258	5,719,897	94.3%		5,267,908	4,242,139	80.5%		3,813,169	3,291,461	86.3%		2,773,563	2,443,339	88.1%		2,743,376	1,029,817
5-1. Emergency transport roads	5,555,626	5,355,365	96.4%	3,920 km	4,998,577	4,067,023	81.4%	2,552 km	3,557,657	3,106,165	87.3%	2,191 km	2,584,039	2,279,595	88.2%	2,180 km	2,625,220	991,640
5-2. Emergency transport/traffic control facilities	23,900	21,017	87.9%	3,448 facilities	16,855	8,473	50.3%	2,439 facilities	9,242	6,844	74.0%	4,837 sites	15,464	12,214	79.0%	6,458 sites	21,856	6,543
5-3. Emergency transport heliports	6,327	2,094	33.1%	1 site	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	24,625
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	20,843	17,652	84.7%	26 sites	20,868	7,009
6. Multipurpose underground utility conduits	261,385	275,928	105.6%	844 km	394,948	257,890	65.3%	591 km	259,420	175,571	67.7%	471 km	255,017	208,175	81.6%	463 km	265,416	104,235
7. Medical institutions	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%	70 facilities	239,812	154,432
8. Social welfare facilities	482,317	219,490	45.5%	857 facilities	280,028	176,408	63.0%	521 facilities	114,756	56,400	49.1%	681 facilities	126,275	98,772	78.2%	256 facilities	46,755	17,925
8-2. Public kindergartens	-	-	-	-	-	-	-	995 schools	35,198	7,074	20.1%	1,159 schools	54,480	27,203	49.9%	267 schools	24,393	5,939
9. Public elementary and jr. high schools	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	2,322,751	1,631,920	70.3%	987 schools	371,977	151,809
10. Public special education schools	84,577	29,685	35.1%	114 schools	32,094	12,070	37.6%	264 schools	56,834	23,262	40.9%	199 schools	43,173	29,955	69.4%	6 schools	5,293	2,452
11. Public buildings	24,169	5,267	21.8%	29 facilities	2,662	1,199	45.0%	670 facilities	62,975	24,429	38.8%	1,737 facilities	369,417	209,134	56.6%	719 facilities	238,055	94,755
12. Coast and river facilities	235,686	187,310	79.5%	334 sites	272,744	225,598	82.7%	491 sites	237,787	182,911	76.9%	687 sites	345,184	302,195	87.5%	801 sites	644,699	245,264
12-1. Coastal preservation facilities	140,865	109,501	77.7%	215 sites	196,496	146,699	74.7%	423 sites	187,407	146,044	77.9%	525 sites	229,583	184,601	80.4%	570 sites	351,724	118,841
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%	162 sites	115,601	117,594	101.7%	231 sites	292,975	126,423
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%	8,931 sites	910,589	379,222
13-1. Erosion control facilities	268,151	247,050	92.1%	2,278 sites	436,635	409,636	93.8%	2,033 sites	354,972	325,910	91.8%	2,063 sites	303,286	257,665	85.0%	1,823 sites	285,307	121,170
13-2. Security 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%	2,728 sites	165,823	60,244
13-3. Landslide prevention facilities	359,433	356,531	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%	717 sites	95,578	46,559
13-4. Steep slope failure prevention facilities	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	94,821
13-5. Reservoirs	170,513	131,645	77.2%	1,252 sites	133,038	90,165	67.8%	1,147 sites	100,913	66,870	66.3%	1,103 sites	83,029	60,539	72.9%	1,814 sites	176,559	56,428
14. Community DRR base facilities	162,319	102,857	63.4%	121 sites	81,642	40,342	49.4%	78 sites	60,905	34,277	56.3%	161 sites	90,683	68,591	75.6%	121 sites	93,033	40,988
15. Disaster management radio communications system	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%	8,953 sites	164,585	42,147
16. Potable water facilities/power generation systems	221,622	126,320	57.0%	444 sites	89,822	55,599	61.9%	405 sites	142,958	72,142	50.5%	517 sites	121,728	93,437	76.8%	443 sites	119,572	50,678
17. Storage warehouses	17,763	8,028	45.2%	437 sites	10,338	5,292	51.2%	296 sites	4,081	838	20.5%	650 sites	7,053	3,968	56.3%	451 sites	10,261	2,395
18. Response and relief 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	32
19. Downtown areas with high density dilapidated housing	2,814,605	1,431,714	50.9%	6,960 ha	1,725,532	916,981	53.1%	7,839 ha	846,197	563,811	66.6%	12,156 ha	501,836	340,080	67.8%	12,645 ha	429,416	87,970
	18,503,368	14,117,470	76.3%		14,157,285	10,018,773	70.8%		12,197,074	8,359,916	68.5%		11,080,537	8,386,758	75.7%		7,868,573	2,871,313

Notes:

1. The content of the Fifth Five-Year Plan (FY2016-2020) is current as of the end of FY2017.
2. The expenses for each project are not limited to projects aimed at achieving earthquake DRR; they include expenses for projects that have other policy purposes, such as those related to urban infrastructure development, but that also are effective in termsof earthquake DRR.
3. Public special education schools include schools known as schools for the blind, schools for the deaf, and schools for the physically or mentally/physically handicapped prior to FY 2006.

Source: Cabinet Office materials.

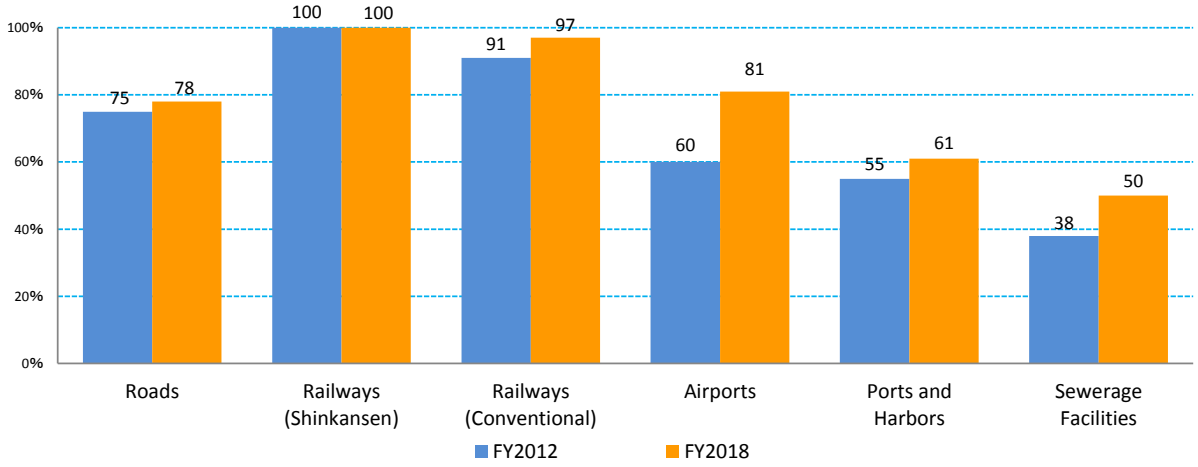
6. Disaster Management Facilities and Equipment

Fig. A-36 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 2019).
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-37 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 FY2017)

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 FY2017.)

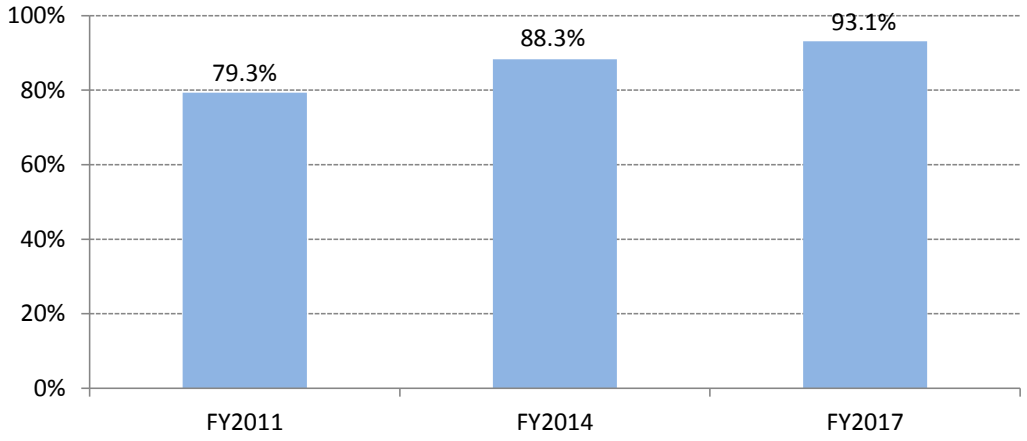
Airports: Percentage of population in a 100 km area around an airport that could be used for emergency transport.

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)). (Left: As of end of FY2012. Right: As of end of FY2017.)

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 FY2017.)

Source: Formulated by the Cabinet Office using materials from the Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Fig. A-38 Trends in the Seismic Reinforcement Rate of Public Facilities That Serve as Disaster Management Bases

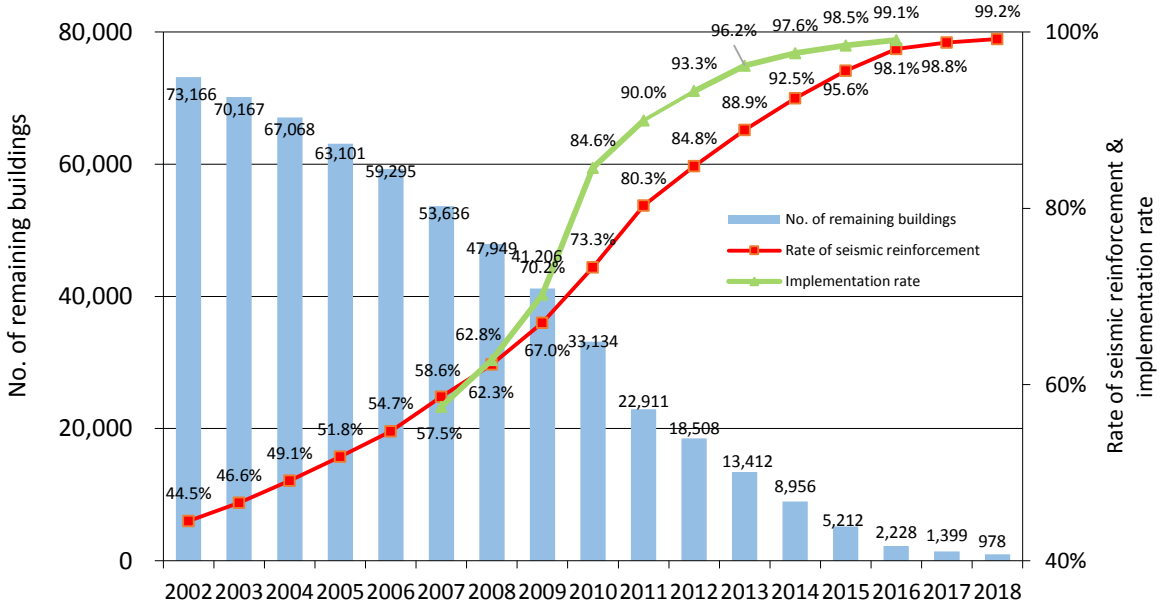


Note) Of all the public facilities owned or managed by local governments (buildings for public or public-private use: non-wooden structures built two stories or taller or buildings with a floor area of 200 m² or more), the facilities that could serve as disaster management bases for implementing disaster 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 shelter, etc.
(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 shelter, etc.
(5) Gymnasiums	Facilities designated as designated emergency evacuation site or designated shelter, etc.
(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 2018)

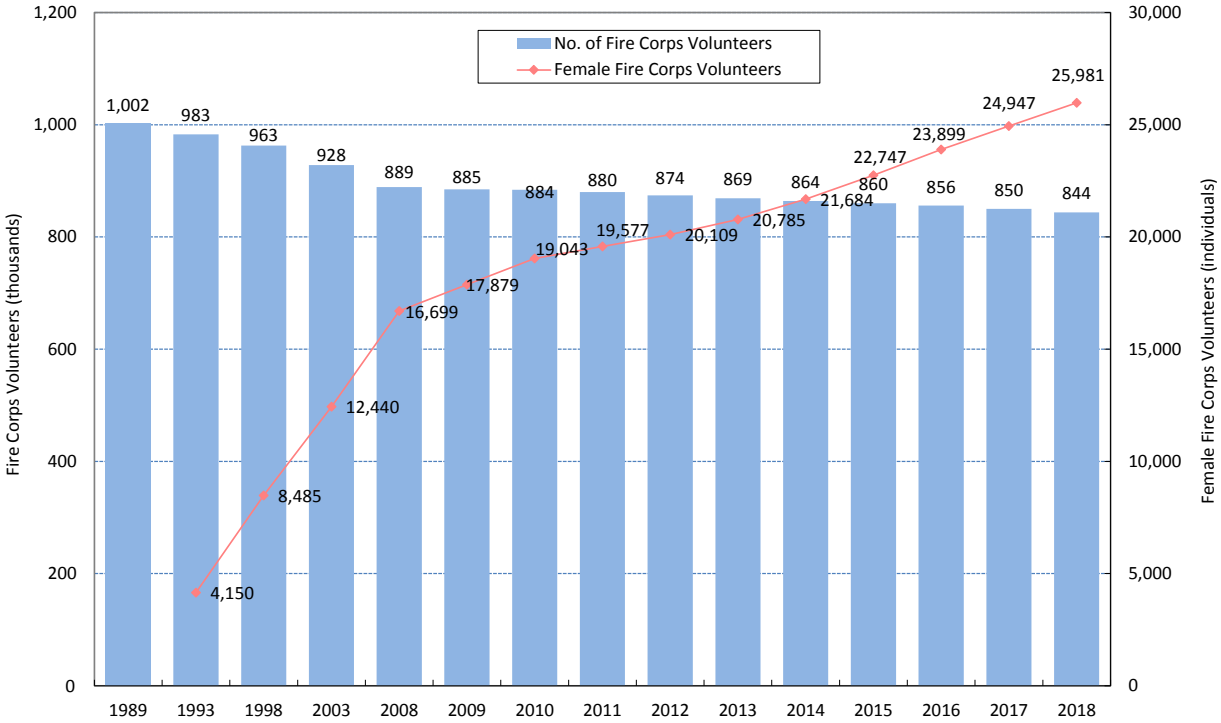
Fig. A-39 Seismic Reinforcement of Public Elementary and Junior High Schools



Source: "Results of a Follow-up Investigation on the Progress of the Seismic Retrofitting of Public School Facilities," Ministry of Education, Culture, Sports, Science and Technology (MEXT) (August 2018)

7. Trends in Numbers of Workers in Disaster Management

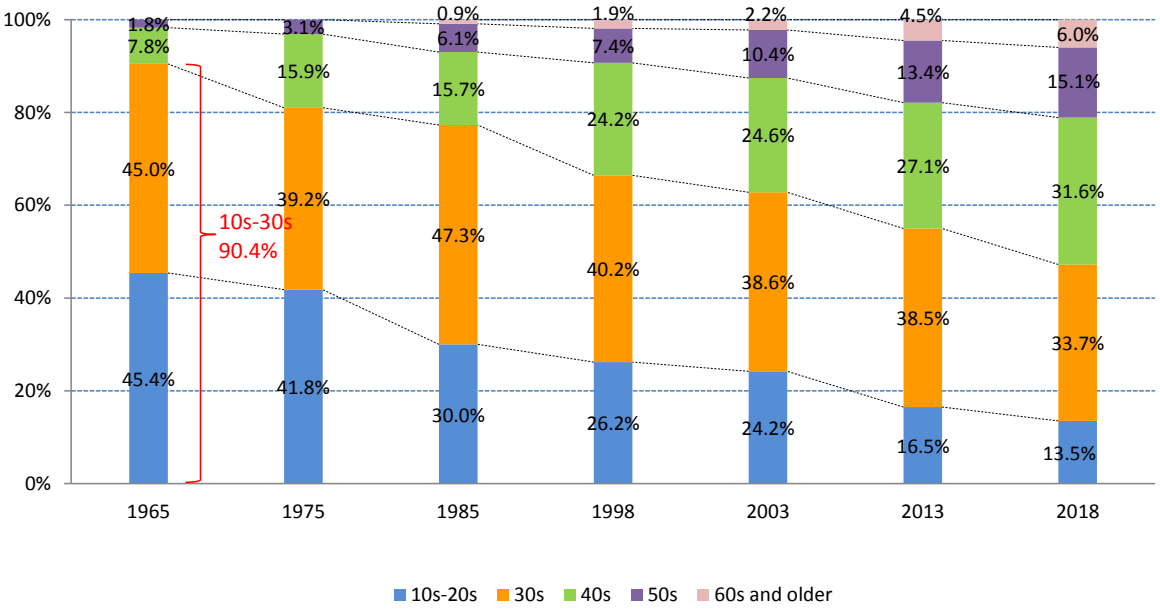
Fig. A-40 Numbers of Fire Corps Volunteers



Note: As a result of the Great East Japan Earthquake, the figure for 2012 for Onagawa-cho, Meshika-gun, Miyagi prefecture is the figure from 2010 (as of April 1, 2010)

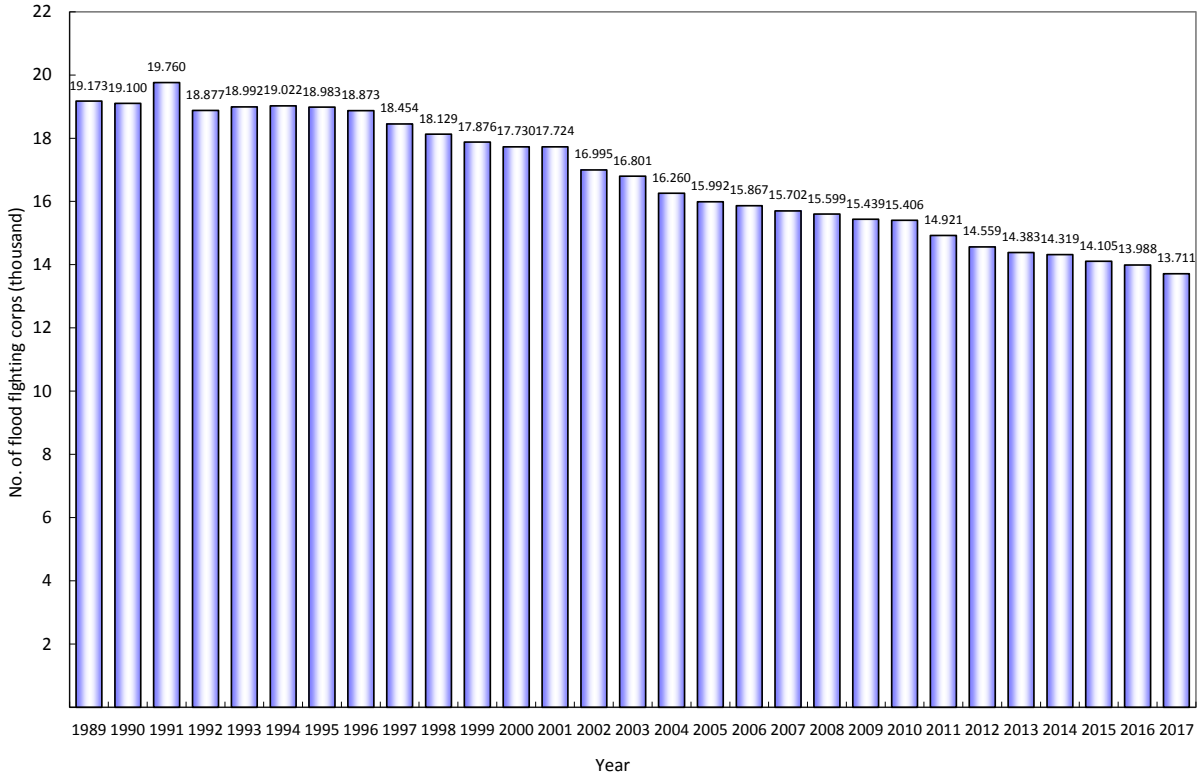
Source: Formulated by the Cabinet Office based on the Survey on the Current Status of Fire and Earthquake Disaster Management Measures of the Fire and Disaster Management Agency

Fig. A-41 Age Composition Ratios among Fire Corps Volunteers



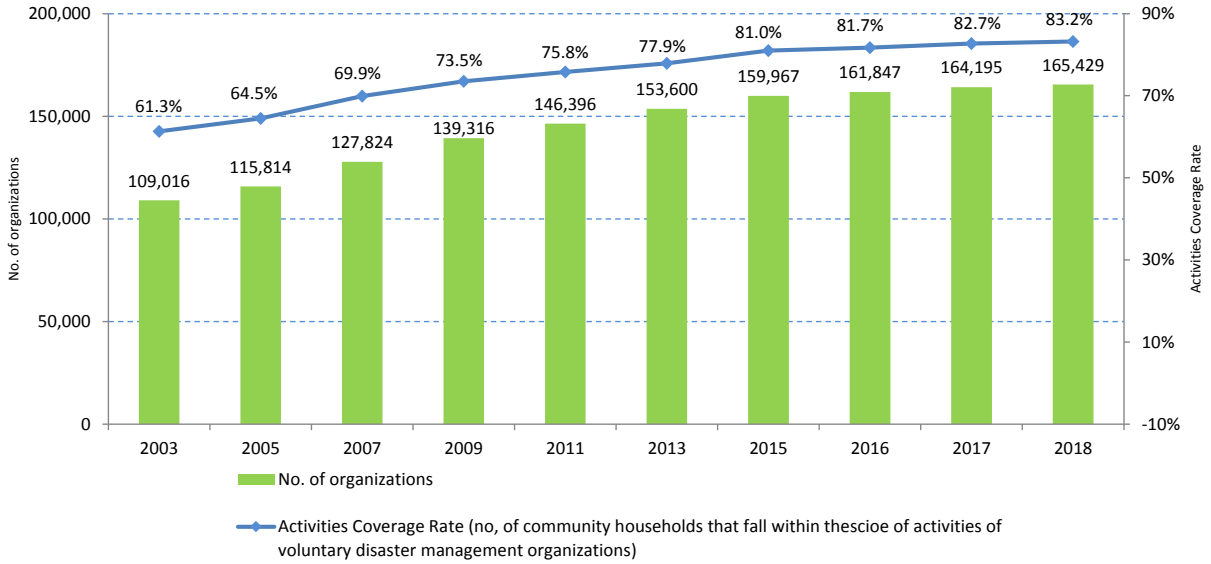
Source: Formulated by the Cabinet Office based on the Survey on the Current Status of Fire and Earthquake Disaster Management Measures of the Fire and Disaster Management Agency

Fig. A-42 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-43 Numbers of 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.

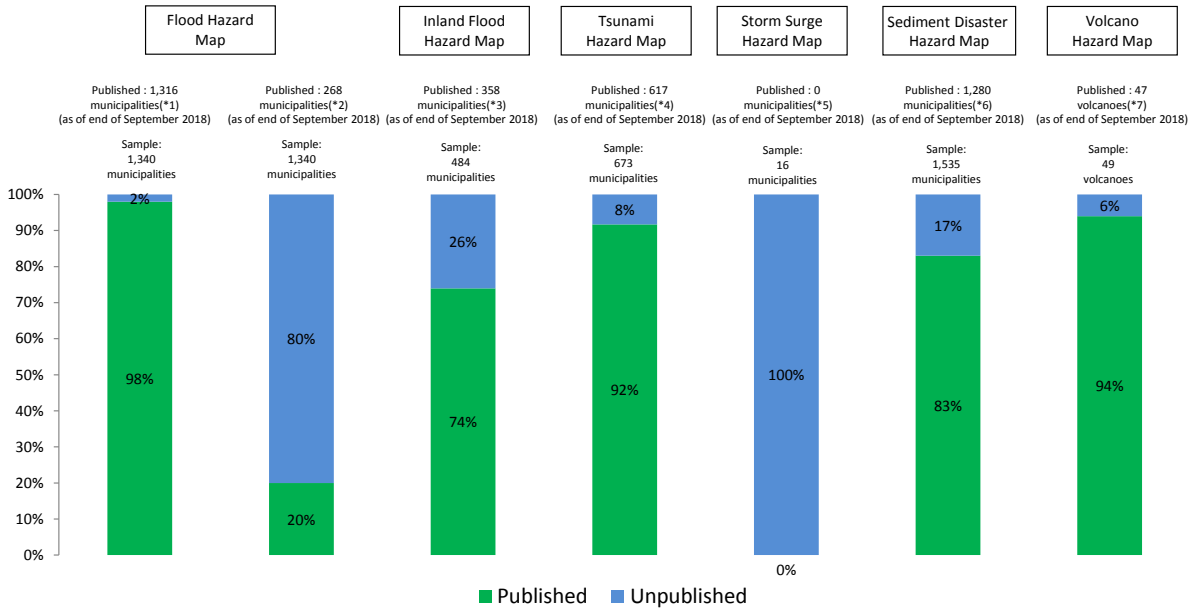
Fig. A-44 Female Representation in Local Disaster Management Councils (by Prefecture, 2018)

	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	68	6	8.8	3,836	120	3.1
Aomori	60	11	18.3	762	36	4.7
Iwate	74	10	13.5	1,133	93	8.2
Miyagi	56	10	17.9	856	62	7.2
Akita	60	4	6.7	716	77	10.8
Yamagata	60	10	16.7	1,002	58	5.8
Fukushima	54	6	11.1	947	40	4.2
Ibaraki	52	6	11.5	1,254	102	8.1
Tochigi	53	9	17.0	635	66	10.4
Gunma	47	6	12.8	901	70	7.8
Saitama	69	8	11.6	2,148	214	10.0
Chiba	61	9	14.8	1,420	140	9.9
Tokyo	66	8	12.1	2,160	243	11.3
Kanagawa	57	12	21.1	966	113	11.7
Niigata	71	19	26.8	878	52	5.9
Toyama	66	10	15.2	499	26	5.2
Ishikawa	70	7	10.0	431	28	6.5
Fukui	56	3	5.4	500	50	10.0
Yamanashi	62	5	8.1	584	50	8.6
Nagano	67	10	14.9	1,897	150	7.9
Gifu	61	12	19.7	969	86	8.9
Shizuoka	59	5	8.5	1,060	95	9.0
Aichi	68	5	7.4	1,470	146	9.9
Mie	59	5	8.5	899	89	9.9
Shiga	58	11	19.0	537	51	9.5
Kyoto	66	14	21.2	758	59	7.8
Osaka	58	6	10.3	1,406	156	11.1
Hyogo	55	7	12.7	1,315	129	9.8
Nara	60	8	13.3	882	80	9.1
Wakayama	54	6	11.1	611	39	6.4
Tottori	65	28	43.1	375	55	14.7
Shimane	73	35	47.9	616	46	7.5
Okayama	57	9	15.8	477	79	16.6
Hiroshima	59	2	3.4	826	60	7.3
Yamaguchi	60	6	10.0	606	63	10.4
Tokushima	81	39	48.1	581	44	7.6
Kagawa	60	10	16.7	430	45	10.5
Ehime	61	5	8.2	485	31	6.4
Kochi	58	7	12.1	743	73	9.8
Fukuoka	61	4	6.6	1,297	187	14.4
Saga	68	19	27.9	396	39	9.8
Nagasaki	68	11	16.2	665	47	7.1
Kumamoto	56	6	10.7	1,629	108	6.6
Oita	58	6	10.3	534	47	8.8
Miyazaki	53	4	7.5	729	54	7.4
Kagoshima	63	7	11.1	1,115	73	6.5
Okinawa	54	7	13.0	579	51	8.8
Total	2,882	453	15.7	45,515	3,822	8.4

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” (FY2018)
2. Figures for April 1, in principle.

8. Various Policies and Measures

Fig. A-45 Hazard Map Development



Source: Formulated by the Cabinet Office based on materials of the Ministry of Land, Infrastructure, Transport and Tourism (volcano hazard maps are materials owned by the Cabinet Office)

*1 Municipalities (including special wards) with designated flood and inundation hazard areas based on Article 14 of the Flood Control Act, which have published a hazard map pursuant to Article 15, paragraph (3) of the Flood Control Act

*2 Municipalities (including special wards) that have published a hazard map covering the estimated maximum precipitation

*3 Municipalities that need to promptly develop a hazard map as they suffered significant damage from past floods, which have already published a hazard map.

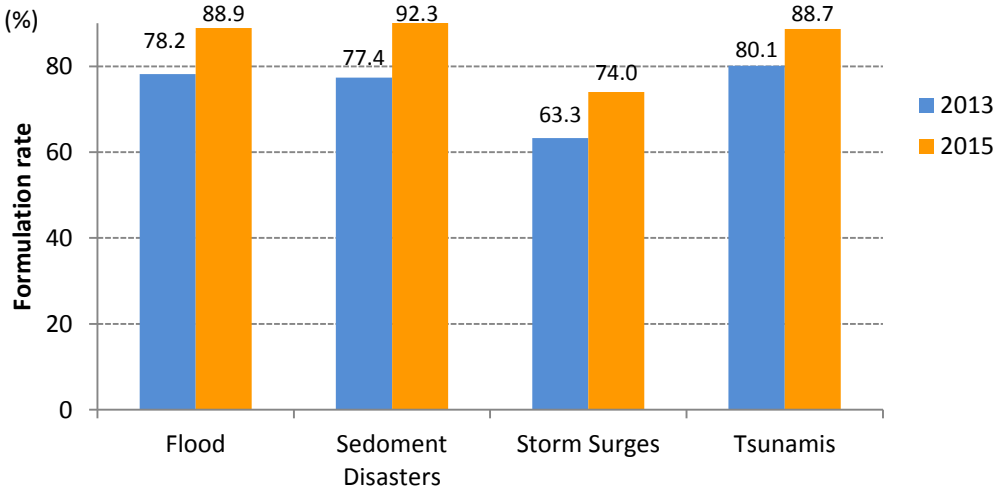
*4 Municipalities located in coastal areas or the tsunami hazard areas under Article 8 of the Act on Regional Development for Tsunami Disaster Prevention, which have already published a tsunami hazard map

*5 Since hazard coastal areas were first designated in FY2018, municipalities which were designated as storm surge and inundation hazard areas under Article 14-3 of the Flood Control Act and have already published a hazard map pursuant to Article 15, paragraph (3) of the Flood Control Act are tallied.

*6 Municipalities (including special wards) designated as sediment disaster hazard areas that have already published a hazard map pursuant to Article 8, paragraph (3) of the Sediment Disasters Prevention Act

*7 Volcanoes for which Volcanic Disaster Management Councils were established in accordance with Article 4 of the Act on Special Measures for Active Volcanoes, which have already published a volcano hazard map (one of the tasks of a Volcanic Disaster Management Council)

Fig. A-46 Formulation of Official Announcement Criteria for Evacuation Recommendations in Municipalities



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-47 Communication Method of Evacuation Instructions in Municipalities

Year	Disaster management radio communications system		Communication facilities of agricultural/ fishery cooperatives (including wired systems)	Patrols by loudspeaker vans	Siren	Bell ringing	News media	Through voluntary disaster management organizations	email	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%
2018	1,170 67%	1,450 83%	155 9%	1,651 95%	1,256 72%	195 11%	1,046 60%	1,203 69%	883 51%	972 56%

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

Fig. A-48 Assistance based on Mutual Support Agreements between Prefectures and Support Agreements with Private-Sector Institutions

Year	Support Based on Mutual Support Agreements Between Prefectures		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	1,065	47	477	47	2,648	47	1,754	47	1,898	47
2018	10	5	349	47	457	41	1,272	47	514	47	3,392	47	1,850	47	2,384	47

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

Fig. A-49 Mutual Support Agreements in Municipalities

Year	No. of Municipalities	No. of mutual support agreements concluded between municipalities in the same 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%
2018	1,741	—	1,701 98%

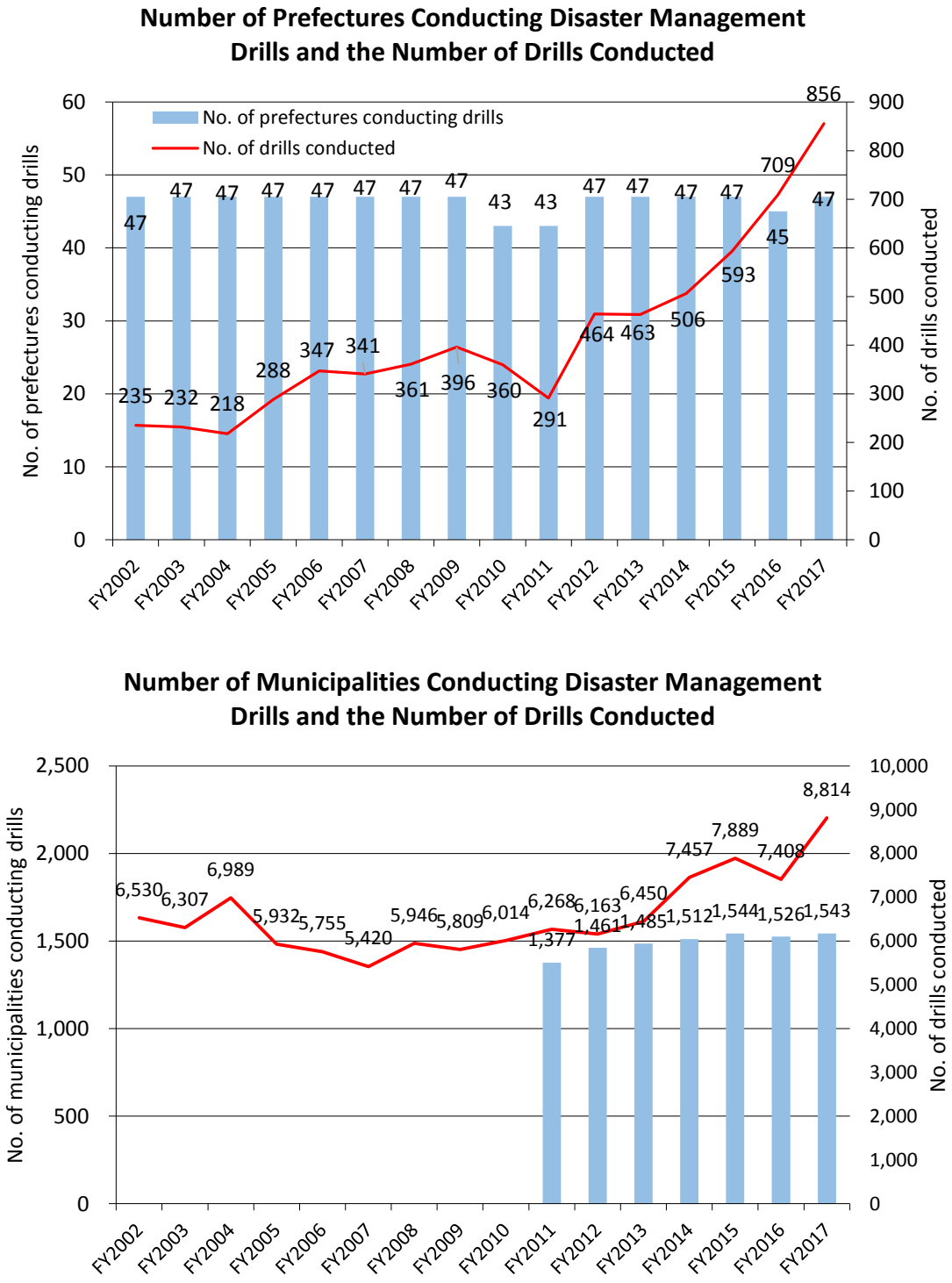
Source: Formulated by the Cabinet Office based on the Fire and Disaster Management Agency report “Status of Regional Disaster Management Administration”

Fig. A-50 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
2018	708	140	117		981	31	925	10	1,478	213	1,561	56	826	276

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

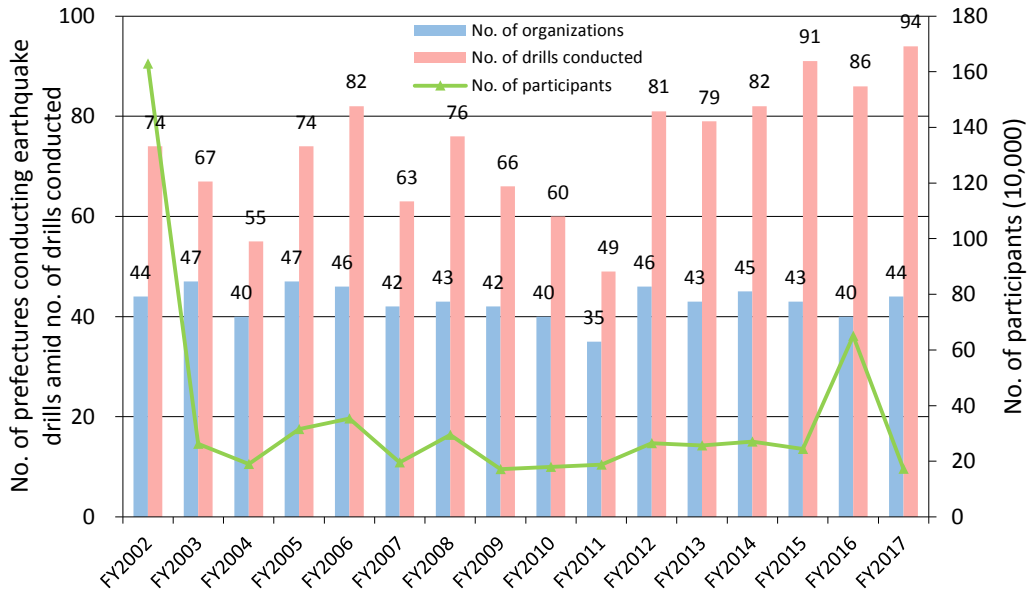
Fig. A-51 Disaster Management Drill Implementation



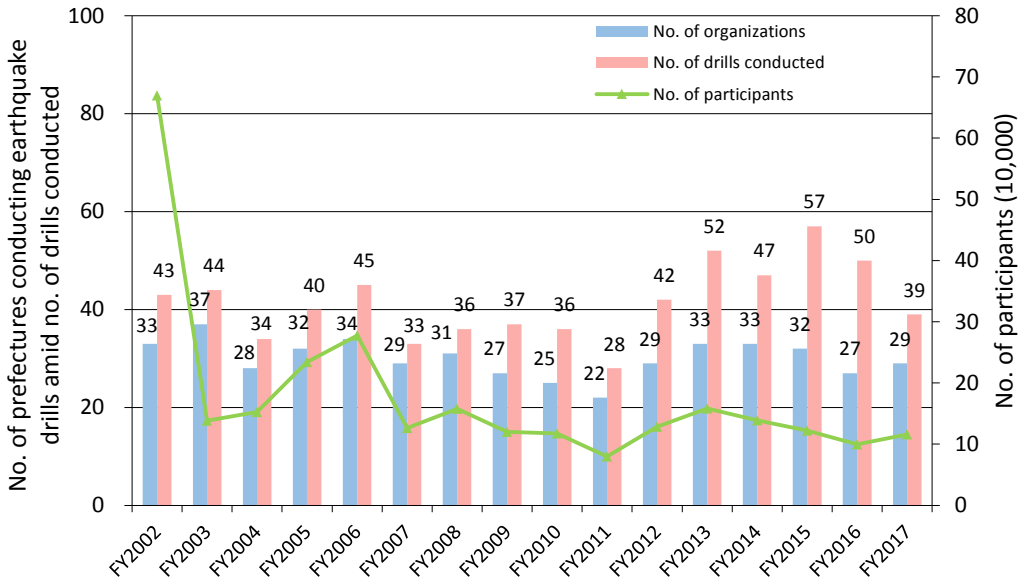
Source: Formulated by the Cabinet Office based on the Fire and Disaster Management Agency report "Status of Regional Disaster Management Administration"

Fig. A-52 **Earthquake Disaster Management Drill Implementation**

Number of Prefectures Conducting Earthquake Disaster Management Drills, Number of Drills Conducted, and the Number of Participants (Comprehensive Drills)



Number of Prefectures Conducting Earthquake Disaster Management Drills, Number of Drills Conducted, and the Number 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-53 Implementation of Tsunami Countermeasures

Year	No. of govts.	Coastlines		Designated as hazardous tsunami inundation areas	Measures incorporated into local disaster risk reduction plan	Evacuation Routes		Evacuation Sites		Tsunami Breakwaters	
		Present	Absent			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
2018	1,741	645	1,096	626	500	10,058	184	23,285	414	967	101

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-54 List of Cooperation Projects Conducted by Ministries and Agencies

Ministry/ Agency	Project	Partner/ Target Country (Target Institution)	Description	Budget for FY2018 (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, a video conference was held concerning Japan-U.S. disaster management cooperation in December 2018.	—	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 counties, the Cabinet Office and the Ministry of Home Affairs held the 2nd round of the Japan-India Disaster Management Cooperation Meeting in October 2018 and the 3rd round of the same meeting in Delhi, India in March 2019.	—	Disaster Preparedness, Public Relations and International Cooperation Division, Disaster Management Bureau, CAO
	Partnership between the Cabinet Office and Republic of Turkey Ministry of the Interior	Turkey	Based on the Japan-Turkey Summit in 2017, the Cabinet Office and the Ministry of the Interior have promoted bilateral cooperation in the disaster management field. At the Asian Conference on Disaster Reduction 2018 held in Hyogo Prefecture in October 2018, Turkey announced its accession to the Asian Disaster Reduction Center.	—	Disaster Preparedness, Public Relations and International Cooperation Division, Disaster Management Bureau, CAO
	Partnership between the Cabinet Office and South American governments' ministries in charge of disaster prevention	Peru, Chile	In light of the fact that Chile is the APEC host country for 2019, the Cabinet Office and the South American governments' ministries in charge of disaster prevention held the Japan-Peru Public-Private Disaster Management Seminar in Lima, Peru in February 2019, and Japan-Chile Public-Private Disaster Management Seminar in Santiago, Chile in March 2019.	—	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
	Hosting observers of a comprehensive nuclear emergency response exercise	IAEA, OECD/NEA. US, France, Canada, Germany, Indonesia	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 and Canada as observers at the Comprehensive Nuclear Emergency Response Exercise held at Ohi and Takahama Nuclear Power Station in August 2018 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 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, FY2018 (JPY 641m)	International Cooperation Division, Global Strategy Bureau, MIC
	Support to AHA Center (ASEAN Coordinating Centre for Humanitarian Assistance on disaster management)	AHA Center (ASEAN)	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

Ministry/ Agency	Project	Partner/ Target Country (Target Institution)	Description	Budget for FY2018 (in JPY million; if applicable)	Department Responsible
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
	Cooperation in the fire control field between the Fire and Disaster Management Agency and the Ministry of Public Security of Vietnam	Vietnam	Based on the Memorandum of Cooperation in the fire control field signed in October 2018, the Fire and Disaster Management Agency will exchange opinions with relevant Vietnamese agencies and provide them with support in improving fire control and safety, including the standardization of fire control equipment and the establishment of a certification system.	6	Fire Prevention Division, FDMA
Ministry of Foreign Affairs (MOFA)	Financial Contributions to International Organizations in Response to the Establishment of World Tsunami Awareness Day	UNISDR, UNDP, UNITAR, OCHA	In response to the establishment of World Tsunami Awareness Day, Japan carried out some promotional activities, such as holding the World Tsunami Awareness Day Symposium in various areas around the world. It also provided tsunami control training in low-income countries, which are vulnerable to natural disasters, as well as leadership seminars for female government officials concerning tsunami control. Japan also supported the UN Office for the Coordination of Humanitarian Affairs (UNOCHA) which runs ReliefWeb to provide global disaster information in real time.	782	Global Issues Cooperation Division, International Cooperation Bureau, MOFA Humanitarian Assistance and Emergency Relief Division
	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 FY2018, 11 cases of such assistance were carried out. One example is the provision of electric generators in response to the flood damage in Djibouti in May.	Included in JICA Management Expenses Grant	Humanitarian Assistance and Emergency Relief Division International Cooperation Bureau, MOFA
	Deployment of Japan Disaster Relief (JDR) teams	Countries affected by natural disasters	In the event of a large-scale disaster overseas, MOFA deploys Japan Disaster Relief (JDR) teams upon request of the government of the affected country. In FY2018, Japan sent a Japan Disaster Relief (JDR) team (Infection Team) in response to the Ebola outbreak in the Democratic Republic of the Congo in June and a Japan Disaster Relief (JDR) team and the SDF in response to the earthquake and tsunami in Indonesia in October. *As of February 2019.	Included in JICA Management Expenses Grant	Humanitarian Assistance and Emergency Relief Division International Cooperation Bureau, MOFA
	Science and Technology Research Partnership for Sustainable Development (SATREPS)	130 countries that are the object of ODA	This program is jointly implemented by MOFA, the Japan International Cooperation Agency (JICA), MEXT, the Japan Science and Technology Agency (JST), and the Japan Agency for Medical Research and Development (AMED). It aims to promote joint international research on solutions to global issues that occur in developing countries, tapping into the power of leading science and technology and Official Development Assistance (ODA). Disaster prevention is one of the research fields under this program; in FY2018, 23 projects were carried out in 19 countries.	(MOFA) Included in JICA Management Expenses Grant (MEXT) Included in JST Management Expenses Grant	Development Administration Division, International Cooperation Bureau, MOFA International Science and Technology Affairs Division, Science and Technology Policy Bureau, MEXT
	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 emergence 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 governments and local government officials held several times a year.	50	International Nuclear Energy Cooperation Division, Disarmament, Non-proliferation and Science Department, MOFA
	Japan-Turkey Disaster Management Cooperation	Turkey	Based on the Japan-Turkey Summits in 2017 and 2018, the two countries signed a Memorandum on Cooperation in disaster prevention in December 2018 with a view to strengthen comprehensive disaster management cooperation in the bilateral context as well as in a third country and in the international community.	—	First Middle East Division, Middle Eastern and African Affairs Bureau, MOFA

Ministry/ Agency	Project	Partner/ Target Country (Target Institution)	Description	Budget for FY2018 (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/ 16 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, 92 institutions, and 16 international institutions (as of February 2019).	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	This program is jointly implemented by MEXT, JST, AMED, MOFA, and JICA. It aims to promote joint international research on solutions to global issues that occur in developing countries, tapping into the power of Japan's leading science and technology and Official Development Assistance (ODA). Disaster prevention is one of the research fields under this program; in FY2018, 23 projects were carried out in 19 countries.	(MEXT) Included in JST Management Expenses Grant (MOFA) Included in JICA Management Expenses Grant	International Science and Technology Affairs Division, Science and Technology Policy Bureau, MEXT Development Administration Division, International Cooperation Bureau, MOFA
Ministry of Land, Infrastructure Transport and Tourism (MLIT)	Initiatives on Tsunami Preparedness in Partnership with Chile	Chile	On the assumption that a tsunami caused by an earthquake in Chile propagated the Pacific Ocean, water gate closure drills, etc. were conducted in Japan on November 9, 2018 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. At the ceremony held on November 7, 2018, awards were given to two people and one organization (Hajime Mase, emeritus professor and specially appointed professor at Kyoto University, Professor Harry Yeh from Oregon State University and the DONET developer team).	—	Port and Airport Research Institute, National Institute of Maritime, Port and Aviation Technology
	Disaster Management Collaboration Dialogues	Vietnam, Myanmar, Indonesia, Turkey,	This dialogue has been held since 2013 with the attendance of representatives from the industry, academia, and government sectors in order to strengthen bilateral cooperation in the disaster control field and support emerging countries that have problems in this field, while also disseminating Japan's disaster prevention technologies overseas.	22	River Planning Division, Water and Disaster Management Bureau/ Overseas Projects Division, Policy Bureau, MLIT
	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 5th meeting of the Japan–India Joint Working Group on Roads and Road Transport was held in India. At the meeting, the Japanese side presented slope protection measures and the disaster recovery measures implemented in FY2018.	—	International Affairs Office, Planning Division, Road Bureau, MLIT
	International Centre for Water Hazard and Risk Management (ICHARM)	UNESCO, etc.	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
	US-Japan Natural Resources Panel on Earthquake Research (UJNR)	US	With a view to contributing to the establishment of earthquake disaster reduction technologies, researchers from public seismic research institutions in Japan and the U.S. met to present the latest research outcomes and exchange opinions. The event was held in Kumamoto Prefecture in October 2018 (the event will be held every two years in Japan and the U.S. alternately).	7	Research Management Division, Geography and Crustal Dynamics Research Center, Geospatial Information Authority of Japan, MLIT
	Cooperation through the Regional Committee of United Nations Global Geospatial Information Management for Asia and the Pacific (UNGGIM-AP)	National Geospatial Information Authorities of 56 Member States of UN in the Asia-Pacific region	UN-GGIM-AP discusses institutional arrangement, policy, technological trends and capacity building, etc. concerning geospatial information management in the region. Japan has contributed to the Working Group on Disaster Risk Management. The Working Group surveyed best practices of the use of geospatial information in disaster response in various countries and published the Guidelines for Disaster Risk Management Using Geospatial Information and Services in November 2018.	—	International Affairs Division, Planning Department, Geospatial Information Authority of Japan, MLIT

Ministry/ Agency	Project	Partner/ Target Country (Target Institution)	Description	Budget for FY2018 (in JPY million; if applicable)	Department Responsible
Japan Metrological 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 to facilitate harmonious development of meteorological services around the world), 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.	Under the framework of the UNESCO Intergovernmental Oceanographic Commission (IOC), the JMA collects, analyzes, and provides data on oceans and maritime meteorology for the northeast Asian region. It also provides 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 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, 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 conducts training for developing countries to improve their meteorological services. Also, in response to requests from developing countries, the JMA dispatches expert staff and accepts trainees from national meteorological institutions.	—	Office of Disaster Mitigation, Planning Division, Administration Department, JMA
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 cleanup 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.	3	Protection of Marine Environment Division, Guard & Rescue Department, JCG
Ministry of Environment (MOE)	Support for the Enhancement of Disaster Waste Measures in the Asia-Pacific Region	Countries in the Asia-Pacific Region and others	The MOE provides Japan's know-how on disaster waste measures, while also working on the development of support schemes for affected countries in coordination with relevant institutions.	17	Office of Disaster Waste Management, Office of Director for Environmental Regeneration, Environmental Regeneration and Material Cycles Bureau, MOE
Ministry of Defense (MOD)	Komodo 2018 Multilateral Joint Training Exercise Hosted by the Indonesian Navy	Indonesia, US, Australia, India, UK, and others	A multilateral joint training hosted by the Indonesian Navy. Japan joined the drills related to disaster relief and humanitarian aid activities.		Training Division, Bureau of Defense Policy, MOD
	Multi-National Joint Training Exercise, RIMPAC 2018	US, Australia, Brazil, Brunei, Canada, and others	A multilateral joint training hosted by the U.S. Navy. Japan joined the drills related to disaster relief and humanitarian aid activities.		Training Division, Bureau of Defense Policy, MOD
	US-Philippines Joint Training Exercise Kamandag 2018	US, Philippines	A joint training hosted by the U.S. and the Philippines. Japan joined the drills related to humanitarian aid and disaster relief activities as part of international disaster relief 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	A trilateral training among Japan, the U.S., and Australia. Japan joined the drills related to humanitarian aid and disaster relief activities.		Training Division, Bureau of Defense Policy, MOD
	Exercise Cobra Gold 2019	Thailand, US, Indonesia, Singapore, Malaysia, Republic of Korea, Malaysia, India and China	A multilateral joint training hosted by the U.S. and Thailand. Japan joined the drills related to humanitarian aid and civilian assistance activities.		Training Division, Bureau of Defense Policy, MOD
	Japan-U.S.-Australia Joint Training for Humanitarian Assistance and Disaster Relief	Australia and US	A joint training among Japan, the U.S., and Australia. Japan joined the drills related to humanitarian aid and disaster relief activities.		Training Division, Bureau of Defense Policy, MOD

Source: Formulated by the Cabinet Office based on materials from various ministries and agencies.

Fig. A-55 Technical Cooperation Projects in Disaster Risk Reduction (FY2018)

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, 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	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 Waning 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.
Philippines	2018-2020	Project for Developing a Flood Control Master Plan for Davao	This project aims to support the preparation of a comprehensive flood control master plan for three river basins (Davao river, Matina river, Talomo river) in Davao city and carry out feasibility studies on priority plans.
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.
Thailand	2018-2022	The project on regional resilience enhancement through establishment of Area-BCM at industry complexes in Thailand	This project aims to establish a method to introduce and use Area-BCM in clusters in Thailand through the development of a method to analyze and assess flood risks, development of a method for business impact analysis concerning natural disasters, establishment of systems to manage Area-BCM in specific clusters, and development of training programs for the domestic and international introduction of Area-BCM.
Vietnam	2018-2021	The project for strengthening capacity in weather forecasting and flood early warning system	This project aims to provide disaster management institutions and residents with more accurate meteorological information in a prompt manner by improving maintenance, inspection, and calibration skills for meteorological observation equipment, improving abilities to analyze data obtained from two weather radars introduced under the Grand Aid program and quality control skills, improving monitoring and forecasting skills concerning heavy rains and typhoons, and improving communication skills.
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.
Myanmar	2018-2022	Project for Enhancing Capacity of Weather Observation and Forecasting in Myanmar	This program aims to improve the Myanmar Department of Meteorology and Hydrology's capacity for the maintenance of meteorological observation equipment and weather data analysis and processing skills. By ensuring more effective forecasting, Myanmar aims to reduce damage from disasters. This program is intended to create a synergy effect with support related to meteorological observation equipment, such as the introduction of three weather radars under the Grand Aid program.
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.

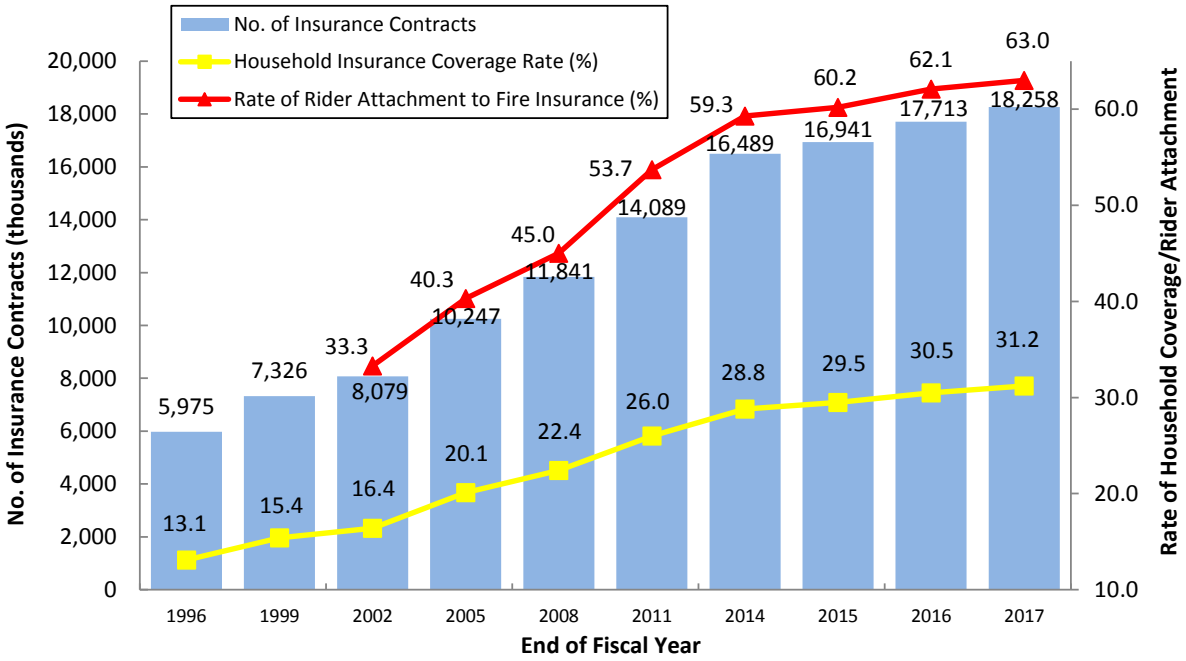
Country	Cooperation Period	Project Name	Description
Kyrgyz	2016-2019	Project for Capacity Development for Road Disaster Prevention Management	This road disaster prevention project involving Kyrgyzstan's Ministry of Transport and Roads seeks to (1) summarize the roles of relevant departments; (2) improve 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.
Armenia	2019-2021	The Project for the Improvement of Crisis Communication and Public Awareness for Disaster Risk Reduction	This program aims to improve the crisis communication capabilities of the Ministry of Emergency Situations (Armenia) and domestic media by developing crisis communication guidelines, conducting drills based on the guidelines, developing training materials and plans, and conducting training, with a view to ensuring accurate and timely emergency communication.
Bangladesh	2014-2018	Research Project on Disaster Prevention/Mitigation Measures against Floods and Storm Surges (SATREPS)	This project 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 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	2016-2021	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	2014-2018	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.
Sri Lanka	2018-2021	Project for capacity strengthening regarding non-structural measures for landslide risk reduction	This program aims to improve Sri Lanka's capabilities concerning intangible measures by establishing an early sediment disaster alert system using risk assessment, and introducing the concept of land use planning.
Sri Lanka	2018-2020	Project for Storm Water Drainage Plan in selected areas in Colombo Metropolitan Region	This project aims to plan urban drainage and inland flood control measures in Colombo and its surrounding areas, while also selecting priority programs and conducting investigations.
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.
Vanuatu	2018-2021	Project for Enhancing the Capacity of Issuing Earthquake, Tsunami and Storm Surge Information	This project aims to develop a system for the timely and accurate communication of earthquake, tsunami, and storm surge information from the Vanuatu Meteorology and Geohazards Department and the National Disaster Management Office (NDMO) to relevant institutions and residents, by strengthening earthquake and tide monitoring networks (including the observation networks developed under the Grand Aid program), improving data analysis capabilities, and enhancing disaster information communication and alert issuing capabilities.
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.
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.

Country	Cooperation Period	Project Name	Description
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.
Honduras	2018-2022	Project for Control and Mitigation of Landslide in Tegucigalpa Metropolitan Area	This project aims to improve landslide management capabilities by strengthening the following skills: (1) detailed investigation and analysis to understand landslide phenomenon; (2) design, construction, construction management, and maintenance skills concerning small and medium-scale landslide control measure; (3) formulation of landslide hazard maps and risk maps; and (4) land use regulation related to landslide disasters.
Chile	2014-2019	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.
Chile	2018-2021	Institutional Strengthening of ONEMI for Capacity Development in Disaster Risk Reduction Project	Under the Sendai Framework for Disaster Risk Reduction, this project aims to contribute to disaster prevention measures taken by ONEMI (Chile's national disaster control institution) by improving capabilities and fostering talents for the promotion of disaster prevention and reduction measures, development of a disaster knowledge management system, and formulation of regional disaster management plans.
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.
Mauritius	2018-2022	Project for Enhancing Meteorological Observation, Weather Forecasting and Warning Capabilities	This project aims to ensure the timely provision of accurate meteorological information to Mauritian disaster management institutions and residents through technological cooperation aimed at improving the Mauritius Meteorological Services' forecasting and alert issuing capabilities, while also utilizing weather radars introduced under the Grand Aid program.
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)

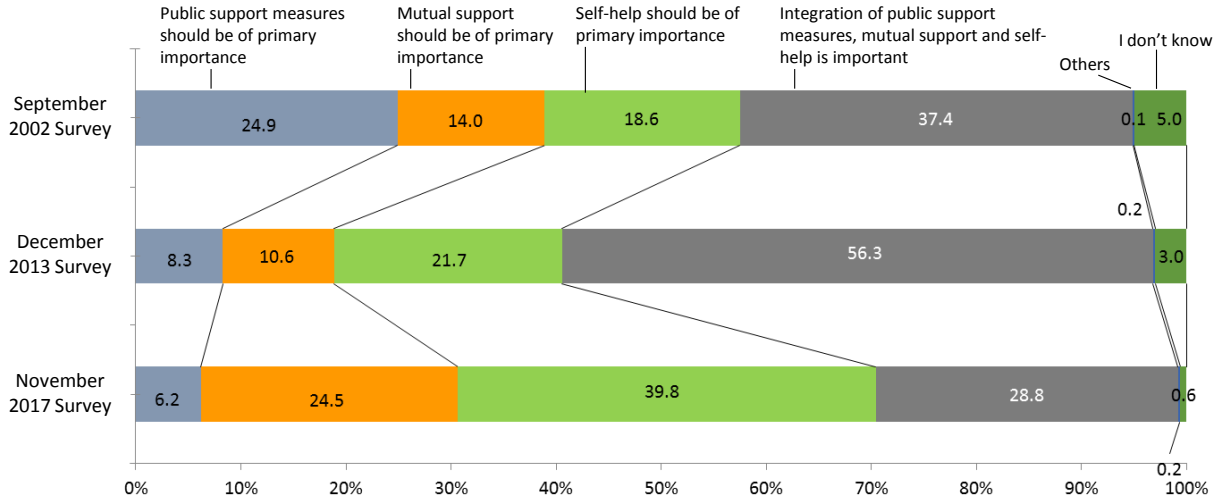
10. Others

Fig. A-56 Number of Earthquake Insurance Contracts



Source: Formulated by the Cabinet Office based on materials from the General Insurance Rating Organization of Japan

Fig. A-57 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 Public Relations Office, Cabinet Office

Fig. A-58 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 of middle-to-high-rise buildings 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 seismic intensity levels. 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 made by experiences of recent earthquake disasters and regularly checked at intervals of about five years. This information will be updated in line with actual phenomena observed in new cases or improvements in the earthquake resistance of buildings and structures.

(6) In the case that the extent of damage cannot be shown in round numbers, the following adverbs and adjectives have been used as a tentative guide.

Term	Definition
Rarely A few/little Majority Almost all	Extremely limited. Hardly ever. Number/extent is extremely small. Just a little bit. Half or more. Less than “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 seismic intensity meters.

●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 are 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, communication network congestion may occur due to increased calls related to safety confirmation and inquiries around regions experiencing strong shaking. To combat this, telecommunications providers offer Disaster Emergency Message Dial and Message Board services if a disaster such as an earthquake with a seismic intensity of about 6 Lower or greater occurs.
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-59 Emergency Warning Issuance Criteria

■Criteria for Meteorological Emergency Warnings

<table>
<tr><th>Phenomenon</th><th colspan="2">Criteria</th></tr>
<tr><td>Heavy rain</td><td colspan="2">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.</td></tr>
<tr><td>Storm</td><td>A storm is predicted…</td><td rowspan="3">…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.</td></tr>
<tr><td>Storm surge</td><td>A storm surge is predicted…</td></tr>
<tr><td>High waves</td><td>High waves are predicted…</td></tr>
<tr><td>Snowstorm</td><td colspan="2">A snowstorm is predicted in association with an extratropical cyclone expected to have a level of intensity observed only once every few decades.</td></tr>
<tr><td>Heavy snow</td><td colspan="2">Heavy snowfall with a level of intensity observed only once every few decades is predicted.</td></tr>
</table>

■Emergency Warning Criteria for Tsunami, Volcanic eruptions, and Earthquake

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

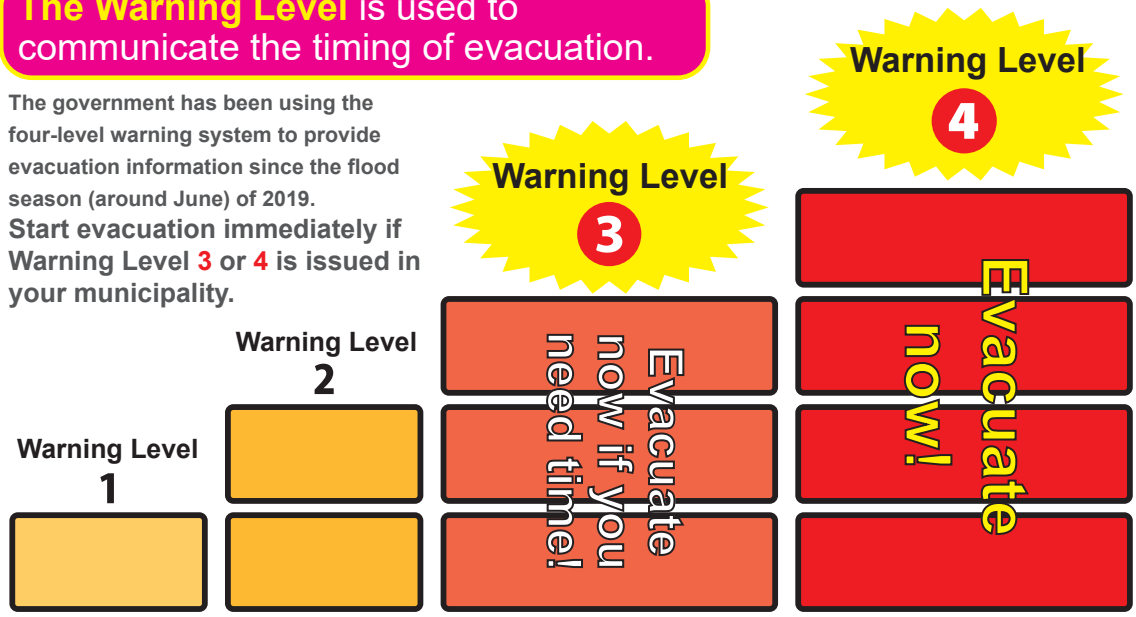
List of Acronyms

ACDR	Asian Conference on Disaster Reduction
ADRC	Asian Disaster Reduction Center
AMCDRR	Asia Ministerial Conference on Disaster Risk Reduction
APEC	Asia-Pacific Economic Cooperation
ASAP	as soon as possible
BCM	Business Continuity Management
BCP	Business Continuity Plan
DOE	Department of Energy
DRR	Disaster Risk Reduction
ECCS	emergency core cooling system
EMWG	Emergency Management Working Group
EPReSC	Emergency Preparedness and Response Standards Committee
ERC	Emergency Response Center
FEMA	Federal Emergency Management Agency
HA/DR	humanitarian assistance and disaster relief
IAEA	International Atomic Energy Agency
ICHARM	International Centre for Water Hazard and Risk Management
ICT	information and communication technology
IRP	International Recovery Platform
ISO	International Organization for Standardization
ISUT	Information Support Team
JANDR	Japan Academic Network for Disaster Reduction
JBP	Japan Bosai Platform
JICA	Japan International Cooperation Agency
JIS	Japanese Industrial Standards
JMA	Japan Meteorological Agency
JVOAD	Japan Voluntary Organizations Active in Disaster
MAFF	Ministry of Agriculture, Forestry and Fisheries
MEXT	Ministry of Education, Culture, Sports, Science and Technology
MHLW	Ministry of Health, Labour and Welfare
MIC	Ministry of Internal Affairs and Communications
MLIT	Ministry of Land, Infrastructure, Transport and Tourism
MOC	Memorandum of Cooperation
NIED	National Research Institute for Earth Science and Disaster Resilience
NPO	Non-Profit Organization
NRA	Nuclear Regulation Authority
NRC	Nuclear Regulatory Commission
OECD/NEA	Nuclear Energy Agency of the Organization for Economic Cooperation and Development
OEIWG	Open-Ended Intergovernmental Expert Working Group
PAZ	Precautionary Action Zone
SCJ	Science Council of Japan
SDF	Self-Defense Forces
SDGs	Sustainable Development Goals
SDMOF	Senior Disaster Management Officials Forum
SFDRR	Sendai Framework for Disaster Risk Reduction 2015-2030
SIP4D	Shared Information Platform for Disaster Management
SMEs	Small and Medium-sized Enterprises
SRSG	Special Representative of the UN Secretary-General
TEC-FORCE	Technical Emergency Control FORCE
TMG	Tokyo Metropolitan Government
UNISDR	United Nations Office for Disaster Risk Reduction
UPZ	Urgent Protective Action Planning Zone
VC	volunteer center

The Warning Level is used to communicate the timing of evacuation.

The government has been using the four-level warning system to provide evacuation information since the flood season (around June) of 2019.

Start evacuation immediately if Warning Level 3 or 4 is issued in your municipality.



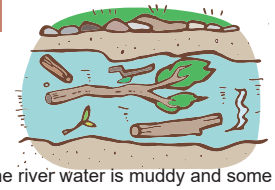
Warning Level 1	Warning Level 2	Warning Level 3	Warning Level 4
Stay alert (Announced by the JMA)	**Check where to evacuate** (Announced by the JMA)	**Those who need time should evacuate** (Issued by municipalities)	**Evacuate to a safe place** (Issued by municipalities)

Signs of Sediment Disaster Precursors

Various signs are often observed before a sediment disaster. Pay extra attention during heavy rainfall and watch for signs such as those listed below. If you are seeing any of the following phenomena, contact the fire department and other relevant authorities and evacuate from the area immediately. You should also evacuate voluntarily if you are concerned about your safety during rainfall, even if you do not see any of these signs.

■Signs of Debris Flow

1



The river water is muddy and some driftwood is observed.

2

The water level drops while it is still raining or stays the same when the rain has already become lighter. (The river flow may be being blocked upstream by collapsed land.)

3

You hear a rumbling sound from or in the mountains. (Also be warned when you hear sounds of trees splitting or boulders rolling in the river.)

■Signs of Slope Failure

1

Pebbles continuously falling.

2

The slope is cracked or looks “swollen.” You hear unusual or rumbling sounds from the slope.

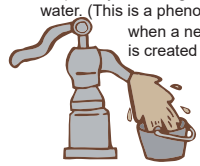
3

Water is gushing out from the cliff. (Also be warned when you see muddy water flowing out from the cliff.)

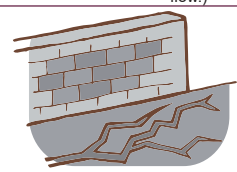
■Signs of Landslide

1

You see a dramatic change in the quality or quantity of underground or spring water. (This is a phenomenon that occurs when a new water passage is created underground or when an existing water passage has been expanded due to increased water flow.)



2



The ground is cracked. (You see cracks in farmland, a road, a house, etc.)

3

Water is gushing out from the slope. (Trees are inclined or collapsed.)