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.



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.





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/).

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

OHuman casualties (as of January 9, 2019)

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)





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.



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)

Drofocturo	Completely	Half-	Partially	Above-floor	Below-floor
Prelecture	destroyed	destroyed	damaged	flooding	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

OHouses damaged (as of January 9, 2019)

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)

	Maximum number of	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)

ODamage to lifeline utilities

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



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
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JUIYII	Finne minister Abe visits one of the anetted areas (Okaydilla Plefettule).

- July 12 Cabinet approval on the use of contingency reserves (approx. 2 billion yen)
- July 13Prime 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.



Prefectures work closely with municipalities in their jurisdictions to support affected local governments.

(2) To support disaster management efforts by affected municipalities (Deployment of a General Adviser Team)



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

<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).)



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 "x" 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 extratropical 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).

(from 0:00 on September 3 to 24:00 on September 5)							
					Maximum wir	nd velocity	
Ranking	Prefecture	Municipality	station	(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 Citv	Kobe Airport	34.6	South- southwest	9/04	13:59

Top five AMeDAS stations registering the highest maximum wind velocity

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 recordbreaking tidal levels.

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

Stations that Observed Record-Breaking Tidal Levels

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)



(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 antiflood 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.

	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

ODamage to lifeline utilities

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.



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.



(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 Sept	ember 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. Asce	ertain the extent of the damage without delay.		
2. Wor	k closely with local governments as an integrated government team, sparing no effort in taking		
eme 3 Fully	rgency disaster control measures, including the rescue and relief of affected people.		
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 Hokkaldo Pretectural Government decided to invoke the Act on Support for Reconstructing		
	Livelinoods of the Affected due to Disaster with respect to Sapporo City, Kita-Hiroshima City, and Atsuma Town, Vijfutcu gun (date of occurrence: September 6) (invoked with respect to all areas		
	in Hokkaido Prefecture on Sentember 26)		
September 19	Deployment of a government investigation team led by then Minister of State for Disaster		
September 15	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 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 constructiontype 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.

ONumber of u	nits of construction-typ	be emergency tempora	ry housing for the Hea	ivy Rain Event of July 2
	Prefabricated	Wooden	Trailer and mobile	Total
	temporary housing	temporary housing	houses, etc.	IUlai
Okayama	158	103	51	312
Hiroshima	178	31	0	209
Ehime	12	164	0	176
Total	348	298	51	697

ONumber 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 Of	fice)

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 an implemented using contingency reserves, supplementary budgets, an The government will swiftly carry out robust support measures for the than before the disaster. A support Measure	nd recovery from the damage of the 2018 Hokkaido Eastern Iburi Earthquake. These measures will be d other resources as necessary. e tourism industry in Hokkaido Prefecture in order to bring about a happier and stronger Hokkaido
(1) Support Measures for the Swift Recovery of Affected Areas > Designation as a Disaster of Extreme Severity (Cabinet approval on the 28th) Nationall Projects for the restoration of public civil engineering works, farmlands, etc. from the disaste Regional: Asuma-cho, Albra-cho, Mkawa-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 > Atchnical review by a third party committee will be conducted. Development of winter power supply-demand measures and a package based on emergency inspection 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 f > 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	From Hokkaido Prefecture ➢ 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 "Welcomel 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

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

- Support for the group purchase of materials for agricultural greenhouses [0.5 billion ven1
- 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 105.3 billion yen

- o Support grants for reconstructing livelihoods of affected people [6.7 billion yen] o 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]
- O 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 ven]

2. Urgent and prioritized safety assurance measures in schools: 108.1 <u>billion yen</u>

(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

Source: Cabinet Office

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] o Improvement of police equipment and communication infrastructure for disasters [54.5 billion

- venl o Improvement of fire department vehicles and equipment for disasters [4.4 billion yen]
- o Improving the resilience of refinery plants and tank facilities [8.4 billion yen]
- o Seismic retrofitting of SDF facilities [13.1 billion yen]
- o Support for the introduction of power-regeneration and storage equipment in shelters [21billion

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]

o Assistance for capital investment for improving productivity in agriculture [40 billion yen] o Support for capital investment for strengthening profitability in dairy and livestock farming [56 billion yen]

- o Improvement of timer processing facilities to strengthen the industry's competitiveness [39.2
- billion ven] o 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]
- o Development of information-gathering satellites [16.7 billion yen]

(2) Recovery from disasters, etc.: 213.6 billion yen

- O 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 ven]
- o Post-disaster public housing development projects [4.1 billion yen]

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

Additional expenditures: 3,035.1 billion yen

[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.

Northern Osaka Prefecture Earthquake		ıka 9	a Western Japan Typhoon Jebi (18 Torrential Rains (mainly in the Kai (Heavy Rain Event of region) July 2018)		21) Isai	Hokkaido Eastern Iburi Earthquake		Typhoon Trami (1824) (nation-wide)	
Date of occurrence	Date of June 18			July 6	September 4 (date of landfall)		September 6		September 30 (date of landfall)
Scale Maximum seism intensity: 6 Lowe		mic wer	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 ca	ses	Approx. 179,0	000	Approx. 65,000	Approx. 881,00	0	Approx. 60,000)	Approx. 429,000
Insurance claims paid Approx. 103 billion yen (third largest eve earthquake insurance)		.3 er in	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 eve in earthquake insurance)	r	Approx. 237.8 billion yen (sixth largest ever ir fire insurance)	
[Reference] Past (Earthquake ins	major suranc	natural disasters a e)	nd insi	urance claims paid	(Fire insurance)				
Farthquake	201 Japa	1 Great East In Earthquake	1,27 (lar	79.5 billion yen gest ever)	Typhoon	Тур (91	hoon Mireille 19) (nation-wide)	56 Iar	8 billion yen (second gest ever)
2016 Kumamoto 3 Earthquake la		382 larg	.4 billion yen (second est ever)	יד (C		Typhoon Songda (0418) (nation-wide)		387.4 billion yen (third largest ever)	
The number Japan and ar	of ca e sub	ases and insura ject to change	ince (as o	claims paid are base f December 11, 201	ed on the estima 8). "Fire insuranc	ition e" ir	s by the Genera Includes automo	al Ir bile	nsurance Associate insurance and ca

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.



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.



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)





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)

Leaflet (issued on September 20)



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.