

Special Feature 1. The Great Kanto Earthquake and Disaster Management in Japan

The year 2023 marks the 100th anniversary of the Great Kanto Earthquake of 1923. It caused unprecedented damage to the metropolitan area of modern Japan and is a significant disaster that deserves special mention in the history of disasters in Japan. September 1, the day on which it occurred, has been designated as Disaster Preparedness Day by the Cabinet. Mainly on and around the day during the period of Disaster Preparedness Week (August 30 to September 5), disaster drills, including the government's comprehensive disaster management drill, and various awareness-raising events are held every year in various places. In this way, the Great Kanto Earthquake can be seen as the starting point for Japan's disaster management.

On the other hand, it can hardly be said that the state of the damage caused by the great earthquake 100 years ago, the disaster response measures that followed, and the reconstruction efforts are widely known by people today. In this disaster, fires caused a great deal of human suffering in Tokyo Prefecture (its name at that time; the same shall apply hereinafter) while damage from strong earthquakes, tsunamis, landslides, fires, liquefaction, etc. spread to various places, centered on Kanagawa Prefecture, close to the epicenter Sagami Bay, presenting a complex picture. In terms of disaster relief, mutual help among residents, which could be called volunteerism in modern times, and support from remote areas, including overseas, played a major role. Furthermore, the results of the reconstruction projects based on the Imperial Capital Reconstruction Plan shaped the central areas of modern Tokyo and Yokohama. We can learn much from the efforts of those days as we face the risk of various large-scale disasters today.

In addition, on the 100th anniversary of the Great Kanto Earthquake, which was the starting point for Japan's current disaster management, it would be meaningful to take a bird's-eye view of how disaster management has been enhanced and strengthened and the various changes to the environment surrounding Japan during the period after the earthquake in order to consider the general direction of future disaster management.

For this reason, the 2023 version of the White Paper on Disaster Management focuses on the theme of "The Great Kanto Earthquake and Disaster Management in Japan" as "Special Feature 1." First, Chapter 1 examines the damage caused by the Great Kanto Earthquake and subsequent responses to it, and it reviews how disaster management has been enhanced and strengthened through subsequent large-scale disasters, with the Great Kanto Earthquake as the starting point. Next, Chapter 2 analyzes the various environmental changes that have occurred in Japan over the past 100 years, and it identifies challenges to be addressed in promoting future disaster management. In addition, Chapter 3 presents the direction of future disaster management based on the lessons learned from the Great Kanto Earthquake and subsequent environmental changes.

Moreover, "Special Feature 2" reviews the major disasters that occurred in FY2022, their damage situations, and the government's responses to them.

Chapter 1. Looking back on the 100 years after the Great Kanto Earthquake

Figure 1-1 compares the damage of the Great Kanto Earthquake with two later major earthquakes, namely the Great Hanshin-Awaji Earthquake and the Great East Japan Earthquake. Even when compared with the two later earthquakes, the Great Kanto Earthquake was an extremely large-scale disaster, both in terms of the enormous

human suffering and material damage it caused and the impact it had on the social economy of that time.

Fig. 1-1 Comparison of damages caused by the Great Kanto Earthquake, the Great Hanshin-Awaji Earthquake, and the Great East Japan Earthquake

	Great Kanto Earthquake	Great Hanshin-Awaji Earthquake	Great East Japan Earthquake
Date of occurrence	September 1, 1923 Saturday 11:58 a.m.	January 17, 1995 Tuesday 5:46 a.m.	March 11, 2011 Friday 2:46 p.m.
Magnitude	Magnitude of 7.9	Magnitude of 7.3	Moment Magnitude of 9.0
Direct deaths or missing persons	About 105,000 (about 90% of casualties burnt)	About 5,500 (about 70% of casualties suffocated/crushed)	About 180,000 (about 90% of casualties drowned)
Disaster-related deaths	–	About 900 people	About 3,800 people
Houses completely collapsed/destroyed by fire	About 290,000	About 110,000	About 120,000
Economic damage	About 5.5 billion yen	About 9.6 trillion yen	About 16.9 trillion yen
GDP at the time	About 14.9 billion yen	About 522 trillion yen	About 497 trillion yen
GDP ratio	About 37%	About 2%	About 3%
National budget at the time	About 1.4 billion yen	About 73 trillion yen	About 92 trillion yen

Note: Regarding “GDP at the time,” the value of gross national product is presented for the Great Kanto Earthquake.

Source: Compiled by the Cabinet Office based on Moroi & Takemura (2004) “Japan Association for Earthquake Engineering Academic Papers,” Vol. 4, No. 4; Tokyo City Hall (1926) “Tokyo Earthquake Records: Prequel”; Research Centre for Information and Statistics of Social Science, Institute of Economic Research, Hitotsubashi University, “Long-term Economic Statistics Database”; and documents from the Japan Meteorological Agency, the National Police Agency, the Fire and Disaster Management Agency, the Reconstruction Agency, the National Land Agency, the Cabinet Office, the Ministry of Finance and Hyogo Prefecture

Japan's disaster management has been enhanced and strengthened through the experience of large-scale disasters and the lessons learned from them. In addition to the two earthquakes mentioned above, the Ise Bay (Isewan) Typhoon (Typhoon Vera) of 1959 can be cited as a large-scale disaster that became a turning point in disaster management after the Great Kanto Earthquake.

Therefore, this chapter first focuses on the Great Kanto Earthquake. Section 1 details the extent of the damage, while Sections 2 and 3 review disaster response measures and reconstruction efforts, respectively.

In addition, Section 4 discusses disaster management measures that were enhanced and strengthened in response to the Great Kanto Earthquake. Section 5 touches on various disaster management measures that were enhanced and strengthened in the wake of the subsequent Ise Bay Typhoon and the two great earthquakes.

This will provide an overview of the history of disaster management in Japan, with the Great Kanto Earthquake as the starting point.

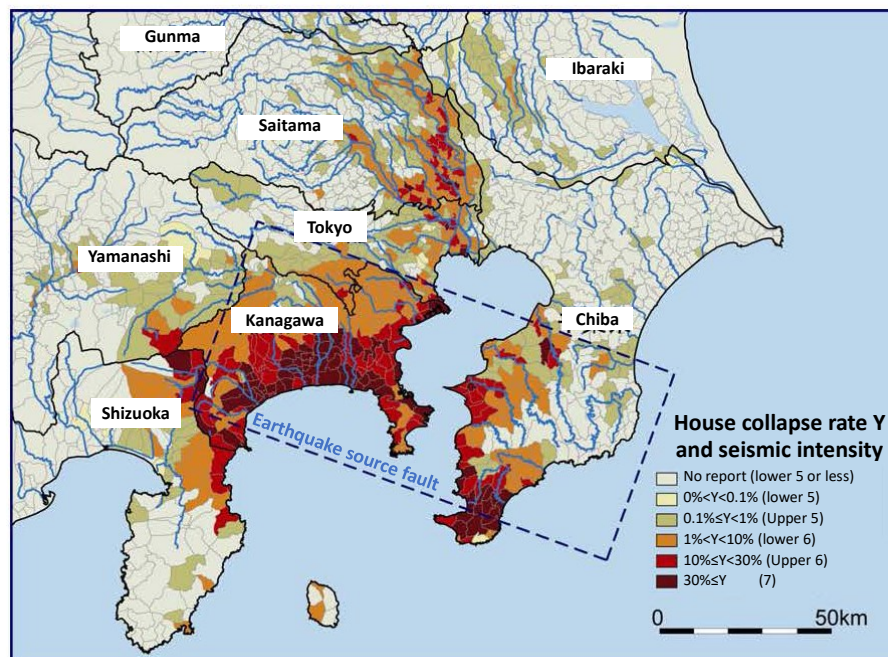
Section 1. Aspects of the Damage Caused by the Great Kanto Earthquake

Overview of the Great Kanto Earthquake

The Great Kanto Earthquake disaster was brought by an earthquake (known as the Taisho Kanto Earthquake) with an estimated magnitude of 7.9 that occurred at 11:58 on September 1, 1923. Due to this earthquake, a seismic intensity of 6 was observed in Saitama, Chiba, Tokyo, Kanagawa and Yamanashi prefectures, and seismic intensities ranging from 5 to 1 were observed over a wide area from southern Hokkaido to the Chugoku and Shikoku regions.¹

It was a trench-type earthquake, with its epicenter in the Sagami Trough. Since the epicenter was immediately beneath semi-mountainous areas, such as Hakone and Tanzawa, and was close to the metropolitan area with a large population concentration, the earthquake caused wide-ranging damage. Specifically, the strong earthquake caused more than 100,000 houses to collapse² and triggered sediment disasters, such as landslides in mountainous areas, and tsunami damage in coastal areas. Since it occurred at lunch time, when people were using fires to cook, many fires broke out and spread as large-scale fires. In addition, the damage caused by ground liquefaction was widespread and particularly severe in the lowlands of Saitama Prefecture, far from the epicenter.

Fig. 1-2 Seismic intensity distribution and collapsed house percentages in the Great Kanto Earthquake



Note 1: The dashed lines in the figure show the estimated earthquake source fault plane projected onto the ground surface.

Note 2: The seismic intensity distribution was estimated based on the percentages of collapsed houses.

Source: Compiled by the Cabinet Office, based on Moroi & Takemura (2002) "Japan Association for Earthquake Engineering Academic Papers," Vol. 2, No. 3, 35-71 (cited in the National Disaster Management Council (2006) "Great Kanto Earthquake Report, Part 1")

¹ At that time, the seismic intensity scale had seven grades from 0 to 6, but given the amount of collapsed houses, it is estimated that the seismic intensity in the Sagami Bay coastal area and the southern tip of the Boso Peninsula was equivalent to the current seismic intensity of 7.

² In this section, the word "collapse (潰)" is used instead of "break (壊)" to refer to damage to residential houses from the Great Kanto Earthquake. This is in line with the description in a report by the National Disaster Management Council's Expert Investigation Committee (National Disaster Management Council [2006], Great Kanto Earthquake Report, Part 1).

Human Suffering and Residential Damage

The Great Kanto Earthquake completely or partially collapsed, burned down, washed away, or buried a total of about 370,000 houses, with about 105,000 people dead or missing.

The majority of human suffering was due to fires, and about 90,000 people are estimated to have died or gone missing due to the fires. In particular, a fire at a former clothing factory in Yokoamicho, Honjo Ward (currently Sumida Ward) killed about 40,000 residents who were sheltering there. On the other hand, about 10,000 people were killed when their houses completely collapsed, and many others died due to tsunamis, landslides, or the collapse of factories. Thus human suffering occurred due to various factors.

In terms of damage to residential houses, more than 200,000 houses completely or partially collapsed due to the seismic motion. Particularly in Kamakura County (name at the time) in Kanagawa Prefecture and Awa County (name at the time) in Chiba Prefecture, the total collapse rate reached 60% or more. In addition, some houses were destroyed by fires mainly in Tokyo Prefecture, and others were washed away by tsunamis or buried by sediment disasters in Kanagawa and Shizuoka Prefectures.

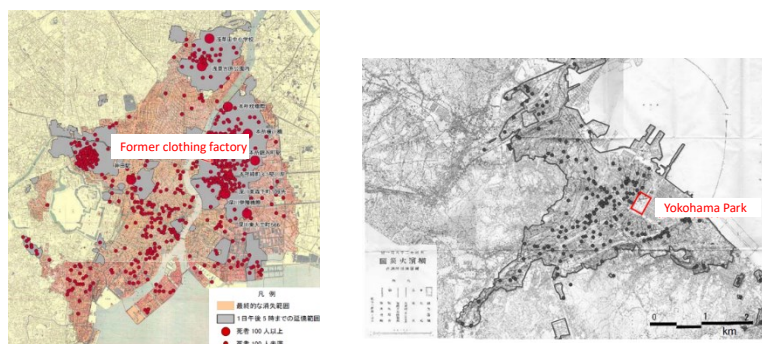
Fig. 1-3 Numbers of houses damaged and deaths caused by the Great Kanto Earthquake

Prefectures	Number of houses damaged								Number of deaths (including missing persons)				
	Completely collapsed	Unburnt	Half collapsed	Unburnt	Burned down	Washed away, or buried	Total (Excluding "half destroyed")	Total (Including "half destroyed")	Houses completely collapsed	Fires	Washed away, or buried	Damage of factories, etc.	Total
Kanagawa	63,577	46,621	54,035	43,047	35,412	497	82,530	125,577	5,795	25,201	836	1,006	32,838
Tokyo	24,469	11,842	29,525	17,231	176,505	2	188,349	205,580	3,546	66,521	6	314	70,387
Chiba	13,767	13,444	6,093	6,030	431	71	13,946	19,976	1,255	59	0	32	1,346
Saitama	4,759	4,759	4,086	4,086	0	0	4,759	8,845	315	0	0	28	343
Yamanashi	577	577	2,225	2,225	0	0	577	2,802	20	0	0	2	22
Shizuoka	2,383	2,309	6,370	6,214	5	731	3,045	9,259	150	0	171	123	444
Ibaraki	141	141	342	342	0	0	141	483	5	0	0	0	5
Nagano	13	13	75	75	0	0	13	88	0	0	0	0	0
Tochigi	3	3	1	1	0	0	3	4	0	0	0	0	0
Gunma	24	24	21	21	0	0	24	45	0	0	0	0	0
Total	109,713	79,733	102,773	79,272	212,353	1,301	293,387	372,659	11,086	91,781	1,013	1,505	105,385
Municipalities													
Tokyo city	12,192	1,458	11,122	1,253	166,191	0	167,649	168,902	2,758	65,902	0	0	68,660
Yokohama city	15,537	5,332	12,542	4,380	25,324	0	30,656	35,036	1,977	24,646	0	0	26,623
Yokosuka city	7,227	3,740	2,514	1,301	4,700	0	8,440	9,741	495	170	0	0	665

*To avoid duplication, the total number of houses damaged is the sum of those that were not destroyed by fire, those that were destroyed by fire, those that were washed away and those that were buried.

Source: Compiled by the Cabinet Office, based on the National Disaster Management Council (2011) "Learning from the History of Disasters: Trench-type Earthquakes and Tsunamis"

Fig. 1-4 Burned areas (about 34.7 km²) and distribution of fatalities in Tokyo City (name at the time) (left), and burned areas (about 10 km²) and distribution of fire breakout points in Yokohama City (right)



Source: Compiled by the Cabinet Office, based on the National Disaster Management Council (2011) "Learning from the History of Disasters: Trench-type Earthquakes and Tsunamis," and the National Disaster Management Council (2006) "The Great Kanto Earthquake Report, Part 1"

Damage to Lifelines

Lifelines were also severely damaged. Many hydroelectric and thermal power plants, transmission lines and substations were damaged, and power to households was not resumed until the night of September 5. At that time, gas was supplied to about 240,000 households in Tokyo City (the name at the time; the same shall apply hereinafter) or about half of the households in the city. Of those households, about 140,000 were destroyed by fires. The gas supply to the remaining 100,000 households was partially resumed at the end of September but not completely until the end of the year. From September 4, the water supply began to be gradually restored, starting in the Yamanote area, but it took time in the severely damaged areas of Honjo and Fukagawa, and it was not until November 20 that the water supply to the entire area resumed.

Railways also suffered damage, mainly in Tokyo and Kanagawa. Of the 192 stations, 178 were damaged, burned down, or completely collapsed. Of the 112 trains that were in operation at the time of the earthquake, 23 turned over or derailed and 11 caught fire. Many lines were restored within one to three weeks after the earthquake, but there were sections that were not rebuilt until the end of December, such as the section between Yokohama and Sakuragicho on the Tokaido Main Line, and there were sections that took a year and a half to fully re-open, such as the vicinities of Nebukawa Station on the Atami Line. However, some lines resumed operations the same day of the earthquake, such as the section between Kameido and Inage on the Sobu Main Line.

Photo 1. Situation after the Great Kanto Earthquake



Burnt ruins near the current Ginza 4-chome intersection
Source: Tokyo City "Tokyo Earthquake Records"



Cloud columns generated from a fire on the day of the earthquake
Source: Home Ministry, Social Affairs Bureau, "Taisho Era Earthquake Chronicle"



Tokyo Ueno area photographed from the sky
Source: Tokyo City, "Tokyo Earthquake Records"

Section 2. Disaster Response Measures against the Great Kanto Earthquake

The Government's Initial Response System

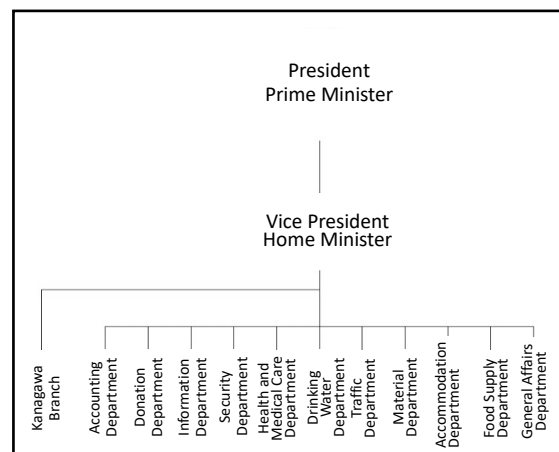
The Great Kanto Earthquake disaster occurred when the Prime Minister's position was vacant. Prime Minister Tomosaburo Kato died on August 24 while still in office, and on the day of the disaster, work was underway toward the formation of the cabinet of Gonbei Yamamoto. The inauguration ceremony of the Yamamoto Cabinet was held on the evening of September 2, the day after the earthquake. Prior to the ceremony, an extraordinary cabinet meeting held on the morning of September 2 decided to establish an interim earthquake relief secretariat and promulgate martial law.

The interim earthquake relief secretariat (Figure 1-5) was established in the Home Ministry with the Prime Minister as president and the Home Minister as vice president. The first meeting of the secretariat was reportedly held at around 3:00 p.m. on the afternoon of September 2, approximately 27 hours after the disaster.

In addition to the Prime Minister's position being vacant, the fact that the government itself became a disaster victim, including the complete destruction by fire of the main building of the Home Ministry, which was supposed to play a central role in disaster response measures, as well as the Metropolitan Police Department, which was in charge of the security of the capital city, also contributed to the delay in the initial response. Furthermore, the fact that the earthquake happened to occur on Saturday, a half working day, meant many government and local government employees went home immediately after the quake to check on the safety of their families, which also adversely affected the initial response.

The military began relief activities after the establishment of the Kanto Martial Law Enforcement Headquarters on September 3.

Fig. 1-5 Operation and Organization of the Interim Earthquake Relief Secretariat



Source: Compiled by the Cabinet Office, based on Home Ministry (1926) "Taisho Era Earthquake Chronicle Photo Album (published in the National Disaster Management Council (2006) "Great Kanto Earthquake Report, Part 1") and National Disaster Management Council (2009) "Great Kanto Earthquake Report, Part 2)

Rescue of Affected People and Fire Fighting

As fires spread in urban areas, firefighting became an immediate priority, along with rescuing people from

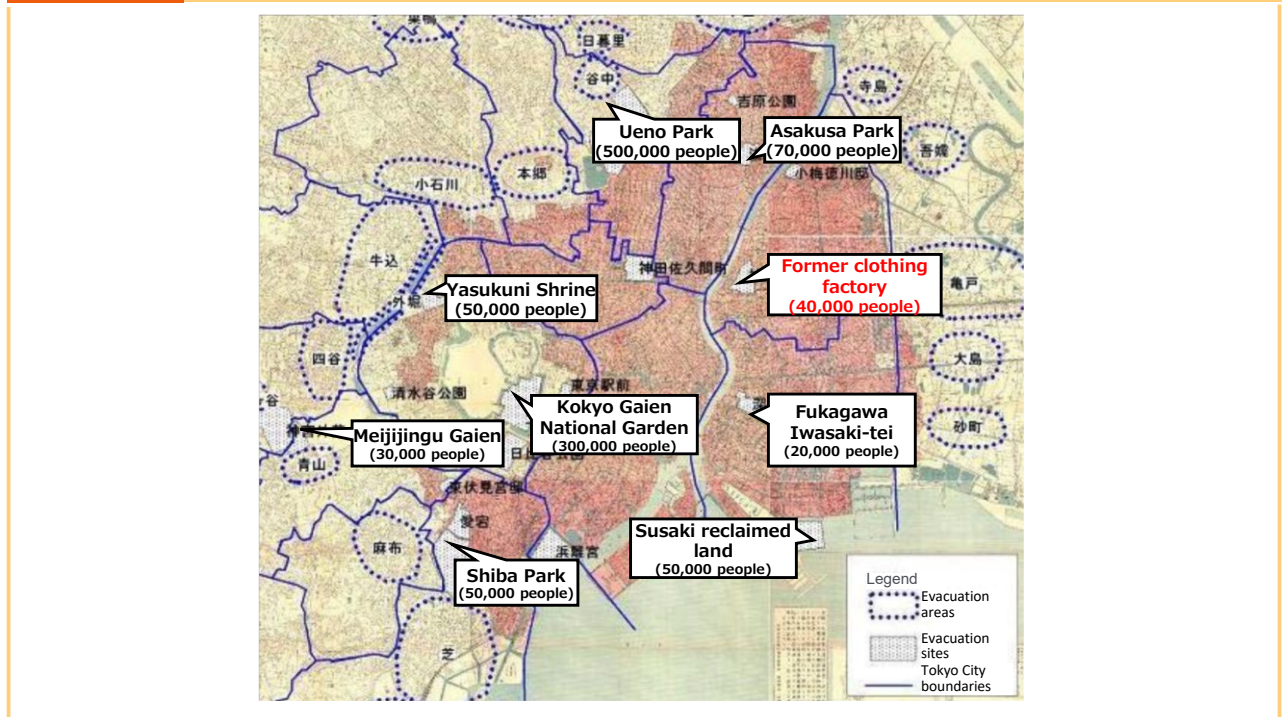
collapsed buildings and providing medical treatment to the injured. In the affected areas, houses and supplies, including food, were lost, mainly due to fires. The damage to transportation systems and bridges made it difficult for people to escape from the affected regions and hindered the delivery of external aid and supplies. Despite these challenging circumstances, relief efforts for the affected people and firefighting activities were carried out in each area.

In Tokyo City, fires broke out immediately after the earthquake struck, and most of the telephones and fire alarms were damaged by the shaking of the earthquake, leaving them out of service. With the water supply cut off, the effectiveness of the firefighting service significantly decreased. Despite the efforts of the fire department and residents, the fire spread for nearly two days after the earthquake. As a result, 43.6% of the city was damaged by fire.

At that time, there were no designated evacuation sites in the event of disasters, so people evacuated to relatively large spaces, such as Ueno Park, the Imperial Palace, and Yasukuni Shrine, depending on the location of the fire, the direction of the wind, and the movement of people (Fig. 1-6). There were also evacuation sites where many people died, such as the former clothing factory in Yokoamicho, where fire broke out, probably because of household goods that were brought in or radiant heat.

Relief activities by Tokyo Prefecture, Tokyo City, and the Metropolitan Police Department were conducted mainly at these evacuation sites. However, only about 1 in 10 people had received public food rations by the day after the disaster. An organized distribution system was put in place around September 6, so it took some time before the supply of food and the relief system became fully operational.

Fig. 1-6 Major Evacuation Sites and Evacuated Population in Tokyo City Immediately after the Earthquake



Source: Compiled by the Cabinet Office, based on National Disaster Management Council (2009) "Great Kanto Earthquake Report, Part 2"

Disruption of Information and Spread of Unfounded Rumors

Radio broadcasting in Japan began in 1925, two years after the earthquake. At the time of the earthquake, the main means of disseminating information were the telegraph, telephone, and newspapers. Immediately after the earthquake, media and communication organizations stopped functioning, and baseless rumors spread that the explosions and flying sparks generated during large fires were caused by bombs being thrown or arson while the turbidity of well water and pond water was caused by poisoning. There are also investigative reports³ that the spread of such rumors led to incidents, such as the murder of Korean people.

Mutual Aid among Residents

The Great Kanto Earthquake, which exceeded expectations at the time, saw mutual aid among residents play a central role in relief efforts. In various places, residents played a major part through mutual assistance, such as offering accommodation to newly acquainted affected individuals, sharing food and coming together for food distribution and town security.

At that time, there was no system to designate shelters in advance, so schools, government offices, the precincts of shrines and temples, and the mansions of wealthy people were opened to accommodate evacuees. After the public distribution of food started, neighborhood associations coordinated to distribute food to each household. Moreover, first-aid centers were set up in various places to carry out what are now called volunteer activities with the support of neighborhood associations as well as young men's associations and local veterans' associations.

Relief by Visiting Relief Teams, Foreign Governments, Etc.

Various public and private groups, including relief teams from other prefectures, took charge of relief activities, such as operating first-aid centers. In particular, it is reported that official relief activities in the burnt-out areas of Tokyo City and urban central areas gained momentum after the arrival of relief teams from Gunma Prefecture on and after September 3. By early November, Tokyo Prefecture and Tokyo City received support from local groups (young men's associations, local veterans' associations, fire brigades, and other relief groups), totaling 23,357 people from 181 groups representing Hokkaido, one province and 18 prefectures.⁴

In Yokohama City, which was more severely damaged in the disaster, public organizations could not provide relief smoothly, resulting in confusion. Therefore, in addition to relief teams from other prefectures, private steamship companies and foreign governments also played an important role. For example, vessels of a private steamship company that were docked at the Port of Yokohama at the time of the earthquake accommodated affected people and also temporarily served as Kanagawa Prefecture's port office and customs office. In addition, vessels of British and French steamship companies along with American warships engaged in relief efforts for affected people or transported them to the Port of Kobe.

³ National Disaster Management Council (2009) "Great Kanto Earthquake Report, Part 2" p. 206

⁴ National Disaster Management Council (2009) "Great Kanto Earthquake Report, Part 2" p. 140

Section 3. Reconstruction from the Great Kanto Earthquake

The Concept of the Imperial Capital Reconstruction Plan

The Great Kanto Earthquake caused devastating damage to the metropolitan areas, centered on Tokyo and Yokohama, and the extent of the damage was vast, with approximately 4,500 hectares burnt down. The Imperial Capital Reconstruction Council, headed by the Prime Minister, was established as a deliberative organ responsible for the world's largest post-quake reconstruction projects. As its executive body, the Imperial Capital Reconstruction Department was established under the direct control of the Home Ministry and played a central role in drafting the Imperial Capital Reconstruction Plan.

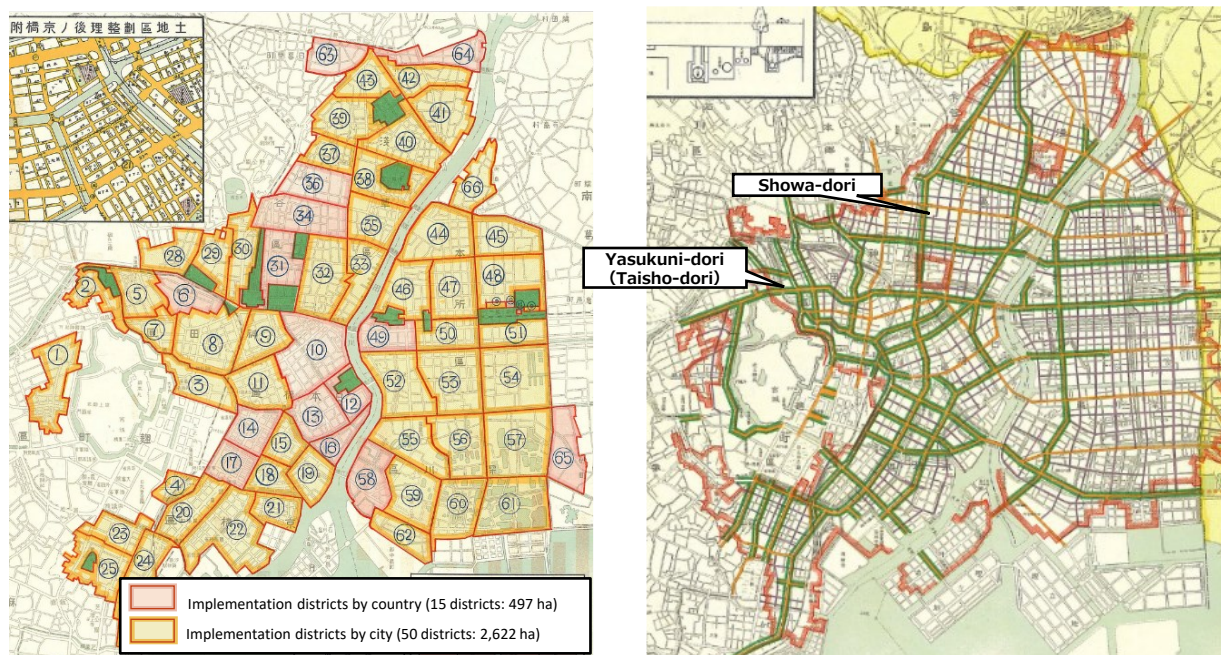
Shinpei Goto, Home Minister at the time, was appointed as the president of the Imperial Capital Reconstruction Department and led the creation of an idealistic draft that was later called “Goto's big pipe dream.” In the draft plan, urban planning suitable for a modern nation was envisaged, such as the construction of roads 100 meters wide and the sharing of lifelines. However, amid the social situation of recession after the First World War, the draft plan, which involved a huge financial expenditure of about three billion yen (at that time), was not accepted, and it was significantly revised by the Imperial Capital Reconstruction Council. As a result, changes were made, such as removing unaffected areas from the scope of the reconstruction project, excluding plans for the reconstruction of Keihin Canal and Keihin Port, and drastically reducing the widths of highways. The budget was also reduced to about 500 million yen.

Development of the Imperial Capital Reconstruction Projects

Despite such a drastic reduction in the Imperial Capital Reconstruction Plan, the projects from the plan are recognized as having achieved remarkable results. In particular, it is worth noting that a land readjustment project covering approximately 3,300 hectares was implemented, creating a modern cityscape with well-developed streets and parks. Many of the highways, such as Showa-dori, included greenbelts and were highly evaluated from both urban landscape and disaster prevention perspectives (Fig. 1-7). In addition to the development of large parks, such as Sumida Park and Yamashita Park, “small reconstruction parks” were established in various locations adjacent to elementary schools. Furthermore, modern public facilities and infrastructures were developed, such as a reinforced concrete elementary schools and bridges over the Sumida River (Fig. 1-8).

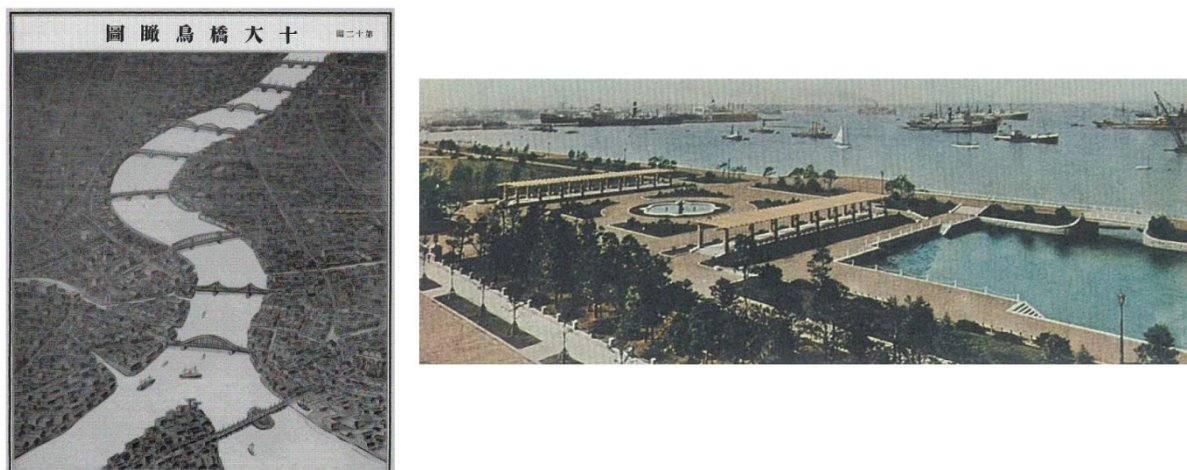
The Imperial Capital Reconstruction Plan for Tokyo and Yokohama Cities was decided in January 1924, the year after the earthquake, and the reconstruction projects were generally completed in 1929 for Yokohama City and March 1930 for Tokyo City.

Fig. 1-7 Land Readjustment Map (left) and Street Planning Map (right) relating to the Imperial Capital Reconstruction Plan



Source: Compiled by the Cabinet Office, based on Tokyo City (1930) "Imperial Capital Reconstruction Project Chart"

Fig. 1-8 Bridges over the Sumida River (left) and Yamashita Park in Yokohama City (right, reclaimed from the earthquake debris)



Source: Tokyo City (1930) "Imperial Capital Reconstruction Project Chart" and Yokohama City (1981) "History of Port Town Yokohama's Formation" (published in National Disaster Management Council (2009) "Great Kanto Earthquake Report, Part 3")

Housing Reconstruction and Social Work

In the Great Kanto Earthquake, about 370,000 houses were damaged by fires, collapse, and other causes, making their reconstruction an essential task. Immediately after the earthquake, emergency temporary housing or barracks were built by local governments, but they were insufficient to accommodate all evacuees. As a result,

many barracks were built by the residents themselves.

After that, in order to secure permanent housing, the construction of small houses using earthquake relief funds and the development of simple housing complexes by the incorporated foundation Dojunkai were promoted. In temporary housing complexes and deteriorated housing areas after the earthquake, the establishment of social facilities such as simple bathhouses, employment agencies, simple dining halls, and public markets was vigorously promoted. These efforts relatively quickly restored people's lives and stabilized the society.

Photo 2. Barracks in the precinct of Yasukuni Shrine (left) and Dojunkai Aoyama Apartments (right)



Source: Kobundo (1930) "Tokyo on Reconstruction Path" Postcards (Tokyo Metropolitan Library's TOKYO Archive), Reconstruction Research Association Edition (1930), "Imperial Reconstruction History and Yokohama Reconstruction Memorial History" (published in National Disaster Management Council (2009) "Great Kanto Earthquake Report, Part 3)

[Column]

Relief Donations from Japan and Abroad after the Great Kanto Earthquake

After the Great Kanto Earthquake, many relief donations were made in Japan and from abroad. According to documents of the Home Ministry at the time, the total amount was about 64.59 million yen, and in particular, about 22.11 million yen, or more than one-third of the total, was donated from 30 countries. Many other items were also donated.

Considering that the total amount of relief donations after the Great East Japan Earthquake was approximately 342.5 billion yen, of which approximately 22.5 billion yen (as of the end of December 2020) came from abroad, it can be said that the ratio of post-quake donations from abroad after the Great Kanto Earthquake was extremely large. The monetary value at that time is estimated to be about 600 times the current value on the basis of the corporate goods price index. Therefore, approximately 22.11 million yen at that time is approximately equivalent to 10 billion yen or more now. Considering the size of the Japanese economy at the time, it is obvious that a very large amount of donations came from overseas.

The relief donations were used for a variety of purposes, including direct payments to affected people for food, clothing, hygiene and medical expenses, as well as the management of emergency temporary housing called barracks and the development of simple housing complexes through subsidies to the incorporated foundation Dojunkai. The relief donations were a valuable resource to support activities for affected people back then.

Relief donations from abroad (ranked by amount / top 10 countries / including donations by Japanese residents in the countries and foreign residents in Japan)

Country name	Amount	Country name	Amount
U.S.	15,327,875 yen	Peru	186,514 yen
U.K.	4,075,615 yen	Mexico	137,926 yen
China	1,336,941 yen	Switzerland	89,624 yen
Netherlands	341,285 yen	France	87,988 yen
Belgium	194,771 yen	Thailand	61,648 yen

Source: Compiled by the Cabinet Office, based on Home Ministry, Social Affairs Bureau (1926) "Taisho Era Earthquake Chronicle"

Taisho Era Earthquake Chronicle (National Diet Library's Digital Collection)
<https://dl.ndl.go.jp/pid/981916/1/60>

Japanese Red Cross Society Website
https://www.jrc.or.jp/international/news/210303_006556.html



Section 4. Enhancement and Strengthening of Disaster Management in the Wake of the Great Kanto Earthquake

Enactment of Seismic Provisions

In Tokyo at the end of the Taisho Era, which is when the Great Kanto Earthquake occurred, there was a mixture of buildings with or without earthquake-resistant structures, such as traditional wooden buildings, brick buildings constructed after the Meiji Era, high-rise buildings constructed by foreign construction companies having no

earthquake-related experience, and earthquake-resistant buildings independently devised by Japanese researchers.

Under such circumstances, damage to buildings due to the Great Kanto Earthquake occurred mostly in brick buildings, wooden buildings, and foreign-style buildings without consideration of seismic structures, while Japanese-style earthquake-resistant buildings suffered less damage. For example, the Industrial Bank of Japan in Marunouchi, which was under construction at the time, survived the earthquake almost undamaged. Its structure was designed by Tachu Naito, an architect who studied under Toshikata Sano, famous for his seismic design research. On the other hand, some of buildings built by foreign construction companies collapsed during construction, resulting in the deaths of workers and the need for large-scale renovations.

Photo 3. Damage to office buildings in Marunouchi, Tokyo



Naigai Building
(Destroyed during its construction)



Industrial Bank of Japan (It was completed in 1923 and designed by Tachu Naito, incorporating earthquake-resistant walls.)

Source: Website of the National Museum of Nature and Science's Earthquake Archive (published in the National Disaster Management Council (2006) "Great Kanto Earthquake Report, Part 1")

As a direct result of the massive damage to buildings caused by the Great Kanto Earthquake, the structural strength requirements of the Urban Building Law Enforcement Regulations (Home Ministry Ordinance No. 37 of 1920) were revised in 1924, the year after the earthquake. This led to the world's first seismic force-related regulations. After the war, the Urban Building Law (Act No. 37 of 1919) was replaced by the Building Standards Act (Act No. 201 of 1950), which covered the whole country. However, the seismic provisions at that time are regarded as equivalent to the current seismic resistance standards even though they have changed in appearance.

Progress in Earthquake Research

The Great Kanto Earthquake led to the realization of the importance of scientifically pursuing seismic phenomena and actively advancing research related to earthquake disaster prevention. In 1925, the Earthquake Research Institute was established at the Tokyo Imperial University (its name at that time) as a new research institute to replace the Earthquake Disaster Prevention Investigation Committee, which had been established in the wake of the Nobi Earthquake in 1891, which preceded the Great Kanto Earthquake.

The Earthquake Research Institute's official regulations (the regulations created at its establishment) stipulated: "The Earthquake Research Institute shall be responsible for research on matters related to the science of earthquakes and the prevention of earthquake disasters" and listed the science of earthquakes as its first priority. It was an attempt to understand seismic phenomena from the standpoint of vibration engineering, physics, geophysics, etc. rather than conventional statistical research and observations.

Since then, seismology has made great progress, elucidating the mechanism of earthquake generation, which

was not well understood at the time of the Great Kanto Earthquake, and developing an advanced seismic observation network. This has established the basis for today's earthquake disaster prevention measures, such as predicting future mega-quakes and the immediate dissemination of information in the event of an earthquake.

Section 5. Enhancement and Strengthening of Disaster Management in the Wake of Subsequent Major Disasters

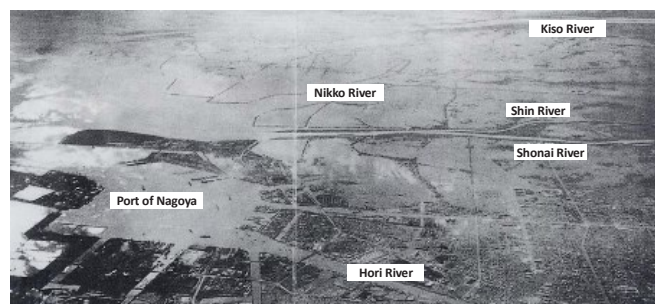
5-1 Establishment of a Comprehensive Disaster Management System in Response to the Ise Bay Typhoon

Overview of the Ise Bay Typhoon

After the Great Kanto Earthquake, disaster management has been enhanced and strengthened each time a large-scale disaster occurred.

An impetus for major advances in postwar disaster management was the Ise Bay Typhoon of 1959. It landed on Cape Shionomisaki, Wakayama Prefecture, on September 26, 1959. Combined with nearly high tides and high waves caused by strong winds, it generated a tidal wave nearly 1 meter higher than the highest historical sea level at Nagoya Port. This typhoon caused as many as 5,098 deaths and missing persons over a wide area, mainly in the Tokai region, and caused great damage.

Photo 4. Low-lying area at the back of the Ise Bay turned into a sea of mud



Source: Kiso River Downstream Office "Relation between Nature and People—40 Years after the Ise Bay Typhoon"

Enactment of the Basic Act on Disaster Management

In response to the damage caused by the Ise Bay Typhoon, the Basic Act on Disaster Management (Act No. 223 of 1961) was enacted in 1961 as the basic legislation for disaster management in Japan. The Act made two policy changes. The first change was to review the previous disaster management, which had focused on post-disaster response measures, and to implement consistent disaster management from disaster prevention to response measures and recovery/reconstruction. The second change was to establish a mechanism for comprehensively coordinating efforts in each field in order to promote comprehensive disaster management.

As discussed in Section 2, disaster management at the time of the Great Kanto Earthquake mainly focused on post-disaster management. In terms of the government system, measures were taken centering on the Home Ministry, as evidenced by the establishment of the Interim Earthquake Relief Secretariat within the Home Ministry.

The enactment of the Basic Act on Disaster Management clarified the concept of disaster management for the first time: "to prevent disasters, and in the event of a disaster, to prevent the spread of damage, and to recover from the disaster." In addition to clarifying the responsibilities of each entity involved in disaster management and

specifying concrete countermeasures and actions, the Act stipulated the establishment of disaster management councils, including the National Disaster Management Council, and the development of disaster management plans, including the Basic Disaster Management Plan, and the establishment of a comprehensive and systematic disaster management promotion system.

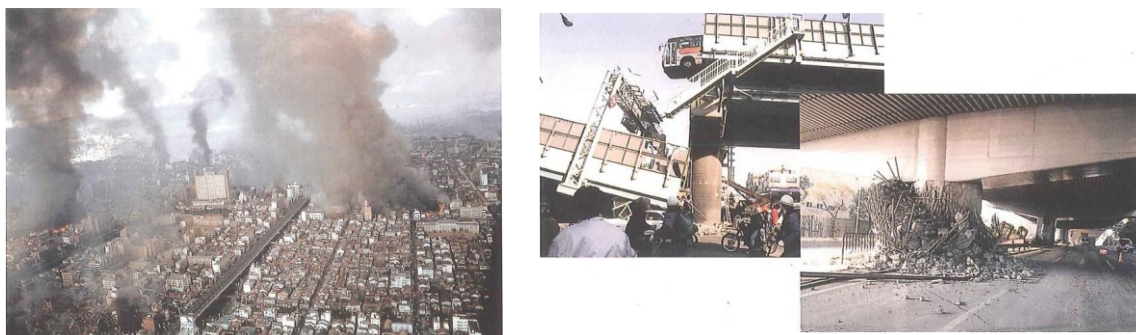
5-2 Strengthening the Government's Initial Response System in the Wake of the Great Hanshin-Awaji Earthquake

Overview of the Great Hanshin-Awaji Earthquake

On January 17, 1995, the Great Hanshin-Awaji Earthquake occurred. This disaster was caused by a magnitude 7.3 epicentral earthquake (Southern Hyogo Earthquake) with its epicenter in the northern part of Awaji Island. This earthquake caused a seismic intensity of 7 in the area from Kobe City to Nishinomiya and Takarazuka Cities as well as in the northern part of Awaji Island. Additionally, a seismic intensity of 5 was observed in Toyooka, Hikone and Kyoto Cities, and other areas. The seismic motions were felt over a wide area from Tohoku to Kyushu.

The Great Hanshin-Awaji Earthquake was an urban earthquake similar to the Great Kanto Earthquake, and caused 6,437 deaths and missing persons (including disaster-related deaths) (Fire and Disaster Management Agency information, as of May 19, 2006). There was also extensive physical damage, including the collapse of houses and buildings, the suspension of electricity, gas, water supply, etc., and the destruction of railways, highways, and harbors. Moreover, the disaster disrupted the information network and paralyzed the cities' functions, including administrative functions, roads, railways and ports.

Photo 5. Damage by the Great Hanshin-Awaji Earthquake



Source: Prime Minister's Office, Secretariat of the Headquarters for Reconstruction of the Hanshin-Awaji Area (2000), "Great Hanshin-Awaji Earthquake Reconstruction Report"

Strengthening of the Government's Initial Response System

This disaster caused delays in information communication and the initial response system of the entire government, including the communication of information to the Prime Minister's Office. In particular, damage information could not be promptly collected immediately after the disaster occurred, making it difficult to ascertain the scale of damage, including the numbers of deaths and collapsed buildings.

In light of this, an emergency mobilization system was established, including the establishment of the Cabinet's Information Collection Center to collect information 24 hours a day, the establishment of a Crisis Management Center at the Prime Minister's Office, and the immediate mobilization of an emergency meeting team to take an initial response in the event of a major earthquake. Furthermore, an early damage forecasting system was

developed to immediately estimate the scale of damage and use such information for an initial response.

Also at the time of the Great Kanto Earthquake, prompt collection of damage information and an initial response became issues, and it can be said that the same issues were brought to the fore again in the Great Hanshin-Awaji Earthquake. As mentioned in Section 2, when the Great Kanto Earthquake occurred, it took about 27 hours to set up an interim earthquake relief secretariat and hold its meeting, but after the Great Hanshin-Awaji Earthquake, its Major Disaster Management Headquarters was set up and its meeting was held in about 6 hours.⁵ At the time of the Great East Japan Earthquake, which will be discussed later, the Extreme Disaster Management Headquarters was established and its meeting was held within one hour⁶ of the earthquake's occurrence as a result of the government's efforts to strengthen its initial response system and partly because it was during the daytime on a weekday when many staffs were in their offices.

Enhancement and Strengthening of Other Disaster Management

As discussed in Section 4, the seismic provisions for buildings established in the wake of the Great Kanto Earthquake were carried over to the post-war Building Standards Act, and were strengthened in 1981 in the wake of the 1978 earthquake off the coast of Miyagi Prefecture. In the Great Hanshin-Awaji Earthquake, damage concentrated on existing unqualified buildings that did not satisfy the revised earthquake resistance standards. Therefore the earthquake triggered the development of laws and support measures for seismic diagnosis and retrofitting. This mitigated the damage of building collapse in the subsequent Great East Japan Earthquake.

After the Great Hanshin-Awaji Earthquake, more than 1.3 million people from all over Japan participated in various volunteer activities, and it was later called the "First Year of Volunteerism." Recognizing the importance of the role of volunteers in times of disaster, the "Basic Act on Disaster Management" was revised in 1995, and provisions were established for the first time to improve the environment for volunteer activities. In 1998, the Act on Promotion of Specified Nonprofit Activities (Act No. 7 of 1998) was enacted, positioning disaster relief activities as specified nonprofit activities. While mutual aid by residents and rescue teams from remote areas played an important role also in the Great Kanto Earthquake, such activities were re-recognized as volunteer activities more than 70 years later.

At the same time, public assistance for affected people was enhanced, and in 1998, the Act on Support for Reconstructing Livelihoods of Disaster Victims (Act No. 66 of 1998) was enacted to support those who suffered significant damage to their livelihood due to a disaster.

5-3 Enhancement of Affected People Support System in the Wake of the Great East Japan Earthquake

Overview of the Great East Japan Earthquake

On March 11, 2011, the Great East Japan Earthquake occurred. The disaster was caused by a trench-type earthquake (2011 off the Pacific coast of Tohoku Earthquake) with a moment magnitude of 9.0 and its epicenter off the coast of Sanriku. The scale of the earthquake was the largest ever recorded in Japan, with

⁵ The earthquake occurred at 5:46 on January 17, 1995. The cabinet meeting decided to establish the Major Disaster Management Headquarters at 10:04 on the same day. The first Headquarters Meeting was held at 11:30 on the same day.

⁶ The earthquake occurred at 14:46 on March 11, 2011. The cabinet meeting decided to establish the Extreme Disaster Management Headquarters at 15:14 on the same day. The first Headquarters Meeting was held at 15:37 on the same day.

a maximum seismic intensity of 7 recorded in Kurihara City in the northern part of Miyagi Prefecture, and a seismic intensity of upper 6 was observed in Miyagi, Fukushima, Ibaraki and Tochigi Prefectures. Tremors were observed over a wide area from Hokkaido to Kyushu. The earthquake also caused huge tsunamis to hit the Pacific coastal areas centering on Iwate, Miyagi, and Fukushima prefectures. The heights of the tsunami that hit various places was 9.3 m or higher in Soma City, Fukushima Prefecture, 8.6 m or higher in Ishinomaki City, Miyagi Prefecture, 8.5 m or higher in Miyako City, Iwate Prefecture, and 8.0 m or higher in Ofunato City.

This earthquake and tsunamis left 22,318 people dead or missing in 13 prefectures (including disaster-related deaths) and 122,039 houses completely destroyed in 9 prefectures (Fire and Disaster Management Agency information, as of March 9, 2023), and up to about 470,000 people evacuated when the disaster struck. In addition, the accident at the Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Station released radioactive materials, forcing many residents living in the vicinity of the station to evacuate and causing extensive damage to all industries, thereby creating a complex disaster of unprecedented scale.

Photo 6. Tsunami surging over the embankment into the town (left: Miyako City, Iwate Pref.) and emergency firefighters rescuing affected people (right: Kesenuma City, Miyagi Pref.)



Source: Miyako City, Iwate Pref. (left) and Tokyo Fire Department (right)

Enhancement of Affected People Support System

In the Great East Japan Earthquake, communication disruptions in the affected municipalities and damage to government staff and buildings made it difficult to grasp information such as necessary supplies for the affected people. In addition, there were large differences in the management of shelters, and it was not possible to adequately respond to the changing needs of the affected people. The necessity of giving consideration to women, the elderly and the disabled was also pointed out.

In consideration of the above, the 2012 and 2013 revisions to the Basic Act on Disaster Management established provisions enabling push-type support, in which the national government can provide supplies at its own discretion without waiting for requests from local governments, a provision for pre-designating shelters where affected people can stay for a certain period of time and temporary evacuation sites in emergencies, and a provision for residents in need of assistance in evacuation. An action guideline concerning shelter management, and an action guideline from the perspective of gender equality were also established.

As discussed in Section 2, at the time of the Great Kanto Earthquake, there was no system for predesignating shelters, and therefore schools, government offices, temple precincts, etc. were opened to accommodate evacuees. In addition, food and other goods were supplied to the affected people through the mutual help of the residents. After the Great East Japan Earthquake, the designation of shelters was legally required, and a

government-led system for material support, including push-type support, was established. On the other hand, in anticipation of future large-scale disasters, and as was the case at the time of the Great Kanto Earthquake, it is still important to secure an appropriate living environment for evacuees, including for those outside the designated shelters, and to support affected people's self-help and mutual assistance, such as helping one another among the residents.

Enhancement and Strengthening of Other Disaster Management

Upon the Great East Japan Earthquake, the term "unexpected" was frequently used, highlighting the necessity to reexamine the conventional method of estimating damage, which traditionally relied on replicating earthquakes and tsunamis that had occurred during the past several hundred years. Additionally, based on the belief that disasters cannot be prevented by hardware measures alone, there was a call for thorough implementation of the concept of "disaster mitigation," which minimizes damage by combining various hardware and software measures.

Based on this, the damage assumptions for a Nankai Trough earthquake, a Tokyo inland earthquake, and a trench-type earthquake in the vicinity of Japan and Chishima Trenches have been revised sequentially, and the basic principles of disaster management, including the concept of "disaster mitigation," have been clearly stated in the Basic Act on Disaster Management to ensure the thorough enforcement of the Act.

At the time of the Great Kanto Earthquake, scientific knowledge about the earthquake generation mechanism was scarce, and it was not until around 1965 that it was confirmed that the epicenter of an earthquake is a fault moving underground. Since then, seismological research and observations have advanced, and earthquake models based on the latest scientific knowledge have been devised. Scientific risk assessments based on the latest knowledge will continue to be required, and disaster response should be conducted while always keeping in mind the possibility of disasters exceeding expectations.

Please also refer to Appendix 5 for an overview of Japan's post-war disaster management system and schemes, including those discussed above.