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CENTER FOR EXCELLENCE
IN DISASTER MANAGEMENT & HUMANITARIAN ASSISTANCE
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NORTHEAST ASIA

CHINA | JAPAN | SOUTH KOREA | TAIWAN

Disaster Management Reference Handbook

April 2022

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Letter from the Director

The People's Republic of China, Japan, South Korea, and Taiwan all frequently experience natural disasters or other emergencies, and over the years, each has developed policies and structures to reduce disaster risk at home and respond to disasters, domestic and foreign. Not only as a consequence of being stricken by major disasters but also as developed economies who are donors, they have all come into contact with the international disaster management community. Whether in concert with other donors and responders or individually, then, China, Japan, South Korea, and Taiwan are all established or emerging players in disaster management both in the Indo-Asia-Pacific region and the wider world.

Each of the four has its own preferred way of interacting with disaster-affected foreign states and communities, and they have differing relationships with the global disaster management and humanitarian assistance coordination framework as led by the United Nations. Moreover, they have different cultures of volunteerism and giving. Consequently, the administrative structures and legal frameworks for foreign disaster relief and humanitarian assistance differ, and involvement of non-government and community-based organizations varies widely.

The United States (U.S.) is a proponent of integrating donors and responding parties into the international humanitarian assistance coordination system. In disaster management-oriented events and meetings with China, Japan, South Korea, and Taiwan, the U.S. Government and Department of Defense have emphasized international best practice, transparency, and communication. Some of these players are further along in their integration into the international system. The Center for Excellence in Disaster Management and Humanitarian Assistance (CFE-DM) continues to promote the use of international best practice and has worked alongside parties from these players to research and rehearse foreign disaster relief.

The goal of this handbook is to provide background information for personnel responding to a disaster during which they may interact with responders from China, Japan, South Korea, or Taiwan. First, it includes background on the disasters each of the four experiences and past foreign disasters to which they have responded. Second, it details the lead agencies tasked with disaster management at home and overseas. Third, it provides an overview of how each of these players interacts with the U.S. and the broader disaster response and humanitarian communities. While Mongolia is frequently integrated in Northeast Asia, this handbook does not address Mongolia as CFE-DM has produced a separate Mongolia Disaster Management Reference Handbook.

Sincerely,

Joseph D. Martin, SES
Director

About the Center for Excellence in Disaster Management & Humanitarian Assistance

Overview

The Center for Excellence in Disaster Management and Humanitarian Assistance (CFE-DM) is a United States (U.S.) Department of Defense (DoD) organization comprised of nearly 30 subject matter experts that provide academic research, civil-military coordination training, and operational insights to support decision making before, during, and after crises. The Center is designed to bridge understanding between humanitarians, civilian, and military responders. CFE-DM partners with a diverse group of governmental and nongovernmental actors, as well as academic institutions to increase collaborations and capabilities in humanitarian assistance and disaster response. While maintaining a global mandate, the Indo-Pacific region is our priority of effort and collaboration is the cornerstone of our operational practice. The Center is a direct reporting unit to U.S. Indo-Pacific Command (USINDOPACOM) and is located on Ford Island, Joint Base Pearl Harbor-Hickam, Hawaii.

Vision

The Joint Force, allies, and partners are fully prepared to conduct and support foreign humanitarian assistance.

Mission

CFE-DM builds crisis response capacity in U.S. and partner militaries, enhances coordination and collaboration with civilian and foreign partners, and strengthens those relationships to save lives and alleviate human suffering before, during, and after humanitarian crises.

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EXECUTIVE SUMMARY

The experiences of the people of the People's Republic of China (hereafter "China" or "PRC"), Japan, the Republic of Korea (hereafter "South Korea," "Korea," or "ROK"), and Taiwan in disasters and emergencies make them valuable partners in global humanitarian assistance and disaster relief (HADR). Each player responds differently with disaster-affected states and foreign communities, and they have differing relationships with the global HADR coordination framework as led by the United Nations (UN). Consequently, the administrative structures and legal frameworks for foreign disaster relief and humanitarian assistance differ, and the involvement of non-governmental organizations (NGO) and community-based organizations (CBO) varies widely. For example, hundreds of well-funded and well-connected Japanese NGOs work on emergency response outside of Japan whereas South Korea's external emergency relief has traditionally been more closely linked to government financial donations and Korean corporations already operating commercially in disaster-hit areas; only in the past two decades have Korean CBOs become sufficiently financially independent and robust to operate independently of their government.

Northeast Asia is highly exposed to various hazards. Many of the region's people live in high risk, multi-hazard areas that are also served by well-developed infrastructure that is similarly exposed to hazards. The risk landscape includes biological hazards alongside floods, storms, earthquakes, volcanic eruptions, and tsunamis. Moreover, the effects of climate change will exacerbate some hazards. While Northeast Asia generally escapes some of the worst impacts in a worst-case climate change scenario, the number of people at high risk will still rise as climate change drives higher temperatures and different patterns of rainfall.

Northeast Asia accounts for about one-third of all Asia-Pacific disaster-related fatalities over the past decade. In addition to the human costs, annual economic losses from disasters can be massive. The hazard that has caused the greatest economic losses in China is drought while earthquakes have caused Japan's greatest losses, and typhoons have had the highest economic cost of all disasters in South Korea and Taiwan. While Mongolia is frequently integrated in Northeast Asia alongside its neighbor, China, this handbook does not address Mongolia as it is addressed in its own Center for Excellence in Disaster Management and Humanitarian Assistance (CFE-DM) disaster management handbook. Beyond the aforementioned major hazards, communities in the region have been impacted by pandemics, sand and dust storms, and heatwaves. The potential is high and rising for disasters to come in quick succession – e.g., typhoons and floods, earthquakes and tsunamis, and drought with sand and dust storms – or simultaneously, as occurred when floods hit during the Coronavirus Disease 2019 (COVID-19) pandemic.

Based on experiences and frameworks, then, China, Japan, South Korea, and Taiwan all bring different levels of expertise to HADR. Chinese government and security force agents have gained a reputation for urban search and rescue (USAR) and rapid response capabilities. Japanese medical teams have decades of experience responding to regional and global emergencies alongside the Japanese Self-Defense Forces (JSDF) who undertake search-and-rescue missions and provide flood control, medical care, epidemic prevention, water supply support, and transportation of personnel and supplies. ROK legal and institutional frameworks for humanitarian assistance prioritize demand-driven HADR with the government focused on ensuring predictable resources for implementing partners via both bilateral and multilateral channels, including UN agencies. Finally, Taiwan can deploy military air assets to deliver supplies while it also delivers cash and technical expertise for health care, such as during the COVID-19 pandemic.

REGIONAL OVERVIEW

Over the past 50 years, the Asia-Pacific region as a whole has accounted for 57% of global fatalities from natural disasters and 87% of the global population that has been affected by natural hazards. Between 1970 and 2020, natural hazards in the region affected 6.9 billion people and killed more than 2 million. Nevertheless, there has been substantial progress; in 2019 and 2020, the average annual loss fell to around 6,200 lives from an overall average of 10,936 lives per year during the period 2011-2020. At the same time, while more recent fatality rates are lower, the average number of people affected annually has fallen only slightly, i.e., from 139 million people between 1970 and 2010 to 122 million people between 2011 and 2020, with the Asia-Pacific region accounting for around three-quarters of the world's disaster-affected population. Indeed, disasters frequently drive people away from their homes. In 2019 alone, over 19 million people were displaced by natural hazards in the region, around three-quarters of the global total. Ranked fourth among impacted countries, China alone accounted for 4 million people displaced by natural disasters in 2019. Among the Asia-Pacific subregions, disaster-related fatalities from 2011 to 2020 were greatest in South and Southwest Asia (44%), followed by East and Northeast Asia (29%), and Southeast Asia (25%).

In the broader Asia-Pacific region, around 260 million people are vulnerable to heatwaves, 196 million to cyclones, and 68 million to drought and drought-associated biological hazards. In March 2021, amid the COVID-19 pandemic, North and East Asia were hit by the worst sand and dust storms in a decade. In East Asia, a projected global temperature rise of 1.5°C (2.7°F) above pre-industrial levels between 2030 and 2052 will expose 48 million people to water scarcity with associated impacts on agriculture and industry.[1]

In addition to the human costs, annual economic losses can be generalized. The hazard that causes the greatest economic losses in China is drought while earthquakes cause Japan's greatest losses, and typhoons have the highest economic cost of all disasters in South Korea[2] and Taiwan.[3] Figure 1 shows the percent of average annual loss caused by different hazard type in China, Japan, and South Korea; the agency assessing this metric did not assess Taiwan.[4]

The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) estimates that upwards of 70% of the Northeast Asian economy is exposed to typhoons, 10% to riverine floods, and 34% to seismic hazard. Indeed, the region's seismic fault lines threaten transport, energy, and information and communications technology (ICT) infrastructure. Of nearly 1,500 coal, oil, and hydropower resources, nearly 50% of capacity is exposed to earthquakes and one-third to earthquakes, and more than 52% of solar and wind infrastructure is at risk of typhoons. Some 27% of the road networks is exposed to seismic hazards, while 49% of airports and 51% of ports are at risk during earthquakes. Meanwhile, 70% of airports and 75% of ports are exposed to typhoons. Of the region's ICT infrastructure, 16.7% is exposed to earthquakes. Given that access to well-functioning road networks, airports, and ports are essential for evacuations and for distribution of supplies after a disaster, power failures can have cascading impacts on health services and ICT. It is estimated that between 1970 and 2018, total deaths from natural disasters in East and Northeast Asia amounted to 564,946 people. Earthquakes and tsunamis contributed 71% per cent of the total deaths in the subregion versus only 46% in the whole Asia-Pacific region. Earthquake and tsunami are followed by floods, which contribute 13% of fatalities. The hazard risks in Northeast Asia stand in contrast to the Asia-Pacific region where

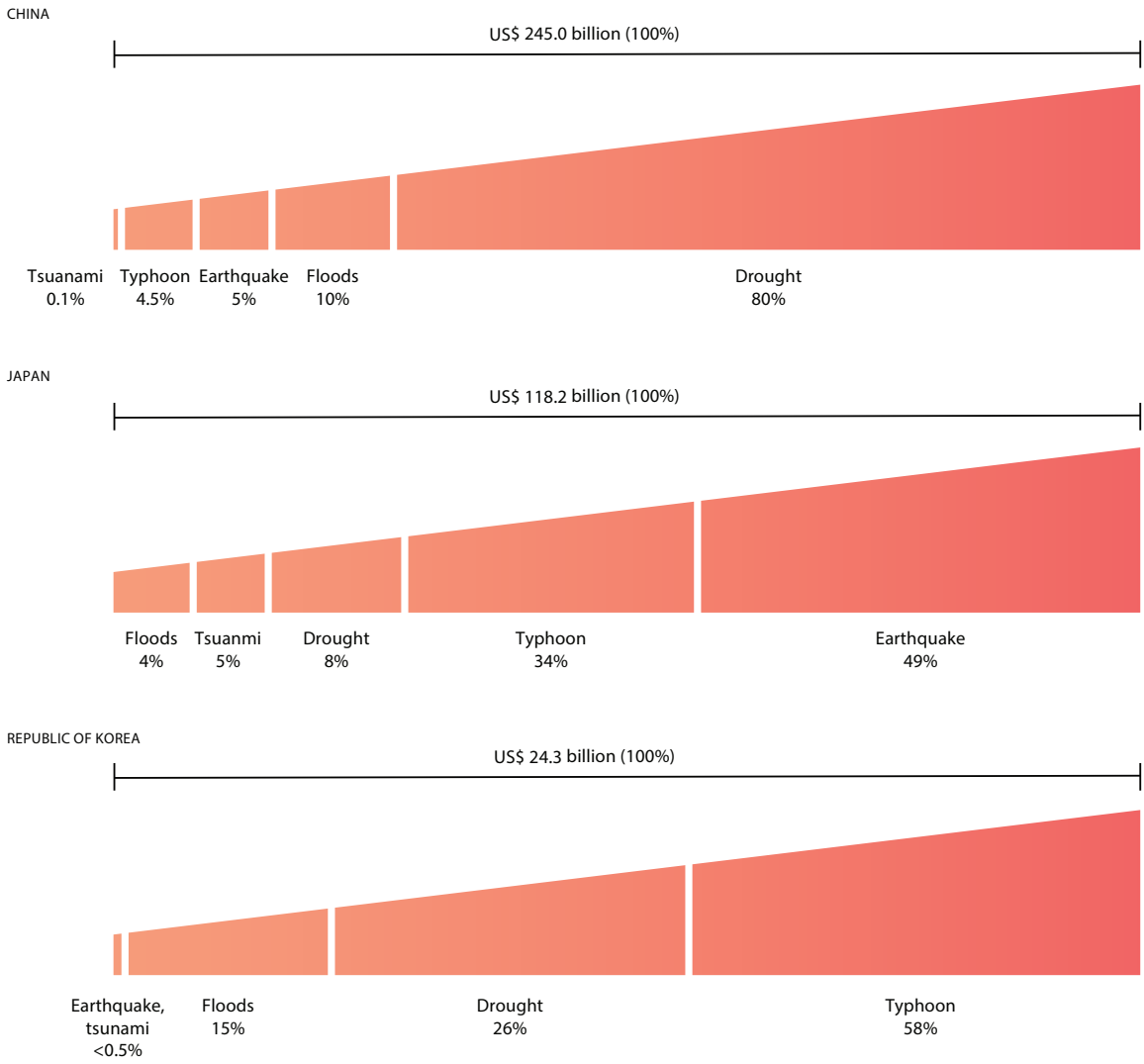
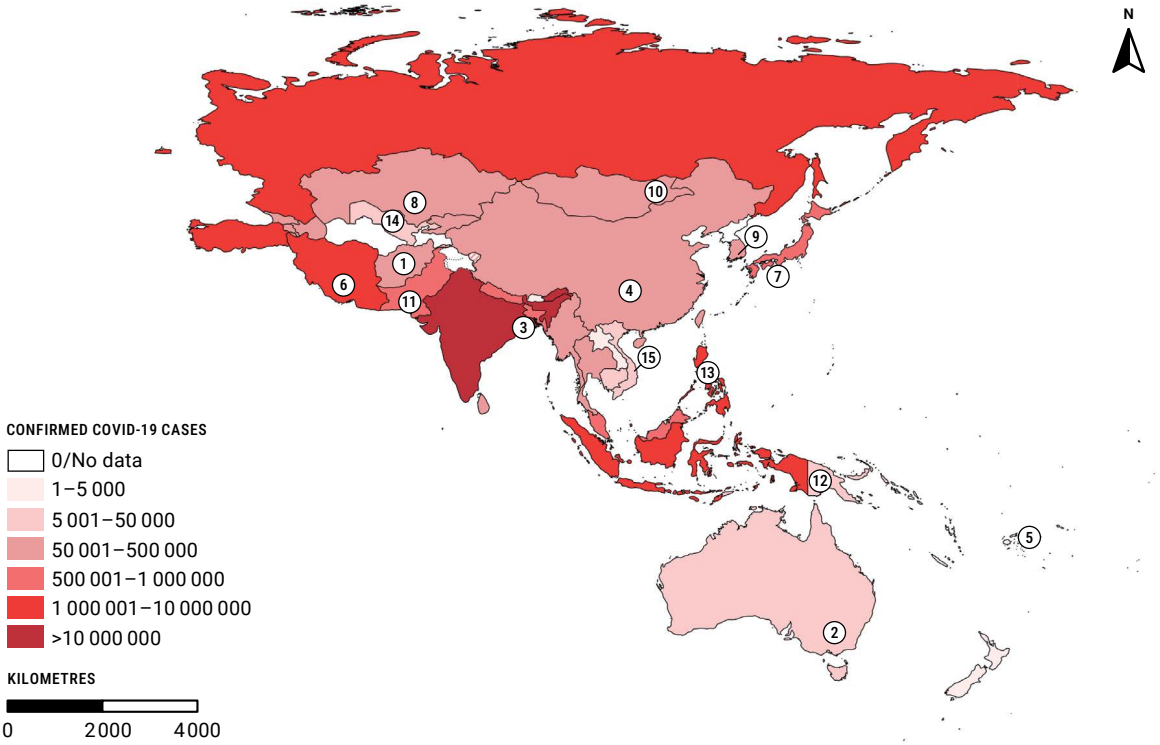


Figure 1: Risk (in Average Annual Loss) of Hazards Impacting Northeast Asia

the second-highest number of fatalities is caused by storms.[5]

While the COVID-19 pandemic raged, the region continued to experience other natural hazards, as illustrated in Figure 2.[6] Tropical cyclones hit many countries across the region, and major flood events hit China and Japan. Pandemic-related lockdowns, travel restrictions, and other containment measures interrupted many established measures for prevention, response, and recovery from natural hazards. At the same time, natural hazards also hampered the response to COVID-19 and facilitated its spread as people were forced to crowd together in emergency shelters.

Looking forward, the region will confront the challenge of responding to disasters with a vastly changed public, i.e., a much older, on average, population. In the Asia-Pacific region overall in 2019 more than 400 million people were aged 65 and older and, therefore, were more vulnerable to negative impacts from both slow-onset and sudden disasters, including heatwaves, pandemics, and storms. Japan, at present, has the world's highest proportion of older people, and events in 2020 illustrated challenges for this more vulnerable population. In July 2020, torrential flooding on Kyushu affected more than 50 nursing homes, leading to several deaths. Although a warning was issued, it was difficult to evacuate older people. The countries with the highest proportion of their older population



1 AFGHANISTAN
Hazard: Drought
Period: Jan–Apr 2021
Province: Badghis
Affected population: 9 million

2 AUSTRALIA
Hazard: Convective storm
Period: 19–21 Jan 2020
State: New South Wales & Victoria
Damage in USD: 1.5 billion

3 BANGLADESH AND INDIA
Hazard: Cyclone *Amphan*
Period: 16–21 May 2020
Affected population: 20.6 million
Damage in USD: 14.5 billion

4 CHINA
Hazard: Flood
Period: 21 May–30 Jul 2020
Province: Yangtze River Basin
Affected population: 4.2 million
Damage in USD: 17 billion

5 FIJI
Hazard: Cyclones *Harold, Ana*
Period: 8–9 Apr 2020, 30–31 Jan 2021
Province: Kadavu, Viti Levu
Affected population: 180,000 & 82,751

6 IRAN (ISLAMIC REPUBLIC OF)
Hazard: Flood
Period: 1–2 Apr 2020
Province: Fars, Hormozgan, Qom
Affected population: 2,845
Damage in USD: 1.2 billion

7 JAPAN
Hazard: Flood
Period: 29 Jun–10 Jul 2020
Province: Kyushu
Damage in USD: 5.8 billion

8 KAZAKHSTAN
Hazard: Flood
Period: 1–4 May 2020
Province: Turkestan
Affected population: 33,000

9 REPUBLIC OF KOREA
Hazard: Cyclone *Heishen*
Period: 6–8 Sep 2020
Province: Ulsan
Damage in USD: 1.2 billion

10 MONGOLIA
Hazard: *Dzud*
Period: Dec 2020
Province: Khovd, Gobi-Altai
Affected herders: 150,000

11 PAKISTAN
Hazard: Flood
Period: Aug–Sep 2020
Province: Sindh, Khyber Pakhtunkhwa
Affected population: 2.6 million
Damage in USD: 1.5 billion

12 PAPUA NEW GUINEA
Hazard: Flood
Period: 4–7 Apr 2020
Province: Moripi, Toaripi
Affected population: 60,000

13 PHILIPPINES
Hazard: Cyclones *Ulysses, Goni*
Period: 11-12 Nov 2020 & 31 Oct-1 Nov 2020
Affected population: 4.9 million and 2 million
Total deaths: 111 and 399
Damage in USD: 42 million and 369 million

14 UZBEKISTAN
Hazard: Flood
Period: 1-11 May 2020
Province: Syr Darya
Affected population: 70,050

15 VIET NAM
Hazard: Cyclone *Linfa*
Period: 6 Oct–3 Nov 2020
Province: Da Nang, Hà Tĩnh
Damage in USD: 6.7 billion

Sources: ESCAP, based on WHO Coronavirus Disease (COVID-19) Dashboard, as of 6 June2021; EM-DAT accessed on 4 May 2021; and Reliefweb, Accessed in February 2021.

Disclaimer: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

Figure 2: Coincidence of COVID-19 and Major Disasters (2020 and 2021)

living with multi-hazard risks under a worst-case global warming scenario are in East and Northeast Asia.[7]

Hazards

Northeast Asia is highly exposed to various hazards. Many of the region's people live in high risk, multi-hazard areas. The region is also one of rapid economic development. Well-developed infrastructure is exposed to hazards, and disasters often follow each other in quick succession, e.g., typhoons and floods, earthquakes and tsunamis, and drought with sand and dust storms.[8]

The risk landscape includes biological hazards and the impacts of climate change alongside floods, storms, earthquakes, and tsunamis. Moreover, the region is at risk of heatwaves and related biological hazards that intersect with earthquakes and typhoons. The COVID-19 pandemic has increased awareness of how risks interconnect and how systemic biological and hydro-meteorological risks will be affected by the changing climate. While communities in Northeast Asia generally escape some of the worst impacts in a worst-case climate change scenario, the number of people at high risk still increases. Climate change will slow poverty reduction with a particular impact on cities where "urban heat islands" will impact the poorest in society as these countries experience higher temperatures and different patterns of rainfall. In both urban and rural areas, some groups are particularly vulnerable, notably women, children, the elderly, and those living with disabilities. The combination of natural disasters and climate change can be expected to widen gender disparities with respect to health services access and employment patterns as the locations, hiring practices, and productivity of formal and informal employment shift alongside remuneration for skilled and unskilled labor. Moreover, the convergence of climate change and biological and other natural hazards will increase child malnutrition while, at the other end of the age spectrum, people aged 65 and over, many of whom are women or living with disabilities, will be at greater risk during slow-onset or sudden disasters.

Drought

Drought is a widespread, slow-onset disaster that most impacts communities that depend on agriculture for a high proportion of their Gross Domestic Product (GDP) or that have lower human development indexes. Droughts can lead to increased pollution, pests, diseases, and famine. Shrinking water sources increase the risks of contamination, and when droughts force people to migrate there is often an increase in child malnutrition and stunting, and even adult malnutrition. Droughts typically affect the most vulnerable populations, creating cycles of intergenerational deprivation.[9]

Although agriculture in China only accounts for 9% of total GDP – amounting to US$890 billion - China's agriculture average annual losses from drought still represent more than 80% of the country's total losses from disaster.[10] Drought occurs frequently in China. Historical records identify 1,056 droughts in the period 206BCE-1949CE, or one drought every two years. Northern China has become warmer and drier over the last four decades. Annual precipitation has declined by about 43.9 millimeters (mm; 1.73 inches), and seasonal drought in southern China has become more severe.[11]

Japan in general has abundant rainfall and is characterized by a rainy summer season and annual typhoons. However, most rivers are steep, and rainwater falling in the mountain ranges flows quickly to the ocean, offering little opportunity to harvest rainwater. Although Japan has repeatedly faced serious water shortages owing to severe droughts, studies suggest that the normal rainfall pattern – the summer Baiu rains, the fall Shurin rains, and continuous spring rainfall, in addition to winter snow – reassert swiftly.[12] Japan experienced severe droughts multiple times in the 20th century. Analysis from 1902 to 2009 shows the most severe drought took place from 1939 to 1941, lasting for 666 days. This drought affected water supply, electricity, hydropower generation, factories, railway, and

marine transportations. A more recent example is the nationwide drought of the mid-1990s. A long period of low rainfall caused a deterioration of water quality of major rivers near Lakes Sagami, Tsukui, and Tanzawa and forced water rationing.[13] Approximately 16 million people experienced water-supply suspension or water-saving restrictions at least once, and the country suffered economic losses worth around ¥140 billion (US$1.2 million) because of the decline in agricultural production.[14]

The Korean Peninsula faced a severe three-year drought (2013–2015), during which annual precipitation was less than 35–50% of normal levels. Droughts on the Korean Peninsula are more likely when the summer monsoon season is relatively short as 70% of annual precipitation is normally concentrated in the summer.[15] For decades, scientists have noted an overall increase in precipitation over South Korea. However, several parts of the country have experienced droughts of moderate intensity each year since 2000, and drought risk is expected to increase with climate change. During the 2013-2015 drought, local government enforced water use restrictions in eight cities of the west coast. The most affected area has been the Han-River watershed including Seoul, Gangwon, and Gyeonggi Provinces where nearly 30 million live.[16]

Although the average precipitation in Taiwan is high, the island is prone to drought due to the uneven temporal distribution of precipitation and the small storage capacity of reservoirs. Typhoons deliver most of the annual precipitation over a period of a few days. In southern Taiwan, for example, 90% of annual rainfall occurs during the wet season. Therefore, when typhoons bring less than normal amounts of precipitation, drought is likely in the spring of the following year.[17] Based on statistics of historical cases, severe droughts are more likely to happen from late fall through winter.[18]

Earthquake

Earthquake risk is extremely varied and depends on tectonic setting. The highest hazard regions are either underlain by subduction zones (where two tectonic plates collide and where the heavier, usually oceanic, crust sinks into the earth's mantle beneath the lighter, usually continental, plate) as in Japan or located along collision plate boundaries such as southwestern China.[19] East Asia is bounded by the Indian plate to the southwest and the Pacific and Philippine plates to the east.[20] In general, the Pacific Plate is pushed beneath the other plates, producing major subduction zones from Japan southward to New Zealand.[21] In general, crustal deformation in mainland China is controlled by the northeastward collision of the Indian plate into Eurasia and westward subduction of the Pacific and Philippine Sea plates beneath Eurasia.[22] Among the major quakes that have occurred in recent years, two are notable:

- 2008 - Wenchuan, Sichuan Province, China: a 7.9 magnitude event claimed some 70,000 lives, triggered landslides, and was felt thousands of kilometers away; and
- 2011 – Tohoku (northeast region), Japan: a 9.0 magnitude earthquake and tsunami brought waves up to 40 meters (m; 131 feet) high;[23] some 20,000 people were killed,[24] and over 100,000 buildings were destroyed.[25]

Earthquakes that occur in developed areas are the Asia-Pacific region's costliest events in terms of average annual loss, which incorporates direct and indirect losses to the economy. Japan accounts for 64% of total earthquake losses in the region while China accounts for 14%.[26]

Figure 3 shows the concentration of populations most exposed to seismic risks, such as earthquakes and tsunamis.[27]

Flooding

Floods are the Asia-Pacific region's second most costly events in terms of average annual loss. China alone accounts for 28% of total flood losses in the region.[28] Despite exposure, in recent decades, the impact of flood regionally has fallen in terms of fatalities and the number of people affected. In the 1990s, floods killed 55,000 people in total, but that number fell to 39,000 in the 2000s, as illustrated in Figure 4.[29]

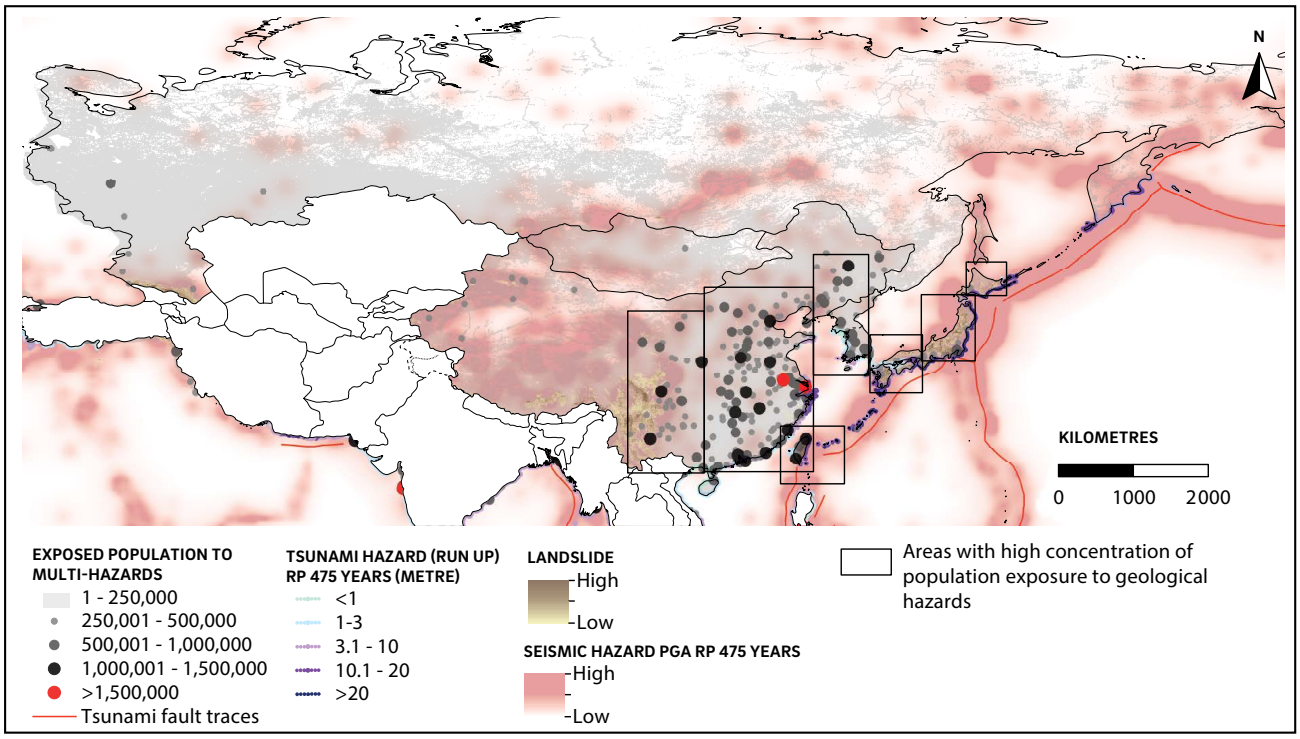


Figure 3: Concentration of the Population Exposed to Seismic Risks



Figure 4: Number of Fatalities and People Affected by Floods in the Asia-Pacific (1991-2020)

By worsening living conditions and displacing people from their homes, thereby forcing them to use compromised water sources, floods can lead to gastro-intestinal illnesses. They also interrupt the treatment of non-communicable diseases by disrupting supply chains and access to health care. In addition, there is a heightened risk of vector-borne diseases, such as dengue and malaria. The human-animal-insect interaction weaves a complex web of disease transmission that is compounded during flooding, which provides a perfect breeding ground for mosquitos.[30]

For China, flooding is a perennial threat to people and livelihoods, and China's economic growth over the past 30 years has been mirrored by a rising economic toll caused by flooding – i.e., in the 1990s, average annual loss from floods was US$24-39 billion, in the 2000s US$7.2-30.6 billion, and in the 2010s US$24-

56 billion.[31] These losses stem from the fact that more expensive and more concentrated economic inputs are being damaged or destroyed rather than that flooding is more widespread or frequent. Several types of flooding impact the country:

- Flash flooding is typical in China's remote or mountainous areas and causes 70% of flood-driven loss of life. Landslides, mudflows, and debris flows caused by the sudden onset of intense storms account for many casualties because warning times are shorter, populations are more dispersed, and access and communications are more difficult and expensive.
- Coastal flooding results from storms in conjunction with high tides with an average of four such floods each year in China, mostly between July and September. The country has invested in sea walls and improved evacuation routes for coastal regions, but losses caused by storm tides are expected to increase due to global warming and associated rising sea levels.
- Urban areas may be flooded by main rivers or because of poor drainage. Extremely rapid urbanization associated with economic development and migration from rural areas has seen populations in some cities triple or even quadruple over a short period, and many newcomers have settled on flood-prone land. Meanwhile, drainage systems in many city centers have become antiquated.
- Poor drainage is a serious problem in rural areas where it causes crop losses and property damage when heavy rains overwhelm water management infrastructure. Local efforts to capture stormwater runoff behind dikes or informal polder embankments can often intercept stormwater runoff that otherwise would drain to rivers or lakes, and this retention results in longer periods of waterlogging behind dikes.[32]

About one-half of Japan's total population lives on alluvial plains, and nearly three-quarters of the country's total economic assets reside on those plains. Some areas of the densely populated Tokyo, Ise, and Osaka Bay regions are below sea-level. Already, Japan receives double the global average rainfall of 1,718 mm (67.6 inches) annually, with much of it concentrated during the rainy and typhoon seasons.[33] Japan is exposed to the following types of floods:

- Water pushed to shore by storm winds, which, when coinciding with tide, can create considerable rise in sea levels.
- River floods result from heavy rainfall over several days and cover large areas where water levels rise when the soil is saturated.
- Flash floods are caused by intense rain over a small area; while the soil may not be saturated, the rainfall exceeds the infiltration rate and runs off the surface.
- Tsunami waves are generated by large volumes of water displaced by earthquake, landslide, or volcanic eruption, and they can travel through the open sea for hundreds of kilometers without losing their energy and will increase in height when they reach Japan's shores.[34]

Historically, Japan has managed flood risk by large-scale flood control projects with a special focus on urban flood control as the country experienced rapid urbanization in the second half of the 20th century. To date, embankments, reservoirs, discharge channels, and underground diversion facilities have sufficed to save urban areas, but based on the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) and the Ministry of Land, Infrastructure, Transport, and Tourism's Technical Review Board for Climate-Change-Based Flood Control Planning, the country can expect double the frequency of significant flooding by the end of the 21st century based on limiting global temperature rises to 2°C (3.6°F).[35]

South Korea has a rainy season running June to September, during which air masses from the northern Pacific and tropical cyclones move northwards and, as they hit the Korean Peninsula, they account for 55% of South Korea's annual precipitation. Given weather patterns and

the predominance of mountainous terrain, most of the heavy rainfall is concentrated in western and southern river basins. Further, coastal floods occur repeatedly every year. Industrialization and urbanization have resulted in larger population concentrations in metropolitan areas and, in turn, an increase in impervious surfaces. Therefore, the frequency and scale of damage caused by urban floods are increasing.[36]

Taiwan sits on typhoon tracks with high temperatures and heavy rainfalls; non-typhoon rains also impact the country with its mountainous terrain promoting swift runoff into lowland areas. The annual average precipitation is 2,500 mm (98.4 inches) and can reach 3,000-5,000 mm (118-196 inches) in mountain regions. Typhoon-related torrential rains are concentrated in the summer and autumn. During the last quarter of the 20th century, floods damaged 3,000 buildings with losses of US$518 million. The heavy losses of life and damage to property and infrastructure during the years 1977-2001 forced the authorities to initiate appropriate measures for the reduction of the impact of floods. Taiwan's flood risk mitigation efforts have since then shifted to non-structural efforts, such as flood alert and warning systems and away from structural elements that have proven to be made swiftly obsolete by growing urbanization and population growth.[37]

Heat

Heat incidents disrupt economic activity, result in losses in labor productivity, agriculture, transport, and utilities, and present profound risks to health. Heatwaves increase deaths for those suffering from underlying cardiovascular and respiratory conditions and are also associated with suicides. The very old, the poor, the socially isolated, and those who work outdoors in informal economies, are the most susceptible to the adverse effects of heatwaves. Poorer people, living in inferior housing conditions, experience overheating, while the costs of water make bathing more expensive. The use of electricity for fans and air conditioning leads to shortages of supply. Furthermore, the poor may not be able to afford any form of mechanical cooling.[38]

Among the 30 most populous cities in China, 24 have seen the arrival of the first hot day of the year (measured as the temperature reaching 30°C / 86°F) earlier for the period 2001-2020 compared to the previous two decades. In the most extreme cases, in central and southern China, the first hot day of the year has been arriving on average, two to three weeks earlier than the baseline period. The major metropolitan areas of Beijing, Shanghai, and Guangzhou-Shenzhen have experienced heatwaves (daily maximum temperature of over 35°C (95°F) for at least three days) with increasing frequency and severity since the 1990s.

Among the 21 most populous cities in Japan, 18 saw 30°C (86°F) temperatures arrive earlier in the spring or summer. In the far north, Sapporo recorded the first hot day, on average, 23.1 days earlier during 2001-2020 compared to the previous 20-year period. In 17 cities, the number of extreme hot days (defined as the temperature reaching 33°C / 91.4°F) per year has increased significantly since the 1980s. In Tokyo, the number of extreme hot days has increased at a rate of nearly three days per decade since 1961. In the 1960s, the temperature in Tokyo reached 33°C (91.4°F) on average 13.0 days per year, while for the period 2011-2020 that number more than doubled to 26.9. In Saitama, a site of rapid urbanization, the number of extreme hot days has been increasing at a rate of 5.1 days per decade since the 1980s.

Recent summers in Korea have been marked by nationwide heatwaves that resulted in excess mortality and significant rises in hospitalizations. According to the Korea Meteorological Administration (KMA), 2016 was the hottest year on record since 1972, with 22 heatwaves. In August 2018, extreme temperatures again broke records with severe health impacts. The Korea Disease Control and Prevention Agency (KDCA) said that the 2018 heatwave episode caused at least 42 deaths, and 3,400 people were treated for heat-related illnesses, such as heat stroke.[39] Of the eight most populous cities in

South Korea, hot days of 30°C (86°F) arrived sooner in six cities. In Seoul, the first hot day of the year arrived on average 10.6 days earlier during the period 2001-2020 compared to the previous 20-year period while Gwangju saw the most dramatic shift with the first hot day arriving 12.7 days earlier for the period 2001-2020 compared to the baseline. For all Korean cities, the 2010s saw the highest number of 35°C (95°F) days when the years 1960-2020 are considered. In Busan, the number of annual 33°C (91.4°F) days did not exceed 10 for the period 1961-2010. In 2013, that number reached 13 days, and in 2018, it peaked at 18 days. Likewise, in Seoul, the average number of 33°C (91.4°F) days exceeded 12 for the period 2010-2019, more than double the average for 1961-1990.[40]

For Taiwan, heatwaves are forecast to become more severe. Heatwaves on the island are associated with abnormal warming and drying atmospheric conditions even as surrounding waters provide moisture to suppress the drying, thereby ensuring high humidity during the hot spell. The warm and humid air gets trapped in the surface layer, leading to positive feedback loop that ensures consecutive days of high temperature and high humidity.[41] Examining temperature data for Taipei, Taichung, and Kaohsiung cities from 1980 to 2020, there is evidence that the urban heat island effect is the most remarkable for Taipei, likely due to its concentration of concrete buildings, motor vehicles, and people. Over that 40-year period, the average nighttime temperature rose by 2°C (3.6°F), and the average daytime temperature by 1°C (1.8°F).[42]

Pandemic

The COVID-19 pandemic caused many countries to examine how they manage public health emergencies, including epidemics and pandemics. All communities in Northeast Asia have some experience with highly contagious pathogens, but the complications posed by the modern, interconnected world will continue to challenge communities to develop monitoring, messaging, and management systems that may be at odds with historic methods.

China has centuries of written history regarding pathogens with deep scholarship exploring medicine, social impacts, and political and economic questions. One large-scale statistical analysis found evidence of 880 epidemic years in the territory of modern China from 220 BCE to 1949 CE. Epidemics broke out almost annually during the period from the mid-15th to the mid-20th centuries. Responses to these diseases differed over time and space as concepts of infection, administration, and social belonging shifted. A turning point came during the mid-20th century, during World War II and into the first decade of the People's Republic of China when both the modern health care system and the top-down state developed roles in epidemic control.[43] Since that period, the state has taken a lead role in managing infectious disease outbreaks both domestically and on the international scene when epidemics become pandemics, such as the "Asian flu" of 1957-1959 that killed two million people worldwide and, more recently, the coronavirus outbreaks of 2002 and 2019.[44] The two Severe Acute Respiratory Syndrome – Coronavirus (SARS-CoV) pandemics highlight the challenges of aligning individual, social, and national interests in management of deadly diseases. The SARS pandemic in 2003 prompted the first substantial improvement of China's public health system in decades, and, despite some lingering gaps, these improvements helped the country contain the COVID-19 pandemic through effective resource sharing and the tracking of close contacts.[45]

Like China, Japan has a long, written history that addresses epidemic diseases, their treatments, and how they impacted society. Key parts of the history of epidemics until 1600 (when Japan banned travel and trade with most of the outside world) include the period 700-1050, an age of severe epidemics of smallpox, measles, influenza, and mumps, and the period 1050-1260, when some killer diseases became endemic. During the latter period, disease management became a household or village matter rather than a national issue, setting

the stage for Japan to view disease control as a personal moral duty and, therefore, setting the cultural stage for managing subsequent epidemics. Large-scale public mobilizations or interventions such as those instituted in Europe to combat the Black Plague are absent from the record.[46] Post-World War II Japan has seen significantly fewer outbreaks of highly contagious pathogens. It was largely spared by the 2003 SARS pandemic and the 2012 Middle East Respiratory Syndrome (MERS) crisis. It was not until a 2014 outbreak of dengue in Tokyo that the country was reminded the medical, economic, and political implications of an epidemic. Although the country has a National Institute of Infectious Diseases, it lacked funding and staff to meet the demands of the COVID-19 pandemic.[47] Thus, the country resorted to shutting its doors to keep out infection and asking its citizens to stay home to contain the spread of infection.

South Korea was not spared the COVID-19 pandemic, but, throughout the crisis, it has consistently been held up as a paragon of how to confront such a public health challenge. Two factors are believed to have allowed it to have more success in mitigating early harm than other similarly developed, aging, high tech societies. The first was the capacious formal health system that was able to continue care for non-COVID patients even as cases of COVID rose. More importantly, the country had failed in 2015 to adequately confront the spread of MERS and, consequently revamped its pandemic preparedness and response mechanisms. In 2015, the country reported 17,000 MERS cases and 38 deaths. During the six months of that outbreak, Koreans lived in fear, and the government lost an estimated US$2.6 billion in tourism revenue while spending almost US$1 billion on its response. After MERS, the country developed more infection control staff and isolation units, expanded outbreak simulations and personal protective equipment (PPE) training, and began community-based collaboration between medical centers and local governments. When COVID-19 struck, the painful memory of MERS inspired an early and aggressive government response and a public willing to adhere to prevention protocols. Within this trusting environment, KDCA exploited the country's strong public-private industry relationships and its strong high-tech sector to swiftly develop and produce medical diagnostic equipment that the public trusted.[48] The contrast in management of MERS and SARS underscores the importance of leadership in South Korea's model.

Similarly, Taiwan was roundly applauded for its ability to control the spread of SARS-CoV-2 while keeping its economy growing. To a great extent, like South Korea, Taiwan's success was a result of experiences with the 2003 SARS crisis. Upon learning of the discovery of a novel coronavirus in Wuhan, China, in December 2019, Taiwan's authorities activated a national strategic response plan prepared in the years after 2003. The strategy is two-pronged: 1) keep the virus out, and 2) prevent and control community spread. While the first prong meant stringent travel restrictions, the second was administrative. Within weeks, Taiwan stood up the Central Epidemic Command Center to lead all COVID-19 related matters in close cooperation with Taiwan's Centers for Disease Control, the National Health Insurance Administration, the immigration authority, and the private sector. Taiwan's public cooperated in a demonstration of trust in the health authorities. However, this organization and cooperation became something of an obstacle by the time the vaccine roll-out began. As there was minimal infection-related immunity alongside limited vaccine access and vaccine hesitancy, in the first five months of the vaccination drive, only 0.001% of the population had been vaccinated. This continued such that, by May 2021, Taiwan entered a phase of community spread, and medical staff, hospital bed space, and testing capacity were all stretched. Emergency measures were taken to limit social interactions. While this served to squash the massive spread, it also took a toll on Taiwan's economy as consumer spending declined and unemployment reached a 10-year high. Despite a summer 2021 wave, Taiwan's overall COVID-19 experience was laudable with swift action

by a strong Centers for Disease Control and healthcare system along with public cooperation based on transparency and ample supplies of personal protection equipment, all of which played a critical role in managing the pandemic.[49]

Sand and Dust Storms

Sand and dust storms constitute a concern for health and the environment. Originating principally in arid areas of China's Inner Mongolia and in Mongolia's Gobi Desert, windborne dust particles are carried eastward to affect China, the Korean Peninsula, and Japan.[50] The storms are driven by low-pressure systems combining with strong winds and cold air fronts, pushing dust into the atmosphere, and carrying it across the continent.[51] Mineral dust suspended in the atmosphere can affect human health because of its physical, chemical, and biological properties. Exposure to mineral dust can result in conjunctivitis (Pink Eye) and dermatological problems, while inhalation can cause respiratory illnesses, such as silicosis ("desert lung syndrome"). It can also act as a trigger for many other conditions like asthma, bronchitis, emphysema, and chronic obstructive pulmonary disease.[52] Over the past decade, the yellow dust phenomenon has become a more serious problem because of industrial pollutants and intensified desertification in originating regions. Yellow dust storms also have negative effects on water, air, soil, and animals.[53] China is among the countries with the largest population (in absolute terms) exposed to medium and high levels of poor air quality due to sand and dust storms at 40 million people.[54] South Korea is periodically exposed.[55]

Tsunami

Tsunamis can be immensely costly in terms of average annual loss, which incorporates direct and indirect losses to the economy. Japan accounts for 91% of total typhoon losses in Northeast Asia.[56]

China's mainland coast is exposed to tsunami from wave-inducing events in the East China Sea and Yellow Sea; the hazard is generally moderate with elevated hazard levels found along both flanks of the Yangtze and Pearl River estuaries. The probability that these more vulnerable coastlines will be impacted by one meter (3.2 feet) or greater tsunami waves is about 14-40% in the next century. The shallow and tongue-shaped submarine terrain amplifies the hazard level by trapping the tsunami energy in these areas. Major subduction zones in the Northwest Pacific were identified as the main sources of destructive events along the coast of the East China Sea, while the Manila Trench is the main source zone that threatens the northern South China Sea.[57]

Many areas of Japan's coastline are at risk of being significantly affected by tsunamis of greater than 10 m (32.8 feet), depending on their topography. The coastal areas most likely to be affected by tsunami are concentrated on the islands' eastern coasts, but areas of the northwestern coast – on the Sea of Japan/East Sea – are also vulnerable. Major historic tsunamis include:

- 1703: the 8.2 magnitude Genruko earthquake, located in what is today the Tokyo region, triggered a tsunami whose maximum height was just higher than 10 m (32.8 feet) and claimed more than 5,000 lives;
- 1923: the Great Kanto earthquake was followed by a tsunami of about 12 m (39.3 feet), which claimed thousands of lives and caused major destruction along the Sagami Bay and Boso and Izu Peninsulas and the Izu Islands; and
- 2011: the Tohoku (Great East Japan) tsunami reached nearly 40 m (131 feet) in some areas;[58] although the magnitude of the earthquake was immense, the tsunami waves were responsible for most of the deaths (nearly 20,000) and destruction, including more than 120,000 buildings destroyed and more than one million damaged; importantly, the tsunami waves overtopped protective walls and entered the Fukushima Nuclear Power Plant and caused a cooling system failure that resulted in a meltdown and release of radioactive material.[59]

While historic events may suggest that Japan's Pacific coast – impacted by major subduction zones such as the Japan Trench and the Nankai Trough – is at the greatest risk, upwards of 60 faults off the Sea of Japan/East Sea coast pose non-negligible tsunami hazards. Indeed, earthquakes greater than 7.0 magnitude off Japan's western coast have generated large tsunamis, the most recent damaging one in 1993. The Hokkaido Nansei-oki earthquake was a 7.8 magnitude event and caused a maximum run-up height of more than 30 m (98.4 feet) on Okushiri Island in Hokkaido. Other large-scale events also occurred on the Sea of Japan/East Sea coast in 1983, 1964, 1940, 1833, and 1741; there are also records suggesting such events as far back as 3,000 years.[60]

The possibility of a tsunami causing significant damage to South Korea's coastal regions is low, due to its geographic location, but the risk is not zero. The Korean Peninsula is shielded by Japan on the east. For any tsunami originating in the Pacific, Japan would stand in the way of direct waves. On the other hand, a strong quake in western Japan, the Sea of Japan/East Sea, or in the Yellow Sea, South Korea may be vulnerable. Records from the 17th century show multiple cases of earthquake-induced waves. Since 1900, there have been four recorded tsunamis that caused substantial damage on the Korean Peninsula; they originated in the Sea of Japan/East Sea. The most recent event, in 1983, was caused by a 7.8 magnitude earthquake near the Japanese island of Hokkaido; the resulting 3 m (9.8 foot) tsunami killed three people and destroyed dozens of fishing boats in cities on South Korea's west coast. A survey by national authorities found 165 underwater earthquakes of 3.0 magnitude or higher between 1978 and 2012; any of these, depending on power and location, could cause a tsunami. The KMA suggests an earthquake larger than 6.5 magnitude in Korea's east coastal area can trigger a tsunami that could cause substantial damage, and a 6.6 magnitude quake can create a tidal wave that is 0.5 m (1.64 feet) in height. It would take a much stronger quake - 7.5-7.8 - in the shallower Yellow/West Sea to cause a damaging tsunami.[61]

Taiwan is not entirely insulated from tsunami, and large (>8.0 magnitude) earthquakes in the Manila Trench could send waves onto Taiwan's eastern coast. The Trench is just 100 kilometers (km; 62 miles) off Taiwan, and a tsunami generated by a large quake could arrive on Taiwan's shores within 15 minutes. In such a case, the island's topography would still protect most population centers as a tsunami may only reach 0.5-1 km (0.3-0.6 miles) inland. Although a tsunami could potential hit any part of the island, communities on the southern coasts are thought to be particularly vulnerable due not only to topography but also to the seascape south and southeast of the island.[62] In case of a tsunami generated by a 9.4 magnitude earthquake along the Manila Trench, the worst case scenario predicts the highest risks in southwest Taiwan, specifically, up to 4 m (13.1 feet) at the Port of Kaohsiung, Taiwan's principal port and the sixth largest container port in the world.[63]

Typhoons and Tropical Storms

Typhoons are among the Asia-Pacific region's most costly events in terms of average annual loss, which incorporates direct and indirect losses to the economy. Japan accounts for 47% of total typhoon losses in the region while South Korea accounts for 16%. Figure 5 shows a map of the concentration Northeast Asia economic stock that is exposed to hydro-meteorological hazards; the dark areas of Japan and South Korea underscore the exposure of these developed economies to annual typhoons and other storms.[64]

Climate scientists have determined that warmer sea surface temperatures make it more likely that typhoons will have greater wind speeds and carry more moisture. Thus, typhoons are more likely to be stronger and wetter, will cause devastating flooding and landslides, and can trigger storm surges. Long-range predictions for Northeast Asia indicate that the region will see climate change-induced storms that arrive further to the north – i.e., more storms in China, Japan, and the Koreas – and will see a greater

number of category 4 and 5 storms each year.[65] In the region, between 1978 and 2018, the strongest cyclones, with a maximum surface wind speed of 185 kilometers per hour (km/h; 115 miles per hour (mph)) or more, seem to have been getting stronger, while the weaker cyclones of 93 km/h (57.5 mph) or less have become somewhat weaker. While the number of people affected is high and could continue to rise due to demographic trends, Northeast Asia tends to escape the worst human impacts, as shown in Figure 6 where Northeast Asia's fatality rates are shown to have fallen to near zero over the past decade.[66]

Through water contamination, cyclones can lead to communicable and infectious diseases. Subsequent waterlogging also creates breeding grounds for the vectors of malaria, dengue, and chikungunya, with an increased risk of skin infections.[67]

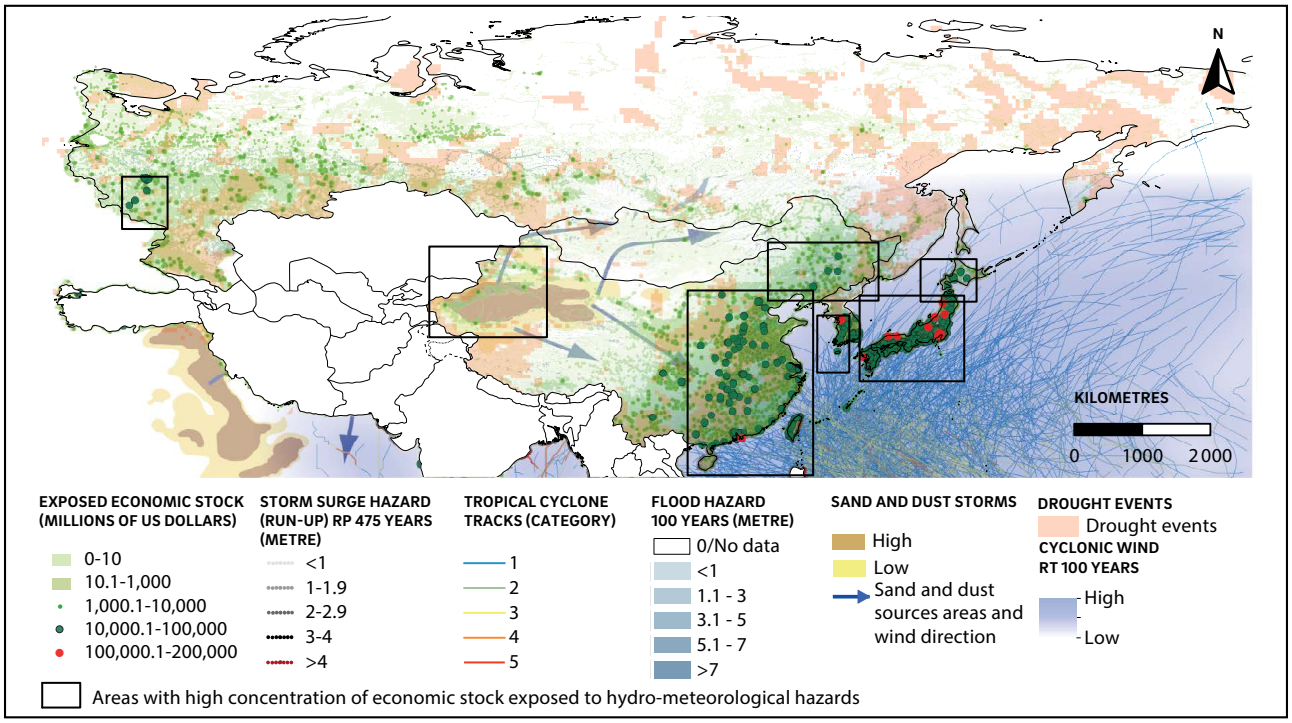


Figure 5: Exposure of Economic Stock to Hydro-Meteorological Hazards



Figure 6: Number of Fatalities and People Affected by Tropical Cyclones in Asia (1991-2020)

Volcanic Eruption

Japan is exposed to the highest risk of volcanic eruption, while China, South Korea, and Taiwan are at relatively lower risk. Japan's volcanoes frequently erupt although not all of them threaten population centers. Indeed, there is broadly less threat from lava flows throughout the region than there is from the fumes and ash that could explode from a volcano and affect air traffic or pollute air, soil, or water.

In mainland China, there are many Cenozoic volcanoes (formed and active from about 66 million years ago). Only a few are active, such as Changbai and Wudalianchi in northeastern China, Tengchong in southwestern China, and Hainan in southernmost China, on the island of the same name. These volcanoes have erupted many times throughout history. In recorded history, Changbai erupted six times: 1120 BCE and 1050, 1413, 1597, 1668, and 1702 CE Wudalianchi erupted during 1719–1721 CE, Tengchong erupted during 1465–1620 CE, and Hainan has erupted many times since the Eocene (56-33.9 million years ago).[68] Tianchi, the summit caldera of Changbai (also known as Changbaishan, Baegdu, Baekdoosan, Baitoushan, Chang-pai-shan, Hakuto, and P'aektu-san) is on the border of China and the Democratic People's Republic of Korea (DPRK or North Korea).[69] It poses the greatest risk to people of any of China's active volcanoes. The three major hazards from Tianchi are columns of debris and gas ejected into the stratosphere, pyroclastic flows (fast-moving rock, gas, and ash), and lahars (flows of water mixed with rock). One of the biggest explosive eruptions at Tianchi occurred about 1,000 years ago, and the eruption column reached an estimated height of 35 km (21 miles). A similar eruption today would have a potential impact on the local area with more than 100,000 people. In the Wudalianchi volcanic field, in Heilongjiang Province, there are 14 monogenetic (single eruption) volcanoes.[70] This field of volcanoes last erupted in 1776, and there is minimal indication of coming eruption.[71] The Tengchong volcanic field in Yunnan Province is part of the southeastern Himalayan tectonic belt. There are 68 late Tertiary–Quaternary (formed about 2.6 million years ago) volcanic centers and several hot springs.[72] An unconfirmed explosive eruption took place at Tengchong in 1609, and there are unconfirmed reports of eruptions during the Qing Dynasty (1644-1911). The area includes active geothermal fields, the largest and highest temperature of which is the Rehai geothermal field, where more than 20 hydrothermal eruptions have occurred since 1993.[73] The Hainan volcanic field consists of 58 cones and craters. Historical eruptions were reported in the Lingao and Chengmai areas in the 19th and 20th centuries.[74]

Japan is home to more than 100 active volcanoes or 7% of the world's total. Many are located close to residential areas. Twice in the past half century, eruptions have caused casualties and damage. In 1991, Mount Unzen's Fugen Peak in Nagasaki Prefecture erupted, triggering a massive pyroclastic flow that killed more than 40 people. Then, in 2014, central Japan's Mount Ontake erupted; 63 people, mostly climbers, were killed or went missing. Even Mount Fuji - Japan's highest peak, a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage site, and the geographic symbol of the nation – is an active volcano that some volcanologists say could erupt at any time. However, there is no single agency dedicated to dealing with volcanic disasters. Since 2019, the government has operated a system designed to enable 14 government organizations and universities to share research and monitoring information, but only 10 have participated so far.[75]

There are three volcanoes in the Korean Peninsula. The biggest one is Baekdu (Changbai, described above under China's volcanoes). The second volcano is Halla, which forms most of Jeju Island, and the third is Ulleung Island, in the Sea of Japan/East Sea. Halla was created about 1.8 million years ago and stands 1,950 m (6,398 feet) high. Histories suggest that there were volcanic eruptions in 1002 and 1007 CE, but it has not erupted since. Ulleung is a volcanic island whose peak stands 984 m (3,228 feet) high.

It is a double volcano with a new volcano inside the caldera at the center of the island.[76] The last major, explosive eruption dates to 11,000-12,000 years ago; that blast produced pyroclastic flows and deposited ash as far away as central Honshu, Japan.[77]

Taiwan confronts a minimal risk of destructive volcanism. Nonetheless, based on fresh scientific observations, the Central Weather Bureau has begun to implement a volcano monitoring and warning system to monitor the Tatun Volcanoes to the island's north and Turtle Island off the northeast coast.[78] Turtle (or Guishan) Island is a volcanic island 10 km (6.2 miles) off Yilan County's Toucheng Township. The island's volcano last erupted in 1785. The island is uninhabited although it is a tourist attraction with day visitors.[79] In 2020, scientists discovered significant volcanic features in the Tatun Volcano Group[80] where there has not been an eruption in recorded history; despite fumaroles and hot springs in the vicinity, the group was long considered extinct.[81] However, increased releases of gases and heat as well as regular earthquakes between 2014 and 2017 brought fresh attention. In the case of an eruption, the lava would most likely pour out through a volcanic conduit near Dayoukeng, threatening Taipei.[82]

5-Year History of Major Disasters

The following section offers a brief description of some of the most significant disasters to impact China, Japan, South Korea, and Taiwan since 2016. It is not intended as an exhaustive list but, rather, to inform readers of the types and scopes of disasters that each experiences and, therefore, has some capacity to respond to internationally.

China

Earthquake – September 2021

A 5.4 magnitude earthquake occurred in southeastern Sichuan Province on 15 September. Three people died, 100 people were injured, and 121,000 people were affected, mostly in and around Luzhou City. A reported 1,400 houses collapsed while more than 35,000 were damaged.[83] Much of the damage was related to falling trees, crumbling brick walls, and blown out windows. Authorities launched rescue efforts as the provincial government activated a level 2 response, the second highest in China's four-tier earthquake emergency response system. Thus, thousands of soldiers and emergency workers, along with rescue equipment, medical supplies, makeshift surgical vehicles, and heavy machinery were dispatched to assist while evacuees were directed to tents set up in a nearby village.[84]

Typhoon – July 2021

Shanghai City and areas of Zhejiang and Jiangsu Provinces were struck by Typhoon In-Fa on 25-26 July. The storm brought heavy downpours and flooding and packed winds up to 137 km/h (85 mph) at its eye. Ahead of landfall, the typhoon sent heavy rains, strong winds, and sudden floods into Zhejiang. Authorities evacuated 1.5 million people and opened more than 12,000 temporary shelter facilities. The typhoon also caused heavy rain and gales at coastal areas of Jiangsu's Nantong city. A total of 97,915 people across Jiangsu were evacuated. In Shanghai, Typhoon In-Fa toppled 1,000 trees.[85] Moisture associated with In-fa also impacted central China's Henan Province. At least one person was reported dead amid floods in Gongyi city. Meanwhile, heavy rain shattered records. In one hour, Zhengzhou saw 200 mm (7.9 inches) of rain, and in 24 hours, it reported 553 mm (21.8 inches).[86]

Earthquakes – May 2021

A series of earthquakes and aftershocks rattled southwest and northwest China on 21-22 May. At least three people were killed and 33 injured, most of them in the first of the two primary quakes, in Yunnan. The Yunnan quake was a 6.4 magnitude temblor near the city of Dali and was followed by at least two aftershocks. In addition to the human casualties, at least 192 houses collapsed, and more than 20,000 people had

to be evacuated. A few hours after the Yunnan quake, a 7.4 magnitude quake struck in a sparsely populated area of Qinghai Province; it, too, was followed by an aftershock. At least two bridges collapsed, and two sections of highway were destroyed in the latter quake.[87]

Earthquake – March 2021

A 5.4 magnitude earthquake struck in western Xinjiang on 23 March. At least three people died near the epicenter of the quake, in Aksu Prefecture, and 278 persons were evacuated after 65 houses were damaged.[88]

Sand and Dust Storms – March 2021

During the period 15-18 March, China was among the countries hit by the worst sand and dust storms in a decade. The storms extended from the Gobi Desert and the central and western deserts over Mongolia, to some provinces in northern and northwest China including Beijing and affected 40% of the population. The pollution level was more than 150 times the recommended limit.[89]

Typhoon – August 2020

Typhoon Higos and unusually heavy seasonal rains caused flooding and landslides on 19 August. Five people were missing in Yunnan after a landslide destroyed two houses. In Sichuan, 21 vehicles fell into a hole after the road beneath them collapsed. Typhoon Higos drenched Hong Kong before making landfall in Zhuhai, Guangdong Province, with maximum sustained winds of 126 km/h (78 mph). Power was knocked out in Meizhou, Guangdong, after trees fell onto power lines. The worst of the flooding was in Chongqing, which saw floods that covered roofs in low-lying areas. On the Yangtze River, the inflow of water into the reservoir behind the Three Gorges Dam hit a record 72,000 cubic meters (2.5 million cubic feet) per second.[90]

Typhoon – August 2020

Typhoon Hagupit crashed into eastern China on 3 August. The storm brought flood-inducing rainfall, strong winds, and storm surges. As the storm approached China, officials evacuated residents from vulnerable coastal areas of Zhejiang and Fujian Provinces. Hagupit made landfall near Wenzhou in Zhejiang. At least 200,000 people were sheltering in evacuation centers as wave heights of 4.2 m (13.8 feet) were observed and rainfall totals climbed to 50-100 mm (2-4 inches) in Zhejiang. As Hagupit tracked northward, it continued to drop massive amounts of rain; Rui'an reported 212 mm (8.33 inches) of rainfall, and Xianju reported 195 mm (7.68 inches). The storm passed just west of Shanghai, which experienced periods of heavy rain and wind gusts around 70 km/h (45 mph).[91]

Earthquake – January 2020

One person was confirmed dead and two were injured after a 6.4 magnitude earthquake hit Xinjiang on 19 January. The epicenter was in Jiashi, Kashgar prefecture, and was followed by at least eight aftershocks, including a 5.2 magnitude quake not far from Jiashi. Evacuations were conducted in several areas as personnel from emergency management, earthquake, civil affairs, and health departments arrived. Nine passenger trains running in the quake zone were halted.[92]

Earthquake – December 2019

Eighteen people were injured when a 5.2 magnitude earthquake hit Zizhong County, Neijiang City, Sichuan Province, on 18 December. Authorities reported that 20 houses collapsed while 11,968 households lost power and three mobile communications base stations were damaged. Rescue operations were carried out by local police, emergency response forces, medical staff, and firefighters.[93]

Drought – August-November 2019

From mid-August through early November, Anhui Province had received only about 60% of its average precipitation and, on 9 November, raised its drought emergency response to level III as the worst dry spell in decades showed no signs of abating. The third-highest level in the four-tier system was activated after scarce rainfall brought moderate drought to most areas south of

the Huaihe River and severe drought to the Dabie Mountains and some areas along the Yangtze River. The drought affected over one million residents and damaged 400,000 hectares of crops, and the estimated direct economic losses rose to ¥1.6 billion (US$227 million). A local official said the drought had killed large tracts of forest and that the biggest danger was mountain fires. Shanxi, Jiangxi, Hubei, Hunan, Guangxi, and Chongqing were also impacted.[94]

Earthquake – September 2019

A 5.1 magnitude earthquake struck southeastern Sichuan on 7 September. One person was killed and 63 injured. More than 10,000 people were affected as 132 houses were destroyed and 5,041 damaged.[95]

Typhoon – August 2019

At least 28 people were killed, and more than one million people were forced from their homes as Typhoon Lekima hit China. The storm made landfall on 10 August in Wenling, near Shanghai. The deaths were caused by a landslide in Wenzhou, near where the storm made landfall, after a barrier lake formed, pooling water from the heavy rains, before the barrier collapsed. Fallen trees and power cuts were widespread. Shanghai evacuated some 250,000 residents, with another 800,000 in Zhejiang Province also evacuated. At landfall, the storm brought winds of 187 km/h (116 mph). An estimated 2.7 million homes in the region lost power after power lines toppled in the high winds.[96]

Earthquakes – June 2019

Thirty-one people were injured after a 5.4 magnitude earthquake jolted Gongxian County in Sichuan Province on 22 June. The quake was quickly followed by a 4.6 magnitude aftershock in nearby Yibin, also in Sichuan. These events followed a 17 June 6.0 magnitude earthquake in Yibin. The earlier quake left 13 people dead and 220 injured and forced the evacuation of 80,000 people.[97] The government had supplied 5,000 tents and bedding for the victims of the 17 June quake that impacted some 243,880 after 20,000 houses collapsed or were severely damaged.[98]

Typhoons, Tropical Storms, and Floods – June-September 2018

Tropical Storm Ewiniar left at least five people dead after heavy rains struck Guangdong Province where landslides and flooding were reported on 8 June. The deaths occurred after the storm dumped more than 203 mm (8 inches) of rain that led to a mudslide that buried a residential building in Yungfu.[99] This was followed by heavy rains from 7 July that caused flooding throughout Sichuan and Gansu Provinces. Typhoons Prapiroon and Maria impacted the affected areas, compounding the flooding. In Sichuan, 1.3 million people were affected and three people killed. More than 900 houses collapsed, and 29,000 houses were damaged. In Gansu, 1.5 million people were affected and 12 died. More than 2,300 houses collapsed, and 19,000 were damaged. Later in July, torrential rains caused flooding in Inner Mongolia where 12 people died. In early September, heavy rains triggered a mudflow in Yunnan Province that killed eight people in Mengdong Township, Malipo County, on 2 September. At least 4,200 houses were damaged.[100] Finally, Super Typhoon Mangkhut buffeted Hong Kong on 16 September. It brought strong winds and waves as well as floods. More than 200 people were injured and 40,000 households lost power. Mangkhut went on to make landfall in the Pearl River Delta[101] where it brought winds of up to 162 km/h (100 mph).[102] The storm battered Shenzhen where it caused blackouts in 13 locations and flooding in 35 low-lying areas.[103]

Typhoon – August 2018

Typhoon Rumbia killed at least nine people as it wreaked havoc across central and eastern China. The storm made landfall on 19 August and brought heavy rains to Xuzhou, Jiangsu Province, where more than 1,800 houses were damaged. In addition, the storm brought heavy rains to nine cities and 33 counties across Anhui Province where more than 1.7 million people and

nearly 243,000 hectares of crops were affected. In neighboring Henan Province, around 888,000 residents were affected. Nearly 109,000 hectares of crops were affected by heavy rain. Three meteorological stations reported precipitation exceeding 500 mm (19.6 inches).[104]

Flooding – June-October 2017

During the last week of June, heavy rains in southern China caused severe floods and landslides that, together, affected over 7.3 million people. A massive landslide in Xinmo, Sichuan Province, left at least 10 people dead. Rains continued during the first week of July, and a particularly bad flood on 3 July left 16 people dead in Guangxi Zhuang. Provinces along the Yangtze River were also badly impacted. In Hunan Province, the Xiangjian River inundated houses, uprooted trees, and damaged cars and roads. Summer rains continued, and from 29 July to 7 August, flash floods in Shaanxi killed 10 people and prompted the evacuation of 76,800 people. Parts of Qinghai, Gansu, and Yunnan were also affected by localized flash floods. Then, between 20 August and 6 September, more than 28,000 people were evacuated in Fujian Province due to two storms while more than 17,000 people were evacuated in Chongqing, Guizhou, Sichuan, Yunnan, Qinghai, and Shaanxi following heavy rains that triggered flooding and landslides. There was no let up, and in the first two weeks of October alone, 28 people died, more than 13,700 houses collapsed, and over 24,000 houses were damaged; the October storms affected Chongqing Municipality and the provinces of Anhui, Henan, Hubei, Sichuan, and Shaanxi.[105]

Typhoon – August 2017

On 23 August, Typhoon Hato swept through Macau and onto the mainland. It killed at least 22 people, including 10 in Macau where power and water cuts were widespread, and debris piled up in the streets.[106] The storm also battered Hong Kong where it flooded streets and forced thousands to flee to shelters, but it reserved its greatest damage for the mainland where it made landfall in Zhuhai, Guangdong Province. At least four people died and 26,817 people evacuated. Nearly two million households were briefly without power. Waves up to 10 m (33 feet) high were reported in the South China Sea. Waves crashing ashore submerged some waterfront streets, and ferry operators halted commuter services and routes to Macau and cities in the Pearl River Delta. The storm's strong winds brought down trees and blew out windows on skyscrapers. Maximum sustained winds of 124 km/h (78 mph), with gusts of up to 207 km/h (129 mph) were reported.[107]

Earthquake – August 2017

Two earthquakes struck Sichuan Province on 8 August. One, a powerful 7.0 magnitude earthquake struck Jiuzhaigou; it was followed by upwards of 2,000 aftershocks, the most significant registering near 5.0 magnitude.[108] Twenty-five people died, and more than 520 people were injured. In total, more than 176,000 people were affected[109] after 40,000 houses were damaged.[110] The second of the two primary quakes was a 6.5 magnitude event near Yongle city. It resulted in the deaths of 13 people while 175 people were injured.[111] In the case of the Jiuzhaigou quake, authorities and relief organizations contrasted the event to the 2008 Wenchuan quake that killed 80,000. Many cited scaled-up training and the development of rapid emergency teams as decisive alongside early warnings that were broadcast via media and to mobile phone apps well before the tremor struck. The time between the warning arrived and shaking began ranged from 19 seconds to 40 seconds, depending on how close people were to the epicenter.[112]

Earthquake – May 2017

A 5.5 magnitude quake struck Xinjiang on 11 May. Eight deaths were reported alongside 23 injured people. Over 1,500 houses were destroyed or badly damaged.[113] Some 82 aftershocks, some of them powerful, followed, and the on-going seismic activity led to cracks in walls of houses throughout Taxkorgan County, the epicenter of the main quake. The county

government sent personnel to search for people buried by collapsing buildings in Quzgun Village, the worst-hit village, where 820 head of livestock were also injured or killed.[114]

Flooding and Landslides – June-September 2016

Beginning in June, severe weather, including heavy rain, thunderstorms, and hail, affected most of the country. By late June, some nine million people had been impacted by flooding in central and eastern provinces even as storms spawned tornadoes in coastal areas. At least 112 people had died and 800 were injured, and over 30,000 houses were partially or fully damaged in Shanxi, Henan, Hubei, Sichuan, Shaanxi, Gansu, Guangdong, Guangxi, Hainan, and Jiangsu. Torrential rains over the middle and lower Yangtze River exacerbated flooding that led to the declaration of a Level IV (national) emergency response. Continued heavy rains and hailstorms into July triggered severe floods and landslides in southern areas where over 240,000 people were displaced and 128 people killed. On 9 July, a landslide caused by torrential rains in Xinjiang killed 36 people. Heavy rains continued from mid-July into August in northern, central, and eastern China where floods and landslides were reported. From 18 to 28 July, 417 flood-related deaths were recorded, and 16 Level IV national responses were declared. But the rains continued, and during August, Beijing, Fujian, Guangdong, Hebei, Jiangxi, Shandong, Liaoning, and Heilongjiang Provinces experienced floods that affected 200,000 people and killed one person. Leaving aside the damage caused by Typhoons Megi and Meranti (addressed below), late September also saw torrential rainfall cause flooding, mudflows, and landslides in Sichuan and Yunnan Provinces. As of 22 September, 14 deaths had been confirmed while 81,000 people across 28 counties and 13 cities were affected.[115]

Typhoon and Landslides – September 2016

Typhoon Megi made landfall in the southern province of Fujian on 27 September and brought winds of close to 120 km/h (74.5 mph). As the storm came onshore, Fujian and Zhejiang Provinces bore the brunt of it.[116] Two landslides in Zhejiang killed 16 people. More than 20 houses in Sucun village[117] were wiped away after a mountainside gave way and brought vegetation, mud, and debris down on the village. Ahead of the storm, China had shuttered schools and cancelled dozens of flights; more than 120,000 people who worked close to shore or at sea were moved by Fujian authorities, and the province's 31,700 fishing boats were recalled to port to avoid the high winds.[118]

Typhoon – September 2016

Typhoon Meranti left 28 dead in China. The storm struck the eastern provinces of Fujian and Zhejiang on 15 September. It made landfall in Xiamen City, Fujian, with a maximum of 17-grade wind forces (on the extended Beaufort scale). In addition to the wind, the storm brought extraordinary rains. The typhoon paralyzed several cities in southern Fujian, including Xiamen, Quanzhou, and Zhangzhou. Direct economic losses were estimated at over ¥16.9 billion (US$2.6 billion). Heavy rainfall was the cause of deaths and injuries in Zhejiang where more than 900 houses collapsed and over 1.5 million people were affected.[119]

Typhoon – July 2016

The remnants of Typhoon Nepartak struck China on 9 July. Although it had been downgraded to a tropical storm, it killed at least six people, overturned cars, damaged buildings, and caused mud flows. More than 200,000 residents in 10 cities were temporarily relocated, and 1,900 homes were destroyed. Power cuts impacted hundreds of thousands of people in Fujian, and the power cuts also forced five airports to close and hundreds of high-speed train journeys to be cancelled through 11 July. The economic cost of damage and disruption was estimated at ¥860 million (US$135 million).[120]

Japan

Typhoon – September 2021

Typhoon Chanthu pounded western Japan and left at least seven people injured amid strong

winds. The typhoon made landfall on Kyushu on 17 September and moved east before hitting Shikoku and the Kinki Prefecture. In Mihama, Wakayama Prefecture, a strong gust of wind blew away roof tiles from around 50 houses and broke windowpanes. Train services were widely disrupted while many flights were canceled. More than 7,000 households were without power at one point in Kyushu.[121]

Earthquakes – February-March 2021

A 7.1 magnitude earthquake struck off Japan's east coast on 13 February. The epicenter was northeast of Namie, a coastal town 96 km (59.6 miles) from Fukushima.[122] One death was linked to the quake, which was felt throughout Fukushima, Miyagi, and Iwate Prefectures, and there were 185 people injured across 10 prefectures across northeastern Japan. More than 3,000 houses were damaged,[123] and at least 950,000 homes temporarily lost power, but this outage was mostly resolved within a day. Given the proximity to the Fukushima Daiichi nuclear station, Tokyo Electric Power Company reported that there were no irregularities detected at the Fukushima plants nor any change in radiation levels around plants.[124] The 13 February quake was followed by another 7.0 magnitude temblor on 20 March off the Miyagi Prefecture coast, just north of Fukushima Prefecture. There were reports of buildings shaking as far away as Tokyo. Authorities reported seven injuries, and train service was disrupted in parts of the East Japan Railway Company network. Both the February and March quakes were considered aftershocks of the 9.0 magnitude quake in 2011.[125]

Typhoons – September 2020

Typhoon Haishen brought heavy rains to the Ryukyu Islands and Kyushu on 6-7 September, and it triggered floods and landslides that killed at least two people and injured 90 people. Nearly 100 houses were damaged or destroyed across the affected area.[126] The storm caused a loss of power for hundreds of thousands of homes while eight million people had been asked to evacuate from the path of the storm. Haishen struck just after Typhoon Maysak, one of the region's strongest typhoons in years, had slammed into Japan a week earlier. Nearly 430,000 homes in Kyushu were without power on 7 September while factories, schools, and businesses across western Japan were shuttered. Hundreds of flights and trains were cancelled. Haishen also forced Japan's coast guard to suspend its search for missing sailors from a cargo ship that sank during Typhoon Maysak. The Gulf Livestock 1 was carrying 43 crew members and 6,000 cows when it went missing.[127]

Summer Storms – June-July 2020

Wet summer weather associated with storms along a seasonal front drenched parts of southern Japan from late June into early July. One of the most severe incidents occurred on 3-4 July when devastating flooding and landslides battered Kyushu. Around 381 mm (15 inches) of rain fell in just six hours, a record for rainfall with some areas seeing about a half of their average annual rainfall in just two days. On 8 July, a landslide occurred in a residential area of Hita City, Oita Prefecture, and covered several houses with mud and trees. Some three million of Kyushu's 12 million residents were advised to evacuate. Sixty people were confirmed dead in Kumamoto Prefecture, two in Fukuoka Prefecture, and one in Oita Prefecture, all due to flooding. The Kuma River, which flows through Kumamoto Prefecture, rose well above its banks on 4 July and washed away at least one bridge, cut off citizens from rescue crews, and caused widespread power outages. The Chikugo River in Fukuoka Prefecture flooded a large residential area. Prime Minister Abe announced a relief package with a budget of ¥400 billion (US$3.7 billion) to support the area.[128]

Typhoon – October 2019

At least nine people were reported dead, and dozens were injured as Japan recovered from its biggest storm in decades. Typhoon Hagibis triggered floods and landslides as it battered the country with wind speeds of 225 km/h (140 mph). Rivers breached their banks in at least 14

places and inundated residential neighborhoods. The storm made landfall on 12 October on the Izu Peninsula, southwest of Tokyo, and moved up the east coast. Almost 500,000 homes were left without power. In Hakone, more than one meter (3 feet) of rain fell in 48 hours, the highest total ever recorded in Japan. Further north in Nagano Prefecture, levees along the Chikuma river gave way and sent water rushing through residential areas. Officials said some of those killed were swept away by landslides while others were trapped in their cars as floodwaters rose. More than seven million people were urged to leave their homes as the storm approached, but it is thought only 50,000 stayed in shelters. Many bullet train services were halted, and several lines on the Tokyo metro were suspended. More than 1,000 flights to and from Tokyo's Haneda and Narita airports were cancelled.[129]

Tropical Storm – August 2019

At least three people died, and 49 were injured after a tropical storm struck Japan. Tropical Storm Krosa was the third tropical storm or typhoon to strike the country in as many weeks.[130] Krosa made landfall near Hiroshima on 15 August and began moving north. More than 400,000 people were advised to evacuate. Around 800 flights and train services were cancelled. Ferries to Shikoku were cancelled as high waves lashed the coast.[131] Krosa brought more than 800 mm (30 inches) of rain and wind gusts of nearly 144 km/h (90 mph). Yanase, a mountainous area of Kochi Prefecture on Shikoku, topped the storm's rainfall totals list with 869.5 mm (34.23 inches) of rain, 124.5 mm (nearly 5 inches) of which was recorded in just three hours. A peak wind gust of 151 km/h (94 mph) whipped Muroto, in coastal, eastern Kochi. Torrential rain triggered a large rockslide, which closed a main road in a mountain valley. Dangerous seas forced officials to cancel ferries connecting Shikoku to other parts of Japan. The worst of Krosa passed to the west and north of Tokyo, but the city endured a wind gust to 69 km/h (43 mph).[132]

Typhoon – August 2019

At least one person died, and several were injured on Kyushu as a strong typhoon hit the country on 6 August. Typhoon Francisco, the season's eighth typhoon, made landfall in Miyazaki where it delivered strong winds and torrential rain before it traveled northward. Nearly 130 flights were canceled, and train services were disrupted. At least 24,710 households lost power in 11 Kyushu cities and towns. The strongest wind was recorded in Miyazaki at 140 km/h (87 mph) while Nobeoka city received 95.5 mm (3.75 inches) of rain in one hour.[133]

Typhoon – September 2018

Typhoon Trami hammered the Ryukyu Islands, including Okinawa, before making landfall in the southern home islands. Trami underwent rapid intensification in the 24 hours leading into 23 September, reaching Category 4 strength in southern waters but was a Category 1 when it made landfall in Wakayama Prefecture on 30 September. Trami injured dozens of people and forced tens of thousands to evacuate, and it brought high waves, flooding, and storm conditions in much of central and southern Japan. Nanjo City on the southern part of Okinawa measured a wind gust of 201 km/h (125 mph) on 29 September. Kadena Air Base, Okinawa, reported a wind gust of 168 km/h (105 mph) the same day. On mainland Japan, wind gusts late on 30 September were clocked at over 128 km/h (80 mph) in Nagoya and over 96 km/h (60 mph) in Tokyo. More than 431 mm (17 inches) of rain fell in southern Japan, including in Miyazaki and Kochi. Flooding of homes and farms was reported.[134]

Earthquake – September 2018

A 6.7 magnitude earthquake struck Hokkaido on 6 September. The tremor struck 62 km (39 miles) southeast of Sapporo and was one of the strongest earthquakes Hokkaido has experienced. It triggered 3,800 landslides as well as cases of liquefaction, and it ripped roads apart. At least

41 people were killed, and some 700 people were injured.[135] More than 3,600 people were evacuated to shelters. Water supply and local public transportation were disrupted in some areas, and electric power was cut to nearly 3 million households after damage to a major thermal plant. The Japanese Government set up an emergency task force and provided search and rescue while the JSDF deployed 25,000 personnel for relief efforts.[136] One month after the quake, the prefectural government estimated that damage would cost upward of ¥367.5 billion (US$3.1 billion). Power shortages caused shutdowns at factories and shops, and significant amounts of industrial equipment were destroyed. The quake also caused extensive damage to agriculture, forestry, fishery, and public works.[137]

Typhoon – September 2018

The strongest typhoon to hit Japan's mainland in 25 years smashed a tanker into a bridge and forced one of the country's largest airports to close and hundreds of flights to be canceled. At least 10 people died after Typhoon Jebi slammed into western Japan on 4 September. It made landfall with "very strong" force in Tokushima Prefecture. Winds lashed buildings and whipped up the sea, yanking the tanker Houunmaru from its anchorage and ramming it into the bridge connecting Osaka's Kansai Airport with the mainland. Storm surges also swamped runways at Kansai Airport. Flight cancellations also affected Itami Airport in Osaka and Chubu Centrair International Airport in Nagoya. Authorities said more than 400 people were injured across 20 prefectures. More than 8,000 residents sought shelter in 1,667 evacuation shelters in 24 prefectures. On Honshu, nine cities and towns issued compulsory evacuation orders. A further 53 issued non-compulsory evacuation orders. Towns and cities in Gifu, Aichi, Kyoto, Osaka, Hyogo, Nara, and Wakayama, along with Tokushima, Kagawa, and Kochi on Shikoku were affected. Jebi dumped more than 500 mm (19.6 inches) of rain in some areas.[138]

Typhoon – August 2018

Typhoon Cimaron passed through western Japan to the Sea of Japan on 24 August; it left at least 13 people injured and disrupted traffic before being downgraded to an extratropical cyclone off northeastern Japan. Downpours caused power outages affecting about 138,000 households in central and western Japan and grounded 60 flights. After making landfall on Shikoku, Cimaron caused the Kumano River to overflow in Wakayama Prefecture.[139]

Summer Storms – July 2018

Southwestern Japan suffered its worst rainfall disaster in 25 years in 2018, an event officially labelled "Heisei san-jū-nen shichi-gatsu gōu" (平成 30 年 7 月豪雨, "Heavy rain of July, Heisei 30 (2018)"). The 5-15 July rains resulted in widespread devastating floods and set off landslides that killed 225 people and forced millions to evacuate across 15 prefectures. Meteorologists say that the annual Baiu, a seasonal persistent rain-front extending west to east, can become stationary as a non-tropical low, and, when this happens, it can interact with moist air streaming over the country; this combination brings heavy downpours. The rainfall of 2018 was supercharged by the remnants of Typhoon Prapiroon interacting with the Baiu front, and this interaction led to an incessant 10-day rainfall that, in some areas, exceeded 400 mm (15.7 inches) of precipitation. Hiroshima Prefecture alone had 1,243 mudslides. A post-disaster accounting found that the country had sustained damage to agriculture, forestry, and fishery sectors that amounted to losses of ¥1.09 trillion (US$9.86 billion). The sudden shut down in many sectors also led to shortages of water, food, and shelter.[140]

Earthquake – June 2018

A powerful earthquake struck northern Osaka Prefecture on 18 June. There were five fatalities in Osaka Prefecture, and a total of 417 injuries across Osaka, Kyoto, Nara, Hyogo, Shiga, Mie, and Tokushima Prefectures. Nearly 7,000 homes were damaged in Osaka and three

other prefectures. The quake, which came in at a maximum of lower 6 on the Japanese 7-point seismic intensity scale (5.5-5.9 magnitude), damaged gas and water utilities as well as important railway networks, but all were back online within a week. The quake struck at the peak of the morning rush hour commute and led Japan Railways Co. and other private railway lines to halt services on almost all train lines. At one point, some 200,000 people were stuck in trains that made emergency stops on the tracks.[141]

Volcanic Eruption – January 2018

Mount Kusatsu-Shirane erupted on 23 January. The eruption killed one person and injured 11 others. The phreatic (steam blast) eruption saw underground water heated by magma turn into vapor and burst through the crater.[142] The individual who died was a member of JSDF who, along with colleagues, was taking part in training in the area. Those injured were other JSDF members and skiers who were injured when the eruption triggered an avalanche and sent rocks raining down on the slopes.[143]

Typhoon – October 2017

At least two people were killed and 17 injured as Typhoon Lan struck Japan where it brought dangerous winds and threatened to cause major flooding and mudslides. The storm made landfall on 23 October along Japan's southern coast near Minamiizu before rapidly moving to the northeast. At arrival, Lan packed winds of 165 km/h (100 mph). More than 200,000 people were ordered to evacuate, and a further 2.2 million homes were under advisory to prepare for evacuation. Several parts of Japan recorded rainfall totals greater than 500 mm (19.6 inches) in 72 hours. Shingu, in Wakayama Prefecture, recorded 894 mm (35.1 inches) during the 3-day period.[144] Flooding and landslides were also reported along the Pacific coast, and the storm forced the cancellation of domestic flights and the suspension of some trains, while rains closed parts of several expressways amid fears of flooding.[145]

Typhoon – September 2017

A powerful typhoon struck Japan on 17-18 September. It left at least two people dead. Typhoon Talim made landfall in Kyushu with winds of up to 162 km/h (100 mph) and moved northeast along the country to reach Hokkaido; it dumped torrential rain and paralyzed transportation. One of those killed was a woman found inside her house, which was hit by a landslide in Kagawa; another was a man found in his car, which sank under a swollen river in Kochi. National media said 38 people had been injured in storm-related accidents. At least 116 domestic flights were cancelled, and some Shinkansen train services were suspended in northern Japan. Talim had battered Okinawa where it caused the most rain seen over a 24-hour period in 50 years in the city of Miyako.[146]

Typhoon – August 2017

Typhoon Noru killed two people and brought more than 504 mm (19.8 inches) of rain in 24 hours to the Ryukyu Islands on 30 July. By the time the storm began to impact Kyushu, it had weakened although it still brought significant rain – 200 mm (7.8 inches) in some places. As the storm moved northward and eastward, Owase and Nikko, both on Honshu, recorded 213 mm (8.3 inches) and 263 mm (10.3 inches) respectively.[147]

Flooding and Landslides – July 2017

Heavy seasonal rains impacted northern Kyushu amidst a warm, wet weather front on 9-10 July. Emergency responders recovered three bodies from a landslide in Asakura, Fukuoka Prefecture, on 10 July as authorities conducted searches for missing people and provided help to residents trying to dig out from flooding and landslides. Although recovery efforts were beginning, the region was still under a high risk of landslides from the mountains due to the softening of the ground from torrential rainfall. Travel was disrupted in Oita Prefecture where at least one bridge was washed out and a landslide covered train tracks.[148]

Typhoon – July 2017

Typhoon Nanmadol swept through southern Japan the first week of July, and it caused flash flooding that killed at least one person. The storm made landfall in Nagasaki Prefecture on 4 July. It dumped heavy rains that disrupted traffic and left 70,000 without power in Nagasaki and Kumamoto as it traveled eastward. The city of Aso in Kumamoto saw over 80 mm (3.1 inches) of rain in one hour, and Nagasaki recorded 50 mm (1.9 inches) in the same short time.[149] The rains triggered landslides in Fukuoka and Oita Prefectures. In Fukuoka Prefecture, about 375,000 people at risk of flooding were ordered to leave their homes. Overflowing rivers damaged the town of Asakura. In Oita Prefecture, more than 21,000 people were told to evacuate.[150] Then, the typhoon brought downpours to the Hokuriku region where Kanazawa reported 60 mm (2.4 inches), and there were landslide warnings for some areas in Niigata, Toyama, and northern Nagano Prefectures after rainfall of up to 300 mm (11.8 inches) fell over a period of several hours.[151]

Typhoon – September 2016

A powerful typhoon struck Kyushu on 20 September; it left at least 36 people injured as torrential rains caused serious flooding that washed away a bridge and inundated homes and cars. Transportation across Kyushu and parts of western Japan came to a standstill as Typhoon Malakas brought winds of up to 180 km/h (112 mph). Houses, cars, and fields were partly submerged in Miyazaki Prefecture, where a record 578 mm (22.75 inches) of rain fell on one city in just 24 hours. Officials issued evacuation advisories that affected about 620,000 people. More than 114,000 households lost power. Regional train services were halted, and about 180 flights were cancelled because of strong winds.[152]

Typhoons – August 2016

Three typhoons hit northeastern Japan in quick succession between 21 and 31 August. First Typhoon Kompasu, then Typhoon Mindulle, and finally Typhoon Lionrock brought heavy rains and strong winds to areas stretching from Tokyo to Hokkaido. Typhoon Kompasu hit Hokkaido on 21 August and killed one person. The storm was downgraded and moved off swiftly, but it was followed by the more powerful Mindulle, which dumped heavy rain that caused flooding on Hokkaido on 23 August after killing one person near Tokyo where it made landfall on 22 August. In all, at least one person was killed and 61 were injured as Mindulle flooded rivers, submerged roads, and damaged farms across Japan's northeast. More than 500 flights were cancelled, and more than one million people across eastern Japan were covered by evacuation advisories of varying degree. In Hokkaido, more than 2,700 people temporarily fled their homes to public shelters.[153] Finally, on 30 August, Lionrock brought flooding and landslides to Iwate Prefecture. At least 10 people were killed, mostly in a home for the elderly, while 1,100 people were evacuated from their homes, and 400 people had to be rescued after they were stranded by flooding and landslides. As it moved northward, Lionrock was downgraded to a low-pressure system, but it still dumped heavy rain over areas of Hokkaido, causing evacuations and riverbank collapses. The Sorachi River broke its banks, and 4,200 residents were ordered to evacuate, while 26,000 were advised to do so.[154]

Earthquake – April 2016

On 14 April, a 6.5 magnitude earthquake struck Kumamoto Prefecture, Kyushu. The quake and its effects left at least nine people dead and 800 injured with damage and casualties concentrated in Kumamoto and Oita Prefectures. More than 120,000 people were evacuated. Two days later, on 16 April, another quake, measuring 7.3 magnitude, hit in the same area, and initial assessments found that another 42 people were dead and thousands injured as a result of the second quake; dozens of people were reported trapped in the rubble of collapsed buildings.[155] Water service had been cut throughout the entirety of Kumamoto city, with a population of roughly 730,000.[156] By 30 April, 66 people were

confirmed dead and 1,500 injured, and more than 23,000 people remained displaced. Aso Region in Central Kumamoto experienced the worst destruction.[157]

South Korea

Sand and Dust Storms – March 2021

During the period 15-18 March, South Korea was among the countries hit by the worst sand and dust storms in a decade. The storms extended from the Gobi Desert and western Mongolia, through northern China. Sand and dust also affected 66% of the population of South Korea.[158]

Typhoons and Tropical Storms – August-September 2020

Typhoons Maysak and Haishen brought heavy rainfall, flooding, and damaging winds to South Korea in the first week of September. Haishen was the first Super Typhoon of the season in the western Pacific Ocean; it made landfall near Ulsan on 7 September with windspeeds the equivalent of a Category 2 hurricane – between 154 km/h (96 mph) and 176 km/h (109 mph). Although it had weakened by the time it reached South Korea, Haishen was the fifth named tropical system to make landfall in the country during the 2020 season, a new record for named storms making landfall. Haishen was also the fourth tropical system to impact the Korean Peninsula in 30 days, with each system stronger than the last. From the series of storms, rainfall totals of 100-150 mm (4-6 inches) were reported in eastern coastal areas where average rainfall totals are 25-75 mm (1-3 inches). Significant travel disruptions were caused by flooded and blocked roadways, and Haishen caused power cuts and tree damage across the region. More than 100 homes were destroyed or flooded, and at least 80 fishing boats sank as Haishen battered the area.[159]

Haishen followed Typhoon Maysak, which ripped through the country's southeast; Maysak, too, had followed Typhoon Bavi, which grazed the peninsula a week earlier, and all these storms compounded the damage of one of the longest rainy seasons recorded in the country. Before it moved into the East Sea on 3 September, Maysak left devastation in Busan, Ulsan, Daegu, and North and South Gyeongsang, indirectly killing one person and injuring over a dozen others; most of the injuries involved objects broken or knocked over by intense winds that measured up to around 46 meters per second (102 mph). Authorities said 2,412 people had been forced to temporarily evacuate their homes because of the storm. A total of 858 cases of property damage were reported, including over a hundred homes and 5,151 hectares of farmland throughout Gyeongsang. Up to 121,949 households were affected by blackouts due to damaged electric lines. Intense downpours accompanying the storm fell throughout the peninsula, with Jeju Island seeing 1,037 mm (40.8 inches) of rain over 48 hours, and parts of greater Seoul receiving 100-190 mm (4-7.6 inches).[160]

The first typhoon of the season had landed in South Korea on 10 August. With windspeeds of 50 km/h (31 mph), Typhoon Jangmi landed on the southern tip of Geoje Island near Tongyeong in the country's southern Gyeongsang Province. Over 14,000 facilities were damaged while 7,000 people were displaced from their homes.[161]

Flooding – August 2020

At least 30 people were reported dead as of 9 August after 46 days of heavy rains in South Korea, with the country's longest monsoon in seven years causing flooding, landslides, and evacuations. The Central Disaster and Safety Countermeasure Headquarters said at least eight people were injured. More than 5,900 people from 11 provinces and cities were evacuated. An estimated 9,300 hectares of farmland were swamped or buried, while 9,500 cases of damage to public and private facilities were reported. About 100 m (328 feet) of levee collapsed at the Seomjin River in the southern edge of the peninsula and flooded the area, with about 1,900 people evacuated in the province including about 500 from around the river. The forestry agency raised landslide warnings to its highest level

after five homes were buried in a landslide in Gokseong, South Jeolla; five people were killed.[162]

Typhoon – August 2020

Typhoon Hagupit brought deadly downpours to South Korea whose government moved to designate special disaster zones in the country's interior as of 5 August. This declaration would pave the way for state support for the central regions that experienced losses of life and property damage. Seoul, and Gyeonggi and North Chungcheong Provinces alongside other central areas suffered heavy rains. According to the Central Disaster and Safety Countermeasures Headquarters, at least 15 people were killed. Among the fatalities were a family of three, killed in a mudslide in Gapyeong, Gyeonggi Province. The massive downpours also forced the suspension of some train services, the shutdown of roads, and the closure of low-lying bridges.[163]

Flooding – July 2020

During the second half of July, widespread flooding hit central and southern parts of South Korea. The worst affected areas were South Chungcheong and North and South Jeolla Provinces as well as Daejeon City. At least two people died, and 100 buildings were damaged in Daejeon.[164] In addition, two people were killed in Hamyang County and two were rescued in Hapcheon County, both in South Gyeongsang Province.[165]

Tropical Storm – September 2019

Tropical Storm Tapah brought rain and winds to southern South Korea on 21 September. The conditions left 30 people injured and knocked out power to about 27,790 houses. Although the storm did not make landfall on the Korean Peninsula, South Korean officials reported that one person was hurt seriously, and 29 others had minor injuries. The storm flooded streets, damaged houses, and led to about 250 flight cancellations at 11 airports.[166]

Typhoon – September 2019

At least three people were reported killed and dozens injured on 7 September as Typhoon Lingling brought heavy rains and strong winds to South Korea. Hundreds of minor incidents were reported throughout the country, with nearly 300 flights being canceled or delayed. Several sections of road, including bridges to Incheon Airport, were closed due to strong winds that threatened to overturn small vehicles. Korea Electric Power Corporation said more than 161,000 homes had experienced power outages. Local meteorologists reported that the fastest wind speed measured was 195.8 km/h (121.6 mph), in South Jeolla Province; it was the fifth strongest gust of wind on record in South Korea.[167] Strong winds also caused power outages in 17,000 homes on Jeju Island where it toppled trees and streetlamps and damaged traffic signs.[168]

Tropical Storm – October 2018

Tropical Storm Kong-rey struck southern South Korea on 9 October. It killed at least two people and left thousands without power. The tropical storm made landfall near Chinhae Naval Base on the southeastern coast before skimming Busan and passing through the provinces of North and South Gyeongsang. Throughout the southeast and on Jeju Island, more than 60,000 customers were without electricity, and hundreds of homes were flooded.[169]

Super Typhoon – October 2016

At least seven people were killed as Super Typhoon Chaba struck southern South Korea with strong winds and heavy rains on 7 October. Seven fatalities were reported with the worst hit areas being the southern cities of Busan and Ulsan, as well as Jeju Island. Nearly 229,000 households lost power although power was almost completely restored by the day after the storm struck. The typhoon inundated 508 houses and 1,000 vehicles and damaged 7,500 hectares of crops. About 200 people from 90 households were evacuated due to flooding. The government immediately announced ₩8 billion (US$6.7 million) of special grants to the typhoon-hit regions to deal with the aftermath.[170]

Taiwan

Drought – 2021

Taiwan experienced its worst drought in 56 years in early 2021; it began to abate in June that year. Many of the impacts were on the water-intensive semiconductor sector and the livelihoods of those employed in the sector. With water shortages hitting the island, efforts were made to maintain water supply to the semiconductor sector to the detriment of other sectors, notably agriculture and tourism. By diverting water from other purposes towards chip production, Taiwan maintained much of its production by exempting major science parks in central Taichung, where many high-tech businesses are located, from water rationing. Nonetheless, the sector still saw temporary shutdowns of some factories due to water scarcity and Taiwan was unable to supply an ever-rising global demand for chips. As drought becomes persistent and tech industries prepare to move out of Taiwan to escape the potential disruptions this could cause, there is every expectation of future job losses for the 3 million Taiwan residents employed in this sector. Although risk of displacement among blue-collar workers involved in the tech sector is rising, the risk of displacement from drought also exists for Taiwan's farmers who bore the brunt of the impact of the drought. The contribution of the agricultural sector to Taiwan's GDP fell by nearly 5% in the first quarter of 2021, largely due to constraints that water shortage had on production. In addition, the authorities had put a halt on irrigation, affecting 183,000 acres of farmland. This move led to increased tensions between farming and tech as this was the third time the agriculture sector had to compromise due to water scarcity; the first was in 2004 and the second in 2015.[171]

Severe Winter Weather – January 2021

An intense cold wave affected parts of Taiwan between 8 and 11 January, with temperatures dropping below 10°C (50°F); rare snow and freezing temperatures were recorded at higher elevations. On 8 January alone, local authorities reported 18 sudden deaths ascribed to the cold weather after many older people were impacted by cardiac events linked to hypothermia and exposure in areas where most houses do not have central heating. Taiwan's mountainous areas saw temperatures below freezing.[172]

Tropical Cyclone – September 2019

Tropical Cyclone Mitag passed just east of Taiwan on 30 September. Heavy rains soaked parts of eastern Taiwan with Datong Township recording 228-355 mm (9-14 inches) of rain in one day. Taipei's Taoyuan Airport reported wind gusts of near 88 km/h (50 mph).[173] The Central Emergency Operation Center reported that at least 12 people were injured by the storm's passage. More than 500 households had experienced power outages, and at least 165 domestic and international flights had been cancelled.[174]

Earthquake – August 2019

A 5.9-magnitude earthquake rattled Taiwan on 8 August. It killed one person and caused temporary power outages that affected over 10,000 homes. Tremors were felt across the island, and high-rises in Taipei swayed although the epicenter was near northeastern Yilan County.[175]

Typhoon Maria – July 2018

Typhoon Maria brought heavy rains and strong winds to Taiwan on 10-11 July. One person died and eight people were injured. The death resulted from a fall as a man tried to prepare his home for the storm. The eight injuries were concentrated in northern Taiwan, and most were minor injuries caused by falling tree branches or vehicular accidents. The Ministry of Economic Affairs said that 59,485 households lost power during the typhoon, which inflicted an estimated 1.3 million New Taiwan Dollars (NT$; US$47,000) in damaged agricultural produce.[176]

Earthquake – February 2018

On 6 February, a 6.5 magnitude earthquake struck Taiwan's Hualien County. A week after the quake, the death toll stood at 17 with nearly 300 people injured. Among the 17 deceased, 14 died in the Yun Men Tsui Ti building, which housed a restaurant, a hotel, and residential apartments. The quake was the most severe earthquake to hit Hualien in 67 years, and it was followed by more than 60 aftershocks within eight hours. Four buildings partially collapsed,[177] and more than 800 residents were accommodated in emergency shelters until the aftershocks had passed and buildings nearby were declared safe. Additional damage included roads that had cracked and buckled while at least 40,000 homes were at least briefly without water and 2,000 without power.[178]

Tropical Cyclone and Tropical Storm – July 2017

Tropical Cyclone Nesat made landfall in northeastern Taiwan on 29 July. As the Cyclone passed over northern Taiwan, Tropical Storm Haitang struck southwestern Taiwan on 30 July. Agencies reported that 128 people were injured by the heavy rains and strong winds brought by the two storms; over 12,900 had been evacuated, and over 643,200 households suffered power outages in Tainan and Pingtung Counties.[179]

Typhoon – September 2016

Typhoon Megi left a trail of destruction and four people dead in Taiwan on 27 September. Falls, drownings, and accidents accounted for the deaths. More than 500 people were hurt, including eight Japanese tourists whose bus was toppled by strong winds. Schools and offices were shut for several days after Megi left roads blocked by landslides and homes flooded, and some mountain villages in Wulai were completely cut off by blocked roads. Around 4,300 people were in temporary shelters after more than 14,800 were evacuated. At its peak, Megi knocked out power for 3.8 million households. Yilan County in the northeast of the island reported an accumulation of more than 1.3 m (4.3 feet) of rain as the storm passed. Nearly 300 flights were either cancelled or delayed, and trains were halted.[180] Agricultural losses reached more than NT$1.31 billion (US$42 million), the Council of Agriculture reported, adding that Yunlin County suffered the heaviest losses, followed by Taichung City, Kaohsiung City, and Yilan County. Crop damage accounted for most of the losses with rice growers taking the biggest hit although growers of bananas, guavas, peanuts, and grapes also suffered heavy losses, and livestock losses included loss of ducks, chickens, and pigs.[181]

Typhoon – September 2016

Typhoon Malakas caused widespread disruption as it clipped northern Taiwan on 18 September. Sustained winds at the center of the storm were around 200 km/h (124 mph), but on land, winds were nearer to 100 km/h (62 mph). Flights and train services were suspended, and more than 2,700 people had to evacuate their homes. Businesses were ordered to close across the northeast throughout the weekend, as violent winds accompanied by torrential rains battered the island. New Taipei City reported 50 mm (2.17 inches) of rain in only three hours as the storm passed. Mudflow alerts were issued by the Soil and Water Conservation Bureau, and at least 6,600 households were left without power.[182]

Typhoon – September 2016

Typhoon Meranti, the strongest storm to hit Taiwan in 21 years, impacted southern areas of the island with very high winds and heavy rainfall on 14 September. Wind gusts topped 160 km/h (100 mph) in several locations as the center of Meranti passed just south of the island; among the gusts registered were a 180 km/h (112 mph) gust recorded at Kaohsiung International Airport and a 182 km/h (113 mph) gust recorded in Hengchun. In Penghu County, a wind gust of 215 km/h (134 mph) was clocked. Rainfall totals in excess of 508 mm (20 inches) were measured in the mountains of Taiwan in just one day. Taiwu Township in Pingtung County saw just over 762 mm (30 inches) of rain.[183] At least 200,000 households lost power, but because the winds came in from the east, the cities to the lee of the mountains were afforded some shelter from the force of the wind.[184]

Super Typhoon – July 2016

Super Typhoon Nepartak hit the east coast of Taiwan on 8 July; it overturned cars and forced thousands from their homes. The storm made landfall in Taitung with winds of 234 km/h (145mph).[185] Torrential rain started on the eastern coast of Taiwan several hours prior to the storm's arrival. Taiwan's central mountains slowed Nepartak, which was downgraded from a super typhoon to a typhoon as it passed over the island. Three deaths and 142 injuries were reported by the Taiwan Central Emergency Operations Center. More than 16,000 people were evacuated from the worst affected areas; two railway systems were out of service, and most flights were canceled out of Taiwan's Taoyuan International Airport for the day on 8 July. Power outages affected more than 500,000 homes, but electricity was restored to most the night after the storm.[186]

Earthquake – February 2016

On 6 February, a 6.4 magnitude earthquake (later dubbed the "0206 Tainan Earthquake") shook southern Taiwan. Affected regions included Tainan City, Kaohsiung City, Pingtung City, Chiayi County, and Chiayi City. The heaviest hit area was in Yongkang District, where a residential building collapsed and killed 117 people. Official statistics reported that 551 people were injured in the disaster.[187]

Winter Weather – January 2016

A cold snap killed at least 85 people in Taiwan in late January 2016. Local media reported deaths from hypothermia and cardiac disease following a sudden drop in temperature, which particularly impacted elderly people in northern regions such as Taipei and Taoyuan. The temperature in Taipei city fell to a 44-year low of 4°C (39°F) on 24 January. A key challenge was that many homes in the area lacked central heating, and most of the victims were found indoors rather than dying from exposure.[188]

History of Recent Foreign Disaster Response

The following sections outline recent international disaster response operations undertaken by China, Japan, South Korea, and Taiwan.

China

China has extensive domestic expertise to draw upon when responding to overseas catastrophes. Government and security force agents have gained a reputation for urban search and rescue (USAR) and rapid response capabilities. Most of China's work in foreign disaster relief has been within the Asia-Pacific region, with 35% of China's funding directed to the region over the past decade.[189] In the past 10 years, top crises for which China has funded humanitarian relief included the Ebola outbreak in West Africa (2014), the Nepal earthquake (2015), and Kenya drought (2017). More than 50% of all Chinese government HADR funds have gone to the target country's government while about one-third has gone to UN agencies.[190]

Prior to its global humanitarian outreach during the COVID-19 pandemic, China's strictly humanitarian international activity was poorly catalogued and seemed mostly ad hoc. In 2018, the China International Development Cooperation Agency (CIDCA) was established as a sub-ministry with the mandate of coordinating foreign aid. In consonance with the founding of CIDCA, China's humanitarian spending repeatedly hit new highs in recent years, setting a record at US$128.5 million in 2017. Meanwhile, in 2020, Beijing announced that it would contribute at minimum US$100 million into the UN humanitarian system. It has increased direct contributions to the World Health Organization (WHO) and the United Nations' Global Humanitarian Response Plan to Covid-19.

While it is difficult to fully quantify China's COVID-19 relief to foreign countries, as of mid-2020, the country announced that it had donated medical supplies to more than 150 countries

and international bodies and sent medical teams to 27 countries. To facilitate government-to-government aid, CIDCA works with the Ministry of Commerce, Ministry of Foreign Affairs, and China's embassies.[191] Nonetheless, CIDCA has no dedicated resources to deliver assistance, and it relies on China's armed forces, the People's Liberation Army (PLA), to procure and transport relief materials, equipment, and personnel; this equipment may include PLA Navy's Peace Ark hospital ship.[192]

The PLA has been involved in foreign disaster relief for two decades although there has been little call for a massive response in the past five years. The PLA has delivered aid items and deployed rescue teams to Afghanistan, Algeria, Haiti, Indonesia, Iran, Japan, Liberia, Maldives, Mongolia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Sierra Leone, and Thailand in response to earthquakes, cyclones, extreme weather, floods, and epidemics. These deployments have almost exclusively been bilaterally arranged, and there is little evidence that the PLA has participated in multi-national civilian-military coordination mechanisms during HADR operations.[193]

Since 2015, China's civil society organizations (CSO) and NGOs have become somewhat more active in global humanitarian action. Two experiences in 2015 and 2016 paved the way for China's NGOs to seek and gain a better understanding of and more concrete links with the international humanitarian community. The 2015 Nepal earthquake was a wake-up call for some of these NGOs who deployed to the country. For the most part, they were unfamiliar with the various UN agencies and hundreds of local Nepalese NGOs. Not only were China's NGOs inexperienced in the international framework and standards for humanitarian assistance, but they were also challenged by hurdles with language, culture, and coordination. In 2016, Chinese organizations joined humanitarian relief teams from around the world to deliver urgent assistance in the aftermath of Hurricane Matthew in Haiti. A dozen members of the China Foundation for Poverty Alleviation provided first aid treatment and distributed urgently needed supplies while in Haiti. Since then, Chinese NGOs have participated in workshops and seminars to build their understanding and capacity so that so that they can put their experience managing disaster preparedness, response, and recovery at home to work within the international humanitarian system.[194]

Japan

Japan's disaster relief activities date back to 1979, when Japanese medical teams were dispatched to Thailand to assist Cambodian refugees. Since 1987, the country's foreign HADR missions have fallen under the legal framework of the Japan Disaster Relief Team Law (the JDR Law) and the Japan International Cooperation Agency (JICA) Law. The Ministry for Foreign Affairs (MOFA) may consult the Ministry of Defense if the country needs to send teams from the JSDF when large-scale aid is required following a disaster and self-sufficient activities are required in the disaster area. In the fiscal years 2016-2020, the JDR Team has been deployed 20 times (domestically and internationally), with JSDF involved in four missions.

To facilitate swift delivery of relief items, JICA procures and stockpiles supplies at locations as close as possible to disaster areas. JICA has warehouses in Singapore, Miami (U.S.), Dubai (United Arab Emirates), Majuro (Marshall Islands), and Koror (Palau), the last two for delivery of relief supplies within the Pacific Islands States. Six priority goods are stockpiled at these locations: tents, sleeping pads, plastic sheeting (tarpaulins), blankets, portable water containers (plastic jerry cans), and water purifiers.

Based on experience in the response to the spread of Ebola in West Africa in 2015, the JDR Infectious Disease Response Team was established to carry out more effective assistance when global outbreaks of infectious diseases occur. In July 2016 an infectious disease response team was dispatched for the yellow fever outbreak in Democratic Republic of the Congo as the Team's first deployment.[195]

Three key deployments include:

- March 2015: Cyclone Pam hit Vanuatu. JDR dispatched a medical team. Difficulties were anticipated transporting supplies to and moving around the affected islands. After arriving, the team split into two groups; one moved to the central hospital in Port Villa, and the other went to the Mauna Health Post on Pentecost Island. On foot and by boat, the latter group also visited remote locations with poor access to medical support. This was the first time JDR dispatched a team formed specifically to provide mobile clinic services.
- April 2015: A 7.9 magnitude earthquake struck Nepal. A day after the quake, JDR Teams departed Japan; they arrived in the disaster zone three days after the quake. The JDR Team included a rescue team, medical teams, and a JSDF Unit, and they were accompanied by emergency relief supplies. The rescue team, made up of 70 people and four rescue dogs was on-scene until 23 days after the quake. This response was the first time JDR dispatched medical teams with surgery, dialysis, and ward functions.
- 2016: During an 8-month yellow fever outbreak (January-August), the Democratic Republic of Congo's Ministry of Health and National Institute of Biomedical Research (INRB) fell short of reagents, making tests and diagnoses impossible. In its first international deployment, the JDR Infectious Diseases Response Team brought reagents from Japan and enabled INRB to resume testing. In addition, the country had an insufficient quantity of vaccines. WHO's advice was that one-fifth the standard dose of vaccine could be used, and the JDR provided technical support to help local health authorities do so.[196]

The JSDF average more than 200 annual deployments for HADR within the country. Their capabilities and expertise are also available to civilian authorities for deployment outside the country. Ground Self-Defense Force (JGSDF) personnel can perform search-and-rescue missions, deliver aid to ships and aircraft in distress, and provide flood control, medical care, epidemic prevention, water supply support, and transportation of personnel and supplies. The Maritime Self-Defense Force (JMSDF) conducts similar operations in Japan and other countries. The Defense Ministry reports major external foreign HADR missions since 1987, key among them earthquake relief in Nepal in 2015, aid for flood victims in Djibouti in 2019, and assisting Australia in fighting bush fires in 2020.[197]

Table 1 includes JICA donations and deployments during the period 2017-January 2022; unless otherwise noted, emergency relief goods came from JICA stockpiles and warehouses.[198]

Date	Emergency	Location	JICA Supplies	JICA Personnel
January 2022	Volcanic Eruption	Tonga	emergency relief goods	JDR SDF Unit
January 2022	Flooding	Brazil	emergency relief goods (tents, blankets, and plastic sheeting)	n/a
December 2021	Typhoon Rai	Philippines	emergency relief goods, including generators	n/a
May 2021	Volcanic Eruption	DR Congo	emergency relief goods	n/a
April 2021	Typhoon Surigae	Palau	emergency relief goods (water tanks and purifiers, and a generator)	n/a
April 2021	Volcanic Eruption	St. Vincent and the Grenadines	emergency relief goods (blankets and water storage tanks)	n/a

Table 1: JICA Emergency Assistance (2017-Jan 2022)

Date	Emergency	Location	JICA Supplies	JICA Personnel
April 2021	Flooding	Timor-Leste	emergency relief goods	n/a
November 2020	Hurricane IOTA	Colombia and Guatemala	emergency relief goods (blankets, tents, portable jerry cans, and sleeping pads)	n/a
November 2020	Hurricane ETA	Honduras and Nicaragua	emergency relief goods (tents, blankets, plastic sheets, sleeping pads, and polyethylene tanks)	n/a
October 2020	Flooding	Cambodia	emergency relief goods (tents, water purifiers, blankets, generators, plastic sheets, sleeping pads, and portable jerry cans)	n/a
October 2020	Typhoon Linfa	Vietnam	emergency relief goods	n/a
September 2020	Flooding	Niger	emergency relief goods (tents, blankets, plastic sheets, water purifiers, and tanks)	n/a
August 2020	Port Explosion	Beirut, Lebanon	emergency relief goods (tents, blankets, plastic sheets, sleeping pads, portable jerry cans, and water purifiers)	n/a
July 2020	Flooding	Sudan	emergency relief goods (tents, sleeping pads, and generators)	n/a
August-September 2020	Oil Spill	off the coast of Mauritius	n/a	Three JDR Expert Teams (22 members, environmental experts to deliver sorbent for oil clean-up and provide on-site assistance including activities for oil removal on site
January 2020	COVID-19	People's Republic of China	emergency relief goods (masks, Personal Protective Equipment, goggles, and gloves)	n/a
January 2020	Bushfires	Australia	masks	n/a
January 2020	Eruption of Mt. Taal	Philippines	emergency relief goods (masks (N95), drinking water, generators, portable jerry cans, etc.)	n/a
December 2019	Measles	Samoa	n/a	Two JDR Infectious Diseases Response Teams (medical doctors, nurses, pharmacists, and officials of the Ministry of Foreign Affairs and JICA) to provide clinical care to patients
November 2019	Earthquake	Albania	emergency relief goods (tents and sleeping pads)	n/a

Table 1: JICA Emergency Assistance (2017-Jan 2022) (cont.)

Date	Emergency	Location	JICA Supplies	JICA Personnel
November 2019	Heavy Rains and Flooding	Djibouti	emergency relief goods (tents, blankets, sleeping pads, and portable jerry cans)	n/a
September 2019	Hurricane "Dorian"	The Bahamas	emergency relief goods (tents, blankets, plastic sheets, portable jerry cans, and water tanks)	n/a
August-September 2019	Forest Fires	Brazil	emergency relief goods (tents and sleeping pads)	n/a
August-September 2019	Ebola Outbreak	DR Congo	n/a	Japan Disaster Relief (JDR) Infectious Diseases Response Team assisted local efforts in strengthening surveillance, building capacity of Point of Entry/Control, and boosted laboratory diagnosis in Kinshasa and Kisangani
July 2019	Forest Fires	Bolivia	emergency relief goods (Personal Protective Equipment for firefighting, and sanitary and medical supplies)	n/a
March 2019	Cyclone Idai	Mozambique and Zimbabwe	emergency relief goods (tents, plastic sheets, portable jerry cans, water purifiers, flocculants, and generators)	JDR Expert team and Medical Team to Mozambique (two experts for medical data management and 27 doctors, nurses, pharmacists, radiologists, clinical examiners, medical personnel, and logisticians)
March 2019	Flooding	Afghanistan	emergency relief goods (tents, blankets, plastic sheets, and water purifiers)	n/a
March 2019	Flooding	Malawi	emergency relief goods	n/a
September 2018	Earthquake and Tsunami	Indonesia	emergency relief goods (tents, generators, water purifiers, and flocculants)	n/a
June-August 2018	Ebola Outbreak	DR Congo	emergency relief goods necessary for surveillance, points of entry, and laboratory diagnostics	JDR Infectious Diseases Response Team assisted local efforts by strengthening the surveillance system and laboratory confirmation capabilities in Kinshasa
July 2018	Flooding	Myanmar	emergency relief goods (tents and water storage tanks)	n/a

Table 1: JICA Emergency Assistance (2017-Jan 2022) (cont.)

Date	Emergency	Location	JICA Supplies	JICA Personnel
July 2018	Flooding	Lao PDR	emergency relief goods (tents, blankets, water purifiers, and flocculants)	n/a
June 2018	Volcanic Eruption	Guatemala	emergency relief goods (tents, blankets, sleeping pads, and generators)	n/a
May 2018	Flooding	Djibouti	emergency relief goods (tents, blankets, sleeping pads, and portable jerry cans)	n/a
February 2018	Earthquake	Papua New Guinea	emergency relief goods (tents, blankets, plastic sheets, sleeping pads, portable jerry cans, water purifiers, and tanks)	n/a
February 2018	Cyclone "Gita"	Tonga	emergency relief goods (tents, plastic sheets, portable jerry cans, and a generator)	n/a
January 2018	Heavy Rains	Mozambique	emergency relief goods (tents, blankets, sleeping pads, and water purifiers)	n/a
November 2017	Typhoon Damrey	Vietnam	water purifiers	n/a
October 2017	Heavy Rains	Vietnam	emergency relief goods (plastic sheets, blankets, and water purifiers)	n/a
October 2017	Volcanic Eruption	Vanuatu	plastic sheets and blankets	n/a
September 2017	Hurricane "Maria"	Dominica	emergency relief goods (tents, blankets, sleeping pads, etc.)	n/a
September 2017	Earthquake	Mexico	n/a	JDR Search and Rescue Team (72 people, equipment, and four dogs) conducted search and rescue operations in Mexico City; Medical Team
September 2017	Hurricane "Irma"	Cuba and Antigua and Barbuda	emergency relief goods (tents, plastic sheets, sleeping pads, portable jerry cans, and water purifiers)	n/a
August 2017	Plague Outbreak	Madagascar	emergency relief goods (blankets, non-contact thermometers, and masks)	n/a
August 2017	Flooding and Landslides	Sierra Leone	emergency relief goods (tents, blankets, plastic sheets, sleeping pads, portable jerry cans, and water purifiers) from UN Humanitarian Response Depot in Accra	n/a

Table 1: JICA Emergency Assistance (2017-Jan 2022) (cont.)

Date	Emergency	Location	JICA Supplies	JICA Personnel
August 2017	Heavy Rainfall	Nepal	emergency relief goods (blankets, plastic sheets, sleeping pads, tents, and water storage tanks)	n/a
May 2017	Heavy Rainfall	Sri Lanka	emergency goods (tents, plastic sheets, sleeping pads, water tanks, portable jerry cans, water purifiers, and generators)	JDR Expert Team deploys to support government
April 2017	Garbage Mound Collapse	Sri Lanka	emergency relief goods (tents, sleeping pads, portable jerry cans, water purifiers, generators, floodlight equipment, headlights, Poisonous Gas Detectors, High Accuracy GPSs, and mobile toilets)	n/a
April 2017	Flooding	Colombia	emergency relief goods, including generators	

Table 1: JICA Emergency Assistance (2017-Jan 2022) (cont.)

South Korea

ROK legal and institutional frameworks for humanitarian assistance prioritize demand-driven humanitarian assistance in consideration of size and severity of disasters, national capacity of affected countries, appeals from the international community, and assistance provided by other donor countries. The government has sought to ensure more predictable resources to implementing partners and to provide timely and effective humanitarian assistance to countries affected by natural disasters, protracted crises, and complex emergencies including Yemen, Syria, and Iraq. More recently, the country has prioritized addressing COVID-19 needs through both bilateral and multilateral channels, including UN agencies.[199]

The country follows various types of modalities for delivering emergency aid: cash or in-kind contributions, deployment of the Korea Disaster Relief Team (KDRT), capacity building and preparedness, and public-private partnerships. Korea International Cooperation Agency (KOICA) provides cash or emergency relief items to support those in need during and in the aftermath of man-made or natural disasters, based on Ministry of Foreign Affairs (MOFA) direction. KDRT is the official overseas emergency relief team of the South Korean government; KDRT's mandate is to mitigate and recover damage, rescue lives, and provide medical relief assistance. As the KDRT secretariat, KOICA provides capacity building trainings for KDRT members and ensures that equipment is ready for deployment. KOICA provides financial support and capacity building for NGOs who carry out humanitarian assistance projects through partnership agreements.

Statistics from KOICA for 2015-2018 indicate that the country delivered US$31.6-67.8 million in cash, supplies, and public-private partnerships each year. This is dominated by cash donations. Meanwhile, since its founding, KDRT has deployed four times:

- July-August 2018 – Lao PDR – Dam Collapse – 63 members[200] of KDRT in two waves – the first delivered immediate life-saving services, and the second was dominated by medical personnel to address spread of infectious diseases after water supply disruptions;[201]
- April-May 2015 – Nepal – Earthquake – 47 members[202] of KDRT established a base of operation in Bhaktapur to provide medical services;[203]
- December 2014-April 2015 – Sierra Leone – Ebola – 35-member KDRT medical team; and

- November-December 2013 – Philippines – Typhoon – 127 members[204] in two batches of medical, rescue, and survey personnel who provided hospital services and medical care for six weeks;[205] 540 members of the ROK Army helped deliver relief goods (tents, water purifiers, beef fried rice, blankets, and sanitation kits) and rebuilt dozens of schools and hospitals, mostly in Leyte.[206]

Among those Korean major corporations that supports Seoul's emergency relief deliveries is Korean Air. After the 2018 Laos dam collapse, Korean Air flew a 40-ton relief package from South Korea to Vietnam for onward delivery. This mission was preceded by similar efforts including deliveries of water and blankets to flood victims in Peru in 2017. earthquake victims in Kumamoto, Japan, in 2016, cyclone victims in Fiji in 2016, and flooding victims in Myanmar in 2015.[207]

Taiwan

Taiwan has expanded its HADR donations and capabilities in the past decade since January 2010 when it sent rescue teams and a military C-130s to deliver supplies to earthquake-hit communities in Haiti. In March 2011, after the Great East Japan earthquake and tsunami, Taiwan sent rescue teams and released significant financial aid to Japan. In November and December 2013, Taiwan was among the first responders to typhoon-struck Philippines.[208] In the past five years, Taiwan has delivered US$23-83 million annually in emergency HADR funding. Funded and delivered activities have included:

- Water and sanitation recovery in Central Sulawesi, Indonesia
- Funding for post-disaster reconstruction in Fiji, Philippines, and Vietnam following floods and typhoons
- Medical equipment to hospitals in Nepal and in four Central American countries[209]
- Medical teams from Taichung Veterans General Hospital and Kaohsiung Veterans General Hospital held free clinics in Cambodia, Indonesia, Nepal, and Vietnam
- Material supplies to Central American and Caribbean communities affected by earthquakes, hurricanes, volcanic eruptions, floods, and droughts
- Nearly 20,000 tons of rice donated to 21 partners: Belize, Botswana, Cambodia, El Salvador, Eswatini, Guatemala, Haiti, Honduras, Jordan, Lesotho, the Marshall Islands, Mozambique, Nicaragua, Pakistan, Palau, Paraguay, the Philippines, Saint Martin, Sierra Leone, South Africa, and Zimbabwe[210]

In the past few years, Taiwan has focused on humanitarian efforts in Syria and for Syrian refugees as well as on the COVID-19 pandemic. Taiwan's authorities have helped Syrians by providing prefabricated homes, solar-powered LED lights, a mobile clinic, and rice in the Zaatari and Azraq refugee camps in Jordan. More recently, to assist countries hosting Syrian refugees, Taiwan donated 200,000 medical-grade masks and thermal-imaging cameras to Jordan, and 100,000 medical-grade masks to Turkey to help frontline medical personnel in those countries during the COVID-19 pandemic.[211] In addition, under bilateral and multilateral frameworks, Taiwan prioritized COVID-19 assistance. By early 2022, Taiwan had donated more than 50 million medical masks and supported frontline medical personnel in more than 80 countries by delivering medicines and technology along with training as needed.[212]

CHINA (PRC)

The PRC's domestic disaster management (DM) structure continues to evolve. In 2018, the PRC enacted further reforms to strengthen the organizational structure of its emergency management system with the establishment of the Ministry of Emergency Management. The PRC continues to expand its foreign humanitarian aid efforts although less is known about the organizational structure of Chinese humanitarian assistance overseas. China's third white paper on foreign aid released in January 2021, "China's International Development Cooperation in the New Era," marks the first inclusion of a dedicated section on humanitarian aid, suggesting a greater focus on the sector. The white paper reaffirms China's commitment to supporting countries responding to disasters and public health emergencies, post-disaster reconstruction, disaster prevention, and risk reduction.[213]

Government Disaster Management Structure

The DM structure of the PRC is situated within the country's emergency management system and, since April 2018, has been led by the Ministry of Emergency Management (MEM). The PRC's contemporary DM framework has its beginnings in 1989, when in response to the UN's International Decade for Natural Disaster Reduction (IDNDR) initiative, the PRC established an IDNDR Committee, now called the National Committee for Disaster Reduction (NCDR). The NCDR is an inter-ministerial coordination mechanism under the State Council of China and is responsible for drafting key disaster reduction policies and plans. Located in the Ministry of Civil Affairs until March 2018, the NCDR is now housed in the MEM.[214]

The NCDR leads the drafting of five-year national disaster reduction plans, which set out the framework for Disaster Risk Management (DRM) and Disaster Risk Reduction (DRR) for the country. The PRC released its first multi-year, comprehensive national disaster reduction plan for 1998-2010, and since 2007 the country has been preparing comprehensive disaster prevention and mitigations plans, following the government's five-year planning cycle. These plans provide strategic guidance for DRR interventions. Over the years, the plans have reflected a shift from a reactive to a more proactive posture, emphasizing prevention and mitigation.[215]

The Severe Acute Respiratory Syndrome (SARS) epidemic in 2003[216] triggered a comprehensive reform of the PRC's emergency management system. In 2007, the PRC government adopted and enacted the "Emergency Response Law of the People's Republic of China" to prevent and reduce the occurrence of emergencies; control, mitigate, and eliminate the serious social harm caused by emergencies; regulate activities in response to emergencies; protect the lives and property of the people; and maintain national security, public security, environmental safety, and public order.[217]

The Sichuan Earthquake in May 2008 revealed deficiencies in the PRC's emergency management system and was a further catalyst for reform.[218] Following the disaster, the government made considerable efforts to reduce disaster risk by enforcing new building codes, introducing extensive emergency drills in schools, and strengthening earthquake early warning systems.[219] A further reform was the standardization of the country's disaster loss statistical system, which has enabled DRR practitioners to analyze the country's disaster loss data for risk-informed resilience building. The reform has enabled more efficient post-disaster assessments. For example, it took only 27 days to conduct a comprehensive loss estimation following the 2013 Lushan (Sichuan) earthquake,

compared with 112 days following the 2008 Wenchuan (Sichuan) earthquake. In 2020, the average time to conduct the same assessment is around 10 days.[220]

Another reform initiative took place in 2014, when China launched a pilot program of catastrophe insurance in Shenzhen, Ningbo, Yunnan, and Sichuan. Yet, in 2020, the catastrophe insurance program was still considered to be in its pilot phase, with coverage very limited, and many challenges lie ahead with certain types of insurance, such as underdeveloped flood and typhoon insurance programs.[221]

The next major phase of reform occurred in December 2016, when the Chinese Communist Party (CCP) and the government issued a system reform document, emphasizing the need to improve mitigation measures, which had been overlooked due to the excessive focus on response efforts. This was followed in April 2018 by the inauguration of the new MEM as part of the massive government overhaul of its emergency management system. Considered a "super ministry" the MEM took on emergency management powers and resources that were previously spread over 13 ministerial departments, thus becoming the sole agency in charge of emergency response.[222] The creation of the MEM reflects the adoption of a comprehensive emergency management approach or the so-called all-hazard approach.[223]

The MEM has publicly stated that it is working to accelerate three key changes in China's emergency management system, including shifting the focus from response to prevention; from a single disaster to comprehensive disaster management; and from reducing disaster losses to reducing the risk of disasters. According to the Vice Minister of the MEM, speaking at the Boao Forum Conference in China in May 2021 (China's version of the World Economic Forum in Davos), these efforts are yielding results, with disaster-related deaths and damage to homes down by 52% and 47%, respectively, in 2020 compared to 2015.[224]

National Disaster Management Agency

Ministry of Emergency Management

The Ministry of Emergency Management (Chinese: 中华人民共和国应急管理部; MEM)[225] is a cabinet-level executive department of the State Council that is responsible for emergency management, work safety, and emergency rescue.[226] MEM was established in April 2018 as part of the effort to overhaul the PRC's disaster management system. Considered a "super ministry" the MEM took over the disaster management powers and resources that were spread over 13 ministerial departments including: the responsibilities of the former State Administration of Work Safety; firefighting functions from the Ministry of Public Security; disaster relief from the Ministry of Civil Affairs; geological disaster prevention from the Ministry of Land and Resources; drought and flood control from the Ministry of Water Resources; and prairie fire control from the Ministry of Agriculture.[227] The MEM is now the sole agency in charge of emergency response. In addition, the MEM has powers to lead mitigation efforts with regard to fires, floods, droughts, and geological and other hazards having taken over mitigation responsibilities for these hazards from their respective ex-ministries. In addition, MEM has absorbed the NCDR, which was the nominal lead for the mitigation work of various ministries. This merger gives the MEM power to consider the interdependent risks of disasters and do so with a long-term view.

The MEM has the following key responsibilities (unofficial translation from the MEM's website in Chinese):

- Organize preparation of the national comprehensive emergency plan;
- Establish a disaster reporting system and release disaster information in a unified manner;
- Coordinate the construction of emergency forces and material reserves, and ensure unified dispatch during disaster relief;

- Organize the construction of a disaster relief system and guide emergency rescue for production safety (execution of safety measures and safety management), and natural disasters;
- Undertake the work of the national headquarters for responding to major disasters;
- Guide the prevention and control of fires, floods, droughts, and geological disasters; and
- Comprehensive supervision and management of production safety and the supervision and management of production safety in the industrial, mining, and commercial industries.[228]
- The MEM absorbed the public security fire force, the armed police forest force, the production safety team, and other emergency rescue teams, who serve as a comprehensive standing emergency backbone force.[229]
- It is worth noting that the MEM's mandate does not cover public health emergency response, which falls under the authority of the National Health Commission (NHC). However, the MEM has played a role in COVID-19 prevention and control as a member of the joint prevention and control mechanism of the State Council.[230]

The MEM is staffed with personnel from the 13 ministerial departments that were dissolved at its formation. As a result, its staff hold a diverse range of expertise, experience, perspectives, and contacts, and are able to play an effective bridging function with their former ministries.[231]

The relevant department for international cooperation at the MEM is the Department of International Cooperation and Rescue, which has organized a number of international cooperation activities with the International Committee of the Red Cross (ICRC) and other components of the International Red Cross and Red Crescent Movement, and the UN Office for Disaster Risk Reduction (UNDRR).[232] Some other key disaster management agencies, now under the MEM include the NCDR, the China Meteorological Administration (CMA), and the China Earthquake Administration (CEA), which are discussed below.

National Committee on Disaster Reduction

The National Committee on Disaster Reduction (NCDR) was first established as the IDNDR Committee in 1989 and renamed the China Commission for International Disaster Reduction in 2000. In January of 2005, it was renamed with its current title. The NCDR was located under the Ministry of Civil Affairs until absorbed by the MEM in March 2018. An inter-ministerial coordination mechanism, the NCDR is responsible for drafting the national disaster reduction policies and plans.[233]

For over three decades, the NCDR had led the drafting of comprehensive national disaster reduction plans for release by the State Council of China including the Disaster Reduction Plan of the People's Republic of China (1998–2010), the National Comprehensive Disaster Reduction 11th Five-Year Plan (2006–2010), and the National Comprehensive Disaster Prevention and Mitigation Plan 12th Five-Year Plan (2011–2015).[234]

Since 2020 the NCDR has been headed by a State Councilor who is supported by three deputy heads including the Party Secretary of the MEM, the Deputy Chief of the Joint Staff Department under the Central Military Commission, and the Deputy Secretary-General of the State Council.[235]

China Meteorological Administration

The China Meteorological Administration (CMA) is a public institution directly affiliated with the State Council. Its predecessor was the Central Military Commission Meteorological Bureau established in December 1994. Under unified and hierarchical management, both the CMA and the local authorities lead the nation-wide meteorological services, with the CMA providing the core leadership. In China, meteorological operational services are active at five-levels: national, regional, provincial, prefecture, and county. The CMA supervises meteorological work at the national level, while

meteorological authorities at various levels discharge their responsibilities within their jurisdiction. There are approximately 4,000 weather stations nationwide covering different categories and sectors such as agriculture, civil aviation, water resources, salt, forestry, ocean, land reclamation, universities, and research. Figure 7 depicts the organizational structure of the CMA and linkages with the State Council and local governments.

China Earthquake Administration

The China Earthquake Administration (CEA) is a governmental body that was directly under the State Council of China until merging with the MEM in April 2018. The main responsibilities of the CEA include:

- To formulate and implement the national development strategies, guidelines and policies, laws and regulations, as well as the standards regarding earthquake preparedness and disaster mitigation;
- To organize and draft the national program for earthquake preparedness and disaster mitigation, work out the national emergency response plan for destructive earthquakes, establish a national registration system for response plans related to destructive earthquakes, provide guidelines regarding national prediction and preparedness initiatives, and study and propose plans for reconstruction in disaster areas;
- To formulate the national seismic intensity zoning map and strong ground motion parameter zoning map, undertake seismic safety evaluation, examine the results for key construction projects as well as stress factors which could result in serious secondary disasters, and determine the seismic fortification level;
- To supervise and inspect earthquake preparedness and disaster mitigation in accordance with the provisions of the "Law of the People's Republic of China on Protecting Against and Mitigating Earthquake Disasters;" and
- To implement the dual-governing system under the CEA within the provincial and municipal Earthquake Administrations, establish the systems of management and of planning and finance, guide the work of earthquake administrations under the provincial level, and govern the institutional agencies under the CEA.[236]

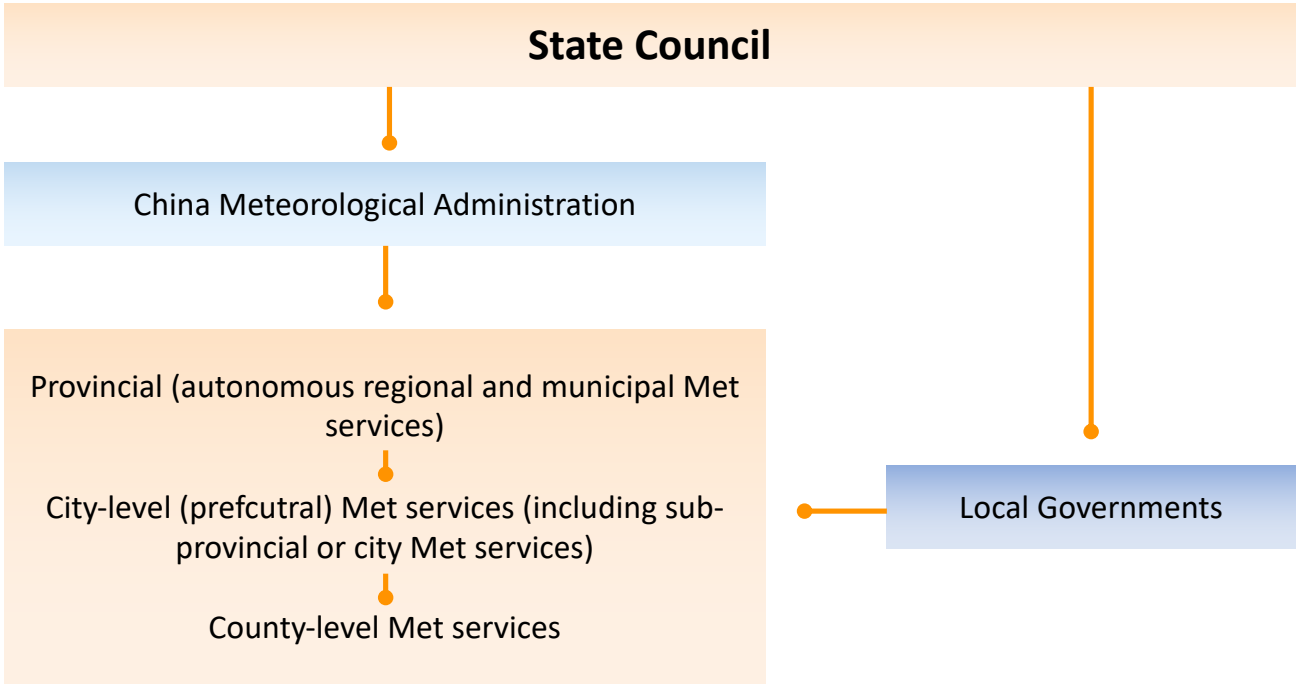


Figure 7: Organizational Structure of the China Meteorological Administration under the State Council

One of the major scientific institutions of the CEA is the Institute of Geology, a national-level multi-disciplinary earth science research institution covering geology, geophysics, geochemistry, and geodesy. China's first laboratory for tectonophysics was established in the Institute, which conducts experimental study on seismic rupture mechanism, rock mechanics under high pressure and high temperature, and the physical mechanical property of the lithosphere.

At present, the Institute of Geology focuses on five scientific and technological issues: 1) seismotectonic environments associated with locations and magnitudes of major earthquakes; 2) earthquake dynamics involving generation processes and mechanisms of major shocks; 3) earth observation technologies to develop new methods of earthquake prediction; 4) eruption mechanisms of active volcanoes and volcanic disaster prediction; 5) earthquake emergency theory and mechanisms of seismic disaster generation.[237]

Lead Agency for International Disaster Response

China conceives of and delivers foreign humanitarian assistance differently than traditional donors, a term that generally refers to countries that are established members of the Organisation for Economic Cooperation and Development (OECD) Development Assistance Committee (DAC), that have a track record of providing substantial development and humanitarian aid relative to GDP, and that contribute to international aid norms and standards.[238] Unlike traditional donors, China does not treat its humanitarian and development aid separately, and instead conceptualizes humanitarian aid as a core part of its development aid. Although China is a significant humanitarian donor compared to non-DAC countries, China's contribution is relatively small compared to traditional donors. China's largest contribution was in 2017 and constituted less than 1% of total reported global humanitarian funding for that year. China's approach to humanitarian assistance tends to be ad hoc rather than guided by public policies or established national priorities. China prefers to coordinate its humanitarian assistance directly with host governments rather than through the international humanitarian system. China further provides most of its humanitarian aid bilaterally rather than through multilateral and civil society partners.[239]

There is no commonly understood "system" for Chinese foreign humanitarian aid.[240] Chinese humanitarian aid has been described as opaque in nature and tightly regimented by the highest members of Chinese political leadership,[241] and up to 33 different agencies are involved in foreign aid. China's foreign aid strategy, budgeting, and implementation were controlled by the Ministry of Commerce (MOFCOM) Department of Foreign Aid until 2018. In April 2018 the China International Development Cooperation Administration (CIDCA) was created to lead aid strategy, bilateral cooperation, and evaluation. CIDCA is not a full ministry, controls only a small portion of the foreign budget, and is not responsible for implementation; all these duties have remained with MOFCOM or other aid entities (e.g., China Exim-Bank, Line Ministries, Ministry of Foreign Affairs).[242] CIDCA is directly under the State Council.[243]

According to aid experts, CIDCA has not become the lead agency for Chinese foreign aid, as some may have hoped,[244] and instead may have contributed to further fragmentation of Chinese aid. For OECD DAC donors looking to engage with China on aid coordination and trilateral cooperation, CIDCA is the natural counterpart to talk to, particularly if one is seeking Chinese funding contribution to a trilateral program. However, with line ministries outside of CIDCA continuing with their respective aid programs (e.g., medical teams under the management of the National Health Commission or agricultural expertise and machinery under Ministry of Agriculture and Rural Affairs), CIDCA has become just another department DAC donors need to contact when seeking to engage in trilateral cooperation.[245]

The Belt and Road Initiative (BRI) has been at the core of Chinese aid program under CIDCA since its inception. BRI is China's signature foreign policy undertaking and the world's largest infrastructure program.[246] It aims to link over 100 participating countries and international organizations through major infrastructure, trade, and development initiatives, with more than US$800 billion estimated spent by 2021 on infrastructure projects and loans.[247] International humanitarian actors, such as the International Committee of the Red Cross (ICRC), have called upon the Chinese government to include a humanitarian component in the BRI to help participating countries design disaster preparedness and response mechanisms.[248]

In terms of implementation, the People's Liberation Army,[249] the Red Cross Society of China,[250] and Chinese NGOs[251] have been involved in Chinese international disaster relief efforts. These actors are discussed in a later section.

Disaster Management Laws, Plans, Policies

There are more than 30 laws and regulations that have been promulgated and implemented on disaster management in China.[252] Many of the key laws are hazard-specific, such as the Law on Water and Soil Conservation (1991), Law on Earthquake Prevention and Disaster Reduction (amended 2008), Law on Fire Fighting (1998), Meteorological Law (2000), and the Law on Production (amended 2009). These laws along with key policies and plans are discussed below. All other disaster-relevant laws, regulations, normative documents, and standards can be found at the MEM website under "Laws, Regulations, and Standards" (*https://www.mem.gov.cn/fw/flfgbz/*).

Emergency Response Law of the People's Republic of China, 2007

The Emergency Response Law issued by Order of the President of the PRC (No. 69) came into effect on 1 November 2007. The law provides for prevention and emergency response preparedness, surveillance and warning, emergency response operations and rescue, post-emergency response rehabilitation, and reconstruction.[253] The law defines an emergency as "a natural disaster, accidental disaster, public health incident, or social safety incident, which takes place by accident, has caused or might cause serious social damage, and needs the adoption of emergency response measures."[254] The law requires the state to establish an emergency response management system with uniform leadership, comprehensive coordination, categorized management, graded responsibility, and territorial management.[255]

Law on Water and Soil Conservation, 1991

The Law on Water and Soil Conservation issued by Order of the President of the PRC (No. 49), effective 29 June 1991, was formulated for the purpose of the prevention and control of soil erosion, the protection and rational utilization of water and soil resources, the mitigation of disasters of flood, drought, and sandstorm, the improvement of ecological environment, and the development of production.[256] The law imposes legal obligations on those carrying out activities such as earth-moving, sand-digging, or quarrying in areas at risk of soil erosion or landslides; tree-felling in forest areas; as well as liability for enterprises or institutions that cause soil erosion in the course of construction or production.[257]

Law on Earthquake Prevention and Disaster Reduction, 1997 (Amended 2008)

The Law on Earthquake Prevention and Disaster Reduction was first adopted on 29 December 1997 and amended on 27 December 2008 (Order of the President of the PRC No. 7), effective 1 May 2009. The original 1997 law provided for the development of plans to protect against and mitigate earthquake disasters; earthquake monitoring and prediction; protecting against earthquake disasters; earthquake emergency and relief; and post-earthquake transitional resettlement, rehabilitation, and reconstruction.

The 2008 amendments included, among other changes, the requirement of higher quake-proof standards for construction projects involving schools, hospitals, and other sites in which people are concentrated. In addition, effective measures should be adopted to strengthen the capacity of existing buildings to withstand earthquakes.[258] The amendment also included a requirement for schools to give instruction on earthquake emergency-response awareness and mandatory rescue training, to foster students' safety awareness and their capacity to rescue themselves and others. The news media is also now responsible for issuing public interest announcements on earthquake disaster prevention and response and on self-help and mutual-help awareness. The amended law further requires local governments to raise awareness amongst villagers about earthquake emergency response including conducting drills to improve safety awareness and the ability of citizens to help themselves and each other.[259]

Law on Fire-Fighting, 1998

The Law on Fire Fighting (Order of the President of the PRC No. 4), effective 1 September 1998, was enacted to prevent fire and to reduce the harm caused by fire hazards, safeguard citizens' personal safety and the security of public and citizens' property, maintain public security, and ensure the smooth progress of the socialist modernization drive.[260] The law is comprised of six chapters covering fire prevention, fire protection organizations, firefighting and rescue, and legal responsibility pertaining to certain fire risk activities.

Expert analysis of the law's application has identified that it lacks crucial elements to ensure compliance with fire safety regulations, particularly when compliance is costly for the owners or managers of buildings and facilities at risk of fire hazards. Past fire disasters suggest a pattern of poor compliance and enforcement of the legal framework prior to a fire incident or a lack of prosecution of responsible persons in the aftermath.[261]

Meteorological Law, 2000

The Meteorological Law (Order of the President of the PRC No. 23) came into effect on 1 January 2000. This law was enacted for the purpose of developing a meteorological service, standardizing meteorological activities, ensuring the accurate and timely issue of meteorological forecast, preventing meteorological disasters, properly and effectively protecting climatic resources, and providing meteorological services for economic development, national defense, social development, and people's well-being. The law contains eight chapters and included provisions covering the construction and management of meteorological facilities, meteorological observation, meteorological forecast and severe weather warning, prevention of meteorological disasters, exploitation and protection of climatic resources, and legal responsibilities of persons carrying out meteorological-relevant activities.[262]

The following are additional policies and measures that supplement the Meteorology Law in elaborating the PRC's meteorology service: "Some Comments Made by the State Council on Accelerating the Development of the Chinese Meteorological Service" (GF [2006] No. 3), "China's National Climate Change Programme" (issued and implemented in June 2007), "Some Comments Made by the General Office of the State Council on Further Strengthening Meteorological Disaster Prevention" (GBF [2007] No. 49), and "Regulations on Prevention of and Preparedness for Meteorological Disasters."[263]

Law on Production Safety, 2002 (Amended 2009)

The Law on Production Safety (Order of the President of the PRC No. 70) was issued in 2002 and amended on 27 August 2009. The law applies to the production safety requirement of entities engaged in production and business operation activities. However, the law states that where there are different provisions in laws or administrative regulations concerning the safety of fire control, road traffic and transportation, railway transportation, water transportation, civil

air transportation, etc., such provisions shall be applied in place of the Production Safety Law. The law contains seven chapters covering the guarantee of safety by production and business operation entities; rights and obligation of employees; supervision and administration of production safety; emergency rescue, investigation, and handling of production safety accidents; and legal liabilities.[264]

National Comprehensive Disaster Prevention and Mitigation Five-Year Plans

In April 1998, the PRC government promulgated the National Natural Disaster Reduction Plan of the People's Republic of China (1998 -2010), the country's first national disaster reduction plan.[265] Since then the government has issued the National Comprehensive Disaster Reduction 11th Five-Year Plan (2006–2010); the National Comprehensive Disaster Prevention and Mitigation Plan 12th Five-Year Plan (2011–2015);[266] and the most current National Comprehensive Disaster Prevention and Mitigation Plan of the 13th Five-Year (2016–2020).[267]

Experts monitoring the evolution of China's National DRR Plans have noticed some key trends since 1998. These include the transformation of China's comprehensive disaster reduction work from a reactive to proactive posture; from disaster loss reduction to DRR; and from single hazard to multiple hazard disaster reduction. This has brought about significant improvement in disaster prevention and mitigation mechanism systems, disaster monitoring and information processing capabilities, and disaster emergency response and comprehensive risk prevention capabilities. While China's plans have always focused on reducing disaster mortality and direct economic loss, the 11th and 13th plans emphasized these as the most important objectives. Moreover, the more recent plans have paid more attention to disaster prevention, recovery capacity enhancement, risk management, and comprehensive prevention in line with the Sendai Framework for Disaster Risk Reduction 2015–2030.[268]

China has been assessed to have given a medium level of priority to integrating DRR into its DRM laws. In 2014, the International Federation of Red Cross and Red Crescent Societies (IFRC) and the United Nations Development Programme (UNDP) examined the extent to which DRR is integrated into the DRM of multiple countries, including the PRC. The report found that DRR is given medium priority in the PRC's DRM laws and is generally integrated into the objectives and mandates of DRM laws and policies at the national and local level. Table 2 below is a summary of the findings of the report's assessment of the extent to which DRR is integrated into DRM-relevant laws and policies in China.[269]

Exchanges on DMHA with U.S.

The Chief of Mission at each U.S. Embassy or Consulate in China bears responsibility for conduct of U.S. government foreign disaster assistance within their jurisdiction. As at all U.S. diplomatic posts, the Chief of Mission (Ambassador, Charge d'Affaires, etc.) is responsible for ensuring that up-to-date disaster plans are operational in the Mission and that Mission Disaster Relief Officers (MDRO) are appointed and perform designated duties. This MDRO would serve as the focal point at the Embassy or Consulate for disaster-related information, planning, and activities affecting both Mission personnel and the affected host

DRR priority in objectives & mandates of DRM laws mandates		Local DRR mandates		Financing (budget line)		Financing (special fund)		Civil society & community participation		Early Warning System		DRR Education	
Law	Policy	Law	Policy	Law	Policy	Law	Policy	Law	Policy	Law	Policy	Law	Policy
Medium	Yes	Yes	No Data	No	Yes	No	No	Yes	No Data	Yes	No Data	No	Yes

Table 2: Findings of IFRC Study of Effective Law and Regulation for DRR in China

community. In case of a disaster in China, the Chief of Mission will have the option of requesting authorization from the U.S. Agency for International Development (USAID) Bureau for Humanitarian Affairs (BHA) to commit a certain level of funding upon the written determination that a disaster exists and meets three criteria: 1) it is of a magnitude with which the affected community cannot cope; 2) recognized representatives of the affected population desire the assistance; and 3) it is in the U.S. government's interests to respond.[270] USAID conducts its activities in China via the Thailand-based Regional Development Mission for Asia, and USAID has developed numerous rapid response packages capable of providing commodities and services to meet the exigencies of both natural and man-made disasters. USAID/BHA Regional Advisors are delegated broad management responsibility for programs in the field.[271]

In the past, the U.S. and China have deconflicted or co-funded some DMHA efforts. In more recent years, each has worked in assisting disaster-stricken or developing countries independently of each other as donors and on competitive terms. The following is a list of some past interaction; it is not an exhaustive history.

In Fiscal Year (FY) 2017, in coordination with The Asia Foundation (TAF) and the Shaanxi Emergency Management Office in Xi'an city, the U.S. Forest Service conducted training for the Chinese audience on the U.S. National Incident Management System, notably the Incident Command System (ICS), disaster planning processes, and other emergency management topics.[272] Between FY2012 and FY2016, USAID/BHA (then the Office of Foreign Disaster Assistance, OFDA) and China's CEA co-funded International Search and Rescue Advisory Group (INSARAG) simulation exercises in China, Indonesia, Malaysia, and Mongolia. These exercises were aimed at improving participating states' ability to conduct and coordinate USAR activities and at strengthening relationships within the international USAR community, thereby facilitating a smoother and more coordinated response when the next disaster requiring international USAR assistance occurs.[273] The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) and the National Earthquake Response Support Service of China's CEA collaborated with USAID/OFDA and TAF in August 2015 to adapt and deliver Community Emergency Response Team training courses in Chengdu, China. The training teaches responders how to prepare ordinary community members to assist in cases of catastrophic natural disasters.[274]

Military Role in Disaster Management

China's People's Liberation Army (PLA) is divided into four services: the PLA Army, PLA Navy, PLA Air Force, and the PLA Rocket Force, as well as two sub-service forces, the Strategic Support Force, responsible for cyber, electronic, information, and space and counterspace operations, and the Joint Logistics Support Force. The PLA is the armed wing of the CCP and, as a "party army," serves the CCP rather than the state, making the PLA unique among modern advanced militaries.[275] The CCP exercises civilian oversight over the PLA through its Central Military Commission (CMC), China's top military decision-making body. President Xi Jinping has chaired the CMC since becoming the CCP General Secretary in 2012. China's Ministry of National Defense – a civilian agency – does not govern the PLA, but instead manages the PLA's interactions with foreign militaries and defense agencies.[276]

The PLA conducted one of its first foreign humanitarian missions in 2002 when it delivered relief materials to Afghanistan after an earthquake. Over the past two decades, the PLA has expanded its involvement in HADR missions abroad. The PLA has increased both the range of HADR operations it performs and the number of personnel and types of assets it deploys, as well as its involvement in HADR exchanges with other militaries.[277]

Within China, the PLA Air Force, the PLA Navy, and the People's Armed Police Forces assist to procure and transport relief materials, equipment, and personnel during a domestic disaster.[278] The PLA deployed more than 5,700 troops and militiamen in Central China's Henan Province to engage in the disaster-relief efforts.[279] The PLA Central Theater Command sent troops, along with 148 vehicles and boats, to more than 30 hazardous areas in Zhengzhou, Luoyang, Xinxiang, and other cities in Henan to help local governments clear debris and aid with clean up. After the floods, the Command activated an emergency response plan and established a disaster relief headquarters. The PLA Central Theater Command used military satellites and aircraft to monitor situations in the flood-hit areas. In all, over 2,000 militiamen from the PLA Henan Provincial Command were mobilized to more than ten locations to clear rivers, examine and monitor riverbanks and dykes, and relocate residents. The first unit to mobilize was the engineering and anti-chemical brigade of the PLA Ground Force's 83rd Group Army. The brigade sent troops to a damaged dyke in Yichuan county to divert floodwater; they used explosives to demolish a section of the barrier. In addition, the PLA Air Force's parachute force responded by reinforcing two hazardous dam breaches along the Jialu River in Kaifeng's Xiangfu district. Approximately 650 troops and 38 vehicles were mobilized to the dam breaches and built a 1.5-kilometer-long, 1.2-meter-tall (0.9 miles × 3.9 feet) sandbag wall. The PLA Rocket Force also responded.[280]

Exchanges on DMHA with U.S. DoD

The U.S. and China's armed forces conducted an annual Disaster Management Exchange (DME) from 2005 through 2020. In 2008, the U.S. military helped provide disaster relief aid to China after the devastating Sichuan Earthquake. Both countries have been involved in disaster relief efforts in the Asia-Pacific region; China's response efforts have generally been carried out unilaterally while U.S. responses generally have been delivered through multinational efforts.[281] Below is a list of encounters; however, it is not an exhaustive list.

U.S.-China DME, 2020

The U.S.-China DME 2020 was held virtually on 11-14 November. The DME is an annual U.S. Army Pacific (USARPAC) disaster risk reduction event with China's PLA that began in 2005. The 2020 iteration was a three-day online seminar on HADR between the Chinese and U.S. militaries. It was attended by more than 50 military personnel from the two sides. The Chinese team leader was Major General Zhao Chengcai, chief of staff of the 71st Group Army of the PLA, and the U.S. team leader was Major General David Wilson, commanding officer of the USARPAC 8th Theater Sustainment Command. The Chinese side shared information on the coordination mechanism of its international humanitarian assistance, military-civil cooperation in humanitarian assistance operations, the PLA's participation in the fight against COVID-19 pandemic including the troops from the PLA Eastern Theater Command participating in flood fighting in Jiujiang, Jiangxi Province, and joining local efforts in prevention, resilience, and disaster rescue during typhoon. The U.S. side shared information on the multinational coordination center (MNCC), emergency management program, disaster early warning system of the Pacific Disaster Center, military support to the local area amid the pandemic, flood profiles of the Mississippi River, and military-civil cooperation in flood fighting and dangerous rescue.[282]

U.S.-China DME, 2019

The U.S.-China DME 2019 was held 15-21 November at Kilauea Military Camp and Kilauea Military Reservation on the island of Hawaii. The exchange centered around a scenario of a notional country suffering from the effects of a volcanic eruption and involved the use of a MNCC led by the host country. The academic portion focused on HADR topics. The table-top exchange included approximately 35 U.S.

military and interagency personnel and 35 PLA participants, specializing in civil coordination, disaster planning, rescue operations, and public information. The participants examined how to promote international coordination in responding to a volcanic eruption scenario and the importance of the MNCC as a platform by which both armies can coordinate and synchronize support to a stricken nation within international standards. The practical field exchange ran concurrently with the table-top exchange and covered displaced civilian operations, medical aid, search and rescue, environmental assessment, and debris clearance.[283]

U.S.-China DME, 2018

The U.S.-China DME 2018 was held 13-18 November in Nanjing, China. The DME comprised three parts: an expert academic discussion, a table-top exchange, and a practical field exchange. The 2018 DME focused on an international disaster relief scenario following a hypothetical devastating earthquake in a third country.[284]

U.S.-China DME, 2017

Engineers and medics from the Oregon National Guard and Joint Logistics Force Soldiers of the PLA trained alongside each other in disaster response capabilities during the annual U.S.-China DME from 16 to 19 November in Oregon. The DME included academic discussion, a Tabletop Exchange with a MNCC, and a practical field exchange between U.S. and PLA soldiers. This included a HADR scenario with a simulated response to a third country suffering from severe flooding based on real world damage assessments from the Spring 2017 flooding in Peru. Members of the Oregon National Guard that participated included vertical engineers of the 442nd Engineer Utility Detachment (EUD) and medics of Detachment 1, 142nd Medical Group who are part of the search and extraction team for the Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Enhanced Response Force Package (CERFP), which responds to large-scale disasters in the Pacific Northwest region. Photo 1 shows Oregon Air and Army National Guard personnel extracting a simulated casualty alongside Joint Logistics Force Soldiers from the PLA during the DME. Other U.S. participants included the Center for Excellence in Disaster Management and Humanitarian Assistance (CFE-DM), USARPAC, the 8th Theater Sustainment Command, the United States Military Academy, the 351st Civil Affairs Command, the 13th Combat Sustainment Support Battalion (CSSB), the 571st Sapper Company, the U.S Coast Guard Sector Columbia River, the U.S. Army Corps of Engineers Northwestern Division, the U.S. Army Corps of Engineers Portland District, the National Oceanic and Atmospheric Administration, the



Photo 1: U.S.-China Disaster Management Exchange (2017)

United States Geological Survey (USGS), and the Pacific Disaster Center (PDC) Global, an applied research center managed by the University of Hawaii.[285]

U.S.-China DME, 2016

The U.S.-China DME 2016 was held 13-19 November at Kunming, Yunnan Province, China. During the DME, leaders and experts from the PLA, USARPAC, 8th Theater Sustainment Command, and 130th Engineer Brigade visited various agencies involved with disaster management including the Experimental Base of Seismological Bureau of Yunnan Province, the Command Center of Civil Affairs Disaster Relief of Yunnan Province, emergency shelters in Baohai Park, and the Kunming Reserve Base of Civil Affairs. The expert exchange featured three days of briefings from senior U.S. Army and PLA leaders on topics varying from high altitude rescues and associated medical threats to the valuable lessons learned in response to previous natural disasters, such as earthquakes in the Yunnan region in 2014. It also featured briefings from the Daniel K. Inouye Asia-Pacific Center for Security Studies (DKI-APCSS) on the combined military response to Cyclone Winston in Fiji and from CFE-DM on how the military is uniquely suited for disaster response based on their normal war fighting capabilities.[286]

U.S.- China DME, 2015

CFE-DM joined a team of U.S. military and civilian HADR experts during USARPAC's annual DME with officials of the PLA in China, 12-19 January. An Expert Academic Discussion in Guangzhou, Guangdong Province, took place for the first four days before approximately 70 U.S. attendees and their PLA counterparts traveled to Haikou, Hainan Island, for a Command Post Exchange (CPX) and Practical Field Exchange (PFE). A natural disaster scenario was used as a basis for the two nations to practice coordinating disaster response efforts. The CPX converted to a MNCC, which provided direction and guidance to the PFE scenario responders. The PFE included collapsed structures, victims in water, and an internally displaced persons' camp.[287]

PLA Senior Medical Delegation Visit to U.S. Pacific Command, 2014

The PLA Senior Medical Delegation visited U.S. Pacific Command to discuss engagement between the U.S. and PLA Navy hospital ships and to participate in medical institutional and educational exchanges. The visit was also intended to enhance U.S.-PRC cooperation within the Asia-Pacific region. Photo 2 depicts U.S. aircrew members of 15th Airlift Wing explaining the medical missions and capabilities of the cargo aircraft C-17 Globemaster III to PLA's Senior Medical Delegation Strategic Working Group at Joint Base Pearl Harbor-Hickam, Hawaii, on 11 March 2014.[288]

Earthquake Disaster Relief to China, 2008

U.S. Pacific Command provided disaster relief aid to China after the devastating 8.0 magnitude Wenchuan Earthquake that struck Sichuan Province on 12 May 2008. This was referred to as the "Hickam C-17" mission because the C-17s were assigned to the 15th Airlift Wing at Hickam Air Force Base (AFB), Hawaii, and the 3rd Wing at Elmendorf AFB, Alaska. The mission's planning and coordination was handled by 13th Air Force, a component from Hickam AFB. Then-Secretary of Defense Robert Gates, in support of the U.S. State Department, authorized Pacific Command to support earthquake relief efforts in the PRC. Two Air Force C-17 Globemaster IIIs landed at the Shuangliu International Airport in Chengdu, China, on 18 May 2008 with nearly 200,000 pounds of relief supplies including food, water containers, generators, tents, blankets, and tools to be taken to earthquake areas. There was a collaborative effort of U.S. government organizations, including the supplies purchased from the U.S. Federal Emergency Management Agency (FEMA). Photo 3 depicts earthquake relief supplies from the U.S. being unloaded.[289]



Photo 2: PLA Senior Medical Delegation and USPACOM Medical and Educational Exchange (2014)



Photo 3: Air Guard Deliver Earthquake Relief Supplies to PRC (May 2008)

Disaster Management Partners

In the PRC, a vast network of NGOs, private foundations, and charities, as well as international organizations, international NGOs, and other international agencies, support the state-led DM system.

National Non-Governmental Organizations

In the China context, "NGO" refers to grassroots NGOs, quasi-NGOs (i.e., state-affiliated people's organizations), government-organized NGOs (GONGO), private foundations and charities, and non-profit organizations. Since the 2000s there has emerged a highly networked and capable NGO community focused on disaster relief within China. During crises, NGOs have carried out relief missions effectively in parallel with state agencies.[290]

Before the 2000s only a handful of international NGOs such as Oxfam Hong Kong were allowed to work directly with victims of natural disasters alongside the official agencies.[291] Currently it is estimated that over 300 grassroots NGOs and voluntary groups across the country participate in disaster relief on a regular basis. Most of these groups are small-scale, locally rooted NGOs, staffed with outdoor sports enthusiasts, amateur or trained rescuers, and activist-minded specialists. Among these groups are the Beijing-based Blue Sky Rescue (BSR), one of the oldest non-governmental outdoor rescue groups in China, and the Cangnan Emergency Rescue One Plus One (Cangnan 1 + 1) from southern Zhejiang Province, which started its first mission when Typhoon Morakot struck Taiwan in August 2009.[292]

The 2008 Sichuan earthquake was a watershed moment for NGO participation in disaster relief.[293] The event ushered in a new wave of bottom-up public participation, volunteerism, and social activism in disaster relief and post-crisis reconstruction in China.[294] The large number of NGOs that responded in the aftermath of the earthquake stood in contrast to the absence of non-state involvement after the equally devastating 1976 Tangshan Earthquake.[295]

NGO networks and alliances play a significant role in disaster relief. Two important platforms, the Sichuan NGO Earthquake Relief Coordinating Office (NGO-RCO) and the 512 Voluntary Relief Services Centre (512 Centre) were established to coordinate NGO relief work nationwide during the early response to the 2008 Sichuan earthquake. Following the crisis, the 512 Centre transformed into the Shangming Social Development Research Centre; and after completing its missions the chief coordinator of NGO-RCO Zhang Guoyuan launched the NGO Disaster Preparedness Centre (NGO-DPC) and co-founded United Rescue (UR) with the aim of conducting large-scale relief missions with peer NGOs.[296]

In 2010, YouChange, a private foundation and a major donor in the field of civil society development, established the Centre for Non-Governmental Disaster Response (CNDR). The CNDR funded and mentored NGO grantees to become the NGO hub for relief work within a particular region and sponsored workshops and training sessions to build the capacity of the NGO disaster relief community.[297] Although CNDR was disbanded in 2012, its training programs brought together the leaders of relief NGOs and inspired the formation of organizations, such as NGO-DPC. In 2013 the China Youth Development Foundation, the China Foundation for Poverty Alleviation (CFPA), the Narada Foundation, the Tencent Foundation, and the One Foundation supported the formation of the Disaster Relief Coordinating Alliance of Foundations ten days after the 2013 Ya'an (Lushan) earthquake. The Alliance represents one of the largest networks of relief NGOs in China today.[298]

Figure 8 depicts the level of NGO involvement in disaster relief missions during the period 2008-2013. The earthquakes in the cities of Wenchuan and Lushan of Sichuan Province in 2008 and 2013, respectively, have seen the highest level of NGO involvement (more than 50 NGOs).[299]

Private foundations and charities have also heavily supported the development of NGO networks and alliances for disaster relief. The three notable private foundations involved in disaster relief work are the One Foundation, the Narada Foundation, and YouChange.[300] Figure 9 depicts the contributions during the period 2008-2013 from the three private foundations, respectively.[301]

Chinese NGOs also work on disaster relief efforts abroad. For example, in the wake of the 2015 Nepal Earthquake, the Disaster Relief Coordinating Alliance of Foundations set up the "Chinese NGO Coordinating Center for the 4.25 Nepal Earthquake" along with international organizations such as the UNDP (China office), the Asia Foundation, and Save the Children.

Table 3 is a summary of some of the national-level NGOs that carry out disaster-related activities in the PRC including the NGOs discussed earlier.[302]

Table 4 is a summary of some of the private foundations and charities supporting disaster relief work in the PRC.[303]

International Agencies

Table 5 is a summary of some of the international agencies and organizations that carry out disaster-related activities in the PRC.[304]

Year	Province (epic area)	Type of disaster	Human loss	Economic loss (million yuan)	NGO participation*
2008	Sichuan (Wenchuan 汶川)	Earthquake	87,000	845,100	+++
2010	Gansu (Zhouqu 舟曲)	Landslide	1,765	400	+
2010	Qinghai (Yushu 玉树)	Earthquake	2,698	300	++
2011	Yunnan (Yingjiang 盈江)	Earthquake	25	2,700	+
2012	Yunnan (Yiliang 彝良)	Earthquake	81	3,700	+
2013	Sichuan (Lushan 芦山)	Earthquake	193	85,200	+++

Source:
Monthly newsletters published by the Zhuoming Disaster Information and Service Center, 2010–2013.
Note:
* + refers to 10 to 30 NGOs, ++ refers to 30 to 50 NGOs, +++ refers to more than 50.

Figure 8: China's NGO Involvement in Major Disaster Relief Missions (2008-2013)

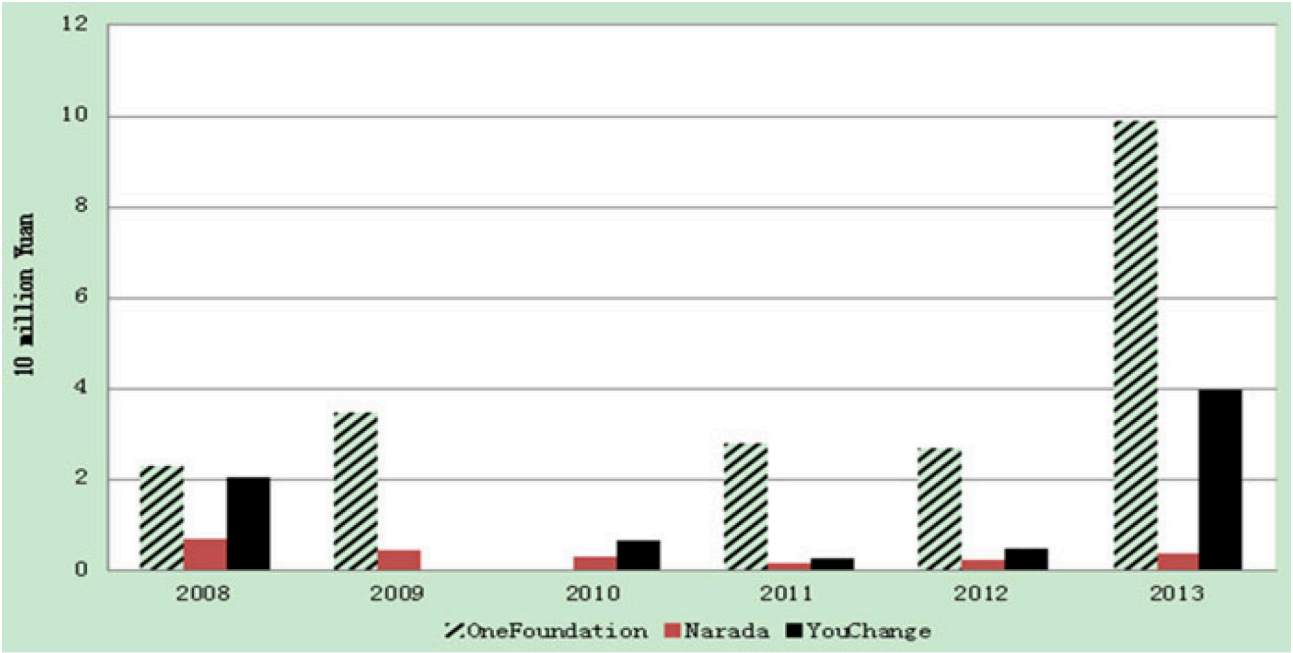


Figure 9: Disaster Relief Funding by Private Charities (China)

Organization	Description
Red Cross Society of China (RCSC) 8 Beixinqiao Santiao Dongcheng District, 100007 Beijing Tel: (86) (10) 6402 8411 / (86) (10) 6402 6934 rcsc@redcross.org.cn https://www.redcross.org.cn	RCSC (中国红十字会), the official National Red Cross Society of the PRC, is a humanitarian social relief organization. Founded on 10 March 1904, the RCSC has been involved in assisting wounded soldiers, helping refugees in times of conflict, and providing assistance to disaster victims. The RCSC also supports whenever possible relief activities in other countries. After the founding of the PRC, with the support of the Central Government, the RCSC was reorganized in August 1950 and reclaimed its legal membership in the IFRC. The RCSC cooperates with the International Committee of Red Cross (ICRC), the IFRC, and many other national societies. In 1993, the Standing Committee of National People's Congress officially promulgated the Red Cross Law of the People's Republic of China, which provides legal protection to the RCSC and its work. The Red Cross organizations in Hong Kong and Macau became highly autonomous branches of the RCSC in 1997 and 1999, respectively. At present, RCSC has branches in the Special Administration Regions of Hong Kong and of Macau and 70,000 grassroots units, with a total membership of 20 million people.
Disaster Relief Coordinating Alliance of Foundations	The Disaster Relief Coordinating Alliance of Foundations (基金会救灾协调会) was founded in 2013, ten days after the Ya'an earthquake; founding groups were the China Youth Development Foundation, the China Foundation for Poverty Elimination (CFPA), the Narada Foundation, the Tencent Foundation, and the One Foundation. The Alliance in 2014 included 300 domestic Chinese voluntary disaster response and rescue teams with approximately 5,000 individual members in total.
NGO Disaster Preparedness Center (NGO-DPC) https://chinadevelopmentbrief.org/ngos/ngo-disaster-preparedness-center-ngodpc-ngo/	NGO-DPC is a registered, national NGO comprised of four NGOs and one academic institution. Its major projects have focused on disaster management and emergency assistance; post-disaster community building and development; and non-profit organization support and capacity building in disaster areas. NGO-DPC receives funding from Global Trafigura Foundation Give2Asia and Beijing Western Sunshine Rural Development Foundation. NGO-DPC cooperates with Japan in the field of disaster management information to develop disaster management tools. They also hold staff exchanges regarding post-disaster construction and emergency relief with Japan.
Shangming Social Development Research Centre	The Shangming Social Development Research Centre (尚明公益发展研究中心) is the organizational successor to the 512 Voluntary Relief Services Centre that launched within 12 hours of the Sichuan Earthquake in 2008. According to experts, small grassroots groups have joined and worked with Shangming not only because it has resources but also because it is transparent about its working relationship with the government.
Blue Sky Rescue (BSR) http://bsr.net.cn/	BSR (蓝天救援) is China's largest non-governmental humanitarian organization, established in 2007. The BSR rescue team has up to 31 branches around China and over 30,000 registered volunteers. Among them are more than 10,000 people with professional training and who are available for immediate rescue assignments. By 2017, BSR volunteers had taken part in more than 10,000 SAR missions, helping save lives after earthquakes, landslides, and hurricanes. During the 2008 Sichuan and 2015 Nepal earthquakes, BSR volunteers provided assistance and support as an important component of rescue forces.

Table 3: NGOs that Carry Out Disaster-Related Activities in the PRC

Platforms/Networks	Description
China Foundation for Poverty Alleviation (CFPA) http://en.cfpa.org.cn/index.php?file=page&cid=1	CFPA was established in 1989 and is headquartered in Beijing. It is one of the largest nongovernmental charitable organizations in China in the field of poverty alleviation. CFPA specializes in poverty alleviation, project management, fundraising, health, education, international development, disaster relief, rural development, and advocacy.
China Charity Alliance http://www.charityalliance.org.cn/English/index.jhtml	In 2016, the China Charity Alliance established a disaster relief committee in Beijing with 53 members. At the time of its creation the committee was charged with guiding, supporting, and reorganizing charitable organizations and enterprises in disaster relief efforts, establishing a mechanism to organize social forces to prevent, mitigate, and prepare for disasters, building a communication platform regarding charitable disaster relief, propagating knowledge of disaster prevention and mitigation, and providing skills training programs, etc.
Narada Foundation http://www.naradafoundation.org/?l=en-us	The Narada Foundation, founded on 11 May 2007, is a private foundation that acts as a supplier of funds and resources in the public welfare industry chain. The Foundation makes grants and provides 'seed money' to promote the development of public welfare projects and organizations and to foster social innovation conducted by NGOs. Along with other partners, the Narada Foundation supported the establishment of Disaster Relief Coordinating Alliance of Foundations in 2013. In response to the 2013 Ya'an earthquake, the Narada Foundation initiated the "4.20 Joint Operation of Chengdu Charity Organizations," which provided on-scene coordination and management, logistical and capacity building services to emergency response teams and volunteers, and needed services including food and other daily necessities to the most vulnerable populations in Ya'an, (women, children, and the elderly).
One Foundation https://onefoundation.cn/	The One Foundation (壹基金), formally known as the Shenzhen One Foundation Charity Fund (深圳壹基金公益基金会), is a Chinese NGO, which focuses on disaster relief, children's welfare, training of public welfare professionals, and funding grassroots charities. It was registered in 2011 as the first private charitable fundraising organization in China. Its headquarters is in Shenzhen, with offices in Beijing, Shanghai, Ya'an, and Chengdu. The foundation's motto is "Charity by All, Doing What I Can" (尽我所能，人人公益). Along with other partners, the One Foundation supported the establishment of Disaster Relief Coordinating Alliance of Foundations in 2013.
YouChange Social Entrepreneur Foundation http://en.youcheng.org/index/about/about.html	YouChange Social Entrepreneur Foundation (YouChange) is a nationwide charitable organization. YouChange's goal is to promote social justice and harmonious development and to discover and support "neo-philanthropy" leaders. YouChange has the mission to establish social innovation network support platforms for cross-sectoral cooperation. In 2010, YouChange supported the establishment of the Centre for Non-Governmental Disaster Response (CNDR).

Table 4: Private Foundations and Charities that Support Disaster-Related Activities in the PRC

Organization	Description
Asian Development Bank (ADB) https://www.adb.org/projects/54447-001/main	The ADB new country partnership strategy aligns with the PRC's 14th Five-Year Plan (2021-2025) to support the government's efforts to achieve high quality, green development. Consistent with the bank's approach to upper middle-income countries, investments and knowledge solutions will focus on the strategic priorities of environmentally sustainable development, climate change adaptation and mitigation, and addressing demographic aging and health security. In the area of disaster risk management, the ADB is delivering technical assistance (TA) under the "Integrated Framework for Cost-Effective Disaster Risk Management." The TA will develop frameworks, build capacity, provide technical guidance, and define cost-effective options for DRM in the PRC. The TA aims to foster regional partnerships between the PRC and its neighbors to improve disaster preparedness and resilience.
UN Country Team http://www.un.org.cn/pages/UNCountryTeamInChina.html	The UN has been a development partner of China for over 40 years. The UN's role in China has shifted from a traditional donor to a partner providing technical expertise and supporting the Government of China in its global engagements, including the Belt and Road Initiative, South-South Cooperation endeavours, and other collaborations among member states. Twenty UN agencies, funds, and programs are active in China including: the UN Economic and Social Commission for Asia and the Pacific (ESCAP); UN Food and Agriculture Organization (FAO); International Civil Aviation Organization (ICAO); International Fund for Agriculture Development (IFAD); International Labour Organization (ILO); International Organization for Migration (IOM); the Joint United Nations Programme on HIV/AIDS (UNAIDS); UNDP; UN Environmental Programme (UNEP); UNESCO; UN Population Fund (UNFPA); UN-Habitat; UN High Commissioner for Refugees (UNHCR); UN Children's Fund (UNICEF); World Food Programme (WFP); and World Health Organization (WHO).
UN Office for Disaster Risk Reduction (UNDRR) https://www.undrr.org/countries-regions/asia/china	Although the UNDRR does not have an office in China, UNDRR and the MEM have collaborated on DRR efforts; together they organized an online workshop in August 2020 to orient Chinese officials to the use of the Sendai Framework Monitor, a platform to track the impact of disasters across a number of indicators and to monitor their progress in the implementation of the Sendai Framework for Disaster Risk Reduction.
UN Development Programme (UNDP) https://www.cn.undp.org/content/china/en/home/development-impact.html	The UNDP's role in China's disaster-related activities is focused on supporting disaster preparedness and promoting community-based disaster risk reduction. For example, one of the activities of the UNDP China Disaster Preparedness Training Program is conducting emergency drills in preparation for earthquake alerts in China's rural schools. UNDP is also conducting the Mainstreaming Risk Management into Sustainable Human Development initiative and a China Risk & Innovation Project.
International Committee of the Red Cross (ICRC) https://www.icrc.org/en/where-we-work/asia-pacific/china	The ICRC Regional Delegation for East Asia covers China, the Democratic People's Republic of Korea (DPRK), the Republic of Korea (ROK), and Mongolia. The ICRC Beijing delegation promotes International Humanitarian Law (IHL), fosters support for ICRC activities in the region and worldwide, supports National Red Cross and Red Crescent Societies, and provides artificial limbs. The ICRC has maintained close cooperation with the RCSC in many areas, such as emergency response, poverty eradication, and public health.

Table 5: International Agencies/Organizations that Carry Out Disaster-Related Activities in the PRC

Organization	Description
China Care International Ltd. https://chinacareinternational.com/about-us/	Since 1996, China Care International Ltd. has provided humanitarian aid and emergency relief to tens of thousands of people in western regions of China and other parts of Asia. China Care International Ltd. is a Hong Kong-based NGO and works with indigenous groups, local government entities, and NGOs already in the concerned areas. The last project highlighted by China Care International was in 2013; it involved support to a stable footbridge to allow villages to travel and get their goods to the marketplace during the rainy seasons.
Plan International China https://plan-international.org/china	Plan International started operating in China in 1995 and, in 2017, it registered a Plan International Inc. Shaanxi Representative Office. Plan International China works with children, communities, and partner organizations on child-centered DRR. This involves keeping children at the center of humanitarian relief, protection, education, and psychosocial care responses during the relief and recovery phases of a disaster.
Save the Children https://china.savethechildren.net/what-we-do	Save the Children's humanitarian response work in China is focused on two priorities: 1) providing immediate emergency relief, including providing psychosocial first aid interventions and supporting children to return to school; and 2) building resilience against future disasters. Save the Children also works on child protection, child rights governance, education, and health in China.
The Asia Foundation (TAF) https://asiafoundation.org/where-we-work/china	In China, TAF focuses on developing the charitable sector, disaster management, gender equality and women's development, child welfare, regional cooperation, and constructive U.S.-China relations. Along with other partners, TAF supported the establishment of Disaster Relief Coordinating Alliance of Foundations in 2013.
World Bank https://www.worldbank.org/en/country/china	China and the World Bank Group (WBG) have worked together for over 40 years. The WBG's new Country Partnership Framework (CPF) for FY2020-2025, issued in December 2019, reflects the evolution of the WBG's relationship with China toward a decline in lending and a more selective engagement in line with the capital increase commitments agreed to by its shareholders in 2018. The WBG prepared a report in 2020, "Learning from Experience: Insights from China's Progress in Disaster Risk Management," which draws on expert insights from China's DRM community and highlights the evolution of national DRR planning; the rise of demonstration communities (select communities designated for raising awareness about the importance of DRR); standardization of the disaster loss statistical system; development of an agricultural insurance system; and establishment of a catastrophe risk insurance system.
World Vision http://www.worldvision.org.cn/en/Children-Affected-by-Disasters	World Vision in China focuses on children left behind, children with special needs, migrant children, and children affected by disasters and since 2010 has worked with the Institute of Psychology, China Academy of Sciences, to provide psychological support for earthquake disasters in Yushu (Qinghai), Yingjiang and Yiliang (Yunnan), Minxian (Gansu), and Lushan (Sichuan). In April 2015, World Vision worked with the Institute of Psychology to organize the first forum about child protection in disasters. In April 2016, World Vision collaborated with the Chinese Academy of Science to again co-organize a forum about psychological support. During this forum the "Minimum Standards for Child Protection in Humanitarian Action" was launched, encouraging relief and humanitarian agencies in China to integrate child protection into humanitarian response.

Table 5: International Agencies/Organizations that Carry Out Disaster-Related Activities in the PRC (cont.)

JAPAN

Japan has a disaster management system with plans and processes for all phases of a disaster: prevention, mitigation, preparedness, emergency response, recovery, and rehabilitation. The system both defines the roles and responsibilities of national and local government agencies and makes space for private sector and voluntary stakeholders. Japan shares its accumulated expertise and experience internationally due to its history of major disasters and based on successes in saving lives and reducing suffering during disasters in the past five decades, as illustrated in Figure 10.[305] The country's government and people are active in global discussions on disaster risk reduction and contribute to disaster impact reduction efforts around the world.

Government Disaster Management Structure

Japan's domestic disaster management structure is headed by the Prime Minister as chair of the National Disaster Management Council, an agency of the Cabinet Office. For delivery of HADR overseas, the Ministry of Foreign Affairs (MOFA) plays a key role in assessing a request, designating the resources to be used, and managing funding and reporting requirements. When MOFA agrees that Japan will offer overseas emergency assistance, the agency in charge of delivery is the Japan International Cooperation Agency (JICA).

National Disaster Management Agency

The top-level office managing disasters at home in Japan is the Cabinet Office wherein there is a Minister of State for Disaster Management. The Cabinet Office's National (sometimes "Central") Disaster Management Council formulates and promotes implementation of the Basic Disaster Management Plan and Earthquake Countermeasures Plans. It deliberates and provides advice on important issues on disaster risk reduction. Among the members of the Council are industrial and corporate leaders, such as the Governor of the Bank of Japan and President of the Japanese Red Cross Society. The Council also includes experts from academia, scientific research institutions, the Special Committee for Risk Management / Disaster Control, and prefectural disaster managers.[306]

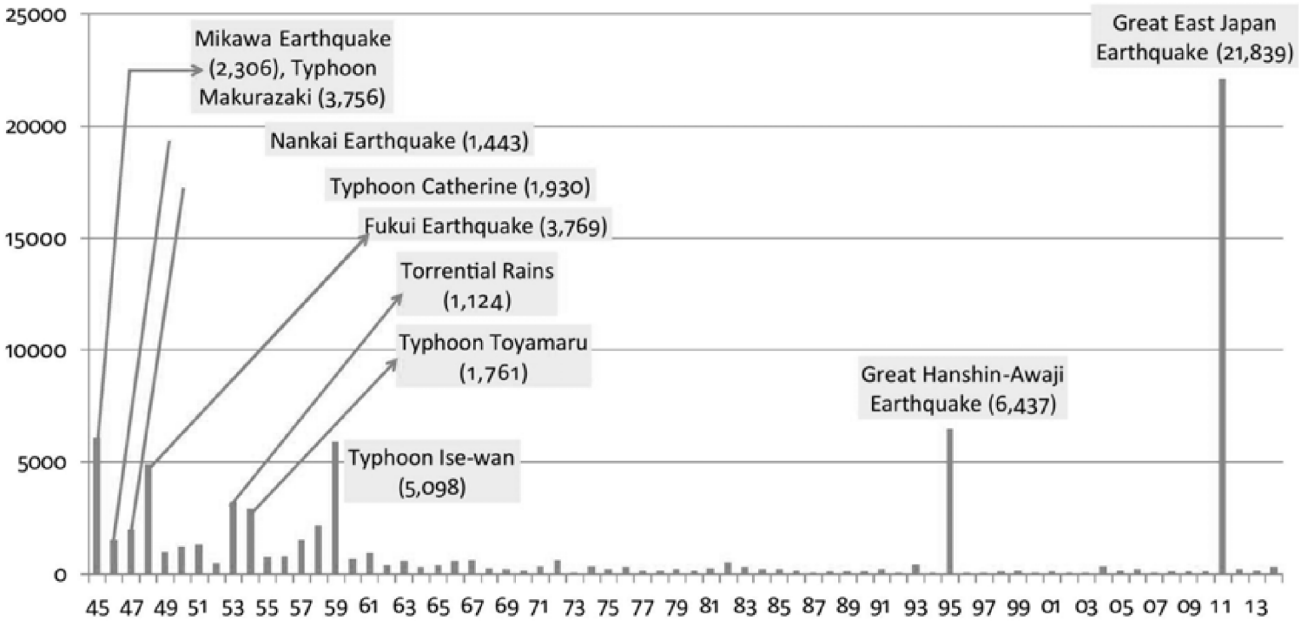


Figure 10: Number of Dead and Missing Persons Caused by Natural Disasters in Japan (1945-2015)

The Council's Director General for Disaster Management Bureau oversees:

- Formulation of Master Plans against earthquake, tsunami, volcanic eruption, flooding, and other events
- Measures against large earthquakes, including the creation of master plans for Nankai Trough and Tokyo Inland earthquakes
- Development of evacuation plans for tsunamis, including the creation of tsunami hazard maps
- Expansion of measures against volcanic eruptions, including the establishment of disaster management councils for volcanic eruptions, the creation of volcanic eruption hazard maps, and the preparation of evacuation plans; and
- Development of measures against large floods, including examining evacuation guidance and emergency rescue activities to be conducted in the event of a large flood.

The Disaster Management Bureau of the Council also develops professional and community capacity to respond to disasters. This includes providing training for central and local government officials as disaster management specialists and establishing a disaster management system by conducting comprehensive disaster reduction drills with the goal being to foster citizens' knowledge and motivation to undertake specific actions for disaster risk reduction in their daily lives, including by becoming volunteers, and for companies to formulate business continuity plans.[307] Among national preparedness activities are a comprehensive series of readiness drills. The first Comprehensive Disaster Management Drill Framework was established after the 1995 Kobe earthquake. Every year since then, the government has reviewed and updated the Framework to inform updates to the basic policies governing disaster response drills.[308]

In the wake of a disaster, the Council will confer among government agencies on countermeasures, information requirements, and coordination. It will dispatch a government investigation team headed by the Minister of State for Disaster Management to assess the situation and establish, as necessary, a Headquarters for Extreme Disaster Management headed by the Prime Minister and composed of all ministers. In addition, the Council provides prefectures with advice on and funding for relief activities to be conducted based on the Disaster Relief Act, and the Council can provide subsidies to cover a portion of prefectures' support money for disaster victims based on the Act on Support for Livelihood Recovery of Disaster Victims.[309]

Japan is administratively divided into three basic levels: national, prefectural, and municipal. Below the national governments are prefectures, which are further divided to better service large geographical areas. Prefectural Disaster Management Councils take charge of formulating and promoting prefectural area disaster management plans and, in cases where a disaster has occurred, coordinate disaster recovery efforts among the prefecture and relevant designated local government organizations, municipalities, and designated public corporations. Among the members of Prefectural Councils are commanders of JSDF units stationed in the prefecture, education and police leaders, and other stakeholders. In areas where a Municipal Disaster Management Council exists, that Council formulates an area disaster management plan.[310]

A "Nuclear Emergency Preparedness Council" has been established in the Cabinet as a body to promote government-wide nuclear emergency preparedness measures. The Council's main role is to approve regional emergency response plans, which translate the national Nuclear Disaster Risk Management Measures into action items. Efforts are led by the Local Nuclear Disaster Management Councils with the participation of the Cabinet Office, other relevant ministries and agencies, and relevant local governments. The Nuclear Emergency Preparedness Council is chaired by the Prime Minister, vice-chaired by the Chief Cabinet Secretary, the Minister of the Environment, the Minister of State for Nuclear Emergency Preparedness, and the Chairman of the Nuclear Regulation Authority.[311]

Lead Agency for International Disaster Response

The Government of Japan formulates its current humanitarian aid policies as a way to demonstrate solidarity with the international community, which contributed massively after the Great East Japan Earthquake in 2011.

Japan has three tools for emergency assistance overseas: dispatch of Japan Disaster Relief (JDR) Team; provision of emergency relief goods; and Emergency Grant Aid. Dispatch of a JDR Team and provision of emergency relief goods are used in the case of a natural disaster such as a flood, cyclone, typhoon, earthquake, volcanic eruption, or pandemic, or in the case of a man-made disaster such as a fire or explosion of an oil or gas installation, but not in the case of a conflict-related disaster. Emergency Grant Aid is available in all cases including conflict.

When a large-scale disaster occurs overseas and the government of the affected country or an international organization requests assistance from Japan, the MOFA examines the details of the request, considers assistance according to the scale, type, and other aspects of the disaster, and consults with the ministries and agencies concerned before agreeing to provide assistance. The process from a request for assistance to dispatch of a JDR Team or provision of emergency relief goods is depicted in Figure 11.[312]

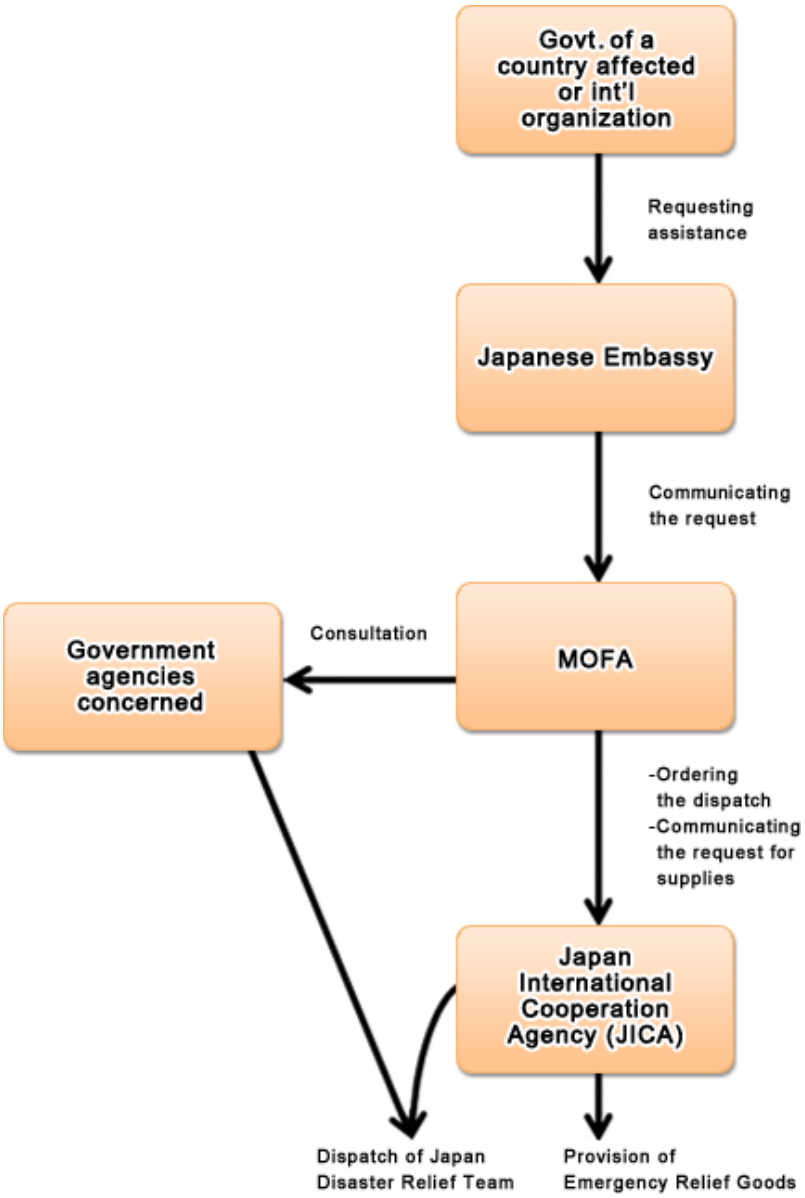


Figure 11: Decision-Making Flow for Japanese Overseas Emergency Assistance

When MOFA receives a request for assistance from the government of a disaster-affected country or an international organization and finds it appropriate to dispatch a JDR Team, MOFA consults with the ministries and agencies concerned for obtaining cooperation under the Law Concerning Dispatch of the JDR Team.

Dispatch and other necessary tasks are carried out by JICA following an order by the Minister for Foreign Affairs. There are five types of JDR teams, as detailed in Figure 12.[313] Since 2010, the JDR Rescue Team has had an INSARAG External Classification (IEC) in the "Heavy" category. The standing JDR Team is comprised of 70 members from MOFA, the National Police Agency, the Fire and Disaster Management Agency, Japan Coast Guard, JICA, and registered medical and structural assessment experts.[314]

When MOFA receives a request for assistance and agrees to provide emergency relief goods,

MOFA communicates the request to JICA. In accordance with the JICA Law, JICA carries out necessary procedures to provide prompt assistance. In support of this mission, JICA maintains six types of high-demand relief items, including tents, blankets, and water purifiers, stockpiled in JICA-managed warehouses in Singapore, Miami (U.S.), and Dubai with additional warehouses with stocks solely for use within Majuro (Marshall Islands) and Koror (Palau).[315] Figure 13 shows how JICA staffs, supplies, and carries out their missions.[316]

Japan provides Emergency Grant Aid for governments of affected countries or international and other organizations (including Red Cross Societies) to provide urgent support. The Grant is provided with a view to achieving:

- Emergency assistance for refugees, internally displaced persons (IDP), or people affected by natural disasters or conflicts
- Support for democratization through providing financial assistance to the governments or international and other organizations which assist the administrative management and monitoring of election processes in developing countries; or
- Reconstruction and development assistance through providing financial assistance for international and other organizations, with a view to supporting post-conflict countries or regions in a smooth transition to the reconstruction phase.[317]

In addition to providing emergency assistance, JICA is Japan's government agency delivering overseas development assistance (ODA). It was founded in 1974, underwent deep reforms in 2003 with the passage of the JICA Law and, since 2008, has been Japan's sole official representative in ODA.[318] As of 2020, the agency could claim 14 offices within Japan, 96 overseas offices, and nearly 2,000 staff members. JICA actively develops alliances with related organizations to contribute to the swift implementation of relief services at the disaster site, and JICA is well-versed in working with the UN Office for the Coordination of Humanitarian Affairs (UN OCHA). [319]

To improve readiness at home and abroad, JICA actively participates in national preparedness drills, including at schools, and it invites international disaster management experts to participate alongside it to ensure that both Japan's future leaders and global players can exchange ideas on risk reduction and readiness.[320] JICA also cooperates with Japanese NGOs operating in affected areas to implement more effective operations.[321]

Under the Ministry of Internal Affairs and Communication, the Fire and Disaster Management Agency (FDMA) participates in emergency rescue, handling hazardous materials, and fire prevention and fighting. In case of a disaster, it plays a coordinating role for the country's fire and rescue forces who are responding to a disaster that has overwhelmed local responders. FDMA's International Rescue Team (IRT) travels as a specialist unit within the JDR concept to provide fire and rescue services. Among IRT's missions is supporting the development of the global community of fire and rescue professionals' skills, and IRT's members both travel to train specialists or host international trainees. Between 1986 and 2008, IRT members responded to a dozen natural and industrial incidents across Africa, the Middle East, and Central and South America, and within Asia by dispatching instructors, rescuers, and logistics teams in groups ranging from one person to 46 people. Teams may include personnel from Japan's National Police or Coast Guard or from the ranks of its medical professionals.[322]

Disaster Management Laws, Plans, Policies

Basic Act on Disaster Management (Act No. 223 of 1961)

Also known as the Disaster Countermeasures Basic Act, Act No. 223 established the National Disaster Management Council and directed it to formulate the national policy for Disaster Management and to function as the national coordinating body for Disaster Management. The law lays out roles and responsibilities

Team Type	Composition	Activity	Duration
Search and Rescue Team 	MOFA, JICA National Police, Fire and Disaster Management, Coast Guard	Search and rescue victims trapped in collapsed structures.	Approx. 7-10days
Medical Team 	MOFA, JICA Doctors, Nurses, Pharmacists, etc.	Emergency medical assistance including patient treatment.	Approx. 2weeks
Infectious Diseases Response Team 	MOFA, JICA Doctors, Scientists, Nurses, Pharmacists, etc.	Assistance in minimizing damage from large-scale outbreaks of infectious diseases.	Depending on circumstances
Expert Team 	Experts form government and private organizations	Technical advice and instructions on disaster prevention and damage mitigation based on assessment of the situation.	Approx. 2weeks
Self Defense Force Unit 	Ground, Maritime, Air Self-Defense Forces	Search and rescue, medical assistance (including epidemic prevention), Air and sea transport	Approx. 2weeks-2months (record base)

※Photos: MOD, JICA

Figure 12: Types of JDR Teams

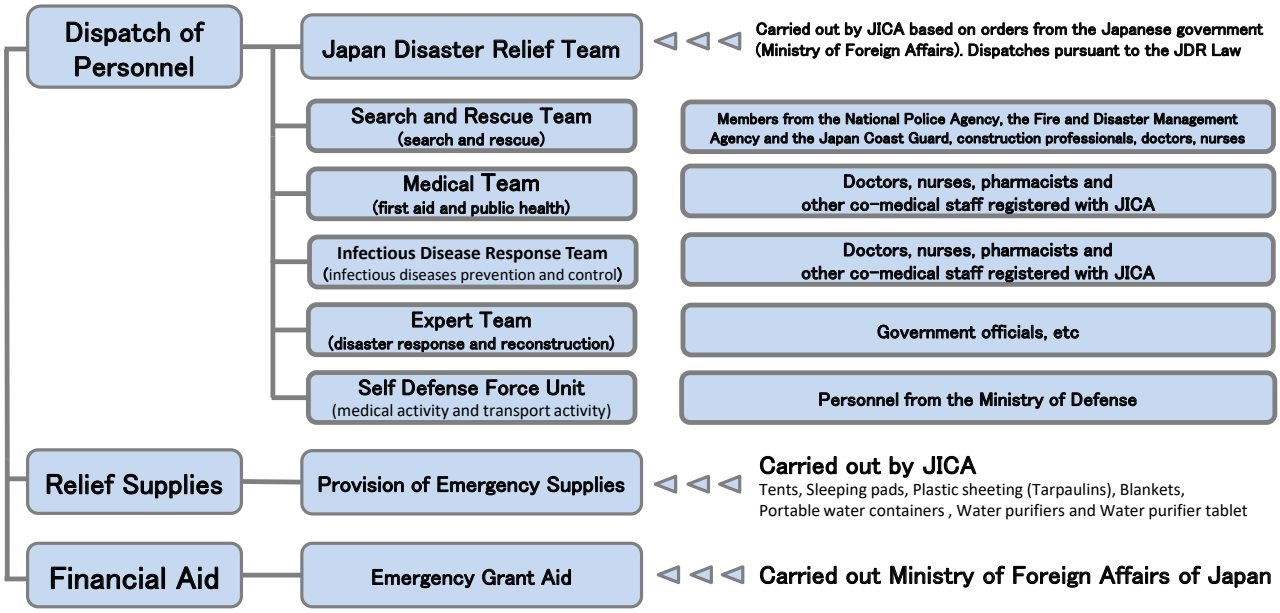


Figure 13: Types of Assistance and How JICA Carries out Missions

related to disaster reduction at the national, prefectural, and municipal government levels as well as the civil society level, including community organizations and citizens. It requires the three levels of government to draw up master disaster management plans.[323] The Basic Act has been amended several times. Of note, 2013 amendments established the Community Disaster Management Planning System to promote voluntary disaster prevention activities through self-help and mutual support by local residents and to allow communities to prepare a draft of local disaster management plan and propose it to the Municipal Disaster Management Council for inclusion in the Municipal Disaster Management Plan. In addition, amendments made in 2021 laid down the framework for establishing a National Disaster Management Headquarters at a stage when a disaster is likely to occur, and they improved provisions concerning evacuation.[324]

Disaster Relief Act (Law No. 108 of 1947)

The Disaster Relief Act is intended to foster a whole-of-society approach to protect disaster affected people and maintain social order. It addresses responsibility to provide emergency relief that is held by all levels of society, including the national government, local public corporations, the Japanese Red Cross Society and other organizations, and the general public. Specifically, upon occurrence of a disaster at or above a specified magnitude, the prefectural governors will make emergency disbursements to assist the affected, including setting up evacuation shelters and rescuing victims; the national government will reimburse 50-90% of these costs.[325]

Act on Support for Livelihood Recovery of Disaster Victims (Act No. 66 of 1998)

The Act is a law to support the reconstruction of livelihoods by providing support grants through a fund contributed by prefectures from the perspective of mutual assistance for affected people who have suffered significant damage to their livelihoods when a natural disaster has caused damage difficult for the affected municipality or prefecture to handle alone. Since its enactment in 1998, the act has been revised several times. In December 2020, the law was amended to add households that are partially destroyed and deemed difficult to live in without substantial repairs as eligible households. The law ensures ¥1,000,000 (US$8,700) for construction or purchase of a house, ¥500,000 (US$4,350) for repair, and ¥250,000 (US$2,175) for rent, and applies to disasters that occurred after July 2020.[326]

Japan International Cooperation Agency Law, 1974

The JICA Law was enacted and JICA was founded in 1974, but with the central government reforms of 2001, JICA was transformed into an independent (and eventually, incorporated) administrative agency of the Government of Japan. As of October 2008, under the Revised JICA Law, JICA subsumed part of the Japan Bank for International Cooperation (JBIC), and the New JICA was reformatted into a comprehensive aid agency with its current three aid schemes: technical cooperation, ODA loans, and grant aid.[327]

Law Concerning the Dispatch of Japan Disaster Relief Teams, 1987

It became evident from carrying out relief activities following the September 1985 earthquake in Mexico and volcanic eruption in Colombia two months later that a comprehensive approach to international disaster relief, including the dispatch of personnel, was necessary. Thus, the National Diet (Assembly) passed the Law Concerning the Dispatch of JDR Teams in August 1987, and the law was put into force the following month. Since then, JDR Teams have been dispatched from a humanitarian standpoint to major disaster areas, especially in developing countries, to carry out rescue operations, provide medical care, and carry out rehabilitation activities as well as emergency activities to mitigate damage in response to requests for help from the

governments of the affected countries.[328]

Basic Disaster Management Plan

The Basic Disaster Management Plan is the plan for domestic disaster management; it is prepared by the National Disaster Management Council in accordance with the Basic Act on Disaster Management and is subject to consideration every year and is revised if necessary. The plan clarifies the duties of the central government, public corporations, and local governments regarding implementing measures. The plan also describes the sequence of countermeasures - i.e., preparation, emergency response, recovery, and reconstruction – for various types of disasters.[329] Based on the Basic Plan, all subsidiary government agencies (government organizations or offices and local or prefectural governments) must prepare disaster management operation plans. In recent years, revisions have been made in light of events or developments in disaster prevention measures, such as the consideration and implementation of countermeasures against infectious diseases, including COVID-19.[330]

White Paper on Disaster Management

The Cabinet Office's annual white paper on disaster management addresses the past year in disasters and projection of challenges that may confront the country during the coming year. The 2021 white paper incorporated a special section on managing COVID-19 when responding to natural disasters. It laid out the special informational and outbreak mitigation responsibilities of local, prefectural, and national authorities.[331]

Basic Act for National Resilience Contributing to Preventing and Mitigating Disasters for Developing Resilience in the Lives of the Citizenry (Act No. 95 of 2013)

The Basic Act for National Resilience defines the Japanese government's responsibility for making the country more resilient to large-scale disasters. It defines the legal principles of resilience and mandates the government to develop a range of policies. Most importantly, it stipulates that the government must create a Fundamental Plan for National Resilience, designed to be a comprehensive and systematic document to guide all other resilience plans, policies, and strategies. Lastly, it establishes the National Resilience Promotion Headquarters within the Cabinet Office. The Headquarters is responsible for creating the Fundamental Plan for National Resilience and overseeing all national resilience initiatives in Japan.[332]

Fundamental Plan for National Resilience, 2018

The 2018 Fundamental Plan builds on the initial, 2014, iteration to present a prescription for developing national resilience based on a vulnerability assessment, and the Plan is formulated as a guideline for other related national plans to promote comprehensive and deliberate measures concerning national resilience. Initiatives for developing national resilience are emphasized in the 2018 Plan based on the assessment of an increasing probability of catastrophic effects from large-scale earthquakes and more frequent extreme weather. The Plan lays out policies for individual and cross-cutting sectors in which resilience activities should occur; they are: 1) Administrative functions/ Police and fire services/Disaster management education, etc.; 2) Housing and cities; 3) Healthcare and welfare; 4) Energy; 5) Finance; 6) Information and communications; 7) Industrial structures; 8) Transportation and logistics; 9) Agriculture, forestry, and fisheries; 10) National land conservation; 11) Environment; 12) Land use; 13) Risk communication; 14) Human resources development; 15) Public-private collaboration; 16) Countermeasures for aging infrastructure; and 17) Research and development.[333]

Five-Year Acceleration Plan for Disaster Prevention, Mitigation, and National Resilience, 2020

The government plans to invest approximately ¥15 trillion (US$130 billion) between 2021 and 2025 in a system designed to prepare for

increasingly severe and frequent meteorological disasters linked to the effects of climate change and large-scale earthquakes. Intensive investment in flood countermeasures has successfully reduced flood damage, and future countermeasures will focus whole river basins, including relocation of towns from at-risk areas and storage of floodwater.[334]

Engagements on DMHA with U.S.

The Chief of Mission at each U.S. Embassy or Consulate in Japan bears responsibility for conduct of U.S. government foreign disaster assistance within their jurisdiction. As at all U.S. diplomatic posts, the Chief of Mission (Ambassador, Charge d'Affaires, etc.) is responsible for ensuring that up-to-date disaster plans are operational in the Mission and that Mission Disaster Relief Officers (MDRO) are appointed and perform designated duties. This MDRO would serve as the focal point at the Embassy or Consulate for disaster-related information, planning, and activities affecting both Mission personnel and the affected host community. In case of a disaster in Japan, the Chief of Mission will have the option of requesting authorization from BHA to commit a certain level of funding upon the written determination that a disaster exists and meets three criteria: 1) it is of a magnitude with which the affected community cannot cope; 2) recognized representatives of the affected population desire the assistance; and 3) it is in the U.S. government's interests to respond. USAID does not have a stand-alone mission in Japan, but USAID has developed numerous rapid response packages capable of providing commodities and services to meet the exigencies of both natural and man-made disasters. USAID/BHA Regional Advisors are delegated broad management responsibility for programs in the field.[335] In addition, there is a USAID/BHA Humanitarian Assistance Advisor to the Military within the U.S. Marine Corps' III Marine Expeditionary Force (MEF) in Okinawa to provide advice and coordination with III MEF during disaster response in Japan or elsewhere in the region where III MEF may deploy.[336]

Various exchanges between Japanese and U.S. agencies have placed a high value on all-hazards disaster preparedness given the unique vulnerabilities to natural disasters and man-made security threats both countries face. Based on the framework of the Emergency Management Working Group (EMWG) established under the U.S.-Japan Bilateral Commission on Civil Nuclear Cooperation established in 2012, the U.S. Department of Energy, the Federal Emergency Management Agency (FEMA), the U.S. Nuclear Regulatory Commission, and other relevant U.S. agencies and their Japanese counterparts have been engaged in cooperation on Nuclear Emergency Preparedness Systems through regular exchanges of views and drills. Exchange meetings address protective measures, training, and professional human resources development among other issues.[337]

Another multi-year process, led by Japan's Cabinet Secretariat crisis management office and the U.S. National Security Council's preparedness policy office, focused on enhancing all-hazards crisis preparedness via exchanges across multiple agencies relevant to disaster preparedness and response, including defense, emergency management, health, and law enforcement. Japanese and U.S. officials shared experiences and observations from a range of natural and man-made crises, including the 2011 Great East Japan earthquake and tsunami, the 9/11 terrorist attacks, the 1995 Aum Shinrikyo sarin gas attack, the post-9/11 U.S. anthrax attacks, the 2013 Boston Marathon bombing, Hurricane Sandy in 2012, and the 2013 Amenas gas plant terrorist hostage-taking of Japanese citizens in Algeria. Japanese and U.S. officials also shared lessons from each country's disaster preparedness exercise programs. Indeed, Japanese officials welcomed a small group of U.S. officials to observe and provide feedback on a 1,000-person chemical attack exercise in Yamagata Prefecture in 2012. The observers included the director of the U.S. Centers for Disease Control and Prevention (CDC) and leaders from defense, emergency management, health, and law

enforcement agencies as well as the White House. Such collaboration continues, including in recent years working to prepare for and prevent crises that could occur around the Tokyo Olympic and Paralympic Games in Summer 2021.[338]

Based on the Memorandum of Understanding (MOU) signed between the Cabinet Secretariat and FEMA in December 2014, a working plan is signed every year, and the two countries use international conferences and video conferences for sharing information and exchanging opinions. A videoconference was held in December 2020 to exchange information on: evacuation procedures under COVID-19 crisis, support and stockpiling of relief supplies under COVID-19 crisis, and general issues raised by the COVID-19 crisis.[339]

In addition to building emergency and contingency response capacity, on 21 September 2018, a Memorandum of Cooperation (MOC) was signed between JICA and the Overseas Private Investment Corporation (OPIC) of the U.S. to strengthen cooperation in recruiting and managing public-private financing for development capital in developing countries, including the Indo-Pacific. The MOC falls within a framework that envisions close collaboration between the two entities to promote investment by Japanese and U.S. companies and respond to the need for development capital in the private sector of development countries, thereby contributing to their sustainable development.[340]

Military Role in Disaster Management

When disasters occur anywhere in the country, the JSDF works in collaboration with municipal governments, engaging in search for and rescue of disaster victims, missing ships, or aircraft, flood control, medical treatment, epidemic prevention, water supply, and transport.

In principle, JSDF will deploy at the request of prefectural governors and other officials who have primary responsibility for disaster management and are positioned to grasp the overall conditions of the disaster. Municipal mayors can ask prefectural governors to request disaster relief dispatch of JSDF. After receiving a request, the Minister of Defense or person designated by the Minister can immediately dispatch units as necessary according to the disaster situation. Under particularly urgent conditions, when there is no time to wait for a request, the Minister of Defense may authorize an exceptional dispatch.

Earthquakes and nuclear incidents have special legal frameworks. When an alert is issued based on the Law Concerning Special Measures for Large-Scale Earthquakes Countermeasures, the Minister of Defense is authorized to order an earthquake disaster relief dispatch of JSDF based on the request of the Director of the Earthquake Disaster Warning Headquarters (the Prime Minister). When a nuclear emergency alert is issued based on the Special Law on Nuclear Disaster Countermeasures, the Minister of Defense is authorized to order a nuclear disaster dispatch of JSDF troops upon request of the Director of the Nuclear Disaster Countermeasures Headquarters (the Prime Minister).

JSDF provides the following types of Disaster Relief Dispatches:

- Transportation of Emergency Patients
- Firefighting Support
- Response to Natural Disasters
- Response to Large-Scale Disasters
- Response to Special Disasters (Nuclear Disasters)

The transport of emergency patients from isolated or remote areas with insufficient medical facilities may require JSDF to use its aircraft. Such operations can make up 80% of JSDF's annual disaster relief operations, with operations addressing needs in Okinawa and Kagoshima Prefectures, and the Goto, Izu, and Ogasawara Islands the most frequent. Firefighting support is the second most common type of dispatch, dominated by responses to fires in areas near JSDF facilities. The JSDF may also conduct aerial firefighting activities in locations where

firefighting by road is difficult, such as mountain and forest areas.

Preparation for Disaster Relief includes:

- JSDF disaster prevention drills including alongside local governments
- Formulation of disaster relief plans
- Maintaining and up-dating contingency plans for responses to large-scale earthquakes; in the specific instance of a major event in the Tokyo region, the plan stipulates the formation of a joint task force; and
- Cooperation with local governments including enhancing information sharing systems.[341]

On the tenth anniversary of the 2011 Great East Japan earthquake and tsunami, the Chief of Staff of the Joint Staff of the JSDF reflected on how the JSDF had responded. JSDF organized a joint task force, the first of its kind in disaster relief efforts in Japan, and deployed approximately 107,000 personnel, 543 aircraft, and 4 warships. The mobilization included the first disaster relief response mobilization of JSDF Ready-Reserve and Reserve Personnel. Alongside foreign military personnel and assets, including the more than 20,000 U.S. personnel who participated, JSDF engaged in large-scale support activities, including search and rescue, cargo transport, airport restoration, school cleaning, and debris removal operations.[342]

The JDR Law was partially amended in June 1992, making it possible for the Minister for Foreign Affairs, after consultations with the Minister of Defense, to send teams from JSDF when large-scale aid is required following a large-scale disaster outside Japan and when self-sufficient activities are required in the disaster area. The JSDF carries out emergency relief activities – e.g., epidemic prevention, medical activity, and transport – when deemed necessary.[343] But beyond responding in times of disaster, JSDF can and does conduct Defense Capacity Building Assistance in the realm of HADR under the direction of the Ministry of Defense and within the scope of what MOFA classifies as development assistance. JSDF may work directly with the military agencies of targeted countries and provide education and training; most participating countries have been members of the Association of Southeast Asian Nations (ASEAN). Some of these efforts are in cooperation or coordination with U.S., Australian, and British forces in the region.[344]

Overall, the impacts of climate change are likely to exacerbate stressors in the region that could undermine security and stability. However, climate change may also present opportunities to strengthen alliances and partnerships, and Japan's soft power in the region. More frequent and severe climate-driven natural disasters could increase demand for HADR operations, which may present an opportunity for Japan to continue to share its deep expertise on disaster management across the Indo-Pacific region and elsewhere. For example, Japan's response to Typhoon Yolanda/Haiyan in the Philippines in 2013 included a central role for JSDF and was the largest such mobilization since JSDF's founding at the end of World War II; it deployed 1,200 members during operations.[345]

Engagements on DMHA with U.S. DoD

Among the 10 types of disaster drills required by the Comprehensive Disaster Management Drill Framework are drills conducted with local governments in coordination with U.S. forces stationed in Japan.[346] Immediately following the 2011 Great East Japan earthquake and tsunami, the U.S. military began sending observers to Japan's annual large force disaster relief exercise, "Joint Exercise Rescue," primarily run out of Japan's Joint Staff Office and Ministry of Defense with participants from other ministries and agencies. As U.S. participation matured, it eventually meant that U.S. Forces, Japan (USFJ) and each of the component forces began to participate in coordination centers at the Ministry of Defense, Yokota Air Base, and at the JSDF JTF headquarters for each exercise. Additionally, prefectures began inviting U.S. military assets to join prefectural and municipal disaster readiness exercises. Finally, when the

U.S. and Japan negotiated the 2015 Guidelines for U.S.-Japan Defense Cooperation, domestic and international HADR operations were included as mission sets for the alliance in a move that provided the basis for routine interaction between the Japanese interagency and U.S. forces.[347]

Remote Island Disaster Exercise – November 2021

For the first time, U.S. forces on Okinawa joined their Japanese counterparts to rehearse unified response to a natural disaster – a simulated earthquake on a small, nearby island. The 2021 Remote Island Disaster Exercise (RIDEX) involved approximately 200 U.S. Marines and airmen from the III Marine Expeditionary Force (MEF) and Kadena Air Base, along with 400 troops from JSDF. The purpose of the exercise was to improve JSDF's ability to respond to disaster situations in remote islands and to strengthen cooperation with related organizations. JSDF has held the island disaster exercise every year since 2014, except in 2020. The 2021 exercise scenario involved an earthquake off Okinawa's southeast coast. During the exercise, medical personnel from Japan and the U.S. confronted language barriers under trying conditions as a mix of 20 Japanese and U.S. troops simulating injuries ranging from severe burns to broken bones were airlifted to the amphibious transport dock JS Kunisaki where they were triaged and then flown to either JGSDF's Camp Naha or to Kadena. From the Kadena flight line, a converted bus carried the simulated casualties to a medical tent.[348]

Search and Rescue Training – November 2021

On 9 November, a Japan Air Self-Defense Force (JASDF) U-125A, a UH-60J, and a U.S. Air Force CV-22 and an MC-130J conducted bilateral search and rescue training over the East China Sea north of Miyako-jima and Ishigaki-jima to improve tactical skills and bilateral response capabilities. Through such training, JASDF improves search and rescue capabilities to save lives in case of emergencies including natural disasters or maritime accidents anywhere around Japan, and it strengthens bilateral Japan-U.S. capabilities to respond.[349]

Maritime Training Activity "Sama Sama" – October 2021

Military personnel from the U.S, Philippines, Japan, and France kicked off Maritime Training Activity (MTA) Sama Sama on 11 October. The virtual engagement focused on the full spectrum of naval capabilities and highlighted the ability of participants to work together towards the common goal of ensuring a free and open Indo-Pacific maritime security environment. For the first time, during this iteration of Sama Sama, subject matter experts and personnel from JMSDF and France joined their U.S. and Philippines colleagues. The Tagalog phrase "Sama Sama" or "together" is the central theme of the training. The exercise aims to provide opportunities for participating militaries to learn and foster professional dialogue during subject matter expert exchanges (SMEE). The SMEE events featured a variety of training opportunities, to include diver training, aviation and information sharing, replenishment at sea methods, maritime domain awareness, medical best practices, Illegal, Unreported, and Unregulated fishing, maritime law, and HADR. The 2019 iteration of the exercise had highlighted the role of intergovernmental and nongovernmental experts to improve understanding. Thus, 2021 participation included representatives from the European Union (EU) Critical Maritime Route Wider Indian Ocean (CRIMARIO), UN Office on Drugs and Crime (UNODC), USAID, ICRC, UN OCHA, CFE-DM, Office of Civil Defense - Philippines, and Bureau of Fisheries and Aquatic Resources.[350]

KAMANDAG 21 – September-October 2021

From 28 September to 8 October, JGSDF joined the U.S.-Philippines exercise KAMANDAG 21 and conducted training for disaster relief and medical evacuation with the Philippines Marine Corps. The year 2021

marked the 65th anniversary of Japan-Philippine friendship, and during the year, all three JSDF services conducted exercises with Philippine forces. Through this exercise with Philippine Marine Corps, JGSDF not only improved tactical skills for HADR but also promoted mutual understanding and cooperation.[351]

Tomodachi Rescue Exercise – February 2021

Tomodachi Rescue Exercise (TREX) is a Japan Joint Staff exercise where units participate in joint and bilateral activities throughout Japan as part of an HADR operation. In 2021, on 12-13 February, the Ministry of Defense and JSDF conducted the Japan-U.S. Joint Disaster Management Drill portion of TREX 21 with USFJ. The exercise series allows JSDF to maintain and enhance its response capabilities for a possible major earthquake in collaboration with relevant authorities.[352] Based on the many lessons and challenges learned from the 2011 Great East Japan earthquake, the JSDF has strengthened cooperation with relevant organizations and USFJ in disaster prevention via exercises. The Japan-U.S. Joint Disaster Management Drill, launched in 2013, is one such initiative, and the 2021 iteration was held within the context of the COVID-19 pandemic.[353]

Tomodachi Rescue Exercise – February 2020

On 21-23 February, U.S. Air Force personnel from Yokota integrated with JSDF to support TREX 20. To remain poised for swift future response, JSDF conducts an annual simulated response training. During the 2020 iteration, JGSDF members trucked 20,000 pounds of "meals, ready to eat" to a combat mobility flight hangar where Yokota personnel rapidly integrated with them, overcoming a language barrier through an interpreter and working through shared task execution procedures. In addition to familiarization with the process of loading and unloading relief items or equipment, the teams exercised the overall U.S.-Japan partnership. Following the Yokota delivery, a small crew delivered the supplies to Japanese Forces in Komaki where they off-loaded the supplies in less than one hour.[354]

Remote Island Disaster Exercise – September 2019

Marines with 1st Marine Aircraft Wing observed JSDF and local government entities as they conducted a RIDEX at the Yaeyama Islands on 1 September, as shown in Photo 4.[355] RIDEX is a disaster drill exercise, implemented to maintain and enhance JSDF HADR capabilities against sudden, large-scale disasters in remote regions, and to enhance the interoperability among local Japanese government organizations. The 2019 iteration was the sixth RIDEX, annually conducted by components of the JSDF alongside many other local government organizations including the JDR Team, local firefighters, medical teams, and police forces. Several realistic training events were conducted during RIDEX 2019, including excavating a vehicle out of the ground, using the Jaws of Life to pull someone out of a vehicle wreck, medical evacuation, water purification, and air reconnaissance.[356]

Sagamihara City Disaster Drill – September 2019

The Sagamihara City Disaster Drill of 2019 included fires, injured people trapped in buildings and thrown from overturned vehicles, power lines in need of restoration, a chemical leak, and downed trees. In wave after wave of disaster scenarios, Sagamihara City, Kanagawa Prefecture, the U.S. Army, JGSDF, and JASDF rescue personnel demonstrated their capabilities to handle it all. The 1 September drill took place next to Sagami General Depot in Sagamihara City, and it included more than 100 organizations and nearly 2,000 participants. City officials invited members of the public to watch the drill and visit displays aimed at helping people prepare. The U.S. Army Aviation Battalion Japan participated by landing a Black Hawk helicopter on a field next to the main staging area so members of the Sagamihara City Fire Department's special rescue team could practice delivering a simulated casualty and bringing back supplies. In addition, firefighters with U.S. Army



Photo 4: U.S. Marines, JSDF Train for HADR (2019)

Garrison (USAG) Japan Fire and Emergency Services conducted an operation where they rescued two simulated injured personnel from a collapsed building. The drill was based on the city's regional disaster prevention plan, which helps ensure that area personnel implement disaster emergency measures promptly and smoothly during large natural disasters. The Mayor said the city is ready to cooperate with the U.S. Army in case of a disaster. There are three U.S. military bases in the city and there is a mutual agreement for disaster preparedness and response with USAG Japan.[357]

Kanagawa Prefecture "Big Rescue" Drill – August 2019

U.S. military medical forces joined over 100 U.S. and Japanese disaster relief organizations in the Kanagawa Prefectural Government's Annual "Big Rescue" Disaster Prevention Joint Drill at Isehara City Sports Park on 31 August. Big Rescue's mission is to strengthen interoperability between U.S. and host nation medical units, law enforcement, and fire and first response agencies to develop and bolster coordinated relief efforts during disasters. It also serves as an opportunity to increase awareness of disaster readiness for local communities. The 2019 drill brought together participants from nine prefectures, multiple municipalities from Kanagawa prefecture, JGSDF and JMSDF, military and civilian staff form US Naval Hospital Yokosuka, U.S. Army Camp Zama's Medical Department Activities (MEDDAC) Japan, and the 374th Airlift Wing all operating under the cooperation and coordination of Kanagawa Prefecture's Disaster Medical Assistance Team (DMAT). Other participating organizations included local and prefectural police departments and fire bureaus, hospital, medical, and public agencies, government agencies, and JASDF units. Public and volunteer groups such as the DMAT and both the Japanese Red Cross and the American Red Cross participated. Communicating through interpreters, U.S. and Japanese medics performed triage, simulated giving intravenous fluids, and bandaged victims' simulated wounds. The exercise was divided into three phases, consisting of rescue, medical care, and medical assistance.[358]

Sagamihara City Evacuation Drill – March 2019

USAG Japan, in coordination with Sagamihara City, conducted an HADR evacuation drill on 21 March. The drill gave both U.S. and Japanese participants the chance to practice their roles in the event of an emergency and to go through the proper procedures, such as accessing installations, providing triage processing, establishing a "safe haven" site, and transporting injured evacuees to a triage point via ambulance. USAG Japan's involvement in the evacuation drill was a follow-up to a locally implemented agreement for limited disaster preparedness, including access to USFJ facilities, signed in March 2019. The scenario was that a fire had broken out near Camp Zama and several local citizens were stranded with nowhere to

evacuate. The evacuees were escorted onto the post from one of the installation's walk-in gates to a temporary safe heaven with assistance from Camp Zama's 88th Military Police Detachment and members of the JGSDF. The evacuation drills help both USAG Japan and Sagamihara City develop a strong partnership so that they can help one another in case of a disaster. The drill helped Sagamihara City residents and others who participated to familiarize themselves with the proper procedures and served to raise awareness for disaster preparedness.[359]

Tomodachi Rescue Exercise – October 2018

On 13-14 October, JSDF and USFJ participated in the annual drill, TREX 18. The drill practiced cooperation among responding partners in the event of a major earthquake. It builds local government, JSDF, and USFJ ability to deal with earthquake disasters through cooperation. In addition to local authorities and the two military forces, five DMAT members from Handa Hospital participated in a medical rescue activity training using the JMSDF escort ship "Hyuga" sailing off the coast of Wakayama Prefecture.[360]

Big Kanagawa Rescue – September 2017

During Big Kanagawa Rescue 2017 at Odawara, Kanagawa Prefecture, on 1 September, U.S. personnel from the 459th Airlift Squadron demonstrated their rescue capabilities to spectators who included then-Prime Minister Abe. Every year on 1 September, the Japanese government hosts the nation-wide Disaster Prevention Day, and leaders and citizens participate in disaster drills. Big Rescue is a comprehensive disaster prevention exercise in which five cities in three prefectures and Tokyo Metropolitan Government participate in any given year. In 2017, more than 140 organizations and approximately 3,000 people participated. These included local police and fire departments, JSDF, the Technical Emergency Control Force, DMAT, U.S. Naval Hospital Yokosuka, U.S. Naval Forces Japan, U.S. Army-Camp Zama, Yokota Air Base, and the American Red Cross. The drills were conducted based on a scenario in which a 7.3 magnitude earthquake occurred at around 7:10 a.m. directly underneath the Kanto region of central Japan.[361]

Forest Light 17-1 – March 2017

U.S. Marines and members of the JGSDF conducted aerial integration training on an MV-22B Osprey tilt-rotor aircraft and JGSDF CH-47 Chinook helicopters during exercise Forest Light 17-1 in Camp Soumagahara, Gunma Prefecture, on 10 March. During the exercise, both forces familiarized themselves with each other's aviation platforms, training techniques, and execution of various mission sets. The forces conducted simulated casualty evacuation drills via MV-22B Osprey. The drill increased combined readiness to events such as natural disaster or crises where an agile and adaptable force is required. Approximately 600 Marines and sailors assigned to III MEF deployed via six MV-22B Ospreys from Marine Corps Air Station Futenma to Yokota Air Base, Japan, to execute Forest Light 17-1.[362]

Sasebo Disaster Drill – September 2016

A U.S. Marine Corps MV-22 Osprey transported medical personnel and evacuated a simulated patient from a remote island during Sasebo City's annual emergency drill on 1 September. The participation of the Osprey demonstrated expanded capabilities that the U.S. military can contribute to assist Japan in the event of a disaster. Two Ospreys were flown from the Bonhomme Richard Expeditionary Strike Group operating in the vicinity of Okinawa to Sasebo to participate in the drill at the JGSDF's Camp Ainoura. At Camp Ainoura, Marines from the Combat Logistics Battalion 31 off-loaded a Tactical Water Purification System to demonstrate capability to produce purified water, an important capability in disaster response. Commander, Fleet Activities Sasebo participates in the city's drill annually alongside medical and firefighting services. This was the first time that capabilities were brought from afloat to assist.[363]

Big Kanagawa Rescue – September 2016

Staff members of U.S. Naval Hospital (USNH) Yokosuka were among the many participants who braved severe weather to conduct Big Rescue Kanagawa 2016 at JGSDF Camp Takeyama on 11 September. The Big Rescue's mission is to strengthen interoperability among participating medical units and other agencies and bolster the resilience of local communities against disasters. In addition, the drill raises awareness among host nation citizens about disaster management and allows participating units to review manuals and agreements on disaster control. In addition to personnel from USNH Yokosuka, U.S. service members representing the Army from Camp Zama, Japan, and the Air Force from Yokota Air Base took part. Japanese participants were from Kanagawa Prefecture, Yokosuka City, JMSDF, JASDF, police and fire bureaus, and hospital, medical, and public agencies. Public and volunteer groups, schools and both the Japanese Red Cross and the American Red Cross participated. The scenario called for teams to respond to a 7.0 magnitude earthquake occurring on the faults of the Miura Peninsula. The exercise was divided into three phases, consisting of rescue and operation, medical care, and medical assistance. Participants performed rescue operations consisting of rescue and firefighting operations in a mid- to high-rise building, and they used power saws to conduct home evacuations and disassembling cars which were staged to simulate the scene of an automobile accident. Evacuated patients were then escorted to the triage tent staging areas where medical care units conducted post-treatment.[364]

Habu Sentinel – June 2016

Chemical, Biological, Radiological and Nuclear (CBRN) Response Element Marines from 3rd Marine Division, CBRN defense platoon, Headquarters Battalion, III MEF, tested their operational capabilities during exercise Habu Sentinel 16 at Marine Corps Air Station Iwakuni, Japan, from 30 May to 8 June. As the annual capstone exercise for the division's response element, this event encompasses multiple objectives specific to CBRN response and validates unit standard operating procedures in an unfamiliar training environment. The initial stages of the exercise reintroduced Marines to the assessment and consequence management equipment, hazardous material operations, and CBRN response element mission sets that range from combat operations to HADR. Members of the JGSDF observed the entire evolution to acquire knowledge of their tactics, procedures, and technical abilities. Several of the scenario elements were taken from the 2011 earthquake and Fukushima nuclear plant disasters.[365]

Disaster Management Partners

Japan engages various international and domestic partners to promote effective disaster response and to improve cooperation on disaster risk reduction. To promote the Sendai Framework, the MOFA and Cabinet Office contribute financially to support the activities of the UNDRR, and they promote partnerships with the UN Framework Convention on Climate Change (UNFCCC) and the UNDP. Additional engagement is via the Asia-Pacific Economic Cooperation (APEC) Emergency Preparedness Working Group (EPWG) and the Asian Disaster Reduction Center (ADRC). The Cabinet Office co-hosts the Asian Conference on Disaster Reduction (ACDR) with the ADRC to share information, exchange opinions, and promote cooperation on issues related to disaster prevention and disaster mitigation in Asia. Table 6 offers details of some major government projects carried out for capacity building through 2020.[366]

Ministry/Agency	Project	Partner/ Target Country (Institution)	Description	Department Responsible
Cabinet Office	Partnership with FEMA	U.S.	Based on Memorandum of Cooperation between the Cabinet Office and FEMA (December 2014) and revised (December 2019), Japan-U.S.	Disaster Preparedness, Public Relations and International Cooperation Division, Disaster Management Bureau, Cabinet Office
	Japan-U.S. Emergency Management Working Group (EMWG)	U.S.	Partnerships in field of Nuclear Emergency Preparedness Systems deepened through regular exchanges of information and opinion since 2013, and reciprocal invitations to exercises within the framework of the EMWG under the U.S.-Japan Bilateral Commission on Civil Nuclear Cooperation established in 2012.	Director General for Nuclear Disaster Management, Cabinet Office
	Cooperation with French Ministry of the Interior on emergency management of nuclear accidents	France	Opinions exchanged with relevant bodies and reciprocal invitations to exercises issued within the framework of the Memorandum of Cooperation on nuclear emergency preparedness (May 2015).	Director General for Nuclear Disaster Management, Cabinet Office
	Hosting observers of comprehensive nuclear emergency response exercise	Countries and international organizations	With the objective of sharing information and exchanging views concerning nuclear emergency preparedness in each country, opinion exchanges are held by inviting countries, regions, and international organizations with cooperative relationships outside Japan to Comprehensive Nuclear Emergency Response Exercise.	Director General for Nuclear Disaster Management, Cabinet Office/International Affairs Office, Policy Planning and Coordination Division, Secretary-General's Secretariat, the Secretariat of the Nuclear Regulation Authority
Ministry of Internal Affairs and Communications	Technical Survey on the Introduction and Dissemination of Digital Terrestrial TV Broadcasting Systems in Latin America	Ecuador, Chile, and Peru	Research, technical support, and demonstration tests were conducted for Emergency Warning Broadcast System (EWBS), which is a disaster prevention system using digital terrestrial TV broadcasting, to be disseminated.	International Cooperation Division, Global Strategy Bureau, Ministry of Internal Affairs and Communications

Table 6: International Cooperation Projects Conducted by Japanese Ministries and Agencies

Ministry/Agency	Project	Partner/ Target Country (Institution)	Description	Department Responsible
Fire and Disaster Management Agency (FDMA)	International Forum on Fire and Disaster Management	Asian countries	The International Forum on Fire and Disaster Management has been held since 2007 to enable the countries of Asia to enhance their firefighting and disaster management capacity, and to introduce Japan's firefighting technologies and systems.	(Counselor of) Civil Protection and Disaster Management Department, FDMA
	Japan-Republic of Korea Firefighting Administration Seminar	Republic of Korea	During 2002, the Year of Japan-Republic of Korea National Exchange, a Japan-Republic of Korea Firefighting Administration Seminar was held in both countries to promote exchange, partnership, and cooperation, through the sharing of information and the exchange of ideas regarding firefighting and disaster management in both countries.	(Counselor of) Civil Protection and Disaster Management Department, FDMA
	Cooperation in the fire control field between the Fire and Disaster Management Agency and the Ministry of Public Security of Vietnam	Vietnam	Based on the Memorandum of Cooperation in the fire control field signed in October 2018, FDMA will exchange opinions with relevant Vietnamese agencies and provide them with support in improving fire control and safety, including the standardization of fire control equipment, and the establishment of a certification system.	Fire Prevention Division, FDMA

Table 6: International Cooperation Projects Conducted by Japanese Ministries and Agencies (cont.)

Ministry/Agency	Project	Partner/ Target Country (Institution)	Description	Department Responsible
Ministry of Foreign Affairs (MOFA)	Operation of IAEA RANET Capacity Building Centre (CBC)	IAEA member countries	The IAEA RANET CBC, where IAEA staff are permanently stationed, was designated in Fukushima Prefecture in May 2013, based on the "Practical Arrangements Between the Ministry of Foreign Affairs of Japan and the International Atomic Energy Agency on Cooperation in the Area of Emergency Preparedness and Response" signed between MOFA and the IAEA in December 2012. Materials and equipment stored for emergence response in the CBC are used in an emergency involving radiation. In addition, the CBC serves as the venue for training courses for officials from foreign and Japanese governments and local government officials held several times a year.	International Nuclear Energy Cooperation Division, Disarmament, Non-proliferation, and Science Department, MOFA
	Japan-Turkey Disaster Management Cooperation	Turkey	Based on the Japan-Turkey Summit Meetings in 2017 and 2018, a MOU on Disaster Prevention and Cooperation was signed in December 2018. Various trainings and sharing of know-how in the field of disaster prevention are held. In addition, the two countries have exchanged opinions and confirmed progress in the annual consultation.	First Middle East Division, Middle Eastern and African Affairs Bureau, MOFA
	Science and Technology Research Partnership for Sustainable Development (SATREPS)	128 countries among the objects of ODA	This program is jointly implemented by MOFA, the JICA, Ministry of Education, Culture, Sports, Science and Technology (MEXT), the Japan Science and Technology Agency, and the Japan Agency for Medical Research and Development. Research institutions in Japan and developing countries cooperate to conduct joint international research on solutions to global issues, tapping into the power of Japanese science and technology and ODA. Disaster prevention is one of the research fields under this program.	Development Administration Division, International Cooperation Bureau, MOFA International Science and Technology Affairs Division, Science and Technology Policy Bureau, MEXT

Table 6: International Cooperation Projects Conducted by Japanese Ministries and Agencies (cont.)

Ministry/Agency	Project	Partner/ Target Country (Institution)	Description	Department Responsible
Ministry of Foreign Affairs (MOFA)	Cooperation in Disaster Prevention and Support for Disaster Recovery through Collaboration with Japanese International Cooperation NGOs	Countries affected by natural disasters	(1) Cooperation for disaster prevention in developing countries through the Grant Aid for Japanese NGOs Projects (N-NGO), and emergency humanitarian aid and disaster recovery support through the Japan Platform (JPF) (2) Establishment of an international disaster prevention network and emergency humanitarian assistance in the Asia-Pacific region through Asia Pacific Alliance (A-PAD).	Non-Governmental Organizations Cooperation Division, International Cooperation Bureau, MOFA
	Provision of Emergency Relief Goods	Countries affected by natural disasters	In the event of a large-scale disaster overseas, MOFA decides providing emergency relief goods to support the immediate needs of affected people, upon request of the government of the affected country through JICA.	Humanitarian Assistance and Emergency Relief Division International Cooperation Bureau, MOFA
	Deployment of JDR teams	Countries affected by natural disasters	Teams dispatch to countries; teams may include the JDR and Infection Control Team (ICT).	Humanitarian Assistance and Emergency Relief Division International Cooperation Bureau, MOFA
Ministry of Education, Culture, Sports, Science and Technology (MEXT)	Promotion of "Sentinel Asia" Project to Share Information on Natural Disasters between Asia-Pacific Countries	28 countries of the Asia-Pacific Region/ 17 international organizations	This project is led and implemented by Japan to contribute to disaster management efforts in the Asia-Pacific Region. It uses satellites to share information relating to natural disasters. Participants consist of 28 countries and regions, 95 institutions, and 17 international organizations.	Office for Space Utilization Promotion, Space Development and Utilization Division, Research and Development Bureau, MEXT
	SATREPS	128 countries among the objects of ODA	This program is jointly implemented by MOFA, JICA, MEXT, and the Japan AMED) Research institutions in Japan and developing countries cooperate with one another to conduct joint international research on solutions to global issues, tapping into the power of Japanese science and technology and ODA. Disaster prevention is one of the research fields under this program.	Development Administration Division, International Cooperation Bureau, MOFA International Science and Technology Affairs Division, Science and Technology Policy Bureau, MEXT

Table 6: International Cooperation Projects Conducted by Japanese Ministries and Agencies (cont.)

Ministry/Agency	Project	Partner/ Target Country (Institution)	Description	Department Responsible
Ministry of Agriculture, Forestry and Fisheries	Enhancing community resilience to climate change in mountain watersheds	Philippines and Peru, and Food and Agriculture Organization of the UN	To strengthen community resilience in mountain watersheds by forest management and conservation, the project supports research and analysis of disaster risk assessment and issues, capacity building through development of educational materials and training, collection of good practices such as demonstration of risk mitigation measures and holding of workshops.	International Forestry Cooperation Office, Forestry Agency
	Development of technologies to enhance the functions of forests for disaster prevention and mitigation in developing countries	Vietnam, Myanmar, and Indonesia	Promoting the global expansion of Japanese private companies for contributing to disaster prevention and mitigation in developing countries through providing information on disaster occurrence and current measures of forest-based disaster prevention and mitigation in developing countries, and development of methods to enhance functions of forests in disaster risk reductions by using remote sensing technologies.	International Forestry Cooperation Office, Forestry Agency
Ministry of Land, Infrastructure Transport and Tourism (MLIT)	Disaster Management Collaboration Dialogues	Vietnam, Myanmar, Indonesia, Turkey,	Since 2013, workshops have been held to match Japanese technologies for DRR/DRM with disaster management issues of other countries.	International Policy and Project Division, Planning Department, Geospatial Information Authority of Japan, MLIT
	International Cooperation through UN Committee of Experts on Global Geospatial Information Management (UNCEGGIM)	All relevant countries	Promoting the use of technologies in the field of geospatial information to share disaster and disaster risk information as co-chairs of Working Group of Disasters (WG-Disasters) at the UNCEGGIM.	International Policy and Project Division, Planning Department, Geospatial Information Authority of Japan, MLIT

Table 6: International Cooperation Projects Conducted by Japanese Ministries and Agencies (cont.)

Ministry/Agency	Project	Partner/ Target Country (Institution)	Description	Department Responsible
Ministry of Land, Infrastructure Transport and Tourism (MLIT)	Collaboration with the Land Information New Zealand (LINZ)	New Zealand (LINZ)	The cooperation document was exchanged 10 November 2020 under the Japan-New Zealand Agreement on Cooperation in Science and Technology to strengthen cooperation in surveying technology between the two countries where there is a large crustal movement. In the future, the technologies of both countries will be utilized to support disaster prevention and mitigation, and measurements will be made to improve surveying technology, which is indispensable for understanding crustal movement and providing accurate location information.	International Policy and Project Division, Planning Department, Geospatial Information Authority of Japan, MLIT
	US-Japan Natural Resources Panel on Earthquake Research	U.S.	With a view to contributing to the establishment of earthquake disaster reduction technologies, researchers from public seismic research institutions in Japan and the U.S. met to present the latest research outcomes and exchange opinions. The event was held in Kumamoto Prefecture in 2022 (the event will be held every two years in Japan and the U.S. alternately).	Research Management Division, Geography and Crustal Dynamics Research Center, Geospatial Information Authority of Japan, MLIT
	Raising Awareness of World Tsunami Awareness Day (Hamaguchi Award)	All relevant countries	Taking advantage of the opportunity presented by the establishment of World Tsunami Awareness Day, Japan founded the Hamaguchi Award (presented by the Minister of Land, Infrastructure and Transport and Tourism) in FY2016 for individuals and/or organizations within Japan or overseas that have made significant contributions in the field of technologies for coastal disaster risk reduction, especially tsunami preparedness.	Port and Airport Research Institute, National Institute of Maritime, Port and Aviation Technology

Table 6: International Cooperation Projects Conducted by Japanese Ministries and Agencies (cont.)

Ministry/Agency	Project	Partner/ Target Country (Institution)	Description	Department Responsible
Ministry of Land, Infrastructure Transport and Tourism (MLIT)	International Centre for Water Hazard and Risk Management (ICHARM)	UNESCO, etc.	As a UNESCO Category 2 Center, ICHARM actively undertook research, training, and information networking activities aimed at mitigating damage due to water hazards worldwide. Specifically, it developed the Rainfall-Runoff-Inundation model and put them into practice in the field; conducted research and development on risk management; and offered master's and doctoral courses in disaster mitigation studies. In addition, it undertook technical assistance and international support initiatives funded by organizations including UNESCO and the World Bank.	Public Works Research Institute
Japan Metrological Agency (JMA)	International Cooperation through World Meteorological Organization (WMO)	WMO member countries	The JMA plays a central role in various international center operations as the keystone of WMO's weather information service in Asia. Also, many staff members of the JMA contribute to the activities of the WMO as experts.	Office of Disaster Mitigation, Planning Division, Administration Department, JMA
	International Cooperation through UNESCO	UNESCO member countries, etc.	Under the framework of the UNESCO Intergovernmental Oceanographic Commission (IOC), the JMA collects, analyzes, and provides data on oceans and maritime meteorology for the northeast Asian region. It also provides information on tsunamis caused by earthquakes that occur in the northwest Pacific region.	Office of Disaster Mitigation, Planning Division, Administration Department, JMA
	International Cooperation through International Civil Aviation Organization (ICAO)	ICAO member countries	The JMA participates in meetings organized by the ICAO, as well as investigations into adopting and improving standard international criteria for aviation weather services. It has also been appointed by the ICAO to operate international centers, thus contributing to the safe operation of global aircraft.	Office of Disaster Mitigation, Planning Division, Administration Department, JMA

Table 6: International Cooperation Projects Conducted by Japanese Ministries and Agencies (cont.)

Ministry/Agency	Project	Partner/ Target Country (Institution)	Description	Department Responsible
Japan Metrological Agency (JMA)	Collaboration on International Research Plans	All relevant countries	The JMA promotes various international research projects in cooperation with other countries. On climate change, it has been involved in writing evaluation reports on the activities of the Intergovernmental Panel on Climate Change (IPCC) since the panel was established in 1988.	Office of Disaster Mitigation, Planning Division, Administration Department, JMA
	Human Resource Development Aid and Technological Cooperation to Developing Countries	All relevant countries	Together with JICA, the JMA conducts training for developing countries to improve their meteorological services. Also, in response to requests from developing countries, the JMA dispatches expert staff and accepts trainees from national meteorological institutions.	Office of Disaster Mitigation, Planning Division, Administration Department, JMA
Japan Coast Guard (JCG)	Participation in the projects of the Northwest Pacific Action Plan (NOWPAP) Marine Environmental Emergency Preparedness and Response Regional Activity Centre (MERRAC)	Republic of Korea, China, Russia	The JCG participates in the projects of the NOWPAP MERRAC, which is a center responsible for preparing for and responding to marine environmental emergencies. As well as undertaking a marine environmental conservation initiative focused on the Sea of Japan and the Yellow Sea, etc. in partnership with neighboring countries, the JCG takes part in joint oil spill cleanup drills organized by relevant organizations and attends meetings held each year. Through these activities, it promotes international cooperation by striving to build systems that will enable relevant countries to work together in the event of an accident.	Protection of Marine Environment Division, Guard & Rescue Department, JCG
Ministry of Defense	Japan-U.S.-Australia Joint Training at Cope North 20	US, Australia	A joint training among Japan, the U.S., and Australia. Japan conducted the drills related to humanitarian aid and disaster relief activities.	Training Division, Bureau of Defense Policy, Ministry of Defense

Table 6: International Cooperation Projects Conducted by Japanese Ministries and Agencies (cont.)

JICA conducts dialogues and meetings with the World Bank, Asian Development Bank (ADB), Inter-American Development Bank (IDB), African Development Bank (AfDB), and European Bank for Reconstruction and Development (EBRD). Moreover, JICA regularly holds strategic discussions with some development partners, including bilateral agencies such as the French Development Agency (AFD), and international/regional organizations, namely UNDP and the UNHCR. JICA continues to hold periodic bilateral discussions with development partners in China and the Republic of Korea, namely the Export-Import Bank of China, KOICA, and Economic Development Cooperation Fund of the Export-Import Bank of Korea (EDCF). In addition, JICA, together with the Export-Import Bank of China, the EDCF, and the Neighboring Countries Economic Development Cooperation Agency of Thailand, holds quadripartite discussions among Asian development finance institutions. Furthermore, not only has JICA been strengthening partnership with other emerging international and regional organizations such as Islamic Development Bank, JICA also continuously works with "non-traditional" partners such as the Bill & Melinda Gates Foundation, the Asia Foundation, and the Arab Coordination Group which consists of 10 bilateral and multilateral Arab development institutions.[367]

National Non-Governmental Organizations

Some surveys indicate that there are more than 400 Japanese NGOs[368] whose main scope of activity is outside the country, in the realms of emergency relief and development work. Some of these are very large with strong global networks, and they work in more than 100 countries. Others are small, specialized organizations that focus on information technology in emergencies or on specific medical interventions.

MOFA collaborates with Japan's NGOs, in part to expand knowledge of operating environments, but also to enhance the effectiveness of ODA. MOFA's NGO Cooperation Division oversees partnerships with Japanese NGOs engaged in international cooperation. The Division can extend funding assistance to Japanese NGOs and helps to create an appropriate environment for NGO activities. The MOFA-NGO partnership has three modalities: funding assistance; creation of an enabling environment for NGOs; and dialogue. Funding assistance may take the form of grants for development activities, emergency funding through Japan Platform, subsidies for specific economic or social development projects, or the JICA Partnership Program. The Program aims to implement projects in developing countries as planned by Japanese development NGOs, Japanese local governments, and Japanese universities. Dialogue is fostered by the NGO-MOFA Regular Consultation Meeting, NGO-Embassy Consultation Meetings in countries that are major ODA targets, NGO-JICA Consultation Meetings, and other meetings as needed.[369]

Japan Platform (JPF)

JPF is a consortium of NGOs, the business community, and the Government; it mobilizes support to respond to emergency humanitarian crises in a more effective and rapid manner than any one party could do alone. MOFA appropriates funds in advance for this purpose. The Standing Committee (comprised of representatives of NGOs, the business community, the Government, and experts), under the mandate of the Board of Directors of JPF, makes decisions regarding the implementation of emergency humanitarian aid.[370] The JPF model has assisted 40 NGOs implementing 1,800 projects in 55 countries. As of January 2022, JPF was supporting projects in Haiti, Venezuela, Mozambique, Sudan, South Sudan, DR Congo, Ethiopia, Yemen, Gaza, Iraq, Syria, Afghanistan, Myanmar, Bangladesh, Thailand, Philippines, and Timor-Leste. Figure 14 offers an illustration of the basic flow of decision-making and monitoring under the JPF model.[371]

Table 7 provides contact information for and a description of the work done by major Japanese NGOs.

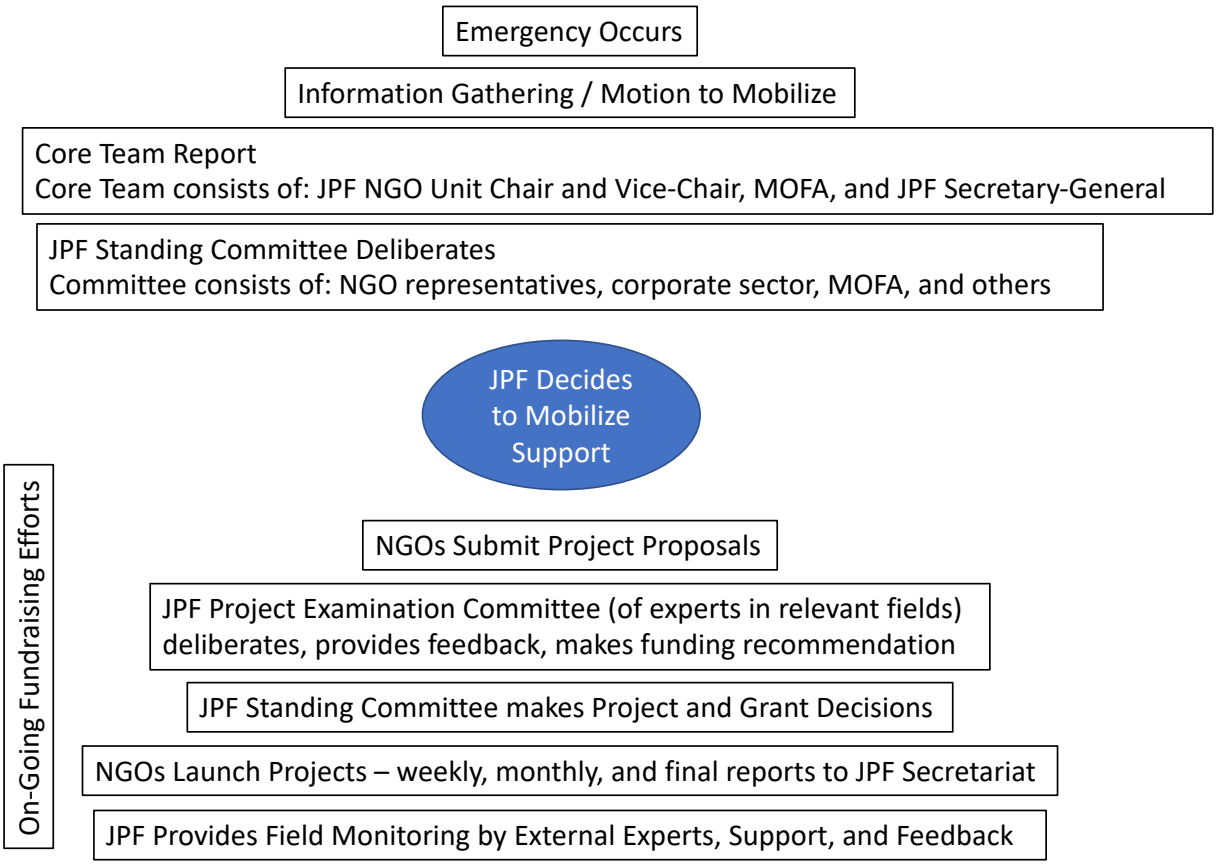


Figure 14: JPF Decision-Making Process

Organization	Description
AAR - Association for Aid and Relief, Japan 7F, Mizuho Building, 2-12-2 Kamiosaki, Shinagawa-ku, Tokyo, 141-0021 https://aarjapan.gr.jp/english/	AAR is active in emergency response, disability assistance, mine action, health, and advocacy. It works on development projects in more than a dozen countries in Central, South, and Southeast Asia, and in Central and East Africa. AAR Japan has been implementing emergency assistance for refugees from conflict and for IDPs and resettled refugees in Bangladesh, Uganda, Turkey, and Kenya. AAR Japan also operates emergency response programs for those affected by natural disasters in Japan.
ADRA Japan 1-11-1 Jingumae, Shibuya-ku, Tokyo 150-0001 https://www.adrajpn.org/	Since 1996, China Care International Ltd. has provided humanitarian aid and emergency relief to tens of thousands of people in western regions of China and other parts of Asia. China Care International Ltd. is a Hong Kong-based NGO. China Care International, Ltd. works with indigenous groups, local government entities, and NGOs already in the concerned areas. The last project highlighted by China Care International was in 2013; it involved support to a stable Adventist Development and Delivery Agency (ADRA), Japan is present in 120 countries; it cooperates with ADRA chapters in each country where it operates as available. ADRA works in both emergency assistance in the event of a disaster and in development assistance within the realms of food security, livelihoods, health and medical care, and education.during the rainy seasons.
AMDA - Association of Medical Doctors of Asia 3-31-1 Ifuku- cho, Kita-ku, Okayama-shi, Okayama 700-0013 https://amda.or.jp/	AMDA provides emergency humanitarian assistance in the medical and health fields by using its network of branches in 32 countries, and it has a multinational medical team. AMDA branches are present in Afghanistan, the Balkans, Central and South America, throughout Central, South, and Southeast Asia, and in Central/Eastern Africa.

Table 7: Japanese NGOs and Non-Profit Organizations Active outside Japan

Organization	Description
APEX – Asian People's Exchange Inoue Building, Negishi 1-5-12, Taitou-ku, Tokyo, 110-0003 http://www.apex-ngo.org/	APEX is an NGO committed to improving the lives of Asian people through environmentally sound development. It collaborates with Indonesian NGOs to implement projects such as low-cost housing, vocational training in machine-works, wastewater treatment, and biomass energy development. Its aim to address the intersection of environment, resources, and poverty.
BHN Association (Telecon for Basic Human Needs) NTT Ueno Bldg. 5-24-11 Ueno, Taito-ku, Tokyo 110-0005 https://www.bhn.or.jp/english/	BHN works to delivery information and telecommunications services to people in underserved or disaster- or conflict-stricken areas. It works in social and human resources development as well as in emergency relief. Its first action was in Ukraine at the time of the Chernobyl disaster, and it has developed a disaster relief portfolio whereby it restores community radio station broadcasting equipment, provides computer, printer, and internet access to local governments and residents, support safety confirmation systems, and set up emergency wireless and satellite communication systems. It has on-going projects in Eastern Europe, the Middle East, and South and Southeast Asia.
Bridge Asia Japan (BAJ) Shintoshin Mansion 303, 3-48-21 Honmachi, Shibuya-ku, Tokyo, 151-0071 https://www.baj-npo.org/ nglish/index.html	BAJ carries out developmental assistance activities in Myanmar and Vietnam. Its four sectors of activity are: 1) providing opportunities for skill acquisition and ability improvement, including technical training and assisting impoverished children or children with disabilities in school attendance; 2) assisting in income improvement either by promoting employment of skilled youth or by restoring traditional crops and cultivating farm-market linkages; 3) setting environmental foundations (infrastructural and skills) for local development; and 4) preserving the environment by promoting environmentally friendly agricultural technologies and safe foods.
CARE International Japan 2-2-1 Mejiro, Toshima-ku, Tokyo 171-0031 http://www.careintjp.org/index_e.html	CARE Japan is one of CARE's 70 global offices. CARE provides long-term support in livelihoods, education, health, water and sanitation, HIV/AIDS, environment, agricultural development, and natural resource management. It also uses its global network to deliver immediate relief to affected communities.
Foundation for International Development/Relief (FIDR) OCC Bldg.3F,2-1 Kanda-Surugadai, Chiyoda-ku, TOKYO 101-0062 http://www.fidr.or.jp/english/	FIDR is involved in both development and emergency relief. It implements programs for improvement livelihoods but also has projects focused on children's wellbeing. It has projects in Cambodia, Vietnam, and Nepal. In emergency scenarios, FIDR focuses on health at evacuation places, and it then shifts to rehabilitation and reconstruction of education, health and medical care, and community.
Good Neighbors Japan Someno Building 7th floor, 7-60-1 Nishikamata, Ota-ku, Tokyo 144-0051 https://www.gnjp.org/	Good Neighbors Japan is a member of Good Neighbors International, and it supports activities in seven countries in Asia and Africa, as well as in Japan. It is active in education, health, water and sanitation, livelihoods, and emergency support. Overseas projects are in India, Indonesia, Cambodia, Nepal, Bangladesh, Ethiopia, and Chad while in Japan, it provides food support for single-parent households.
HOPE International Development Agency 2F Kamiya Bldg., 1-16-2 Sakae, Naka-ku, Nagoya 460-0008 https://en.hope.or.jp/	Japan's HOPE International chapter is active in safe water, health, education, job training, agricultural development, micro-credit, and emergency relief. The HOPE Japan chapter is active in Ethiopia, Cambodia, and the Philippines.

Table 7: Japanese NGOs and Non-Profit Organizations Active outside Japan (cont.)

Organization	Description
Humanitarian Medical Assistance (HuMA) 2-12-9 Palace KY302, Ohashi, Meguro, Tokyo 1530044 https://www.huma.or.jp/	HuMA is a non-profit whose mission is humanitarian medical relief assistance for victims of disasters. It brings together medical professionals, including those who have served in Medical JDR Teams, to train and execute emergency medical interventions both as care providers and as coordinators who can identify needs, secure working spaces, and negotiate deals to acquire necessary items.
IVY 1-17-40 Aratate-cho, Yamagata-shi 990-2432 https://ivyivy.org/en/	IVY started as a poverty relief organization working in Cambodia, the Philippines, and East Timor, but also worked to assist foreigners living in the Tohoku region of Japan via educational workshops and environmental education. After the 2011 earthquake, it used its headquarters as the Tohoku Disaster Relief NGO Center to help coordinate the relief work of more than 80 NGOs. More recently, it has run projects in Northern Iraq's Kurdish region to address needs of Syrian refugees and Iraqi IDP children. In addition, it has a water and hygiene sector project at Rohingya refugees camp in Cox's Bazar, Bangladesh.
Japan Asian Association and Asian Friendship Society (JAFS) 5th floor, Higobashi Government Bulletin Building, 1-2-14 Edobori, Nishi-ku, Osaka-shi, Osaka 550-0002 https://jafs.or.jp/index.html	JAFS is an international cooperation NGO that focuses on provision of clean water throughout Asia. Local affiliates are in 70 regions in 18 countries in West, Central, South, and Southeast Asia. Its projects include water provision, well construction, education and livelihoods, environmental protection, and emergency disaster recovery support.
JEN (Japan Emergency NGO) #305, 7-5-27 Akasaka, Minato-ku, Tokyo 107-0052 https://www.jen-npo.org/en/index.php	JEN is working in Afghanistan and Pakistan, and has worked throughout the Balkans, Middle East, Africa, and Asia. It has had missions in areas of Japan dealing with emergencies. It works to restore and develop livelihoods after conflicts and disasters.
Japan Heart 1510 Building 3 Fl,1-5-10 kotobuki, Taito-ku, Tokyo 111-0042 https://www.japanheart.org/en/	Japan Heart is an association of medical professionals that dispatches health care professionals abroad, trains health care professionals for emergency and humanitarian action, supports health care in remote rural areas and on isolated islands in Japan, and provide comfort services for gravely sick patients in Japan and abroad. It is currently active in Myanmar, Cambodia, and Laos, and it focuses its planning and efforts on Japan and her ASEAN neighbors.
Japan International Support Program (JISP) 4-2-52 Miyamachi, Aoba-ku, Sendai City, Miyagi Prefecture 980-0004 Court Palace B02 https://jisp.org/	JISP is a humanitarian organization that works with communities that have experienced disasters. It provides emergency supplies and psychosocial support and has conducted projects in Nepal, Kenya, the Kurdistan Region of Iraq, and Bangladesh.
Japan Rescue Association (JRA) 2-2-13 Simogawara, Itami-city, Hyogo prefecture, 664-0832 https://www.japan-rescue.com/en/	JRA engages in disaster search dog training and deploys trained dogs and their handlers after disasters at home and overseas. It also conducts therapy dog training and provides therapy dog visits to nursing homes, hospitals, and schools and provides rescue of abandoned dogs and cats. It has worked in Turkey, Iran, Afghanistan, Pakistan, India, Nepal, Taiwan, Indonesia, Mexico, and Peru.

Table 7: Japanese NGOs and Non-Profit Organizations Active outside Japan (cont.)

Organization	Description
Japanese Red Cross Society (JRCS) 1-3 Shiba Daimon, 1-Chome, Minato-ku, Tokyo 105-8521 Tel: (81) (3) 3437 7087 E-mail: kokusai@jrc.or.jp https://www.jrc.or.jp	JRCS, the National Society of the Red Cross, was established under the Japanese Red Cross Law of 1952. Headquartered in Tokyo, JRCS has a nation-wide network of chapters in all 47 prefectures. In addition to blood banking, medical care, nursing education, and social welfare at home in Japan, JRCS can respond to international disasters by delivering funds or in-kind assistance, or by deploying trained delegates and Emergency Response Units (ERU), often in support of the national Red Cross society of the affected country. The JRCS has two Basic Health Care ERU sets of equipment on standby in Japan and abroad (in Singapore), and it is preparing itself to have one Hospital ERU that is designed to provide multi-disciplinary care at a referral level in emergencies. Staffs with suitable professional backgrounds, including medical professionals from the JRCS hospitals, are trained in special ERU courses. JRCS has pre-positioned and maintained emergency response stockpile in the IFRC warehouse in Kuala Lumpur, Malaysia; they supply is sufficient to meet the needs of 10,000 households in the Asia Pacific region.
KnK Japan (Children without Borders) 4-3-22 ShimoOchiai Shinjuku-ku Tokyo 161-0033 www.knk-int.org	KnK provides educational support to disadvantaged children and youth throughout the world. It works in both formal and informal education settings to deliver all levels of education, including trainings for out-of-school youth or youth in trouble with the law, and it delivers education to victims of conflict or disasters and rebuilds schools after conflict or disasters. It has worked throughout the Middle East and South and Southeast Asia.
Medecins du Monde, Japan (MDM) Azabu-Zenba Bldg. 2F, 2-6-10 Higashi-Azabu, Minato-ku, Tokyo 106-0044 https://www.mdm.or.jp/english/	MDM Japan's international medical teams have conducted nearly 400 healthcare programs in more than 70 countries. In addition to providing health care, it is an advocate for the expansion of health care access and supports community efforts to build sanitation and public health policies.
Nippon International Cooperation for Community Development (NICCO) 101Nishi-rokkaku-cho, Rokkaku-Dori, Shinmachi Nishi-iru, Nakagyoku, Kyoto 604-8217 http://kyoto-nicco.org/english/	Afghanistan, Syria, and the Palestinian Territories, and rural development actions in Kenya.
Peace Boat Disaster Relief 2F, 3-13-1 Takadanobaba, Shinjuku, Tokyo 169-0075 https://pbv.or.jp/en/	Peace Boat is a Japan-based international NGO. Peace Boat uses a passenger ship that travels the world with activities to empower participants, strengthen local capacity for sustainability, and build people-to-people cooperation. The voyages, run on a social business model, blend sustainable tourism, lifelong learning and friendship activities with educational programmes, cooperative projects, and advocacy. In addition to on-going work in disaster-hit parts of Japan, Peace Boat has disaster relief projects on-going in Vietnam and Mauritius.
Peace Winds, Japan 1161-2 2nd Floor, Chikada, Jinsekikogen-cho, Hiroshima 720-1622 https://peace-winds.org/en/	Peace Winds Japan is dedicated to the support of people in distress. It provides humanitarian relief in emergencies, rehabilitation and development cooperation, and conflict prevention and resolution. It is currently working in Nepal, Iraq, and the Palestinian Territories and has supplemented these programs with COVID-19 projects as needed.

Table 7: Japanese NGOs and Non-Profit Organizations Active outside Japan (cont.)

Organization	Description
Save the Children, Japan Yamada Building 4th Floor, 2-8-4 Uchikanda, Chiyoda-ku, Tokyo, 101-0047 https://www.savechildren.or.jp/	Save the Children Japan is active in international programs in health, nutrition, and education. When conflicts or natural disasters occur, they provide emergency and humanitarian responses. Within Japan, they participate in programs to eliminate child poverty and child abuse and have conducted programs in response to large-scale disasters such as the Great East Japan Earthquake and the Kumamoto Earthquake. Current, in-going programs are in the Middle East, Mozambique, Afghanistan, Mongolia, and Southeast Asia.
SEEDS Asia 1-7-7-307, Okamoto, Higashi Nada-ku, KOBE 658-007 https://www.seedsasia.org/eng/	SEEDS Asia promotes preparedness and risk reduction among Asian communities vulnerable to natural disasters and the negative effects of environmental destruction. It has conducted emergency response and recovery in India and Japan in post-earthquake and post-tsunami periods. It has expertise in community-based disaster risk management, climate change adaptation, and sustainable development. On-going projects are in India, Myanmar, Japan, Philippines, and Bangladesh.
Shapla Neer – Citizens Committee in Japan for Overseas Support 2-3-1 Nishiwaseda, Shinjyuku-ku, Tokyo 169-8611 https://www.shaplaneer.org/	Shapla Neer works in Bangladesh, Nepal, and Japan. It is active in supporting community disaster preparedness in cyclone- and flood-prone areas, structural development to prevent destruction during emergencies, and emergency and disaster relief.
SDGs Promise Japan (SPJ) 101 Koishikawa Park Tower, 4-16-13 Koishikawa, Bunkyo-ku, Tokyo 112-0002 http://sdgspromise.org/	SPJ is a non-profit working mostly in Africa to help communities work toward the Sustainable Development Goals (SDG). Current activity focuses on refugee communities in South Sudan and Uganda, and on farmers in Malawi. SPJ has performed emergency response in cyclone-hit areas of eastern Africa.

Table 7: Japanese NGOs and Non-Profit Organizations Active outside Japan (cont.)

International Agencies

The following agencies are present in Japan; they not only use Japan as a base of operations for the region but also work to build familiarity and links with Japanese communities. Table 8 includes information from the UN Information Centre's page for Japan.[372]

Organization	Description
Food and Agriculture Organization (FAO) of the UN https://www.fao.org/home/en/	Japan is a major funding source for FAO and holds seats in FAO governing structures. Japan targets funding to three key areas: strengthening of agricultural supply chains in the context of the COVID-19 pandemic; promotion of traditional healthy diets; and statistical capacity. In addition, it provides emergency funding; in recent years, such funds have gone to Afghanistan and to addressing locust infestations in Central Asia. Japan's Ministry of Agriculture, Forestry and Fisheries is the key interlocutor for FAO within Japan, and there are on-going partnerships on investing to offset greenhouse gas emissions in agriculture and food production.
International Atomic Energy Agency (IAEA) https://www.iaea.org/	Japan was among the first countries to ratify the IAEA founding Statute in 1957. Since 2011, IAEA has been an active partner of Japan's Ministry of Economy, Trade, and Industry and Tokyo Electric in addressing the on-going management of the Fukushima Daiichi power plant after the earthquake and tsunami. As of latter 2021, IAEA continued to report and advise Japan on water treatment, fuel debris, and food products in the surrounding area.

Table 8: UN Offices in Japan

Organization	Description
International Labour Organization (ILO) https://www.ilo.org/	The ILO office in Japan has close relationships with the Japanese Trade Union Confederation and the Japan Business Foundation, and, in 2017, the ILO signed a Memorandum of Cooperation with the Ministry of Health, Labour, and Welfare to consolidate ILO-Japan work on the Sustainable Development Goals and with particular focus on collaboration ahead of the 2020 Tokyo Olympics. Japan's financial contribution to ILO helps cover work in more than 20 ILO member states; Japanese-supported projects are mainly implemented through the ILO/Japan Multi-bilateral Programme and the UN Trust Fund for Human Security.
International Monetary Fund (IMF) https://www.imf.org/en/Home	Japan has been an IMF member since 1952 and entered stand-by agreements with the fund in the 1950s and 1960s. Since then, it has largely been a lender and is involved in direction and management. Japan provides accounts for technical assistance and training, scholarships, and emerging markets. As a member, Japan remains active in the IMF's Article IV mission assessments, the latest of which (27 January 2022) continued to assess Japan's economy as strong but in need of long-term reforms regarding the labor force and shifting to low-carbon energy generation.
International Organization for Migration (IOM) https://japan.iom.int/en	IOM opened its office in Japan in 1981 to facilitate onward movement of Indochinese refugees and then to assist in family reunification for Indochinese refugees resettled in Japan. The IOM Tokyo office now plays two roles: 1) donor liaison as Japan supports vulnerable migrants, displaced persons, and refugees worldwide; and 2) operational partner as Japan tries to address its own migration challenges. Japan funds refugee resettlement, return and reintegration assistance for victims of trafficking, and assisted voluntary return and reintegration.
UN Office for the Coordination of Humanitarian Affairs (OCHA) https://www.unocha.org/japan	The Japanese government is an important donor supporting OCHA's activities, particularly via the United Nations Central Emergency Response Fund and country-based Pooled Funds. The OCHA Kobe Office opened in 1999. It works in cooperation with various related organizations in Japan to support mainly overseas emergency humanitarian assistance activities and preparation for them although OCHA could help coordinate emergency activities within Japan.
UN Statistical Institute for Asia and the Pacific (SIAP) https://www.unsiap.or.jp/	SIAP was established in 1970 as a centre for statistical training in Asia and the Pacific by 20 governments, the UN, and UNDP by the initiative of Government of Japan. In 1995, it became a subsidiary body of UNESCAP. SIAP is the training arm of the statistics subprogram of UNESCAP with a mission of strengthening, through training of official statisticians, the capability of developing members to collect, analyze and disseminate statistics, to produce timely, high-quality statistics that can be utilized for economic and social development planning, and to assist those members in establishing or strengthening their statistical training capability and other related activities. Annual residential courses consist of 6- to 16-weeks of JICA-funded group training.
UN Asia and Far East Institute for the Prevention of Crime and the Treatment of Offenders (UNAFEI) https://www.unafei.or.jp/english/index.html	UNAFEI is a UN regional institute, established in 1962 by agreement between the UN and the Government of Japan, with the aim of promoting development of criminal justice systems and mutual cooperation in Asia and the Pacific Region. In 1970, the Government of Japan assumed full administration via the UN Training Cooperation Department in the Ministry of Justice. UNAFEI conducts training courses and seminars for personnel in crime prevention and criminal justice administration, and on the research and study of crime prevention and the treatment of offenders.

Table 8: UN Offices in Japan (cont.)

Organization	Description
United Nations Centre for Regional Development (UNCRD) http://www.uncrd.or.jp/	Based in Nagoya, Japan, UNCRD was established in 1971 based on an agreement between the Government of Japan and the UN. Its primary mission is to promote sustainable regional development with a focus on development planning and management in the context of globalization, decentralization, and the growing concern towards global environmental issues and their impacts. UNCRD serves as a training and research center, provides advisory services, assists developing countries by promoting the exchange of information and practical experience, and providing instruction, and assists and cooperates with other organizations involved in regional development and planning.
UN Development Programme (UNDP) https://www.undp.org/	Japan is consistently one of UNDP's top government funders with major portions of Japanese funding going to Afghanistan, global programs, the Pacific Regional Office, Syria, Iraq, Yemen, Myanmar, and Pakistan. Among Japan's key concerns that it addresses via UNDP work are governance and rule of law, combatting poverty, and resilience and other environmental issues.
UN Office for Disaster Risk Reduction (UNDRR) https://www.undrr.org/	UNDRR maintains a liaison office in Kobe, Japan, via which it works closely with the Japanese Government and other institutions with expertise in DRR. The office manages the Sendai Framework Voluntary Commitments online platform so that non-governmental stakeholders can also contribute to and be recognised for their efforts. The office also promotes collaboration with Japan-based institutions such as government agencies, academic and research institutions, the private sector, and civil society. Japan has hosted two of the most important conferences that led to UNDRR-overseen programs, the Hyogo Framework, and the Sendai Framework for Disaster Risk Reduction 2015-2030.
UN Environment Programme's International Environmental Technology Centre (UNEP-IETC) https://www.unep.org/ietc/	The Osaka-based IETC provides technical and advisory support to national and local governments to enhance use of environmentally sound strategies and approaches. It conducts in-country demonstration projects using innovative waste prevention and management methods and technologies to improve human well-being, reduce the impact of climate change, increase resilience, and create jobs. It works in partnership with governments, academia, civil society, and the private sector to provide learning opportunities and organize public outreach and policy dialogues.
UN Environment Programme's Regional Seas Programme Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (UNEP-NOWPAP) https://www.unep.org/nowpap/	NOWPAP was adopted by China, Japan, South Korea, and Russia in September 1994. The city of Toyama hosts two offices of NOWPAP, i.e., a Regional Coordinating Unit and the Special Monitoring and Coastal Environmental Assessment Regional Activity Centre. The NOWPAP Medium-term Strategy for 2018-2023 includes tasks linked to protecting biodiversity, monitoring pollutants, responding to oil spills, addressing marine litter, and managing data and information.
UN Population Fund (UNFPA) https://www.unfpa.org/	Japan is one of the largest donors to UNFPA each year. Via the MOFA, Japan collaborates with UNFPA on delivery of reproductive health services for women in conflict areas, provision of safe spaces in the Middle East, efforts to end gender-based violence, and maternal and new-born health and emergency obstetric care in the Middle East and Africa.

Table 8: UN Offices in Japan (cont.)

Organization	Description
United Nations Human Settlements Programme (UN-HABITAT) https://fukuoka.unhabitat.org/en/	Japan hosts the UN-Habitat Regional Office for Asia and the Pacific (ROAP) in Fukuoka. The office allows UN-Habitat to improve the effectiveness of its programming and reduce the costs of operations in the region. ROAP addresses settlement issues in developing countries and promotes community-based urban development via technical cooperation projects that run the gamut from urbanization to shelter development. Tasks include rehabilitation in Afghanistan and the Philippines, post-disaster rehabilitation in Cambodia and Lao PDR, the Healthy Ocean and Clean City Initiative in the Philippines, the Cities and Climate Change Initiative in 19 countries 53 cities, technology transfer of "Fukuoka Method" in collaboration with Fukuoka City and Fukuoka University, and knowledge sharing of Japanese environment technology through expert group meetings.
UN High Commissioner on Refugees (UNHCR) https://www.unhcr.org/en-us/	Japan is one of UNHCR's major donors. Japan has played a key role in the Global Compact on Refugees, paving the way for stronger cooperation and solidarity with refugees, displaced people, and affected host countries and communities. UNHCR has had a representative office in Tokyo since the 1970s. In addition to allowing UNHCR to address regional displacement concerns, this office is the focal point for UNHCR to work with Japan's Immigration Services Agency as UNHCR advocates with Japan's Government to adapt refugee, asylum, and migration laws and policies.
United Nations Information Centre (UNIC) https://www.unic.or.jp/	UNIC Tokyo is one of a network of 63 UNICs that share the UN story with communities around the world in their own languages. These centres reach out to the media and educational institutions, engage in partnerships with governments, local civil society organizations, and the private sector, and maintain electronic information resources.
UN Children's Fund (UNICEF) https://www.unicef.org/	Japan is one of UNICEF's largest donors and, in 2020, was one of the first and largest contributors to UNICEF's COVID-19 response. In addition to targeting funding to support children in pandemic-hit communities, the country dedicated funding to strengthening cold chain systems in 56 countries to promote vaccination programs. Japan is a key supporter to UNICEF's work in Yemen, where UNICEF has scaled up nutrition services, and in Syria, where UNICEF rehabilitated water and sanitation infrastructure.
UN Industrial Development Organization (UNIDO) http://www.unido.or.jp/en/	UNIDO's Investment and Technology Promotion Office, Tokyo (ITPO Tokyo) was established in 1981. Its mission is to help developing and emerging countries and economies in transition achieve inclusive and sustainable economic development by promoting foreign direct investment and technology transfer from Japan through delegate programs (invitation of government officials to Japan), technology transfer (identifying and promoting Japanese energy and environment technologies), seminars and events (country promotion, sector promotion, environment exhibitions), capacity building (special programs for embassies in Japan), and activities overseas (business missions and networking). Sectors involved in ITPO Tokyo's programming include manufacturing industries, agri-business, and environment and energy related industries.

Table 8: UN Offices in Japan (cont.)

Organization	Description
UN Institute for Training and Research (UNITAR) https://www.unitar.org/	UNITAR is the principal training arm of the UN, and, in 2003, established an office in Hiroshima, Japan. As a part of the UNITAR Division for Prosperity, the Office develops and delivers needs-based training in support of the Sustainable Development Goals. It trains learners in least developed countries, conflict and post-conflict states, and fragile states, as well as Japanese citizens in programs that address entrepreneurship, leadership and inclusion, finance and trade, anti-corruption and combatting crime, frontier technologies, and peace. The UNITAR Association, via the Hiroshima Office, conducts outreach, builds partnerships with entities in Japan, and hosts public events to raise awareness of and interest in international cooperation and peace.
UN Office of Project Services (UNOPS) https://www.unops.org/	The Government of Japan is a longstanding partner of UNOPS, funding projects throughout Asia, Africa, and the Middle East. UNOPS provides project management, procurement, and infrastructure services on behalf of the Government of Japan. Japan's support has focused on constructing and rehabilitating infrastructure in fragile environments and providing humanitarian assistance. Among other projects that received funding from Japan, specific contributions led to building and improving roads in Afghanistan, the delivery of 20 ambulances to Iraq's Kurdistan Regional Government's Bureau for Migration and Displacement, and construction of a river port on the White Nile to serve humanitarian aid agencies working in the IDP settlement in Mingkaman, South Sudan.
UN University (UNU) https://unu.edu/	Japan hosts the headquarters of UNU, a global think tank and postgraduate teaching organization. The UNU mission is to contribute, through collaborative research and education, to efforts to resolve pressing global problems surrounding human survival, development, and welfare. UNU works with universities and research institutes in UN Member States, and it functions as a bridge between the international academic community and the UN system.
UN Volunteers (UNV) https://www.unv.org/	More than 1,000 Japanese volunteers have worked overseas on UNV assignments. Since 1994, Japan's MOFA has supported UNV through the Japan Trust Fund. Funding through Japan-UNV Trust Fund has supported the deployment of UNV specialists and UN University Volunteers. The Global Health Volunteer Initiative is a Japan-UNV flagship programme to address priority global health issues through relevant UNV assignments geared towards the achievement of universal health coverage. The Government of Japan has supported the Youth (University) Volunteers Programme, which, with Kansei Gakuin University, has deployed over 100 students nine universities. JICA has partnered with UNV since 1989 and has supported the deployment of UN Specialist Volunteers.
UN Women Bunkyo Civic Center 1F, 1-16-21 Kasuga, Bunkyo-ku, Tokyo 112-0003 http://www.unwomen.org	In 2020, Japan was the sixth-largest total government contributor to UN Women. Japan's development cooperation priorities also explicitly incorporate a gender equality perspective that has translated into support for UN Women's work on women's and girls' education, building food security for women and families, and ensuring that efforts in crisis response and management consider women's leadership, accessibility to resources, and need for protection. Since 2018, Japan has championed UN Women's leadership, empowerment, access, and protection programs to support women affected by conflict and humanitarian crises. UN Women Japan Liaison Office is the only liaison office set up in the Asian region.

Table 8: UN Offices in Japan (cont.)

Organization	Description
UN World Tourism Organization (UNWTO) Silkia Nara 2F, 8-1, Sanjo-honmachi, Nara, 630-8122 http://www.unwto.org	To reinforce international cooperation, UNWTO opened its Regional Support Office for Asia and the Pacific (RSOAP) in Japan in 1995. RSOAP works in conjunction with its Tokyo Liaison Office at the UN University Headquarters. RSOAP aims to promote sustainable tourism development, disseminate information based on UNWTO tourism statistics, research, and reports, and revitalize tourism exchange by organizing international conferences and enhancing partnerships with various tourism stakeholders from the private and public sectors, UN-sister agencies, and other international organizations.
World Bank Tokyo Office: Fukoku Seimei Building 14th Floor, Uchisaiwaicho 2-2-2, Chiyoda-ku, Tokyo 100-0011 https://www.worldbank.org/en/country/japan	In 1966, Japan signed its final World Bank loan, and graduated from borrower status in the following year. Japan strengthened its status as a creditor in the 1970s and became the second-largest shareholder of the World Bank in 1984, gaining a greater voice as one of the most important partners. In 2012, moving toward recovery and reconstruction from the Great East Japan earthquake and tsunami, Japan again became the hosting nation for Annual Meetings that have focused on lessons learned from the 2011 disaster and on global health. In 2014, the Japan-World Bank Program for Mainstreaming DRM in Developing Countries was launched, and the World Bank DRM Hub was established in Tokyo. The Japan-World Bank Program for Mainstreaming DRM in Developing Countries and the World Bank Tokyo DRM Hub have provided an operational platform for the joint Japan-World Bank disaster resilience partnership to connect Japan's DRM experts with implementing partners in developing countries. The program focus is on resilient infrastructure, risk identification, reduction, and preparedness, and disaster risk financing and insurance.
World Food Programme (WFP) Japan Relations Office Pacifico Yokohama 6F, 1-1-1, Minatomirai, Nishi-ku, Yokohama-shi, Kanagawa, 220-001 Tokyo Outpost UNU Headquarters Bldg. (UN House) 4F, 5-53-70, Jingumae, Shibuya-ku, Tokyo, 150-0001	Japan is consistently one of the top donors to WFP. The Government and people of Japan provide both financial and technical support as part of the country's publicized commitment to coordinating the global response to food insecurity and malnutrition. The WFP Japan Office works to strengthen partnerships with the private sector, Japanese aid organizations, academia, and individual donors.
World Health Organization (WHO) WHO Centre for Health Development in Kobe I.H.D. Centre Building, 9th Floor, 1-5-1 Wakinohama-Kaigandori, Chuo-ku, Kobe 651-0073 https://extranet.who.int/kobe_centre/en	Japan is one of WHO's top contributors. The Ministry of Health, MOFA, JICA, and Ministry of Agriculture, Forestry, and Fisheries all contribute funding. Major targets for support are the health emergencies programme and the Contingency Fund for Emergencies. Since 2018 Japan has moved to provide support to universal health coverage (UHC) with 50% of all Japanese funding dedicated to the UHC Partnership, antimicrobial resistance, tuberculosis, non-communicable diseases, and mental health. It also provides funding to the aging and health program. The WHO Centre for Health Development in Kobe brings together local and global initiatives, generates new research, builds evidence and capacity towards UHC, and identifies best practices in support of the Sendai Framework and the International Health Regulations.
World Intellectual Property Organization (WIPO) Daido Seimei Kasumigaseki Bldg. 3F, 1-4-2 Kasumigaseki, Chiyoda-ku, Tokyo 100-0013 https://www.wipo.int/about-wipo/en/offices/japan/	The WIPO Japan Office promotes WIPO's global Intellectual Property services for patents, trademarks, and industrial designs, as well as its global databases, IP Advantage, and multi-stakeholder initiatives, to Japanese users through seminars, training, publications, and local customer service in conjunction with Japan Funds-In-Trust and the Japanese government. In addition to WIPO's main systems, the Japan office takes part in the advancement of green technology transfers and sharing knowledge to tackle Neglected Tropical Diseases.

Table 8: UN Offices in Japan (cont.)

SOUTH KOREA (ROK)

Natural hazards occur frequently in South Korea. The country is exposed to floods, typhoons, winter storms, landslides, earthquakes, extreme temperatures, and dust storms. Floods and typhoons are the most frequent and deadliest events. The ROK is not as exposed to earthquakes or tsunamis as other regional countries are, but it can experience strong seismic events. Climate change and other trends (e.g., urbanization and ageing) affect South Korea's exposure and vulnerability as more floods and stronger typhoons strike, heatwaves become prolonged, and desertification in East Asia increases the frequency of dust storms.

An Organisation for Economic Cooperation and Development (OECD) study from 2020 found that South Korea is at "moderate" risk of various disaster events affecting the country every year. Breaking down the study data shows that the consequences caused by disasters originating from natural hazards, technological accidents, epidemics, or terrorism are uneven in terms of economic losses versus human casualties. The ROK ranks better at reducing economic losses than at limiting the number of fatalities. While ROK sits at the OECD average for number of disaster events each year, it suffered lower than average economic losses and higher than average human losses. Regardless of statistics, South Korea has experienced fewer human losses in the past two decades than it felt during previous periods, before the reformation of its emergency response framework in 2004. Figure 15 shows the annual deaths caused by disasters in South Korea from 1980 through 2016; note that the uptick in 2014 relates to the 304 lives lost in the sinking of the ferry, MV Sewol, in a maritime accident.[373]

After a series of major, deadly incidents between 2000 and 2003, in 2004, government enacted the Framework Act on the Management of Disasters and Safety, which established a whole-of-government system from an all-hazards approach for emergency management. It addresses natural and "social" disasters, the latter of which includes infectious diseases. More importantly, it closed gaps and streamlined disaster management processes that had previously been under the jurisdiction of 13 different agencies. The resulting reduction in human loss has been significant.[374]

In addition to its domestic disaster management activities, ROK has legal and institutional frameworks for provision of overseas humanitarian assistance. The government prioritizes demand-driven humanitarian assistance in addition to considering the size and severity of disasters, national capacity of affected countries, appeals from the international community, and assistance provided by other donor countries. In February 2020, ROK joined the Grand Bargain,

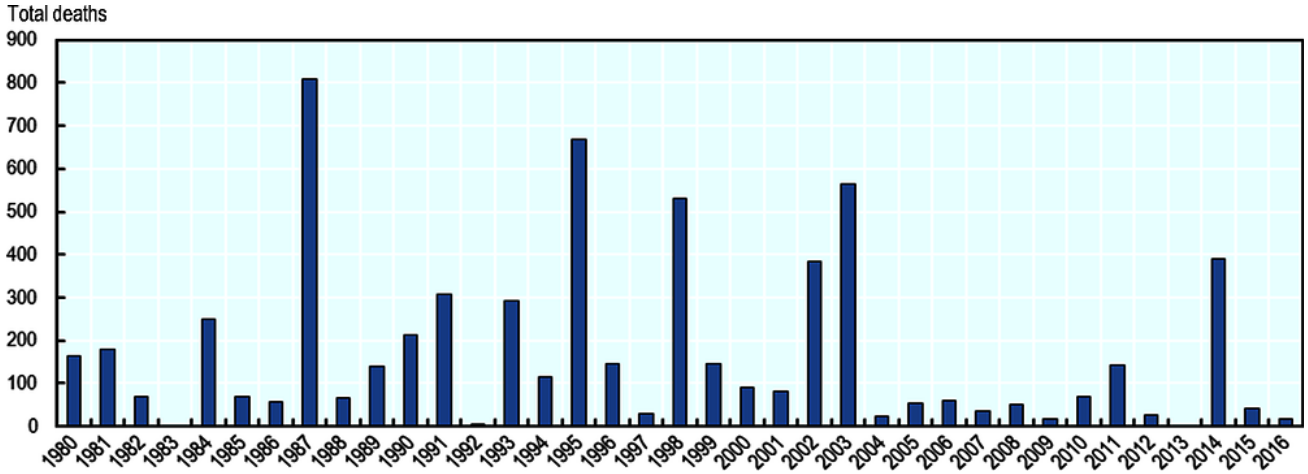


Figure 15: Annual Deaths Caused by Disasters in ROK (1980-2016)

an agreement among donors and implementing partners intended to boost effectiveness and efficiency of humanitarian assistance, in part by increasing the input of local, impacted communities in humanitarian activity.[375]

Government Disaster Management Structure

The Ministry of the Interior and Safety (MOIS), created in 2017, oversees the country's different emergency response capacities. The MOIS Vice-Minister for Disaster and Safety Management oversees both operational response and policy design. There is facilitation of coordination at the strategic level while at the local level, the 17 provinces and metropolitan cities and 226 municipalities all have preparedness responsibilities. Since 1991, the Korea International Cooperation Agency (KOICA) under the Ministry of Foreign Affairs (MOFA) has been ROK's official means to provide assistance outside the country. In 2020, Korea became a member of the Development Assistance Committee (DAC) of the OECD and officially established itself as a donor country. This accession coincided with a steady increase in government willingness to dispatch emergency relief teams to large-scale overseas emergencies, i.e., in 2013 after Super Typhoon Haiyan in the Philippines, in 2014 during the Ebola outbreak in West Africa, after the 2015 Nepal earthquake, and in the wake of the 2018 Laos dam collapse.

National Disaster Management Agency

MOIS oversees all disaster management activity. The organizational chart of the Ministry's Disaster and Safety Management branches is shown in Figure 16.[376] In accordance with the Framework Act on Disaster and Safety Management, natural disasters are caused by natural phenomena (i.e., typhoons, floods, heavy rain, strong winds, wind waves, tsunamis, heavy snow, lightning, drought, earthquakes, yellow dust, tidal currents, tides, volcanic activity, and collision of natural space objects such as asteroids and meteoroids). Social disasters are defined as damages beyond the magnitude designated by Presidential Decree that are caused by fire, collapse, explosion, traffic accidents (including air and marine accidents), chemical, biological, and radiological accidents (CBRN), environmental pollution accidents, paralysis of national infrastructure – including energy, telecommunications, transportation, finance, medical care, and water supply – damage caused by infectious diseases, and the spread of livestock infectious diseases. MOIS implements the disaster management system laid out for each type of disaster.[377]

In the event of a large-scale disaster, the Central Disaster and Safety Countermeasures Headquarters is assembled to oversee and coordinate disaster response and recovery efforts. In the meantime, government ministries set up the Central Disaster Management Headquarters to manage responsible disaster responses, while local governments operate the Local Disaster and Safety Countermeasures Offices to oversee and coordinate the response at the local level. Figure 17 shows the flow of authority and consultation during disaster response.[378]

Korea's horizontal coordination is facilitated at the strategic level through the Central Safety Management Committee, chaired by the Prime Minister, and in which the Safety Policy Coordination Committee and the National Security Council participate. At the local level, Korea's 17 provinces and metropolitan cities and its 226 municipalities all have preparedness responsibilities. Since the adoption of the Framework Act in 2004, local governments have had greater responsibility, particularly for first response. Local governments have established disaster management divisions and are required to develop their Safety Management Plan, and in developing and executing these Plans, they can count on local Fire Services, 119 Rescue teams, and medical institutions, including the network of 256 Public Health Centers located across the country.[379]

The National Disaster Safety Control Center (NDSCC) under MOIS is a situation center with representatives from all relevant ministries and agencies. NDSCC is equipped with situational

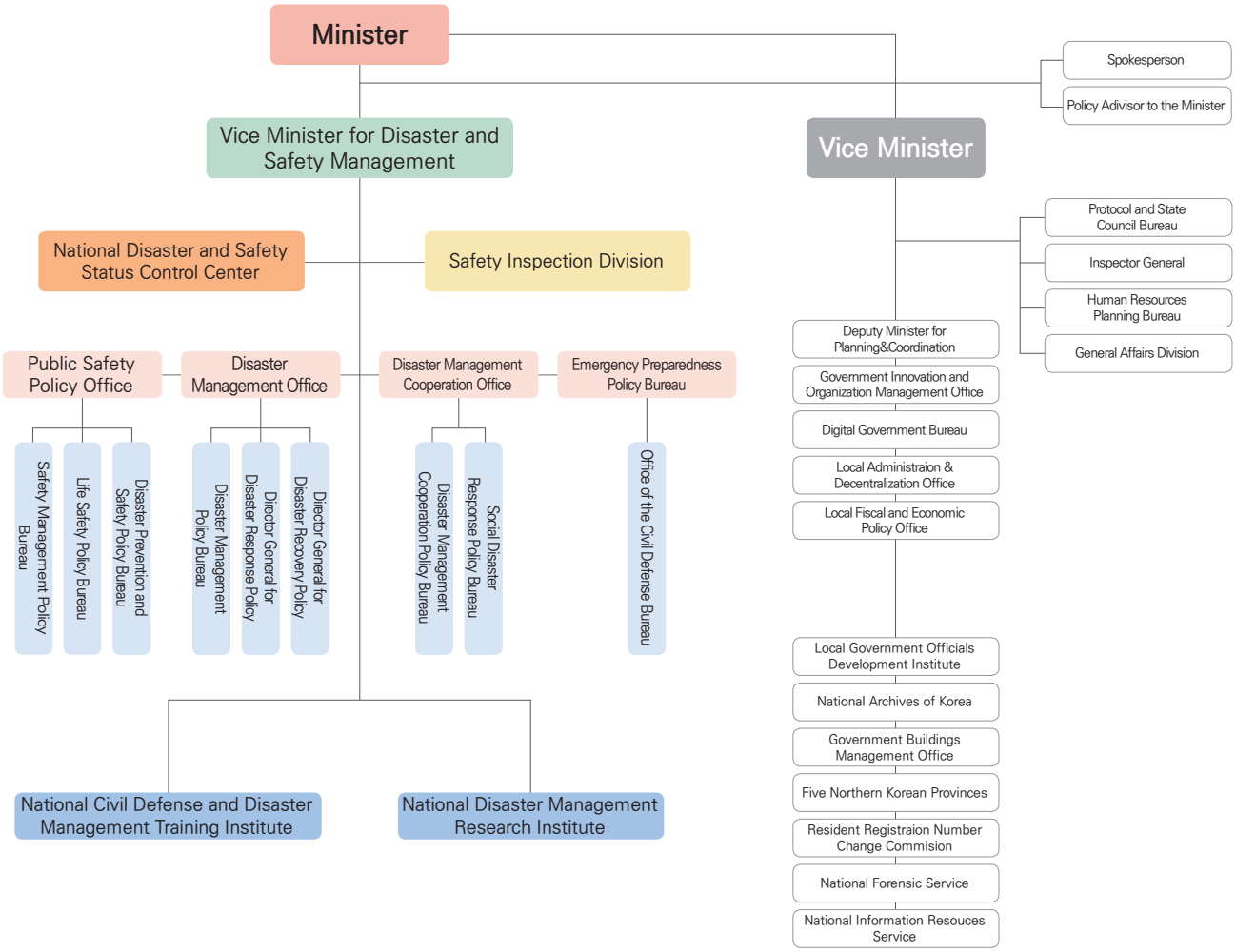


Figure 16: Organizational Chart of MOIS Disaster and Safety Management Offices

awareness and information sharing tools, and it has developed a problem-solving doctrine. It has a direct link to political leadership for decision-making and may incorporate the Minister of the Interior and Safety or the Prime Minister, depending on the scale of a crisis.[380] NDSCC is at the core of the disaster management system with general command to control all disaster responses and operate at central, provincial, and district levels.[381]

The Integrated Situation Center (ISC) monitors and disseminates real-time disaster information on a 24-hour, 365-day basis. Information is collected from 34 agencies such as the Meteorological Administration, the Flood Control Center, local authorities, the mass media, and citizens, all of which feeds into the Disaster Information Sharing System. Through the Disaster Prevention and Meteorological Information System, the ISC monitors satellite and radar images as well as weather reports. Specific monitoring systems exist for flood, rain, tsunami, and earthquake, with closed-circuit TV real-time monitoring. The ISC analyzes the information collected and supports disaster response by issuing reports to national and local authorities and the media. The country has developed a system of alerts delivered through the Internet and the cell broadcasting service, which sends a message to citizens' mobile phones to inform them about evacuation measures.[382]

Separately – but in coordination with MOIS – the Ministry of Health and Welfare (MOHW) oversees policy development and implementation both for infectious disease control and for disaster emergency healthcare. The Korea Disease Control and Prevention Agency (KDCA) is the main operational agency for infectious disease prevention and control, in charge of risk assessment, disease surveillance, risk

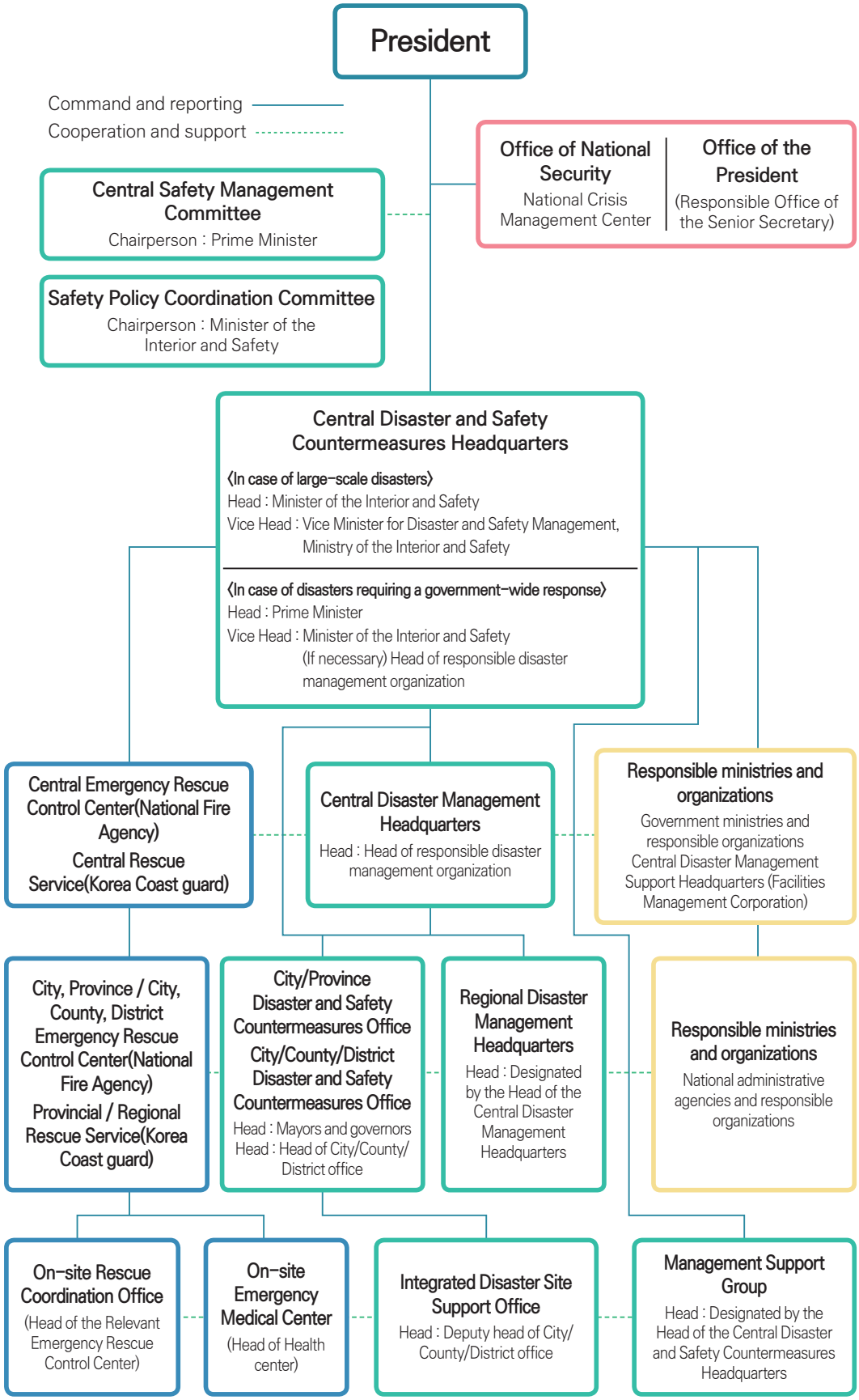


Figure 17: Coordination Flow of ROK DM System

communication, and field investigation. During non-public health disasters, MOHW's Division for Emergency Healthcare coordinates medical emergency support with MOIS. Other line ministries and national agencies that contribute to emergency preparedness and response include the Ministry of the Environment for environmental pollution accidents or dust storms, the Ministry of Agriculture, Food, and Rural Affairs for zoonotic diseases, and the Ministry of Education for disasters in schools.[383]

Lead Agency for International Disaster Response

In partner countries, embassy-led local ODA councils facilitate exchange and coordination within South Korea's system. These councils are complemented by regular meetings of KOICA and the Export-Import Bank of Korea's Economic Cooperation Development Fund (EDCF) offices.[384] However, at the central level, KOICA, a government-funded agency, is subsidiary to MOFA. Its mission is to enhance the effectiveness and efficiency of Korea's official ODA. It carries out programs in health, education, public administration, rural development, technology, energy, and environment. It is also the government's main HADR office conforming to the Overseas Emergency Relief Act (2007), the Framework Act on International Development Cooperation (2010), the Advancement Plan on Overseas Emergency Relief (2010), Strategic Plan for International Development Cooperation (2010), and Humanitarian Assistance Strategy (2015). KOICA assistance comes in four main types:

- Cash or In-Kind Contribution – Cash or emergency relief items (e.g., tents, blankets, etc.) may be delivered to support those in need during and in the aftermath of disasters, based on a decision made by MOFA
- Deployment of the Korea Disaster Relief Team (KDRT) – KDRT is the official overseas emergency relief team of the South Korean government; its mission is to mitigate and recover damage, rescue lives, and provide medical relief assistance
- Capacity Building and Preparedness Activities – KOICA provides capacity building training for KDRT members and ensures that equipment is ready for deployment; and
- Public-Private Partnership for Humanitarian Assistance – KOICA maintains partnership agreements to provide financial support and capacity building for NGOs that carry out humanitarian assistance projects.[385]

The decision to send assistance or deploy KDRT rests with MOFA. In the case of a smaller-scale event, the Ministry will receive and review requests from affected countries or international organizations and release cash or goods. The Minister can assess an event to see if it rises to the scale that it requires international assistance due to loss of lives, loss of property, or other factors, and it will convene a council that decides the scale of relief, method of cooperation with central administrative agencies, methods of cooperation between the government and the private sector, and basic relief measures. This Council is chaired by the Minister with attendance by representatives from relevant ministries/organizations such as the MOHW, National Fire Agency, and KOICA. While this Council can decide on in-kind assistance, it also has the authority to deploy KDRT. The basic decision-making process is illustrated in Figure 18.[386]

KDRT is managed by KOICA and can be deployed worldwide within 48 hours as it was following the 2015 Nepal earthquake. The country only deploys this team for the biggest disasters.[387] In 2016, KDRT acquired "Heavy" classification with the INSARAG External Classification (IEC) system for urban search and rescue teams.[388]

Disaster Management Laws, Plans, Policies

Before March 2004, the government policy was to manage each disaster or emergency by enacting individual laws and regulations. There were three significant acts, classified based



Figure 18: Decision-Making Process for KOICA Assistance

on the kinds of disaster that the government focused on managing, i.e., civil defense, natural disaster, and other emergencies. After 2004, the government tried to manage emergencies (including those relating to critical infrastructure and key resources), including natural and man-made disasters through a single Framework Act.[389] Many of the country's earliest emergency management laws were amended in 2015 in the run-up to the 2017 reforms to the disaster management organizational structure.

Framework Act on the Management of Disasters and Safety, 2004

The Framework Act clarifies the responsibilities of governments from national to local levels across the risk management cycle, i.e., prevention, preparedness, response, and recovery. It instructs all levels of government to establish both a Safety Management Committee for policy planning and implementation and a Disaster and Safety Countermeasures Headquarters for operational response. Moreover, it requires all local governments to develop Safety Management Plans aligned with the national Master Plan for Safety Management, which is developed every five years. Under the Framework Act, local governments bear the primary responsibility for emergency response, but there are also provisions for direct interventions from the national level when local capacities are overwhelmed, when several local governments are affected, or in case of declaration of a State of Disaster by MOIS. The Act promotes emergency preparedness measures, including development of alert systems, response manuals, and emergency drills. The Prime Minister, who chairs the Central Safety Management Committee, together with the Minister of the Interior, bear primary responsibility for overseeing policy implementation and ensuring multi-stakeholder coordination.[390]

Overseas Emergency Relief Act, 2007

The Act stipulates that the Government shall carry out swift and effective overseas emergency relief in close cooperation with affected countries or international organizations upon request from the affected countries. That relief may take the form of:

1. Dispatch of overseas emergency relief teams
2. Provision of relief supplies and equipment, including medical facilities
3. Cash support
4. Health care activities
5. Transportation support
6. Interim disaster recovery
7. Other matters as prescribed by Presidential Decree

The Act led to MOFA establishing basic overseas emergency relief measures, including organizing an overseas emergency relief team; recruiting and training overseas emergency relief personnel; stockpiling, storing, maintaining, and inspecting relief supplies and equipment, including medical facilities; establishing a system for rapid mobilization and transportation of relief personnel and supplies; securing resources necessary for overseas emergency relief; and establishing a cooperative system with private emergency relief organizations and international agencies. The Minister of Foreign Affairs may request that the Minister of National Defense dispatch military transport aircraft or carriers to support rapid transport of personnel or supplies for rescue or relief.[391]

Basic Overseas Emergency Relief Measures

In accordance with Article 6 of the 2007 Overseas Emergency Relief Act, the government instituted Basic Overseas Emergency Relief Measures in January 2018; by law, they must be revised every two years. Legally, MOFA is tasked with developing and revising the Measures to prepare for overseas disasters subject to the deliberation and advice of the private-public joint council for overseas emergency relief. The Measures include organizing an emergency relief team, scouting, nurturing, and training personnel for the team, stockpiling and maintaining relief supplies, establishing a system for rapid mobilization of response personnel and relief supplies, securing resources, establishing cooperation with private relief organizations, and building international cooperation. Once revised, MOFA disseminates the Measures to ensure all government stakeholders integrate them into their own plans.[392]

Humanitarian Assistance Strategy

The Humanitarian Assistance Strategy lays out the framework for effective delivery of aid and assistance. Korea's 2015 humanitarian strategy marked a shift in that it broadened the definition of humanitarian crises to include complex and conflict-related contexts. It outlined Korea's intention to strengthen its role within the international humanitarian system. Finally, the strategy recognized humanitarian aid is a way to exercise Korea's responsibility as a middle-power, providing humanitarian aid in line with capacity and expertise. Since that 2015 revision, South Korea has significantly expanded its humanitarian and ODA budgets, and much of this increased funding was funneled through multi-lateral channels, especially the UN system.[393] In the 2019 revision, Korea sought to reflect an aim to increase the volume and effectiveness of humanitarian assistance and to strengthen efforts to ensure the humanitarian-development-peace nexus.[394]

Engagements on DMHA with U.S.

The Chief of Mission at each U.S. Embassy or Consulate in South Korea bears responsibility for conduct of U.S. government foreign disaster assistance within their jurisdiction. As at all U.S. diplomatic posts, the Chief of Mission (Ambassador, Charge d'Affaires, etc.) is responsible for ensuring that up-to-date disaster plans are operational in the Mission and that Mission Disaster Relief Officers (MDRO) are appointed and perform designated duties. This MDRO would serve as the focal point at the Embassy or Consulate for disaster-related information, planning, and activities affecting both Mission personnel and the affected host community. In case of a disaster in South Korea, the Chief of Mission will have the option of requesting authorization from BHA to commit a certain level of funding upon the written determination that a disaster exists and meets three criteria: 1) it is of a magnitude with which the affected community cannot cope; 2) recognized representatives of the affected population desire the assistance; and 3) it is in the U.S. government's interests to respond. USAID does not have a stand-alone mission within the U.S. Embassy in Seoul, but USAID has developed numerous rapid response packages capable of providing commodities and services to meet the exigencies of both natural and man-made disasters. USAID/BHA Regional Advisors

are delegated broad management responsibility for programs in the field.[395]

The ROK and U.S. belong to many of the same international organizations, including the UN, G-20, OECD, APEC forum, ASEAN Regional Forum, International Monetary Fund, World Bank, and World Trade Organization.[396] South Korea's focus on global DRR efforts is via multilateral venues such as the Global Platform for DRR, a biennial forum held by the UNDRR, the Asia-Pacific Ministerial Conference on DRR, and APEC's Emergency Preparedness Working Group Meeting. Seoul focuses its engagement, donations, expertise, and training within Asia by sharing policies and experience, hosting Korea-China-Japan ministerial meetings, and signing MOUs for bilateral cooperation in disaster and safety management with neighbors, including China, Japan, and Russia.[397] Within the frameworks of these organizations, they have opportunities to collaborate and coordinate on developing management and DRR activities. Indeed, very often there are synergies even in un-connected projects. For example, ROK has committed US$1.8 million to a ROK-Pacific Islands Climate Prediction Service Project to build resilience to natural disasters in the Pacific Islands. Meanwhile, USAID obligated nearly US$8.3 million in fiscal year 2020 to build the Pacific Island countries' disaster preparedness and response capacity to strengthen first responders, enhance and expand early warning systems, increase disaster awareness, and improve preparedness among at-risk communities.[398]

In recent years, the U.S.-ROK Alliance has expanded into a comprehensive global partnership, and the U.S. recognizes the importance of the ROK's role as a regional and global leader, most recently as a successful model for other countries on COVID-19 response. In the early months of the pandemic, the U.S. and ROK collaborated on travel screening measures. More importantly, ROK donated essential medical supplies to the U.S., including 2.5 million protective masks, and facilitated the purchase of 750,000 COVID-19 tests.[399]

After signing an MOU in September 2019, the ROK MOFA and USAID expanded collaboration in development. USAID and KOICA created and began to execute a work plan for cooperation including in COVID-19 response, gender equality, informational and communications technology, and in the youth, health, and education sectors. An additional MOU, signed in October 2019, linked KDCA and U.S. CDC to improve regional coordination on infectious disease control and prevention. KOICA, KDCA, USAID, and the U.S. CDC supported the implementation of a Roadmap for the Global Health Security Agenda in Cambodia and collaborated with the Cambodian Ministry of Health on a project designed to improve public health surveillance, laboratory systems, and the emergency response system.

Over the longer-term, the U.S.-ROK partnership's work is expected to bolster regional disaster resilience. An October 2019 MOU was signed by the ROK Ministry of Economy and Finance and the U.S. Department of Treasury to further bilateral cooperation in support of infrastructure development through market-oriented, private sector investment. The first Korea-U.S. Infrastructure Finance Working Group meeting and a Private Sector Roundtable Meeting on Infrastructure Cooperation were held in February 2020 in Seoul.[400]

Separate from direct bilateral work, USAID/BHA funds IOM work, specifically, IOM Seoul's Humanitarian Capacity Building program, which helps increase regional and local capacities for humanitarian emergencies. It encourages timely and appropriate response by NGOs in order to increase coordination between ROK humanitarians and international donor agencies.[401] The current program dates to 2015 and has seen IOM ROK partner with other part of the UN system and major NGOs to deliver trainings and seminars on key topics in foreign disaster relief to hundreds of Korean humanitarians and government personnel. Recent topics have included delivery and management of cash-based humanitarian interventions and how humanitarians can

prevent and respond to possible risk situations during field missions.

Military Role in Disaster Management

Among the missions of the ROK Armed Forces is "protecting the people's lives and properties from large-scale disasters and providing disaster recovery support for civilians," according to the 2018 Ministry of National Defense (MND) White Paper on Defense Policy. In the past decade, units of the Armed Forces have been called upon to provide recovery support after forest fires and flooding, and they have participated in search and rescue efforts, such as that after the 2014 Sewol ferry accident. In some years, upwards of 300,000 troops may be called to respond to major weather or seismic events. In other years, 10,000-15,000 may be deployed in small-scale support. Nonetheless, based on these experiences, in recent years, the military has expanded cooperation with other national agencies in emergency response.

The armed forces have built disaster response capabilities through education and training and through the establishment of a civilian–government–military coordination system that enables systematic disaster management throughout all phases. MND organizes an annual military-wide conference for disaster management officers to ensure a culture of preparedness and safety within the force, which, in turn, allows the force to assist civilians in times of need. Each unit at every level of the Army, Navy, and Air Force – about 400 entities – operate a disaster control center and maintain emergency response systems and cooperation with relevant agencies, including municipal governments and local fire stations, to ensure they provide prompt support not only in disasters within the military but also in situations requiring military assistance.

As of 2018, MND and the armed forces had updated the "working-level crisis response manual for different types of disasters," which informs MND safety exercises and MND/ROK Armed Forces' participation in MOIS' annual "Safe Korea Exercise." Meanwhile, MND has expanded its program of large-scale fire response exercises in cooperation with district offices, fire departments, and police to strengthen the civilian–government–military joint disaster response system.

As part of ROK's overseas disaster relief, units of the Armed Forces may deploy in support of KDRT or in a medical, engineering, or logistics support capacity. Between 2008 and 2018, ROK Armed Forces responded to earthquakes, typhoons, and floods in Cambodia, Chile, China, Haiti, Indonesia, Japan, Laos, Philippines, Saipan, and Turkey. The largest efforts were:

- Great East Japan earthquake and tsunami (2011): ROK Armed Forces sent 10 transport aircraft (C-130) (4 sorties) carrying 58.8 tons of relief supplies and transported 102 rescue personnel
- Typhoon Haiyan, Philippines (2013): 9 ROK Armed Forces transport aircraft (C-130) (4 sorties) carried 329 tons of relief supplies and transported 2,022 personnel including a rescue team
- Dam Collapse in Laos (2018): ROK Armed Forces sent 5 transport aircraft (C-130) (3 sorties) to deliver 23 tons of relief supplies and transported 20 medical personnel.

ROK has built cooperation with Southeast Asia, most particularly by participating in international conferences and exercises that involve ASEAN civil–military coordination and ASEAN military medicine and disaster relief. Representatives have attended the ASEAN Defence Ministers' Meeting (ADMM) Plus Experts' Working Group on Humanitarian Assistance and Disaster Relief.[402]

Engagements on DMHA with U.S. DoD

Direct engagement with U.S. DoD agencies and personnel on HADR is generally subsumed under other exercises.

Operation Pacific Reach – April 2017

The ROK/U.S. Combined Forces Command kicked off a Combined Joint Logistics Over-the-Shore exercise on 10 April at Dogu Beach near Pohang on the country's east coast. The over-the-shore drill was part of Operation Pacific Reach Exercise 2017 (OPRex17), a bilateral exercise focused on training ROK and U.S. forces on the employment and operation of various logistic processes. The exercise required participants to set up and operate an Area Distribution Center and an Air Terminal Supply Point, conduct Logistics Over-the-Shore operations, and use rail, inland waterways, and coastal lift operations. The exercise was intended to boost expeditionary logistics capabilities that can be employed worldwide during HADR operations, contingencies, or crisis response. Approximately 2,500 U.S. personnel and nearly 1,200 personnel from the ROK Armed Forces took part.[403]

Foal Eagle – March 2016

Foal Eagle is a combined field training exercise conducted annually by the ROK and U.S. armed forces with the support of the ROK/U.S. Combined Forces Command. It provides tactical level units the opportunity to confirm force deployment readiness, capabilities, validate interoperability, and familiarize forces with the environment. From 10 March, the U.S. Navy's 30th Naval Construction Regiment worked with ROK Seabees as part of Foal Eagle 2016. This portion of the exercise tested the regiment's operational abilities to include embark, logistics, communications, and engineering and construction to include Naval Construction Force Units working directly with their ROK counterparts to demonstrate their capabilities in major combat operations, HADR, theatre security cooperation, and construction readiness operations. Various actions included constructing a wharf, conducting road and port surveys, and other tasks such as erecting tents, observation towers, material yards, and bunkers.[404]

Disaster Management Partners

Korea's disaster management and prevention plans are implemented by each ministry and regional government as well as government agencies. Table 9 offers the contact information and a brief description of the Government agencies most involved, particularly overseas. They are listed in alphabetical order rather than any order of precedence; information is sourced directly from their respective websites.

Organization	Description
Korea Coast Guard (KCG) 130 Haedoji-ro, Yeonsu-gu, Incheon, 21995 http://www.kcg.go.kr/english/main.do	KCG is ROK's main agency tasked with protection of the national maritime territory and sovereignty, including managing safety to prevent maritime disasters. It also undertakes rescue and response in coastal seas and prepares for and responds to typhoons, earthquakes, and tsunamis. The KCG International Affairs and Intelligence Bureau undertakes cooperation with counterparts for investigation and has an international cooperation program.
Korea Disease Control and Prevention Agency (KDCA) 187, Osongsaengmyeong 2-ro, Osong-eup, Heungdeok-gu, Cheongju-si, Chungcheongbuk-do https://www.kdca.go.kr/index.es?sid=a3	KDCA, formerly the Korea Center for Disease Control and Prevention, was promoted to an independent agency and renamed in September 2020. KDCA is mandated to keep Korea secure from disease threats by strengthening public health emergency response capacity and operating a response system for new infectious diseases. While this includes routine activity such as implementing the country's childhood immunization program, it also means addressing the spread and treatment of HIV/AIDS and raising public awareness for organ donation. It is the primary information agency for disease diagnostics, surveillance, and management. It is one of the key offices working to develop advanced vaccines for national emergencies and investigate climate change-related infectious diseases.

Table 9: ROK Government Agencies Involved in Disaster Management

Organization	Description
AMDA - Association of Medical Doctors of Asia 3-31-1 Ifuku- cho, Kita-ku, Okayama-shi, Okayama 700-0013 https://amda.or.jp/	AMDA provides emergency humanitarian assistance in the medical and health fields by using its network of branches in 32 countries, and it has a multinational medical team. AMDA branches are present in Afghanistan, the Balkans, Central and South America, throughout Central, South, and Southeast Asia, and in Central/Eastern Africa.
Korea International Cooperation Agency (KOICA) 825 Daewangpangyo-ro, Sujeong-gu, Seongnam-si, Gyeonggi-do, 13449 http://www.koica.go.kr/sites/koica_en/index.do	KOICA is an agency under the MOFA. It undertakes long-term development projects overseas with programming in education, health, governance, agriculture, technology, the environment, and energy. It is also one of MOFA's main avenues for delivering emergency humanitarian aid. KOICA can deliver cash or in-kind supplies, or it can deploy a KDRT or undertake emergency response team/personnel training.
Korea Meteorological Administration (KMA) 61-16 Gil, Yeouidaebang-ro, Dongjak-gu, Seoul 07062 https://www.kma.go.kr/eng/index.jsp	KMA provides weather and disaster-related information to the public. In addition, KMA offers scientific information and scenarios on climate change to contribute to developing national policies to respond to climate change. Via its website, KMA disseminates meteorological and emergency information, and it makes available scientific data to inform the public and practitioners on past climate and emergency events.
Ministry of Environment 11, Doum 6-Ro, Sejong-si, 30103 https://eng.me.go.kr/eng/web/main.do	The Ministry of Environment is tasked with protecting environmental rights of South Korea's people and with promoting conversion to a sustainable economy and society. The tasks it undertakes include comprehensive management of environmental hazards, such as fine dust and algal blooms. Under the Ministry, the KMA facilitates countermeasures against climate change.
Ministry of Foreign Affairs (MOFA) 60, Sajik-ro 8-gil, Jongno-gu, Seoul, 03172 https://www.mofa.go.kr/eng/index.do	MOFA's key tasks are to support a peaceful resolution of the North-South state of conflict on the Korean Peninsula, promote the national interest through public and participatory diplomacy, pursue cooperative diplomacy with neighboring countries, establish a Northeast Asia+ Community of Responsibility, strengthen economic diplomacy and development cooperation, and strengthen the protection of Korean nationals traveling abroad. MOFA and Korea's embassies field requests for humanitarian assistance and, in consultation with other government stakeholders, determines whether and how to respond.
Ministry of Health and Welfare (MOHW) 13, Doum 4-ro, Sejong, 30113 https://www.mohw.go.kr/eng/	MOHW coordinates and oversees health and welfare policies. Its mission is to establish an inclusive welfare state that ensures healthy lives for all citizens. MOHW oversees policy development and implementation both for infectious disease control and for disaster emergency healthcare.
Ministry of Land, Infrastructure, and Transport (MOLIT) 11 Doum 6-ro, Government Complex-Sejong, Sejong City 30103 https://www.molit.go.kr/english/intro.do	MOLIT's role is to build and develop policies to promote infrastructure that facilitates innovation and ensures the safety of all. It is among the stakeholders in the DM system in terms of developing disaster-resilient infrastructure and bolstering the disaster recovery process.
Ministry of the Interior and Safety (MOIS) 13, Jeongbu 2cheongsa-ro, Sejong-si, 30128 https://www.mois.go.kr/eng/a01/engMain.do	Beyond its general missions of managing the relationship between the central government and sub-national authorities, the MOIS is charged with establishing, supervising, and adjusting policies related to safety and DM such as emergency countermeasures, civil defense, and disaster prevention.

Table 9: ROK Government Agencies Involved in Disaster Management (cont.)

Organization	Description
Ministry of Trade, Industry, and Energy (MOTIE) 402 Hannuri-daero, Sejong-si, 30118, https://english.motie.go.kr/www/main.do	MOTIE consults as a stakeholder in the DM system given the importance of ensuring energy inputs and building a resilient energy system.
National Civil Defense and Disaster Management Training Institute (NDTI) 90 Yeonsudanji-gil, Sagok-myeon, Gongju-si, Chungcheongnam-do http://eng.ndti.go.kr/client/common/main.do	Falling under MOIS, NDTI provides specialized education and training at home and abroad to public officials and private professionals; international training courses focus on foreign government officials from countries vulnerable to disasters and offer them realistic simulated experience activities. Partly funded by KOICA and with some ASEAN funding, NDTI provides training to officials from cooperating countries in the Asia-Pacific, Middle East, South America, and Africa.
National Disaster Management Research Institute (NDMI) 365, Jongga-ro, Jung-gu, Ulsan https://eng.ndmi.go.kr/	NDMI is ROK's disaster safety think tank. It researches and reports on practices in DM, is establishing a national DM information analysis information sharing system, and builds DM capacity via technology development. Among its projects are the Web-Based GIS Typhoon Committee Disaster Information System (WGTCDIS) that standardizes disaster information of each of 14 member countries, and the deployment of expert missions that support disaster prevention technologies, train practitioners on WGTCDIS, and strengthen the global network for DRR.
National Fire Agency (NFA) 30128 Government Complex Sejong II, 13, Jeongbu 2cheongsa-ro, Sejong-si, https://www.nfa.go.kr/eng/	NFA is the top-level fire-fighting policy and administration bureau. It has provincial headquarters in all 18 provinces as well as representation at the central level via which it participates in the MOIS-led disaster and emergency management process. Annually, it hosts the International Fire and Safety Expo. NFA is preparing plans for the "Fire 4.0 Era" to prepare for anticipated changes linked to climate change, an aging population, and changes in the rural and urban landscape.

Table 9: ROK Government Agencies Involved in Disaster Management (cont.)

National Non-Governmental Organizations

MOFA chairs the public-private joint council for overseas emergency relief. The national Policy Framework for Government-Civil Society Partnerships in International Development Cooperation was developed by and for the Korean development civil society network and KOICA. Broadly, this Framework refers to meeting the Sustainable Development Goals rather than linking public and private actors in specific activities.[405]

Voluntary, community-based organizations (CBO) for disaster management began to play a role following the MT Hebei Spirit oil spill in 2007. Many people came to the disaster area to clean up the oil from the rocks or beaches. After the 2011 Great East Japan earthquake and the Fukushima nuclear disaster, Koreans donated US$56 million to the disaster-stricken area; this massive outpouring was remarkable not only because of the fraught historical experiences of Koreans with Japan, but because there was little history in ROK of such collective action. These two examples of mobilization were possible because of the 2004 founding of the Korea Disaster Safety Network (KDSN) to coordinate the various activities of voluntary organizations for disaster management. KDSN brings together members of voluntary organizations for disaster management alongside MOIS. MOIS provides substantial assistance to support the financial independence of voluntary organizations for disaster management, including grants and other financial aid, funding for research projects and administrative benefits. Beyond these funding inflows, many voluntary organizations for disaster management have limited budgets.[406]

Table 10 offers a brief overview of some of the major CBOs based in ROK and working internationally; this is by no means an exhaustive list and is presented in alphabetical order; all information is sourced directly from the organizations' websites.

International Agencies

The following agencies are present in South Korea; they not only use the country as a base of operations for the region but also work to build familiarity and links with Korean communities. Table 11 includes information from the UN in the Republic of Korea.[407]

Organization	Description
ChildFund Korea 20, Mugyo-ro, Jung-gu, Seoul, 04522 https://www.childfund.or.kr/	ChildFund is an international NGO based in ROK. While it operates anti-poverty and child protection programs in South Korea, it also participates in global education, health, and livelihoods programs. The HADR facet of their programming consists of emergency relief, early and long-term recovery, refugee assistance, DRR, and child protection, the last by establishing Child Centered Spaces and providing psycho-social support to children to overcome trauma during emergencies.
Global Civic Sharing #901 Gardentower, 84 Youlgok-ro, Jongno-gu, Seoul, 03131 http://gcs.or.kr/	Global Civic Sharing promotes development through capacity building, education and volunteer activities, research, and advocacy to eradicate poverty. International programs are active in Vietnam, Mongolia, Timor-Leste, Myanmar, Thailand, Kenya, Rwanda, and Ethiopia. These programs are in livelihoods, micro-credit, and agricultural and small business support.
Good Neighbors 13 Beodeunaru-Ro, Youngdeungpo-Gu, Seoul, 07253 https://www.goodneighbors.org	Good Neighbors is an international NGO founded in Korea with the goal of ending world hunger. Its first community development project was in Bangladesh, and Good Neighbors now has projects in 192 communities in 40 countries with a focus on inclusive community development and child protection. It has participated in emergency response, first in Rwanda in 1994 when it provided medical and education teams to assist refugees and has since then participated in the responses to the 1995 Kobe earthquake, 2004 Indian Ocean tsunami, 2010 Haiti earthquake, 2013 Typhoon Haiyan, and 2015 Nepal earthquake.
Hope Bridge Korea Disaster Relief Association 5th floor, 52 Shinsu-ro, Mapo-gu, Seoul https://relief.or.kr/eng/	Hope Bridge is a CBO established by broadcasting and newspaper companies and social organizations to respond to disasters. In 2001, it became the country's first government-designated relief organization that can raise/distribute donations in case of domestic natural disasters. In its overseas work, Hope Bridge focuses on disaster-affected communities and climate refugees, including those displaced by typhoon, flood, or drought. They implement healthcare projects such as disease prevention and treatment, healthcare facility support, child nutritional support, and maternity health services. Their drinking water projects are both access and education oriented. Finally, Hope Bridge implements educational access projects in disaster-affected or risk-vulnerable areas.
Korea Food for the Hungry International (KFHI) 109, Gonghang- daero 59da-gil, Gangseo-gu, Seoul https://www.kfhi.or.kr/	KFHI participates in livelihoods support, education, health care, and emergency aid. It serves in poverty-stricken communities in 80 countries by sending more than 1,000 professionally trained "Hunger Corps" volunteers for emergency relief and development programs. Its projects are concentrated in Central, South, and Southeast Asia with some history of work in the Middle East and Africa.

Table 10: Korean NGOs and Non-Profit Organizations Active outside ROK

Organization	Description
Korea International Volunteer Organization (KVO International) 32 Son Seodong, Jongno-gu, Seoul, 110-280 http://www.kvo.or.kr/ nglish/ sub06.php?pgid=0301	KVO International has been supporting underdeveloped countries in the areas of medical service, welfare activities, education, emergency relief for sustainable development as well as domestic welfare, culture, and the environment since 1988. KVO operated free clinics, Taekwondo halls, and a self-supporting farm in Bolivia, and offered medical service by dispatching UN Volunteer doctors and delivering relief goods to Cambodia. KVO has also provided various support efforts in Russia, Mongolia, Thailand, Afghanistan, Iraq, and Ethiopia.
Republic of Korea National Red Cross (KRC) Headquarters: (26465) 50, Hyeop-ro, Wonju-si, Gangwon-do Seoul Office: (04629) 145 Sopa-ro, Jung-gu, Seoul Tel: (82) (2) 3705 3661/2/3/4 E-mail: international@redcross.or.kr https://www.redcross.or.kr/eng	KRC was originally established in 1905 and was re-formed in 1949. Its first major relief operation was for war victims during the Korean War (1950-1953). At present, KRC is one of ROK's major humanitarian organisations providing services to people both in Korea and overseas. Programs promote disaster preparedness and response, blood transfusion, relief and development in foreign countries, first aid and safety, restoring intra-Korean family links, and international humanitarian law. Since the 1990s, KRC has become a resource to other members of the Red Cross and Red Crescent Movement in times of international disasters and emergencies, during which, KRC rallies the Korean public via nationwide fundraising campaigns, but it can also send medical personnel or supplies. KRC supports developing National Societies, particularly in the Asia-Pacific. Ongoing KRC actions to develop sister National Societies are in Kenya, Laos, Nepal, the Philippines, Tanzania, and Vietnam. They partner with the National Societies in each country to develop and implement food security, water and sanitation, infectious disease control, and livelihoods support.
One Body One Soul (OBOS) Rm. 413, Catholic Center, 80, Myeongdong-gil, Jung-gu, Seoul http://www.obos.or.kr/html/	OBOS is the ROK affiliate of the Catholic Church's Caritas international humanitarian and development organization. OBOS undertakes 600 projects in 70 countries that focus on incorporating ecological concerns into development, HADR, and planning. In disaster periods, it focuses on emergency food. As of 2022, OBOS activity is ongoing in Myanmar, Indonesia, and India. It has conducted relief activities in Haiti, Ecuador, the Palestinian Territories, Philippines, and Nepal.
Plan Korea Committee #912 H-Square S-dong, 231 Pangyoyeok-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 13494 https://www.plankorea.or.kr/	Plan Korea is the local affiliate of Plan International. It has gone from being a committee providing assistance to children affected by the Korean War to being a major sponsor of Plan activities in 50 countries. One of Plan Korea's core activities is emergency relief that focuses on children who have lost their homes and families. Most recent programs have been water and education activities in Sulawesi, Indonesia, and food, education, and child safety activities in Mozambique after Cyclone Idai.
World Vision Korea 77-1, Yeouinaru-ro, Yeongdeungpo-gu, Seoul 07327 https://www.worldvision.or.kr/	World Vision Korea is the national affiliate of the World Vision International. It conducts various child protection and education programs alone and in partnership with other affiliates and implementing partners. Recent emergency relief operations have occurred in Bangladesh among Rohingya refugees, in some regions of India during COVID-19, Afghanistan, Haiti, and Nepal.

Table 10: Korean NGOs and Non-Profit Organizations Active outside ROK (cont.)

Organization	Description
United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) East and North-East Asia Office 6-7F, G-Tower, 175 Art Center-daero, Yeonsu-gu, Incheon https://www.unescap.org/subregional-office/east-north-east-asia	The UNESCAP East and North-East Asia Office has been in Incheon since 2010 with the remit of supporting the UN's development pillar. It works with six members – China, Democratic People's Republic of Korea (DPRK), Japan, Mongolia, ROK, and the Russian Federation – and two associate members – Hong Kong and Macau – to build and strengthen partnerships and cooperation for inclusive and sustainable development in the subregion. The Office strives to address social challenges through science, technology, and innovation, strengthen intra-regional connectivity, facilitate development cooperation, promote disaster-resilient societies, and improve environmental sustainability through the North-East Asian Subregional Programme for Environmental Cooperation (NEASPEC).
Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT / ESCAP) 5F, G-Tower, 175 Art Center dearo, Yeonsu-gu, Incheon http://www.unapcict.org/	APCICT/ESCAP was inaugurated on 16 June 2006 as a regional institute of UNESCAP. Located in Incheon, it has a mission to strengthen the efforts of ESCAP members to use information and communications technology in their socio-economic development through human and institutional capacity-building. It implements programs and activities along three pillars: Training, Research and Knowledge-Sharing, and Advisory Services.
United Nations Office for Sustainable Development (UNOSD) Room 205, Libertas Hall A, Yonsei University International Campus, 85 Songdo gwahak-ro, Yeonsu-gu, Incheon http://www.unosd.org/	The UNOSD was established in 2011 by the UN and the ROK Government to support UN Member States in planning and undertaking integrated sustainability transformation, particularly in the context of the Sustainable Development Goals. UNOSD assists countries in applying integrated systems-level approaches for envisioning, planning, implementing, and monitoring national development plans and strategies, as well as the development and use of integrated policies and processes. The Office is managed by the Division for Sustainable Development (DSD) of the UN Department of Economic and Social Affairs (DESA). It is supported by the Ministry of Environment of the Republic of Korea, Incheon Metropolitan City, and Yonsei University.
United Nations Project Office on Governance (UNPOG) 8F, G-Tower, 175 Art Center-daero, Yeonsu-gu, Incheon http://www.unpog.org/	UNPOG is a subsidiary office of UN DESA under the Division for Public Institutions and Digital Government (DPIDG). Its principal mission is to strengthen public governance capacities of states in Asia and the Pacific. During the past decade, under the supervision of DPIDG and with support from the ROK Ministry of the Interior and Safety, UNPOG has contributed to the strengthening of public administration in developing Member States.
Office of the United Nations High Commissioner for Human Rights (OHCHR) 8F, Seoul Global Center 38 Jongro, Jongro-gu Seoul http://seoul.ohchr.org/	OHCHR opened its office in Seoul in June 2015 to monitor how human rights in the DPRK are being respected and to work with relevant governments, civil society, and other actors to protect human rights. The OHCHR Seoul office also works on enhancing communication with the public on the human rights situation in the DPRK.
United Nations Commission on International Trade Law Regional Centre for Asia and the Pacific (UNCITRAL RCAP) 3F, G-Tower, 175 Art center-daero, Yeonsu-gu, Incheon https://uncitral.un.org/en/TA/regionalcentre_asia_pacific	The UNCITRAL RCAP is part of the Secretariat of UNCITRAL. The main objectives are: to provide capacity building and technical assistance services to states, international and regional organizations, and development banks; to support public, private, and civil society initiatives to enhance international trade and development by promoting certainty in international commercial transactions; to build and participate in regionally-based international trade law partnerships and alliances; to strengthen information, knowledge, and statistics through briefings, workshops, seminars, publications, social media, and information and communication technologies, including in regional languages; and to function as a channel of communication between states and UNCITRAL for non-legislative activities.

Table 11: UN Offices in South Korea

Organization	Description
United Nations Office for Disaster Risk Reduction Office for Northeast Asia and Global Education and Training Institute (UNDRR ONEA-GETI) 4F, G-Tower, 175 Art Center-daero, Yeonsu-gu, Incheon 22004 https://www.undrr.org/incheon	UNDRR ONEA-GETI was established in 2010 in Incheon with support from the Ministry of the Interior and Safety of the Incheon Metropolitan City to develop a new cadre of professionals in DRR and climate change adaptation for disaster resilient societies. UNDRR ONEA-GETI follows the mandate of UNDRR to serve as the focal point in the UN system to ensure coordination and synergies among DRR activities and regional organizations and activities in socio-economic and humanitarian fields.
United Nations Development Programme (UNDP) Seoul Policy Centre 4F, Division of International Studies, Korea University, 145 Anam-ro, Seongbuk-gu, Seoul http://www.undp.org/uspc	UNDP helps implement the Sustainable Development Goals with a focus on poverty alleviation, democratic governance and peacebuilding, climate change and disaster risk, and economic inequality. Between 1963 and 2009, UNDP supported the people and the government of the ROK. After it closed its country office, it set up the UNDP Seoul Policy Centre (USPC) in 2011, with the objective of brokering new partnerships between the ROK and the developing world through UNDP networks. USPC is co-funded by the ROK Ministry of Foreign Affairs and UNDP.
UN Environment Programme's Regional Seas Programme Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (UNEP-NOWPAP) 408-1 Sirang-ri, Gijang-eup, Gijang-gun, Busan http://www.nowpap.org/	NOWPAP was adopted by China, Japan, South Korea, and Russia in September 1994. The city of Daejeon hosts the Marine Environmental Emergency Preparedness and Response Regional Activity Centre (MERRAC) at the Korea Research Institute of Ships and Ocean Engineering (KRISO) of Korea Institute of Ocean Science and Technology (KRISO/KIOST). MERRAC is a joint center of UNEP and the International Maritime Organization to develop effective regional cooperative measures in response to marine pollution incidents including oil and hazardous and noxious substance spills. MERRAC also gathers information and delivers assessments on marine-based sources of marine litter. Finally, MERRAC functions as secretariat for the NOWPAP MERRAC Focal Points Meetings, Competent National Authorities Meeting, Expert Meetings, and the NOWPAP Regional Spill Contingency Plan. The NOWPAP Medium-term Strategy for 2018-2023 includes tasks linked to protecting biodiversity, monitoring pollutants, responding to oil spills, addressing marine litter, and managing data and information.
United Nations Population Fund (UNFPA) Seoul Office B106-2, Underwood Main Building, 50 Yeonsei-ro, Seodaemun-gu, Seoul	UNFPA opened its Seoul Office in February 2019. It is responsible for facilitating partnerships in Korea on global population and development matters, including sexual and reproductive health and rights, population aging and low fertility, and humanitarian response. Seoul is an important donor for UNFPA, and, in addition to working closely with the government on global development projects, the Office promotes partnerships with Parliament, civil society organizations, the private sector, and academia to advocate for UNFPA's vision as the UN sexual and reproductive health agency.
United Nations High Commissioner for Refugees (UNHCR) Representation in the Republic of Korea 7F, Kumsegi Building, 6 Mugyo-ro, Jung-gu, Seoul http://www.unhcr.or.kr/	The role of UNHCR in the ROK is primarily of an advocacy nature. UNHCR engages with the government, judiciary, legislature, National Human Rights Commission, NGOs, and civil society to improve the domestic asylum system and treatment of asylum-seekers and refugees, and to ensure respect for their rights, including the principle of non-refoulement. The Government of Korea is a major financial donor with earmarked funds generally targeted to the Junior Professional Officers Program and programs promoting safe resettlement and return of Afghan refugees.

Table 11: UN Offices in South Korea (cont.)

Organization	Description
UN Children's Fund (UNICEF) 8F, Seoul Global Center, 38 Jongro, Jongro-gu, Seoul https://www.unicef.or.kr/	UNICEF started its operations in the ROK in 1948 and in 1950 began an Emergency Relief Program for Korean children and mothers. For 45 years, UNICEF and the Government and people of Korea jointly supported Korean children and mothers to meet their needs in health, education, nutrition, and other sectors. In the 1990s, the ROK graduated from a recipient of UNICEF's funding to a donor country. In 1994, the Korean Committee for UNICEF was established; it leads UNICEF's efforts in fundraising from general public and the private sector, as well as child rights advocacy. In 2017, UNICEF strengthened its partnership with ROK by opening UNICEF's Seoul Liaison Office, an extension of UNICEF's Public Partnerships Division in the Headquarters, which manages UNICEF's partnerships with the government, National Assembly, and other UN agencies and inter-governmental organizations based in the ROK.
United Nations Office on Drugs and Crime (UNODC) and Statistics Korea (KOSTAT) Centre of Excellence for Statistics on Crime and Criminal Justice in Asia and Pacific (CoE) 401, 20, Daedeok-daero 512beon-gil, Yuseong-gu, Daejeon 34126 https://coekostat.unodc.org/	The CoE, is a joint project between UNODC and KOSTAT. Based in Daejeon since 2019, it is a regional innovation hub for the exchange of knowledge, experience, and information among stakeholders involved in national crime statistics systems including national statistics offices, law enforcement, prosecutors, courts, prisons, relevant line ministries, and other relevant external entities. The CoE provides and organizes technical assistance and training activities to support countries in the region to improve statistical methodologies and technical capabilities with respect to the production, collection, analysis, and dissemination of crime and criminal justice data.
UN Institute for Training and Research (UNITAR) Centre International de Formation des Autorités et Leaders (CIFAL) Jeju/ Jeju International Training Center (JITC) 227-24, Jungmungwangwang-ro, Seogwipo-si, Jeju-do http://www.cifaljeju.org/	UNITAR CIFAL Jeju / JITC was established in 2010 part of the global network of UNITAR as Jeju Special Self-Governing Province sought to achieve the UN's economic and social development goals. CIFAL Jeju / JITC has carried out capacity building training sessions to empower government officials and civil society leaders in the Asia-Pacific region in the areas of environment, human security, sustainable tourism, and youth engagement, and it has provided the platform for the economic and social development of local governments and communities.
World Food Programme (WFP) Seoul Office #411, Woojeongwon (Bldg.153), Seoul National University, 1 Gwanak-ro, Gwanak-gu, Seoul https://ko.wfp.org/	WFP opened its Seoul office in July 2005 as an outpost of the Asia Regional Bureau to mobilize resources from the private sector in the ROK. Six years later, it became WFP's regular liaison office dealing with government partnership. Since 2012, the Seoul Office has built its partnership with the Korean government toward reaching Sustainable Development Goal #2 "Zero Hunger by 2030." To raise public support in achieving the goal, the Office is strengthening advocacy partnerships with parliamentarians, academia, civil society, and the general public.
United Nations Educational, Scientific and Cultural Organization (UNESCO) Asia-Pacific Centre of Education for International Understanding (APCEIU) 120, Saemal-ro, Guro-gu, Seoul http://www.unescoapceiu.org/	APCEIU is a UNESCO Centre established in 2000 by agreement between the Government of the ROK and UNESCO to promote and develop Education for International Understanding (EIU) / Global Citizenship Education (GCED). APCEIU plays a pivotal role in promoting GCED and seeks to promote EIU and GCED through strengthening national, regional, and global capacity, promoting international exchange and cooperation in the Asia-Pacific, researching and developing EIU/GCED curricula, organizing training workshops and seminars, and producing and disseminating EIU/GCED learning and teaching materials.

Table 11: UN Offices in South Korea (cont.)

Organization	Description
World Bank Group (WBG) Korea Office 37F, Boo Young Songdo Tower 2, 241, Incheon Tower-daero, Yeonsu-gu, Incheon http://www.worldbank.org/en/country/korea	The WBG Korea Office was established as a global knowledge and operations platform to help World Bank client countries address development challenges. The Office works in knowledge sharing, private sector engagement, outreach, and partnership. The Office leverages the Seoul Center for Financial Sector Development, the Global Themes Knowledge Management Unit, the International Finance Corporation (IFC), and the Multilateral Investment Guarantee Agency (MIGA).
United Nations Industrial Development Organization Investment and Technology Promotion Office (UNIDO ITPO) Korea 16th fl. FRONT1, 122, Mapo-daero, Mapo-gu, Seoul 04213 http://www.unido-itpo.kr/	Since its establishment in 1987, UNIDO ITPO Korea has worked to disseminate Korea's experience of industrial development by promoting investment and technology transfer to developing countries and economies in transition. UNIDO ITPO Korea implements projects and programmes in developing countries to strengthen trade capacity and support green industrialization. They advise on industrial development policy and promote job creation and green technology. UNIDO ITPO Korea also encourages Korean investors to expand their businesses in developing countries.
International Organization on Migration (IOM) 12F, Hyoryeong Building, 32 Mugyo-ro, Jung-gu, Seoul http://www.iom.or.kr/	Since its establishment in ROK in 1994, the IOM Mission in Seoul has worked toward the Sustainable Development Goals by improving migration governance, promoting migration and development, and providing protection and assistance to vulnerable migrants. IOM ROK works with governments and civil societies to mainstream migration into national, regional, and international development plans; to prevent human trafficking and protect its victims; and to provide services to support refugee resettlement and assisted voluntary return and reintegration efforts. Funded by USAID/BHA, IOM ROK also builds capacity of ROK humanitarian workers to respond to global emergencies. IOM was established in 1951 and joined the UN system in 2016.

Table 11: UN Offices in South Korea (cont.)

Photo 5 depicts relief supplies warehoused by Hope Bridge Korea Disaster Relief Association, which has grown to be one of Korea's leading disaster-oriented NGOs since its foundation in 1961.[408]



Photo 5: Relief supplies of Hope Bridge Korea Disaster Relief Association.

TAIWAN

Taiwan is a mountainous island 394 km (245 miles) long and 144 km (89.5 miles) wide, where 23.5 million people reside 130 km (81 miles) east of the People's Republic of China across the Taiwan Strait.[409]

Taiwan faces some of the greatest exposure to multiple hazards, topping the list for most exposed to three or more hazards, ranked first by a large margin for either percentage of total area exposed or population exposed (both 73.1%). Taiwan also leads rankings for high mortality and economic risks from multiple hazards.[410] Referring back to a 2005 World Bank risk analysis for these comparative rankings for Taiwan reflects the extent to which Taiwan is excluded from all sorts of global reports that rank "countries." Taiwan is not found in the European Commission-hosted INFORM risk index identifying risks from humanitarian crises and disasters in 191 countries.[411] Nor is Taiwan found in the Institute for International Law of Peace and Armed Conflict (IFHV) of Ruhr-University Bochum's WorldRiskIndex covering 181 countries.[412] Many reports only cover UN member states, but the UN and most countries in the world do not take a position on Taiwan's sovereignty.

Typhoons,[413] floods, landslides, droughts, and earthquakes are the most frequent natural hazards.[414] Taiwan was particularly impacted by two major disasters – the 1999 Chi-Chi Earthquake that struck Chi-Chi (or Ji Ji) in central Taiwan, killing approximately 2,400 people and injuring 10,000 others,[415] and Typhoon Morakot, which struck central Taiwan in 2009, leaving more than 650 people dead and causing about NT$110 billion (US$4 billion) in damages. Critiques of both disaster responses led to significant disaster management reorganization.

Taiwan's exclusion from global organizations and indices is rooted in the Chinese Civil War. The Republic of China was founded on the Chinese mainland in 1912 and governed by the Kuomintang (Nationalist Party), which was challenged by the Chinese Communist Party (CCP). The CCP won control of mainland China in 1949, leading the Kuomintang to evacuate its government and some two million people in retreating to Taiwan.[416] Despite losing the civil war, the Kuomintang claimed it was still the legitimate ruler of all of China, which Western powers recognized until the 1970s.[417] The party's rule in Taiwan upon arrival was heavy-handed, leading to the 228 Incident, which was a mass uprising by locals starting 2/28/1947. The KMT brutally quashed the unrest, killing 18,000-28,000 people across Taiwan.[418] Forty years of martial law followed, dubbed the White Terror, under which dissent was suppressed. Emerging from one-party rule in the late 1980s, Taiwan underwent a remarkable democratization process.

Building on its rapid industrialization during the 1960s, Taiwan is now considered among the freest societies in the world – not just Asia – politically, economically, and in terms of gender equality. From 1996, when more than 76% of eligible voters participated in the first free and direct elections for the national executive,[419] in 2021 Freedom House ranks Taiwan as 94% politically free, on par with Germany and Iceland,[420] and The Economist Intelligence Unit's Democracy Index ranks Taiwan as the 8th strongest democracy in the world.[421] Taiwan's economy was ranked free by the Heritage Foundation's 2022 Index of Economic Freedom.[422] Taiwan ranks 6th in the world in gender equality and 1st in Asia in 2019,[423] according Taiwan's Executive Yuan's Gender Equality Committee, based on metrics used by the UNDP's Gender Inequality Index, which excludes Taiwan.[424] In 2020, female political representation in Taiwan reached a record high with 42% of legislators being women, the highest rate in Asia.[425] In 2019, Taiwan legalized same-sex marriage, a historic first for Asia.[426]

Despite a robust democracy and economy

and gains in social equality, only 14 countries carry on formal diplomatic relations with Taiwan (as the "Republic of China"): Belize, eSwatini, Guatemala, Haiti, the Holy See (the central administration of the Roman Catholic Church), Honduras, the Marshall Islands, Nauru, Palau, Paraguay, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Tuvalu. China claims Taiwan as its territory and blocks Taiwan's bids for membership in numerous international organizations. While this handbook focuses on disaster management, there is widespread international concern that Taiwan is a potential conflict flashpoint, given China's claim and aggressive posturing over it.

Agencies' Disaster Management Structure

Taiwan's disaster management structure has been heavily influenced by major disasters in recent decades. Two disasters have been particularly influential: 1) the Chi-Chi earthquake, which struck the central township of Chi-Chi (or Ji-Ji) in Nantou County on 21 September 1999; and 2) Typhoon Morakot, which made landfall in central Taiwan on 7 August 2009.

The Central Disaster Prevention and Protection Council (CDPPC) was created by the Executive Yuan in 2000 in response to disaster management vulnerabilities revealed by the 1999 Chi-Chi earthquake response where the central administration's response was not efficiently coordinated. The CDPPC, chaired by the Vice Premier, was made responsible for developing disaster prevention and protection guidelines, authorizing emergency responses to national disasters, and supervising disaster management at various levels of administration.[427] The CDPPC set up the National Rescue Command Center to command and coordinate interagency personnel from various functional authorities in carrying out search and rescue missions following disasters.

The National Fire Agency (NFA) is in charge of executing disaster prevention and rescue operations. As it did in the 1999 earthquake response, the NFA often chairs the National Emergency Operations Center, which is activated by the Ministry of the Interior in large-scale disasters such as earthquakes and typhoons.

After the 1999 Chi-Chi Earthquake, Emergency Operation Centers (EOC) – at the central or national level; at the city and county level; and at the township and urban district level – became responsible for coordinating and integrating various agencies' responses to major disasters. In 2006, the central authorities established the Central Emergency Operation Center (CEOC, also known as the National Emergency Operations Center) to act as the central coordinator during disasters. In the earliest phase of a response, the local EOC usually initiates response, with any request for assistance made to the central center based upon assistance needs. The CEOC follows a grouping largely based on the US Incident Command System (ICS) with a functional grouping, which is a departure as a national incident management system is not universal to Taiwan's disaster management approach.

Taiwan does not have a standard, nationally-recognized system for emergency incident management. The Forestry Bureau of the Council of Agriculture has adopted the U.S. ICS approach, although other agencies with a disaster response role are not entirely ICS-based. Some fire departments report using the ICS approach, others do not, and still others seem to partially use ICS. Where ICS is used, it generally includes the firefighters on scene, but excludes other disaster responders such as police, medical responders, and volunteers.[428]

Figure 19 shows the Taiwan central administration's disaster management structure.[429]

National Disaster Management Agency

Taiwan does not have a single national disaster management agency. Its single-hazard approach officially assigns national disaster response authority to various agencies, depending on the

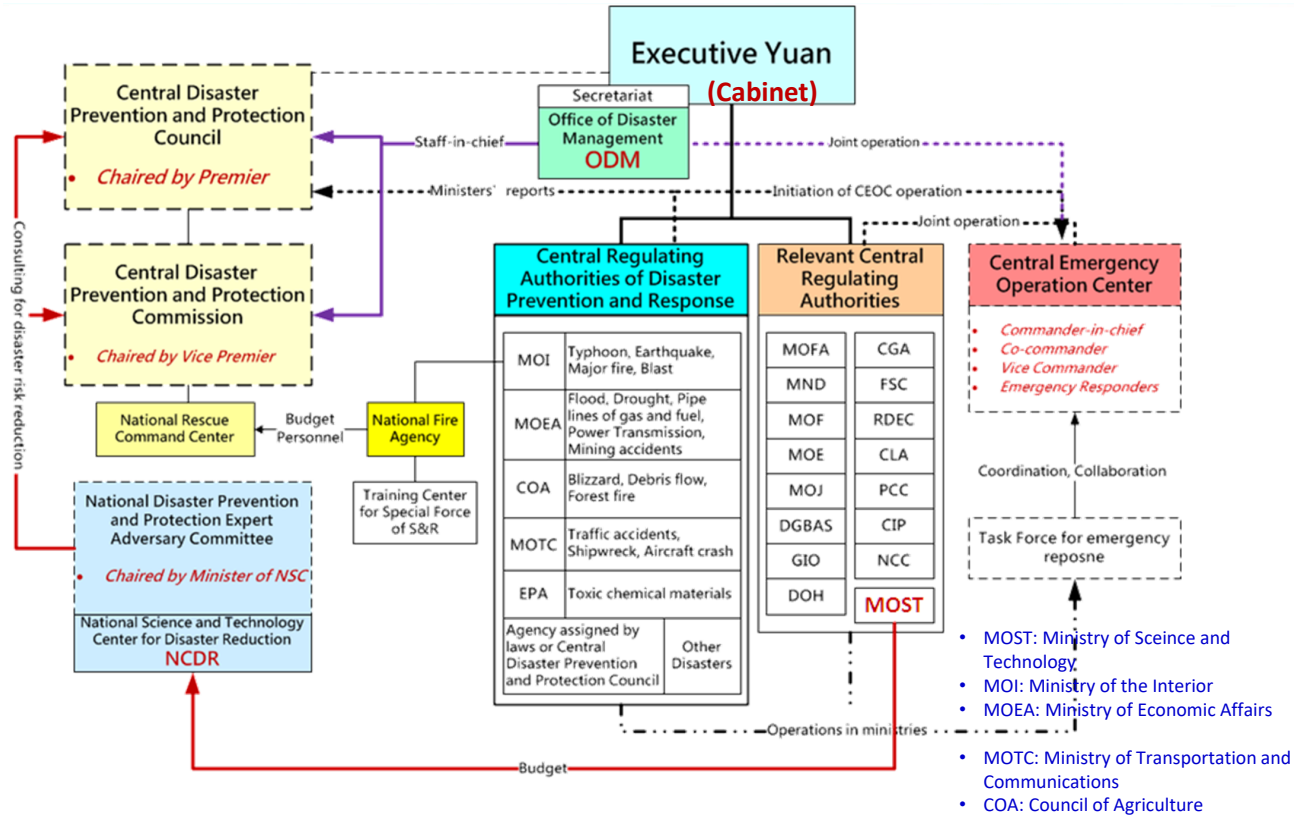


Figure 19: Taiwan Central Disaster Management Structure

type of hazard involved in the disaster.

However, the NFA often operates as the de facto interagency leader for large-scale or multi-hazard domestic disasters. The NFA falls under the Ministry of Interior and leads an annual national-level earthquake exercise as well as community-level disaster response exercises.

The NFA manages the CEOC and 22 local EOCs.[430] The CEOC uses an approach similar to the U.S. ICS, with its focus on functional grouping. This emergency management approach at the central level is not replicated at the county and local levels. An exception is Taipei City's EOC, which uses a functional organization similar to the CEOC's approach. Most counties and cities usually retain the original organization of services for each bureau, resulting in significant differences in the organization of EOCs at each level.[431]

The NFA runs a cutting-edge search and rescue (SAR) training facility.[432] Built in 2010 in Nantou County, the National Fire Training Center has the capacity to train 700 people at a time. The SAR training facility entails a 6.99-km^2 (2.7-square mile) campus with 13 training sites for 66 kinds of rescue scenarios. Training activities pertain to search and rescue, firefighting, hazardous materials (HAZMAT), and emergency medical training. While the facility's main focus is domestic preparedness and response, it also hosts foreign civilian disaster response personnel for training.

The NFA is also home to the National Special Search and Rescue (NSSAR) branch, a team of 75 highly trained SAR experts. The NSSAR focuses on domestic response but has also deployed overseas to Indonesia, El Salvador, Iran, and Sichuan, China. The NFA also leads reception and departure center operations to process and coordinate incoming international HADR support.[433]

Taiwan has robust SAR capabilities, which it has deployed in response to disasters both domestically and internationally. Yet, the island's nebulous diplomatic status has complicated official recognition by the International Search

and Rescue Advisory Group (INSARAG), under the UN Office for the Coordination of Humanitarian Affairs (UN OCHA). However, Taiwan has attended INSARAG meetings as an observer.[434] Taiwan is home to UN-certified search-and-rescue dogs. NFA reports that Taiwan has about 30 search-and-rescue dogs, spread across eight units, and that as of July 2018, of the nine UN-certified search-and-rescue dogs in Asia, seven were in Taiwan and two were in Japan.[435]

The National Airborne Service Corps (NASC), under the Ministry of the Interior, is responsible for executing and providing support for airborne SAR, disaster relief, emergency medical service, transportation, reconnaissance, and patrol in Taiwan. The NASC was created in March 2004 after the consolidation of the Airborne Squadron of the National Police Agency, the Preparatory Office of the Airborne Fire Fighting Squadron of the NFA, the Aviation Team of Civil Aeronautics Administration of Ministry of Transportation and Communications, and the Air Patrol Squadron of the Coast Guard Administration (CGA). The NASC provides support for air rescue actions in natural disasters and severe accidents, for air rescue actions in mountains and water rescue actions on rivers and sea, and for air transportation of rescue personnel, equipment, and goods.[436]

The CGA is a civilian law enforcement agency but can be transferred to Taiwan's Ministry of National Defense (MND) in time of war. It was founded in 2000 as part of the consolidation of the Coast Guard Command (formerly under the MND), the National Police Agency Water Police Department (formerly under the National Police Administration, Ministry of Interior), and the General Administration of Customs and Anti-Smuggling.[437] The CGA provides maritime SAR for Taiwan as part of its core mission. The National Rescue Command Center, Executive Yuan, primarily conducts notification and coordination of maritime rescue operations with the CGA responsible for executing the mission. The CGA fleet is approximately 140 patrol and coastal vessels with plans to expand to 173 vessels, which will add 17,000 tons of capacity for a projected total of 36,000 tons capacity.[438] The CGA has trained domestically with the Taiwan Navy and attended training internationally in the U.S.

Disaster Management Laws, Plans, Policies

After the 1999 Chi-Chi earthquake, the central administration passed Taiwan's first comprehensive disaster management law, the Disaster Prevention and Protection Act (DPPA, also referred to in English as the Disaster Prevention and Response Act). The Act was promulgated in 2000, superseding the 1965 Standard Procedures for Natural Disaster Assistance (SPNDA) and the 1994 National Hazard Mitigation Program (NHMP).[439] The Act was amended several times, including in 2010, the year after Typhoon Morakot devastated central Taiwan, and again in 2019.[440] While the Act shifted some disaster authority to the central administration, there is still no single organization at the national level to lead and manage disaster management in coordination with authorities at the local level.[441]

Significantly, the DPPA outlines Taiwan's single-hazard approach to disaster management, which experts have described as a major obstacle to quickly and decisively responding to complicated, multi-hazard incidents. Per Article 3 of the DPPA, the following agencies shall be the central regulating authorities for disaster prevention and protection, as delineated by hazard type:

1. Windstorm, earthquake (including soil liquefaction), fire, explosion, and volcanic disaster: **Ministry of the Interior**.
2. Flooding, drought, mining disasters, industrial pipeline disaster, and public gas, fuel pipeline, and power transmission line failure: **Ministry of Economic Affairs**.
3. Frost, debris flow, forest fire, and animal and plant diseases: **Council of Agriculture, Executive Yuan**.
4. Air crash, shipwreck, and land traffic accidents: **Ministry of Transportation and Communications**.

5. Toxic Chemical Materials and suspended particulate disaster: **Environmental Protection Administration, Executive Yuan**.
6. Biological disaster: **Ministry of Health and Welfare**.
7. Radiation disaster: **Atomic Energy Council**.
8. Other disasters: the central regulating authorities of Disaster Prevention and Protection business designated by Central Disasters Prevention and Protection Council.[442]

The DPPA elaborates that the various above-named agencies shall be responsible for a wide array of duties in a relevant disaster. These would include but not be limited to command, supervision, and coordination of authorities at the central, municipal, and county level; drafting and implementing amended disaster prevention and protection operation plans; and disaster prevention and protection work.

The challenge of the single-hazard approach established by the DPPA was seen in 2014 in Kaohsiung, when an underground propylene pipeline failure led to explosions that killed 32 people and injured more than 300 others. Senior leaders took several hours to determine which authority should lead the national-level disaster response; relevant agencies would have been the Interior Ministry due to explosion, the Economic Affairs Ministry due to pipeline failure, and the Environmental Protection Administration due to toxic chemicals.[443]

The Act also led to the establishment in 2003 of the National Science and Technology Center for Disaster Reduction (NCDR). The NCDR functions as technological advisory staff to the Central Disasters Prevention and Protection Commission, Executive Yuan, coordinating and collaborating across sectors to plan, organize, and promote technological innovation. The NCDR provides a platform for information service and technology integration and helps design disaster prevention policies; the Center's organizational structure is shown in Figure 20. The NCDR is mandated to:

- Promote and conduct activities related to applied research and development of disaster management;
- Facilitate scientific knowledge and technological advancement for practical implementations to benefit the whole of society;
- Apply science and technology outputs to DRR and emergency preparedness;
- Build up international partnerships to exchange experiences and conduct joint projects;
- Collaborate with domestic research institutes to engage stakeholders' contributions for reducing disaster risk and enhancing emergency preparedness; and
- Provide services relevant to disaster management.[444]

The DPPA required every county, city, and township to establish full-time Disaster Prevention and Response Councils (DPRC). To manage this approach, the Central Disaster Prevention and Preparedness Council (CDPPC) and the Central Disaster Prevention and Response Committee (CDPRC) were established. These local and municipal DPRCs reported to the CDPPC. To streamline disaster management at the national level, the CDPPC and the Central Disaster Prevention and Response Committee were combined to form the Central Disaster Prevention and Response Council (CDPRC).[445]

Engagements on DMHA with U.S.

There is a long history of engagements between the U.S. and Taiwan regarding disaster management, humanitarian assistance, and development assistance. Starting after World War II through USAID, the U.S. government provided foreign aid to Taiwan from 1950 through1965. During that time, goods donated by the U.S. were locally distributed by three religious organizations, Cathwel Service, the Taiwan Christian Service, and the American Good Faith Relief Service. Aid from the U.S. was a factor in shifting the diet of Taiwan's people toward increased wheat consumption, and the imported wheat and other agricultural goods

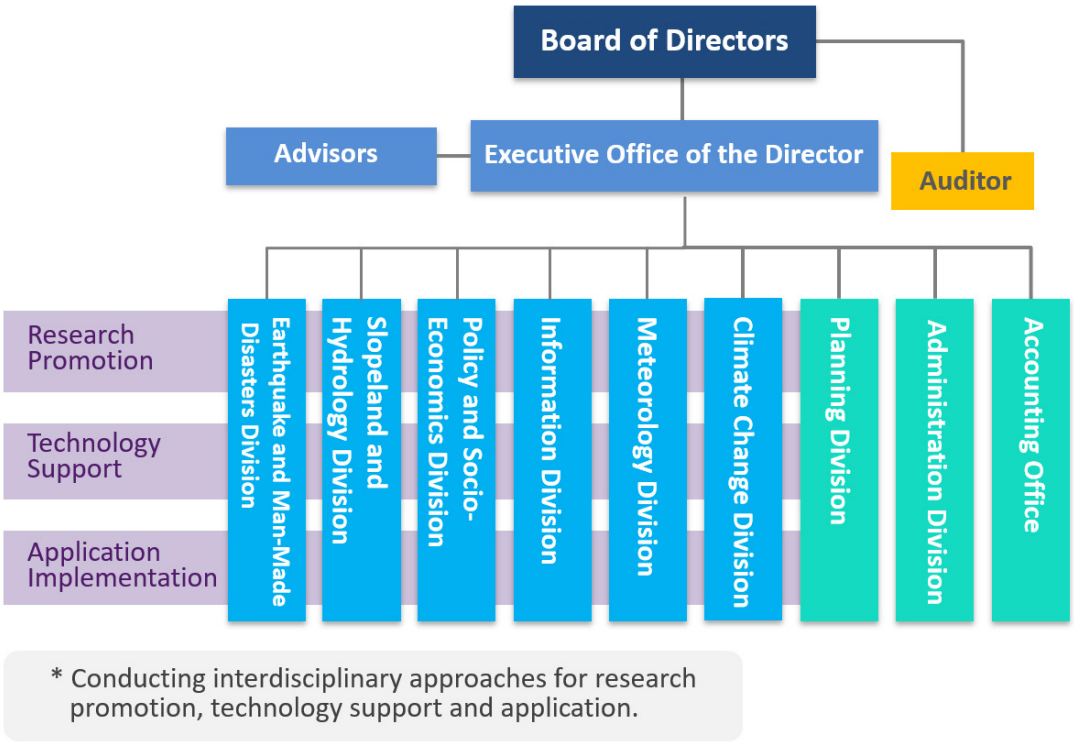


Figure 20: Organizational Structure of Taiwan's NCDR

facilitated export of higher-priced rice and the development of light industry in Taiwan.[446] As Taiwan's economy has grown over the decades into a highly developed free-market economy, the nature of U.S. -Taiwan DMHA engagement has dramatically shifted.

The Director of the American Institute in Taiwan (AIT) bears responsibility for conduct of U.S. government foreign disaster assistance within the jurisdiction. The AIT Director is responsible for ensuring that up-to-date disaster plans are operational within AIT and that disaster relief officers are appointed and perform designated duties. These officers would serve as the focal point at AIT for information, planning, and activities affecting both AIT personnel and the affected host community. In case of a disaster in Taiwan, the Director will have the option of requesting authorization from BHA to commit a certain level of funding upon the written determination that a disaster exists and meets three criteria: 1) it is of a magnitude with which the affected community cannot cope; 2) recognized representatives of the affected population desire the assistance; and 3) it is in the U.S. government's interests to respond. USAID does not have an office in Taiwan, but USAID has developed numerous rapid response packages capable of providing commodities and services to meet the exigencies of both natural and man-made disasters.[447]

Engagements have occurred with a variety of U.S. government agencies, including FEMA and USAID. Many events are facilitated through the AIT. Additionally, since the establishment of the Global Cooperation and Training Framework (GCTF) in 2015, many international exchanges and events have been hosted through that platform in Taiwan. AIT, Taiwan's Ministry of Foreign Affairs (MOFA), and the Japan-Taiwan Exchange Association (JTEA) jointly administer the GCTF, which serves as a platform for Taiwan to engage with international partners and share its expertise around the world.

U.S., Taiwan Collaborate to Boost COVID-19 Case Management in the Pacific Islands – January 2022

On 25 January 2022, USAID and the Taiwan International Cooperation and Development

Fund (TaiwanICDF) jointly organized a technical webinar to strengthen the capacity of health workers in Pacific Island countries to manage complicated COVID-19 cases. With the topic of "Managing COVID-19 in Patients with Non-Communicable Diseases (NCDs) Technical Webinar," the session was attended by 87 clinicians, nurses, and health workers representing six countries, including Fiji, Nauru, Federated States of Micronesia, Republic of the Marshall Islands, Vanuatu, and Cook Islands. The training aimed to build health worker capacity in COVID-19 case management for patients with underlying comorbidities, at both the hospital and community levels. The webinar marked the second USAID and TaiwanICDF collaborative health training event in the region. This partnership leverages the technical expertise, experience, and global and regional knowledge of the two agencies to address development challenges in the Pacific region.[448]

U.S.- and Taiwan-Supported E-Government Program Featured in Training for Pacific Islands – October 2021

The USAID Vietnam e-Government Capacity Building Program shared experience related to e-government program design and implementation at the "Taiwan International and Cooperation Development Fund (ICDF) and USAID Training on e-Governance and Cybersecurity Workshop," organized by U.S.-Support for Economic Growth in Asia (US-SEGA) and TaiwanICDF on 5 and 12 October. The Vietnam e-Government Program was highlighted as an example of good practice in e-government design and development. The discussion offered opportunities for USAID and Taiwan representatives to learn lessons from previous programs, and to provide a practical set of guidelines. The experiences of the Vietnam e-Government Program's early progress are already providing a rich set of learning resources and a good model for future deployments of additional USAID support in this field.[449]

GCTF Virtual Workshop on Building Disaster Resilience at Global and National Levels – September 2021

On 24 September 2021, the AIT, the Taiwan MOFA, the Taiwan Ministry of Science and Technology (MOST), the JTEA, the British Office Taipei (BOT), and the Australian Office Taipei co-hosted part two of the virtual GCTF workshop entitled "Building Disaster Resilience at Global and National Levels." The virtual event enabled 135 disaster management and humanitarian assistance leaders and experts from 34 areas and regions to share best practices for community resilience capacity building, technology applications for DRM, recovery and reconstruction revitalization processes, and disaster risk finance mechanisms. AIT Director Sandra Oudkirk, MOST Minister Tsung-Tsong Wu, Deputy Foreign Minister Ho-jen Tseng, JTEA Chief Representative Hiroyasu Izumi, BOT Representative John Dennis, and Australia Office Representative Jennifer Bloomfield delivered opening remarks. This was the third HADR workshop under GCTF since the framework was established in 2015.[450]

USAID and TaiwanICDF Collaborate to Boost Health Worker Capacity in the Pacific Islands – July 2021

On 13 July 2021, USAID and TaiwanICDF jointly organized a two-part training series to strengthen the capacity of Pacific Island Countries to deliver quality health services to citizens. The training, "Health Workforce Management and Data Systems: A Focus on Pacific Island Countries and Health System Resilience," engaged 40 health leaders, managers, and practitioners representing 10 countries. The training aimed to build understanding in health workforce planning, data, and systems, and to support effective health workforce management. These areas are key to achieving national health goals and to improving response to emerging threats, including public health crises such as the COVID-19 pandemic or catastrophic weather events. Participants engaged experts and shared among their peers to exchange best practices and

innovative approaches to improve their health workforce data and systems.[451]

GCTF Seminar on Building the Resilience of Nations and Communities to Disaster – March 2021

The "Building the Resilience of Nations and Communities to Disaster" event was conducted under the GCTF on 10 March 2021 in Taipei City to deepen cooperation in disaster prevention and mitigation. The one-day workshop was jointly organized by Taiwan's MOFA, the NCDR under the MOST, the AIT, the JTEA, and the BOT, marking the first time the United Kingdom co-hosted a GCTF event. In addition to the high-profile participants on-site, including MOFA Minister Jaushieh Joseph Wu, MOST Deputy Minister Lin Minn-tsong, AIT Director Brent Christensen, JTEA Chief Rep. Izumi Hiroyasu, and BOT head John Dennis, around 110 experts and officials from 35 countries and territories also took part via video link.[452]

U.S. and Taiwan Issued Joint Statement Reaffirming Their Dedication to HADR – March 2021

On 11 March 2021, the U.S. and Taiwan issued a joint statement titled, "Partners in HADR: Awareness Resilience Action." The statement marked the 10th anniversary of the Great East Japan Earthquake, which struck Japan's Tohoku (northeastern) region on 11 March 2011 and claimed approximately 16,000 lives, many of those in the quake-generated tsunami. The U.S. and Taiwan announced a series of activities to mark the HADR partnership; the events began on 10 March 2021 and concluded on 21 September 2021, the 22nd anniversary of the devastating Chi-Chi earthquake that struck Taiwan's Nantou County in 1999.[453]

U.S., Taiwan Lead Workshop on Private, Civil, and Public Disaster Response Cooperation – December 2018

A workshop titled "Integrating Private, Civil & Public Sector Disaster Response" was co-hosted in Taipei from 11 to 14 December 2018 by Taiwan's NCDR and the U.S.'s Daniel K. Inouye Asia-Pacific Center for Security Studies (DKI APCSS). Disaster management professionals from Taiwan, the U.S., and 12 Indo-Pacific countries participated in the workshop to explore ways to integrate private, civil, and public sectors into disaster response. Taiwan representatives shared their experience with other participants and cooperatively developed solutions for improving sector integration. The event was preceded by a one-day Taiwan-only workshop, during which private, civil, and public sector actors cooperatively developed a list of capabilities that could be deployed regionally in support of disaster response operations. This was followed by a three-day multilateral workshop with participants identifying the key inhibitors and enablers for regional response integration and developed mitigation measures to map a way forward to increased capability.[454]

GCTF International Workshop on HADR – December 2018

On 14 December 2018, the GCTF International Workshop on Humanitarian Assistance and Disaster Relief was held at the NFA Training Center in Nantou County. The workshop was co-hosted by the AIT, MOFA, and the NCDR under MOST. AIT Deputy Director Raymond Greene, MOFA Deputy Foreign Minister Hsu Szu-chien, and Ministry of the Interior's NFA Training Center Director Lee Ming-hsien delivered opening remarks. Representatives from the DKI-APCSS shared their experiences in disaster relief at the event. The workshop included participants from 10 countries spanning two continents; they shared best practices and opportunities to deepen international cooperation on integrating private, civil, and public sector disaster response capabilities into regional preparedness and response efforts. This was the GCTF's 15th workshop and the 2nd on HADR since the GCTF was established in 2015.[455]

GCTF International Workshop on HADR – July 2017

On 5 July 2017, the GCTF kicked off an international workshop, its first event dedicated

to HADR. Vice Minister of Foreign Affairs Der-li Liu gave opening remarks at the workshop. "Through this workshop, we hope to facilitate dialogue and cooperation on HA/DR related issues among countries in the region, so as to build a strong regional HA/DR network that can mobilize more effectively when needed, help mitigate the impact of natural disasters and reduce the loss of human lives and properties."[456] The NFA of the Ministry of the Interior and the AIT coordinated closely in organizing the workshop. The multi-day event was held at the NFA in Taipei and its world class Training Center in Nantou and was attended by representatives from six countries and various organizations, including from the NGO Peace Winds America. Taiwan shared its expertise in using science and technology in disaster preparedness and mitigation, situational awareness, mapping risks, and other areas of emergency management. The Training Center demonstrated its state-of-the-art facilities for search and rescue, firefighting, HAZMAT, and emergency medical training. The forum also included training by USAID/OFDA (reorganized in 2020 as USAID/BHA) on OFDA's work in the region and trends in humanitarian assistance.[457]

Military Role in Disaster Management

Taiwan's armed forces have played a growing role in domestic response to major disasters, along with other agencies' search and rescue personnel, medical and relief teams, and NGOs.

It is important to note that the point of contact for U.S. military support to HADR in Taiwan would be the NFA within the Ministry of Interior, rather than the MND. This reflects the NFA's significant role in often acting as disaster response lead, particularly in major or multi-hazard disasters such as earthquakes and typhoons.[458]

The military has a history of playing a significant role in domestic disaster relief. During the 2009 response to Typhoon Morakot, which wreaked havoc in central Taiwan, the military participated significantly in response, rescue, and recovery. From 8 August to 9 September, the military mobilized considerable personnel, vehicles, aircraft, and equipment. An estimated 40,000 Taiwan troops were engaged in disaster relief efforts.[459] They were involved in rescue, disinfection and disease prevention, road rehabilitation, transportation, medical service, settlement of displaced persons, dredging, and other tasks. In the post-disaster recovery phase, the MND developed the Morakot Typhoon Reconstruction Plan and supported the work of other authorities. However, the army's initial response was delayed two days following the typhoon, due to the ambiguous role and command system, leading to disaster management changes. The Minister of Defense then sought and acquired amendments to laws and regulations to include disaster prevention and response in the military's primary task list. The Legislative Yuan also amended the DPPA to authorize the military to have an active role in initiating disaster rescue and response.[460]

The Taiwan Army contributes to the island's capability for chemical, biological, radioactive, and nuclear (CBRN) response. Taiwan's CBRN national response capacity is rather limited. The official regulatory institute, the Atomic Energy Council (AEC), and its subordinate Institute of Nuclear Energy Research have approximately 1,000 personnel. However, these civilian agencies would not have the capacity to deal with off-site contingencies; thus, the three CBRN groups in the Taiwan Army would likely be the main resources to deploy to conduct decontamination.[461]

The Taiwan armed forces have increasingly taken part in civil-military disaster management exercises. In May 2021, they participated in the Min'an Number 7 Exercise in Hsinchu to verify the results of integrated disaster relief. Hsinchu City hosted the exercise, in which the armed forces, city teams, civil organizations, and others participated to exercise joint preparation, response, and recovery capabilities. The scenario included earthquake, building collapse, epidemic prevention, disinfection, and fire, with exercise

tasks involving search and rescue amid the collapsed building and providing large-scale medical relief. For the exercise the Armed Forces deployed 54 service members, 13 categories of equipment, and 49 vehicles and machinery, largely from the 542nd Armored Brigade, No. 53 Engineering Group, and No. 33 Chemical Group.[462]

The Medical Affairs Bureau (MAB), under the MND is a significant part of the national disaster medical system. Medical teams contributed by armed forces hospitals, augmented by health service support teams contributed by field medical units, stand ready to deploy and execute disaster medical support missions. From 2008 to September 2016, a total of 1,195 medical teams had been activated and deployed to render HADR medical support in 21 natural and man-made disasters. A total of 11,990 patients had been cared for by medical teams of Taiwan's military health system and more than 328 medical evacuations conducted. Taiwan's military health system has also been active in international medical support missions to foreign disasters and crises. Guided by policy directives from the central administration,, MAB collaborates with MOFA, the Ministry of Health and Welfare, and NGOs such as Taiwan Red Cross and Tzu Chi Buddhist Foundation in staffing, training, and material provisioning necessary for international HADR medical missions on short notice. From 2010 to 2016, Taiwan international HADR medical missions included deploying to Haiti, the Philippines, and Palau, among others. Taiwan military medical specialists deployed to Burkina Faso to provide healthcare services to the local population in partnership with local health authorities on collaborative public health projects for more than 20 years. One long-running endeavour has been establishing and utilizing telemedicine links between medical facilities in Burkina Faso and Taiwan to increase Burkina Faso's access to specialist consultations. In recent years, the Taiwan Air Force acquired the Eurocopter EC-225 to significantly improve the short-to-mid haul capacity among aeromedical evacuation craft.[463]

Taiwan's military has also played a role in providing foreign disaster relief in a few cases. In response to Typhoon Haiyan striking the Philippines in 2013, Taiwan's Air Force and Navy used two C-130 aircraft and a landing ship-tank to deliver relief worth US$12.7 million.[464] Typhoon Haiyan also struck Palau, and following a request from the Palau President, Taiwan's Navy helped deliver portable housing units, food, and water containers with a total value estimated at US$750,000. Following Typhoon Rai hitting the Philippines in December 2021, Taiwan's Air Force delivered 10 tons of emergency supplies in two C-130 aircraft that departed from southern Pingtung Air Base. The supplies included food rations, instant noodles, bottled water, canned food, and portable water filters, all donated by the Taiwan authorities.[465] Later the same month, Typhoon Odette struck the Philippines, and Taiwan airlifted 10 metric tons of relief goods that arrived on 25-26 December 2021; Taiwan also provided additional relief funding.[466]

Engagements on DMHA with U.S. DoD

Engagements on disaster management or humanitarian assistance involving Taiwan and U.S. DoD agencies have included direct disaster relief, as well as joint participation in HADR-related trainings or missions.

Taiwan Contributes to Pacific Partnership HADR Workshop in Palau – August 2021

U.S. Pacific Fleet's annual humanitarian assistance mission Pacific Partnership concluded in Palau in 2021 as U.S. Pacific Fleet and the Center for Excellence in Disaster Management and Humanitarian Assistance (CFE-DM) co-hosted a HADR workshop 10-12 August 2021, with Taiwan disaster management experts. Pacific Partnership brings host nations and partners from throughout the Indo-Pacific together to prepare during calm periods to effectively respond in times of crisis, with the 2021 mission being its 16th iteration. During the HADR workshop, participants from the U.S., Palau, and Taiwan shared experiences

and lessons learned to identify best practices followed by various organizations and countries. The workshop kicked off with opening remarks from the President of the Republic of Palau, Surangel Whipps Jr. Throughout the workshop, lectures and expert exchanges focused on early warning response, search and rescue, interagency coordination, and enhancing telecommunication systems in times of crisis. Additionally, participants analyzed a case study on information-based emergency operations in Taiwan; it highlighted best practices of Taiwan emergency operations systems for typhoons, earthquakes, and droughts. "We can really learn from sharing our experiences and capacity building," said Vice President of the Republic of Palau, J. Uduch Sengebau Senior. "This is essential for us to survive disasters and save lives in our community." The workshop leveraged HADR expertise from the U.S., Palau, and Taiwan to develop mutual understanding and build capacity in Palau's resiliency and disaster preparedness. Pacific Partnership's mission is to work collectively with host and partner nations to enhance regional interoperability and disaster response capabilities, increase stability and security in the region, and foster new and enduring friendships across the Indo-Pacific. Taiwan was invited to participate due to their expertise in HADR, a key line of effort for Pacific Partnership's mission.[467]

U.S. Responds to Typhoon Morakot – August 2009

Typhoon Morakot made landfall in Taiwan on 7 August 2009 and continued passing over the central southern part of the island during 8-9 August. Morakot was reportedly one of the deadliest typhoons to have struck Taiwan in the past 50 years; it resulted in at least 602 people dead and 92 reported missing. More than 24,000 people evacuated from affected areas, and the storm caused widespread damage throughout central and southern Taiwan, especially in Pingtung, Tainan, and Kaohsiung Counties, with remote mountainous areas particularly affected. An estimated 40,000 Taiwan troops were engaged in disaster relief efforts, including search and rescue.[468]

On 11 August, the AIT Acting Director Robert S. Wang issued a disaster declaration. USAID/OFDA (now BHA) provided US$250,000 through the AIT to support the relief efforts of the Taiwan Red Cross Organization (TRCO).[469] From 14 to 24 August, USAID/OFDA deployed two regional advisors to Taiwan to conduct assessments and coordinate U.S. Government efforts in coordination with the AIT, TRCO, local leaders, the Taiwan military, and the U.S. DoD.[470] Taiwan requested heavy lift assistance from the U.S., and U.S. Pacific Command (renamed U.S. Indo-Pacific Command in 2018) was directed to provide support for logistics, transportation, and relief supplies, as assigned to Combined Task Force 76 (CTF 76). CTF 76 redeployed Commander, Amphibious Squadron 11 (CPR11), along with elements of the commodore's staff, and the 31st Marine Expeditionary Unit (MEU) aboard the USS Denver (LPD 9), which had two MH-53E and two MH-60S helicopters and a Landing Craft Air Cushion (LCAC) hovercraft aboard. CPR11's commodore assembled a Humanitarian Assistance Survey Team (HAST) and flew ashore. He met with USAID, AIT, Taiwan authorities, and military personnel to review the status of relief operations and discussed Taiwan's priorities with USAID representatives. The U.S. military then assisted relief efforts by using the helicopters to lift construction vehicles and equipment to outlying and mountainous areas cut off by floods and landslides.[471] On 15-16 August, the DoD delivered 517,420 water purification tablets and 120 rolls of plastic sheeting via two C-130 cargo planes from Marine Corps Air Station Futenma on Okinawa, Japan, for distribution to affected populations. The DoD also provided two heavy-lift helicopters and two medium-lift helicopters from the USS Denver from Sasebo Naval Base, Japan, to transport excavation equipment. The commodore deployed 45 sailors and Marines to provide a tactical air control team, a helicopter rigging team, a helicopter logistics and maintenance team, and a public

affairs team at Tainan Air Force Base, where they worked together with their Taiwanese counterparts. The MH-60S provided aerial damage surveys and verification of helicopter landing zones, while the MH-53E performed lift missions. The team flew 55 sorties in six days, lifting 20 construction vehicles and 20 boxes of relief supplies, totaling 255,800 pounds.[472] U.S. military helicopters also assisted humanitarian assessments in mountainous Kaohsiung County and the Pingtung coastal delta region. DoD personnel also assisted the USAID/OFDA Principal Regional Advisor in conducting field assessments in southern Taiwan from 20 to 22 August together with Taiwan authorities and AIT officials. DoD assistance was approximately US$700,000 through the Overseas Humanitarian, Disaster, and Civic Aid (OHDACA) account for logistics, transportation, and relief goods.[473]

U.S. Responds to Chi-Chi Earthquake – September 1999

On 21 September 1999, a 7.6 magnitude earthquake struck Taiwan, with the closest township to the epicenter being Chi-Chi (also Ji-Ji), near Taichung. The earthquake resulted in at least 2,084 dead, 8,664 injured, and another 18 reported missing. At least 7,284 houses were reportedly destroyed. Tens of thousands were left homeless, including an estimated 100,000 residents in Nantou County. More than 20 international SAR and medical teams, consisting of over 670 personnel, deployed from 17 countries, including Austria, Australia, Czech Republic, France, Germany, Hungary, Japan, Republic of Korea, Russian Federation, Singapore, Slovakia, Spain, Switzerland, Thailand, Turkey, the UK, and the U.S. Two UN Disaster Assessment and Coordination (UNDAC) team members, deployed by UN OCHA, worked at the Taipei Emergency Operations Center to assist with coordination and to liaise with international SAR teams.[474]

Assistance from the U.S. government included a team from the U.S. Army Corps of Engineers sent to Taiwan to conduct site analysis and assess damage patterns in urban areas, in response to an indication from the Emergency Response Center in Taipei that experts were needed to inspect buildings and dams. The U.S. Bureau of Reclamation, under an existing Memorandum of Understanding with Taiwan authorities, deployed a team of three dam safety experts to conduct dam safety evaluations. The U.S. DoD also contributed US$82,000 toward the response effort by supplying 1,500 body bags to local authorities. USAID provided US$25,000 through AIT which channeled assistance through the TRCO. USAID also committed US$2,386,200 for the cost of an SAR team, which was comprised of 92 personnel, including USAID disaster specialists, Fairfax County, Virginia, SAR specialists, and Miami-Dade, Florida, SAR specialists. The SAR team began operations on 22 September in Touliu, an urban area about 51.5 km (32 miles) from the epicenter, and on 23 September, the SAR team rescued a 32-year-old male. Following an aftershock on 26 September, the USAID Team re-deployed to Nantou County to conduct an assessment. Following local authorities' determination that additional assistance was no longer required from the USAID SAR team, they returned to the U.S. on 28 September 1999.

Disaster Management Partners

International Cooperation and Development Fund (TaiwanICDF)

The TaiwanICDF is Taiwan's central agency for international development assistance, which helps carry out the administration's overseas development assistance (ODA) in other countries. A specialized aid agency, the TaiwanICDF offers technical assistance, hosts overseas volunteer programs, offers humanitarian aid, organizes international workshops, and sponsors scholarships. TaiwanICDF is headquartered in Taipei, with 110 domestic employees and 151 staff working at overseas offices as of December 2021.[475]

Established in 1996, TaiwanICDF works on improving socio-economic development,

enhancing human resources, and promoting economic relations in developing partner countries. The organization also offers humanitarian assistance and aid for natural disasters or international refugee crises. The mission is based on four core operations: lending and investment, technical cooperation, humanitarian assistance, and international education and training.[476]

Recent TaiwanICDF projects in the Asia-Pacific region include agriculture assistance in Palau, Fiji, and Nauru, and hydroponic projects in the South Pacific. Outside the region, they have offered medical assistance in Belize and agricultural support in Honduras. International Organizations and NGOs with which TaiwanICDF cooperates include: Action Against Hunger, African Development Bank (AfDB), Arab Bank for Economic Development in Africa, Asian Development Bank (ADB), CARE, Center for Sustainable Development at Columbia University, Central American Bank for Economic Integration, Development Bank of Southern Africa, European Bank for Reconstruction and Development (EBRD), European Development Fund, European Investment Bank, Food for the Poor, Inter-American Development Bank (IDB), International Fund for Agricultural Development (IFAD), Luke International, Mercy Corps, Organismo Internacional Regional de Sanidad Agropecuaria, Organization of American States, Polish Center for International Aid, Terre des Hommes Foundation, World Vision, Young Americas Business Trust.[477]

Taiwan Red Cross

The Taiwan Red Cross (TRC, which also refers to itself as the Red Cross Society of the Republic of China) was established in 1904 and has participated in domestic and international relief efforts. National Red Cross and Red Crescent Societies are not strictly separate NGOs but are auxiliaries to public authorities in humanitarian areas.[478] The TRC is not officially recognized by the IFRC, but there are some cooperative interactions. The IFRC often refers to TRC as the Taiwan Red Cross Organization (TRCO). According to the TRC, they have collaborated with the Red Cross Society of China during major disaster relief efforts and "have also strived to interact on more frequent and friendly terms."[479]

Following the 1999 Chi-Chi earthquake, TRC worked with the Danish Red Cross, began organizing disaster preparedness and organizational development plans, implemented disaster preparation and response plans, and established Disaster Preparedness Centers in 25 counties and cities. The Centers offer disaster management courses to full-time staff and volunteers. A newer TRC Disaster Preparedness Center opened in Hualien on 17 February 2019. The Hualien Disaster Preparedness Center includes offices, a training venue, a disaster relief dispatch center, and a warehouse with space to store 100 ten-people tents, 800 sleeping bags, 800 blankets, and 800 mattress pieces.[480] During past typhoons, such centers have been used to supply food to emergency shelters. According to the TRC, it is "Taiwan's sole rescue preparedness resource logistics network."[481] The TRC adheres to the IFRC's guidelines and doctrine, and closely follows IFRC work plans and Standard Operating Procedures (SOP). During the COVID-19 pandemic, the TRC has provided relief domestically and internationally. Within Taiwan, the TRC has worked in procuring and delivering personal protective equipment (PPE) to fire departments and hospitals across Taiwan, as well as delivering soap and food parcels to disadvantaged families, nursing homes, and children's homes, in partnership with the Andrew Charity Foundation NGO.[482] USAID supported TRC in 2018 with US$200,000 for risk mitigation activities, including training, with the International Organization for Migration acting as an implementing partner.[483]

The TRC has established major disaster SAR teams in the northern, central, southern, and eastern regions of Taiwan. Volunteers may participate in basic SAR and preparedness training at the 25 Disaster Preparedness Centers in Taiwan and can further their training in the United States. Red Cross SAR team members

usually need to be basic or intermediate emergency medical technicians, qualified to assess a patient's condition and manage respiratory, cardiac, and trauma emergencies. Members need to complete 128 hours of training with the Taipei City Urban SAR Team. Select volunteers are then sent to U.S. FEMA to undergo three weeks of advanced training.[484] During the 2016 Tainan earthquake, five rescue teams from TRC supported military and central authorities' personnel in Tainan City.

The TRC began actively participating in international Red Cross relief operations in 2002, participating in large-scale disaster relief projects in Iran, South Asia, Myanmar, Haiti, and Japan. The TRC cooperates with the IFRC and National Red Cross and Red Crescent societies in providing international relief. The TRC has provided international relief after nearly 80 disasters or crises outside Taiwan, providing monetary donations, goods, or services dating from the 1988 Yunnan, China, earthquake through 2020 COVID-19 pandemic relief delivered to Spain, Cambodia, and Japan. The TRC has also provided longer-term recovery aid following major disasters. This includes the 2015 Nepal earthquake, following which the TRC provided immediate relief supplies and designed a 2-year post-disaster recovery and reconstruction project in collaboration with the IFRC to assist in the residential housing reconstruction program. The TRC also supported post-conflict recovery in Sri Lanka in 2013 by working with the IFRC and Sri Lanka Red Cross Society in building 50 residential housings in Mullaitivu, providing livelihood assistance and establishing the clean water supply system.[485]

National Non-Governmental Organizations

Table 12 presents some of Taiwan's major NGOs.[486]

Organization	Description
Tzu-Chi Foundation http://tw.tzuchi.org/en/	Taiwan's largest NGO is the Buddhist Compassion Relief Tzu-Chi Foundation (BCTF, 佛教慈濟慈善事業基金會), more popularly known as the Tzu Chi Foundation (or Tzu Chi). Founded in 1966, Tzu Chi is a volunteer-based organization headquartered in Hualien, funded by donations from the public. Tzu Chi has branches in 56 countries and regions, with tens of thousands of volunteers. The organization works in the fields of international relief, charity, medicine, education and culture, bone marrow donation, environmental protection, and community volunteerism. Tzu Chi assisted with international HADR efforts as early as 1991 when it assisted flood victims in Bangladesh following Cyclone Marian; it has also assisted flood victims in China and children during the Persian Gulf War (1990-1991). Tzu Chi also provided international aid for COVID-19, responding quickly after the pandemic became global. As early as April 2020, Tzu Chi donated 4,000 masks to the Vatican. By November 2020, Tzu Chi had provided COVID-19 relief supplies to 86 countries and regions, including more than 9 million gloves, 1.3 million medical suits, 11.9 million surgical masks, 536,000 face shields, 297,000 cloth masks, 85,000 vegetarian meals, 69,000 care packages, 50,000 tea tree alcohol containers, and 5,000 foldable beds. As of 2020, Tzu Chi had provided aid to 118 countries. That aid has included providing relief to refugees relocated in host countries, including the U.S. (since 1994), Thailand (Northern region 1995-1997, Bangkok since 2015), Canada (since 1995), Jordon (since 1998), Albania (1999), New Zealand (since 2001), Australia (since 2003), Malaysia (since 2005), Turkey (since 2014), Indonesia (since 2015), Germany (since 2015), Austria (since 2015), Serbia (since 2016), Italy (since 2016), Chile (since 2018), Mexico (since 2018), and Brazil (since 2018).

Table 12: National NGOs in Taiwan

Organization	Description
Tzu-Chi Foundation (cont.) http://tw.tzuchi.org/en/	Tzu Chi's disaster relief efforts receive logistical support from the Tzu Chi International Humanitarian Aid Association, which was founded in 2003 by entrepreneurs from various industries in Taiwan to facilitate logistics and develop goods for use in times of disaster. In December 2021, BTCF was appointed as co-chair of the UN Inter-agency Task Force on Religion and Sustainable Development's (IATF) Multi-faith Advisory Council (MFAC) effective from 1 January 2022 for two years. BTCF Chief Executive Officer Debra Boudreaux said, "It is a privilege for Tzu Chi Foundation to be co-chair of MFAC. The values found in Buddhism can often contribute to the solutions of today's global issues. We will continue to work towards these issues of climate change, food insecurity, food systems, environment and biodiversity, refugees, faith, women empowerment and more." Tzu Chi was one of the 17 founding members, representing Buddhism, in the establishment of MFAC on 21 September 2018 in New York. MFAC is a platform for faith-based organizations to contribute to the different thematic areas of the UN's mandate. Tzu Chi states it "has always and will continue to advocate for and work towards all 17 sustainable development goals (SDG), with a focus on humanitarian aid, climate change, youth, women empowerment, through collaborative and compassionate actions."
Taiwan Root Medical Peace Corps (TRMPC) http://www.taiwanroot.org/?l=en	Taiwan Root Medical Peace Corps (TRMPC, 台灣路竹會), or sometimes Taiwan Root, is a private medical services and health education NGO founded in 1995. TRMPC is comprised of medical personnel and volunteers. Aside from working domestically, Taiwan Root has helped respond to foreign disaster relief efforts such as Typhoon Haiyan in the Philippines in 2013. Following Typhoon Morakot in August 2009, Peace Winds America and Taiwan Root Medical Peace Corps delivered medical treatment to victims. In response to COVID-19, TRMPC has been conducting medical missions domestically.
International Headquarters S.A.R. Taiwan NO.41, Hecheng Road, Bader City Taoyuan, Taiwan 03-3772272-3 rescue.taiwan@msa.hinet.net http://www.rescue.org.tw/ https://www.facebook.com/#!/taiwan.rescue	International Headquarters S.A.R. Taiwan (中華民國搜救總隊) was established in 1981, the first non-governmental, volunteer-based search and rescue organization of its kind in Taiwan. Members of the organization include emergency response specialists and dedicated volunteers such as retired military personnel, academics, and community groups. International Headquarters S.A.R. Taiwan has 97 branches in Taiwan and two international search and rescue units (known as the International Search and Rescue Operations Taiwan). Relief missions involve earthquakes, mudslides, typhoons, flooding, and air-sea and mountain rescues. They have engaged in providing international training. This has included basic SAR training with the Malaysian International Ambulance Team in 2019, setting up an SAR training center in Dhading, Nepal, to include donated SAR equipment, and providing training in cooperation with MOFA and Taiwan AID in 2019, helping Nepal with basic and first aid training for disasters in 2019, and working with the MOFA to send instructors to teach basic disaster preparedness and rescue at a Kathmandu high school in 2019.

Table 12: National NGOs in Taiwan (cont.)

Organization	Description
Taiwan Alliance in International Development (Taiwan AID) http://www.taiwanaid.org/en	Taiwan Alliance in International Development (Taiwan AID, 台灣海外援助發展聯盟) is an umbrella platform for Taiwan-based NGOs. It was established in 2004 by Taiwan Root Medical Peace Corps, Noordhoff Craniofacial Foundation, Zhi-Shan Foundation Taiwan, Eden Social Welfare Foundation, and Field Relief Agency of Taiwan, and it was registered in 2013. The nearly 30 Taiwan member NGOs in Taiwan AID work around the world in medical service, education, information, gender issues, emergency relief, community development, human trafficking, humanitarian assistance, and volunteer service. The purpose of Taiwan AID is to strengthen transparency, efficiency, and cooperation among Taiwan-based NGOs involved in international humanitarian aid with the values of humanity, equality, justice, and sustainable development. The mission of Taiwan AID is to: • Facilitate an interaction platform for international cooperation, such as seminars • Facilitate capacity building to improve professional services • Promote the concept of international development through public education • Advocate and facilitate international development policies • Establish principles, ethics, and regulations of international development and assistance • Make other efforts in favor of international development • Since 2012, Taiwan AID has sponsored the international "Asian NGOs Development Conference" in Taipei every two years. The last conference was held in 2018, with approximately 200 people from 17 countries in attendance. Members of Taiwan AID include: • International Headquarters S.A.R, Taiwan • Taiwan Dental Association • Eden Social Welfare Foundation • Taiwan Fund for Children and Families • The Garden of Hope Foundation • ECPAT Taiwan • Formosa Budding Hope Association • Harmony Home Association Taiwan • The Mustard Seed Mission • Fubon Cultural & Educational Foundation • Overseas Medical Mission Center, Changhua Christian Hospital • CP Yen Foundation • Chaoyang International Volunteer • Bjorgaas Social Welfare Foundation • Noordhoff Craniofacial Foundation • Landseed Culture and Education Foundation • Zhi-Shan Foundation TAIWAN • ELIV International Service • Relieve Disaster Foundation • Frontier Foundation • Taipei Overseas Peace Service, TOPS • Sunshine Social Welfare Foundation • Vision Youth Action

Table 12: National NGOs in Taiwan (cont.)

Organization	Description
Chinese Christian Relief Association	Chinese Christian Relief Association (CCRA, 中華基督教救助協會)is a local disaster relief NGO founded in 1998 and composed of church members from its network of partnered churches. The mission is to provide community service and aid in times of major disaster. From 2003 to 2012, CCRA established 1,919 service centers in 256 villages and townships in partnership with 868 churches, developing a network that can deliver assistance at the community level for disasters and other needs. CCRA has been involved in more than 67 major disaster relief operations in Taiwan and abroad, including Taiwan's 1999 Chi-Chi earthquake, the 2004 Indian Ocean tsunami, 2008 Sichuan earthquake, 2010 Haiti earthquake, 2011 Great East Japan earthquake, 2013's Typhoon Haiyan in the Philippines, 2015 Nepal earthquake, and Taiwan's 2018 Hualien earthquake, among others. It partnered with U.S.-based Operation Blessing International in response to the 2009 Typhoon Morakot.

Table 12: National NGOs in Taiwan (cont.)

International Agencies Working in Taiwan

Table 13 presents some of the world's major NGOs and agencies that have worked in Taiwan or with Taiwan actors.[487]

Organization	Description
World Vision https://www.worldvision.org.tw/english/index.php	World Vision (WV) is a faith-based (Christian) relief, development, and advocacy international NGO. There are some 37,000 staff members that work in around 100 countries around the globe. In the Indo-Pacific, WV works in countries such as Bangladesh, Cambodia, China, India, Indonesia, Myanmar, Philippines, Sri Lanka, and Vietnam. It has a local office in Taipei. WV has assisted Taiwan with both domestic response (e.g., the 2016 earthquake) and foreign disaster relief, working closely with organizations such as TaiwanICDF.
Mercy Corps	Mercy Corps is a U.S.-based international NGO, started in 1981. Mercy Corps' team is comprised of more than 6,000 personnel who work in more than 40 countries around the world, including Bangladesh, India, Indonesia, Mongolia, Myanmar, Nepal, and Timor-Leste in the Indo-Pacific. While Mercy Corps works with Taiwan, there is no local office in Taiwan. Like World Vision, Mercy Corps has also worked closely with TaiwanICDF to deliver foreign humanitarian relief (e.g., the 2018 Sulawesi earthquake and tsunami). In the past, Taiwan's MOFA and TaiwanICDF sought to draw on the expertise and networks of international NGOs and set up HADR joint-funding mechanisms with Mercy Corps and World Vision.
Peace Winds Japan (PWJ) https://peace-winds.org/en/	PWJ is an INGO based in Japan; it has provided humanitarian assistance, disaster relief, SAR, and reconstruction and development assistance since 1996. PWJ is operational in many parts of the world, including the Asia-Pacific. PWJ has helped respond to disasters in Taiwan (e.g., 2015's Typhoon Soudelor) with SAR teams.

Table 13: International Organizations that have Worked in Taiwan

Organization	Description
Peace Winds America (PWA) http://peacewindsamerica.org/	PWA started in 2008 and focuses on strengthening preparedness and response to natural disasters in the Asia-Pacific. PWA has assisted with disaster relief in Taiwan. Following Typhoon Morakot in August 2009, PWA, along with Taiwan Root Medical Peace Corps, delivered medical treatment to victims. In April 2017, PWA visited Japan and Taiwan to continue dialogue on Peace Winds' disaster coordination initiative to bring together disaster responders and policy makers from the U.S., Japan, Taiwan, Philippines, and others, to enhance the region's capacity and collaboration in disaster relief. PWA met with military reservists, Taiwan MOFA and MND, other agencies, and various NGOs. PWA met with USINDOPACOM staff and the then-Commander of USPACOM in June 2016. PWA also met with CFE-DM, the Center for Strategic and International Studies (CSIS) Pacific Affairs, Hawaii National Guard, and the USPACOM USAID/OFDA representative. Major areas of discussion were Taiwan and Myanmar. PWA also met with a delegation of five from the Taiwan MND and with U.S. officials in June 2016 to discuss strengthening disaster preparedness and response in Taiwan.
The Asia Pacific Alliance for Disaster Management (A-PAD) http://apadm.org/	The A-PAD is a transnational disaster aid alliance that works to facilitate cooperation and understanding between governments, private companies, and NGOs in the Asia-Pacific region. Members include Bangladesh, Indonesia, Japan, South Korea, Philippines, and Sri Lanka. A-PAD has provided disaster relief to Taiwan. During the 2018 earthquake response with Peace Winds Japan, A-PAD dispatched a rescue team and provided SAR and medical assistance. Following the 2016 earthquake, A-PAD also provided search and rescue support. The Taiwanese rescue team called Tekkantai (also known as "Iron Han") is A-PAD's local implementing partner organization in Taiwan.
ARROWS (Airborne Rescue & Relief Operations With Search) https://arrows.red/	The organization ARROWS (Airborne Rescue & Relief Operations With Search) was established in December 2019. Members include Peace Winds Japan, A-PAD Japan, and Civic Force. For large-scale disasters, ARROWS plans to send medical professionals and an SAR team, including rescue dogs. The group plans to also implement DRR activities such as teaching life-saving skills to students, businesses, and other organizations. ARROWS is likely to assist Taiwan should a disaster requiring international SAR capabilities be requested or accepted. Two of ARROWS' three members – Peace Winds Japan and A-PAD Japan – have already worked in several relief efforts in Taiwan.
Civic Force https://www.civic-force.org/english/	Civic Force is a Japan-based NGO that was established after the 2004 Niigata Earthquake. Although it primarily responds in Japan, Civic Force is working on establishing an international cooperation mechanism for natural disasters and emergencies in the Asia-Pacific region. The "Asia- Pacific Disaster Relief Platform Initiative" aims to create and strengthen mutual support among various countries in the Asia-Pacific. As part of the newly formed ARROWS organizations, Civic Force is likely to provide SAR support and disaster relief in Taiwan.
GlobalMedic	GlobalMedic, an NGO based in Canada, donated 2.8 million Aquatab water purification tablets to provide 2.8 million liters (740,000 gallons) of clean drinking water to those affected by Typhoon Morakot in 2009.
Presbyterian World Service & Development	Presbyterian World Service & Development (PWS&D), based in Canada, contributed US$160,000 to the TRC to support those impacted by the 2016 Tainan Earthquake.

Table 13: International Organizations that have Worked in Taiwan (cont.)

Organization	Description
Salvation Army	The Salvation Army provided assistance in response to the February 2016 Tainan earthquake. A Salvation Army team from the Tainan Corps (church) assisted at an evacuation center. The Salvation Army also supported efforts by churches and the Chinese Christian Evangelistic Association to provide grants to families affected by the disaster and to visit casualties who were hospitalized.
Operation Blessing International	OBI is a U.S.-based NGO that responded to 2009's Typhoon Morakot, partnering with Chinese Christian Relief (CCR), a local NGO, to aid survivors. OBI provided gas stoves and electric rice cookers, while CCR provided food. The cooking packages were distributed to 500 families who were severely affected by the typhoon.
Baptist World Aid	BWAid, a U.S.-based NGO, coordinated the global Baptist response and made monetary donations to the Chinese Baptist Convention (CBC) in Taiwan following Typhoon Morakot in 2009.

Table 13: International Organizations that have Worked in Taiwan (cont.)

Research and Academia

The Center for Weather Climate and Disaster Research (WCDR), National Taiwan University (NTU)

The WCDR was first established in June 2003 as the Disaster Research Center (DRC) but changed its name and reorganized as the Center for Weather Climate and Disaster Research in February 2010. Located in Taipei, WCDR's purpose is to "reinforce international communication and academic-industry collaboration, provide high quality service to respond [to] the impact of global climate change in order to efficiently reduce disaster damages." Much of WCDR's work is domestically focused, but the center also seeks to strengthen international exchanges and cooperation in industry and science, respond to the impact of global climate change, and enhance the effectiveness of disaster reduction, preparedness, and resilience. WCDR also conducts research on water-related disasters, meteorology, hydrology, mudslides, and landslides. Its mission is "to integrate the relevant manpower and equipment of the university and to engage in basic academic research on the foresight and practicality of the relevant fields of climate and weather disaster prevention and rescue."

The WCDR is organized into four divisions: Weather Climate Cutting-Edge Research Division; Research and Development Division; Disaster-Preventing Project Division; and Administration Division. Major projects include the New Taipei City Emergency Response Project, Work Flow of Weather Monitoring, Cluster Rainfall Forecasting, Flood Simulations, and Typhoon Movement Analysis.
Website: *http://www.wcdr.ntu.edu.tw/introduction.html*

Disaster Prevention Research Center (DPRC), National Cheng Kung University

The DPRC was established in October 1996 in Tainan, following that summer's Typhoon Herb disaster. The DPRC was established to bring relevant scholars and experts together to improve disaster prevention methods and develop appropriate disaster prevention and relief technical specifications to reduce the losses caused by natural and man-made disasters. The main tasks of DPRC are to:

- Engage in disaster prevention science and technology and academic research and to improve the level of disaster prevention research and the implementation of research results;
- Engage in the development of disaster prevention systems and the establishment of disaster prevention databases;
- Assist in the improvement of disaster prevention systems and the promotion of

disaster prevention practices;
- Organize seminars and lectures on disaster prevention and participate in international professional academic exchange activities;
- Issue and publish disaster prevention-related research journals and media; and
- Accept disaster prevention-related business commissions and provide expert advisory services.

DPRC is organized into four groups and one team - Monitoring Group, Planning Group, Innovation is Bred in Groups, Administrative Group, and the On-Site Investigation Team.

Research projects include working on a disaster prevention information system, disaster management projects, telemetry applications, which involve the use of satellite, aviation equipment, drones, satellite imagery interpretation for early warning and disaster planning, and developing disaster simulation software.
Website: *http://www.dprc.ncku.edu.tw/*

Photo 6 shows Taiwan Red Cross personnel assisting with search and rescue efforts in eastern Taiwan's Hualien County, after it was struck by a 6.0 magnitude earthquake on 6 February 2018.[488]



Photo 6: Taiwan Red Cross personnel respond to the 2018 Hualien earthquake

INTERNATIONAL FRAMEWORK

Northeast Asia is home to approximately one-fifth of the world's people and contributes one-quarter of the world's GDP.[489] Within Northeast Asia, this book focuses on China, Japan, South Korea, and Taiwan.

The region is still grappling with historical and territorial disputes, with security concerns regarding denuclearization on the Korean Peninsula and cross-strait tensions between China and Taiwan. In 2021, The Economist called Taiwan "the most dangerous place on earth."[490] Though such a description can unfortunately be applied to a number of places, The Economist's use speaks to a legitimate conflict risk stemming from China's increasingly aggressive posturing that it is willing to use force to seize Taiwan in order to unite it with China. In March 2021, Admiral Phil Davidson, then-Commander of USINDOPACOM, told the Senate Foreign Relations Committee of his concern that China may attack Taiwan as soon as 2027.[491] Davidson's predecessor, Admiral Harry B. Harris Jr., in 2018 stated, "North Korea remains our most urgent security threat in the region," noting a "rapid and comprehensive improvement" in their ballistic missile and nuclear capabilities.[492] Decades of diplomacy have not brought about denuclearization. The moderate progress made in the final rounds of Six-Party Talks (started after North Korea withdrew in 2003 from the Nuclear Nonproliferation Treaty, and involving North and South Korea, the U.S., China, Japan, and Russia) were undone with North Korea quitting the talks in 2009. The destabilizing influence and humanitarian ramifications of any North Korean conflict could spread to its neighbors, South Korea and China, and beyond.

Despite security concerns, Northeast Asia is a significant contributor to the regional and global economy. China is Asia's largest economy and has the world's largest population at 1.4 billion people); Japan is the second-largest economy with a population of 126 million; South Korea is the fourth-largest economy with a population of 51 million;[493] and Taiwan is Asia's eighth-largest economy with a population of 23 million. Taiwan was ranked the 6th in the world in economic freedom in 2022, outranked in Asia only by Singapore.[494]

In terms of humanitarian agreements and frameworks, the Grand Bargain refers to an agreement between some of the world's largest donors and humanitarian organizations to improve effective and efficient humanitarian action and get more means into the hands of people in need. The Grand Bargain was initiated at the 2016 World Humanitarian Summit (WHS), to improve humanitarian delivery. From Northeast Asia, Japan and South Korea are two of the 64 signatories (25 member states, 23 NGOs, 12 UN agencies, 2 components of the International Red Cross and Red Crescent Movement, and 2 inter-governmental organizations), as of December 2021.[495] Japan is a co-convenor, along with UNHCR, of the workstream to reduce duplication and management costs with periodic functional reviews. The other workstreams the signatories work across to implement commitments include:

- Greater transparency;
- More support and funding tools to local and national responders;
- Increase the use and coordination of cash-based programming;
- Improve joint and impartial needs assessments;
- A participation revolution to include people receiving aid in decision-making;
- Enhanced quality funding; and
- Harmonize and simplify reporting requirements.

China, Japan, South Korea, and Taiwan are also increasingly involved in international HADR. While China does not categorize its foreign loans, foreign development assistance,

and foreign disaster relief and humanitarian assistance with the same distinctions as most other countries, research such as that by the College of William and Mary's AidData show overall foreign development aid in the hundreds of billions of dollars.[496] Japan has, for decades, participated in international humanitarian assistance multilaterally through international organizations such as the UN in which it is active. Japan also has a history of engaging bilaterally through its government donor arm, JICA, which was originally established in 1974.[497] South Korea stood up its counterpart a couple decades later, as the Ministry of Foreign Affairs established KOICA in 1991 to maximize the effectiveness of its overseas development assistance. TaiwanICDF was established in 1996, though it had been preceded by the International Economic Cooperation Development Fund in 1989, a founding that followed Taiwan's growth into a developed economy. While TaiwanICDF acts as a development agency of Taiwan's authorities, Taiwan's lack of formal diplomatic relations with most other nations hampers its international interactions. Therefore, in 2015, the GCTF was established to facilitate international exchanges where Taiwan could share its expertise in HADR and other areas. Initially established via a memorandum of understanding between Taiwan and the U.S., in 2019 Japan joined the framework as a full partner, and in 2021 Australia also joined as a full partner. Taiwan, the United States, Japan, and Australia regularly hold GCTF Joint Committee meetings to set future areas of cooperation. Additional countries have also joined in co-hosting GCTF events, including Sweden, Australia, Guatemala, the Netherlands, the United Kingdom, Canada, Israel, and Slovakia.[498]

Guiding Principles (Civil-Military)

Many countries will deploy their militaries or paramilitary organizations when a natural disaster or crisis occurs and creates humanitarian needs within their own territories. Moreover, in cases where neither the affected state nor humanitarian responders have needed capabilities or assets, multi-lateral and/or bilateral support to disaster-affected states can be provided through international deployment of foreign military actors and assets. United Nations Humanitarian Civil-Military Coordination (UN-CMCoord) officers and processes facilitate dialogue and interaction between civilian and military actors, essential to protect and promote humanitarian principles, avoid competition, minimize inconsistency and, when appropriate, pursue common goals. Regional groupings have formed both to provide input to UN-CMCoord and to rehearse it.

UN-CMCoord

UN-CMCoord is a framework for dialogue and interaction among civilian and military actors; it enhances understanding of humanitarian action and guides political and military actors on how best to support that action in order to protect humanitarian principles (humanity, impartiality, neutrality, and operational independence), avoid competition, minimize inconsistency, and promote common goals, the most important of which is to save human lives and reduce suffering.

The UN Office for the Coordination of Humanitarian Affairs (OCHA) Civil-Military Coordination Section (CMCS) is the designated focal point in the UN system for humanitarian civil-military coordination, supporting relevant field and headquarters level activities and operations. As custodian of UN-CMCoord guidelines, CMCS helps humanitarian actors develop context-specific guidance and runs a training program to equip humanitarian and military actors with the skills and knowledge necessary to effectively interact with each other. CMCS also prepares and deploys dedicated UN-CMCoord experts to the field. UN-CMCoord capacity takes two forms:

- Deployment in response to sudden onset humanitarian emergencies or to complex emergencies and protracted crises; and

- Support to UN-CMCoord Officers or Focal Points in an OCHA office.

UN-CMCoord is particularly appropriate in complex emergencies and high-risk environments to facilitate humanitarian access, protect civilians, and secure humanitarian aid workers. When all other sources have proven insufficient, exhausted, or not readily available, a UN agency, through the Humanitarian Coordinator or the Government of an affected state, can make a request for foreign military and civil defense assets (MCDA). CMCS channels such requests through its network of Government asset providers. Once requested and deployed, those military personnel and capabilities must be coordinated with the myriad civilian actors also participating in the emergency response.[499]

Sendai Framework

The Sendai Framework is the successor instrument to the *Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters*. It is the outcome of 2012 stakeholder consultations and 2014-2015 inter-governmental negotiations, which were supported by the United Nations International Strategy for Disaster Reduction (UNISDR - now the United Nations Office for Disaster Risk Reduction (UNDRR)) upon the request of the UN General Assembly.

The Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework) is the first major agreement of the post-2015 development agenda. It works hand in hand with the other 2030 Agenda agreements, including the Paris Agreement on Climate Change, the Addis Ababa Action Agenda on Financing for Development, the New Urban Agenda, and ultimately the Sustainable Development Goals. It is laid out in seven targets and four priorities for action.[500] These targets and priorities are included in Figure 21 along with the scope and purpose, expected outcome, and goals.[501]

Partnerships, Agreements, and Memberships

There are very few partnerships, agreements, or memberships in which China, Japan, South Korea, and Taiwan all fully participate, whether pertaining to disaster management and humanitarian assistance (DMHA) or other topics. Taiwan's lack of recognition by the majority of the world's countries has made it challenging for it to join international organizations as a full member, as China often objects to separate membership, claiming Taiwan as its territory. The few regional organizations that do include China, Japan, South Korea, and Taiwan are usually economically oriented, including the Asian Development Bank, Asia-Pacific Economic Cooperation, and the World Trade Organization.

Multilateral Organizations

ASEAN Regional Forum (includes China, Japan, and South Korea)

The ASEAN member states agreed to establish the ASEAN Regional Forum (ARF) in the early 1990s to foster constructive dialogue and consultation on political and security issues of common interest and concern, and to contribute to confidence-building and preventive diplomacy efforts in the Asia-Pacific region. The participants in the ARF are Australia, Bangladesh, Brunei Darussalam, Cambodia, Canada, China, Democratic People's Republic of Korea, European Union, India, Indonesia, Japan, Laos, Malaysia, Mongolia, Myanmar, New Zealand, Pakistan, Papua New Guinea, Philippines, Republic of Korea, Russia, Singapore, Sri Lanka, Thailand, Timor-Leste, United States, and Vietnam.[502] Disaster relief is among the areas of cooperation under ARF. Work on HADR is the purview of the ARF Inter-Sessional Meeting on Disaster Relief, which meets annually to review and deliberate on the implementation of ARF disaster relief activities.[503]

Chart of the Sendai Framework for Disaster Risk Reduction
2015-2030

Scope and purpose

The present framework will apply to the risk of small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters, caused by natural or manmade hazards as well as related environmental, technological and biological hazards and risks. It aims to guide the multi-hazard management of disaster risk in development at all levels as well as within and across all sectors

Expected outcome

The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries

Goal

Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience

Targets

Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020-2030 compared to 2005-2015	Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020-2030 compared to 2005-2015	Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030	Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030	Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020	Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of this framework by 2030	Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030

Figure 21: Sendai Framework for Disaster Risk Reduction (2015-2030)

Asian Development Bank (includes China, Japan, South Korea, and Taiwan)

The Asian Development Bank (ADB) was established in 1966 and is owned by 68 members, of whom 49 are from the region. Japan, South Korea, and Taiwan (listed as Taipei, China) joined in 1966, and the People's Republic of China joined in 1986. The ADB assists its members and partners, by providing loans, technical assistance, grants, and equity investments to promote social and economic development. ADB maximizes the development impact of its assistance by facilitating policy dialogues, providing advisory services, and mobilizing financial resources through co-financing operations that tap official, commercial, and export credit sources. The ADB recently revised its 2004 Disaster and Emergency Assistance Policy (DEAP). It conducted a comprehensive review with virtual Civil Society Organization (CSO) consultations held in March 2021, and the final policy paper was approved in October 2021. The Revised DEAP provides an updated policy framework to enhance strategic guidance for ADB's assistance for disasters and emergencies, covering risk reduction, preparedness, and response. It focuses on the overall approach, introducing changes based on ADB's experience since the approval of the 2004 policy and evolutions in global good practice. The Revised DEAP, together with a separate paper on a revised emergency assistance loan instrument, supersedes the 2004 DEAP.[504]

Asia Pacific Economic Cooperation (includes China, Japan, South Korea, and Taiwan)

The Asia Pacific Economic Cooperation (APEC) is the premier Asia-Pacific economic forum. Established in 1989, it currently has 21 members. China (1991), Japan (1989), South Korea (1989), and Taiwan (joined in 1991 as Chinese Taipei) are all member economies. Remaining APEC members include Australia, Brunei Darussalam, Canada, Chile, Hong Kong-China, Indonesia, Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, the Philippines, Russia, Singapore, Thailand, the U.S., and Vietnam. APEC's primary goal is to support sustainable economic growth and prosperity in the Asia-Pacific region. They do this by championing free and open trade and investment, promoting and accelerating regional economic integration, encouraging economic and technical cooperation, enhancing human security, and facilitating a favorable and sustainable business environment.[505]

Asian Disaster Reduction Center (includes China, Japan, and South Korea)

The Asian Disaster Reduction Center (ADRC) was established in Kobe, Japan, in 1998 with the mission of enhancing the disaster resilience of its member countries, building safe communities, and creating a society where sustainable development is attainable. ADRC addresses the issue of DRR from a global perspective in cooperation with a variety of UN agencies and international organizations, such as the UN Office for Disaster Risk Reduction (UNDRR), UNOCHA, the UN Economic and Social Commission for Asia and Pacific (UNESCAP), APEC, and the Association of Southeast Asian Nations (ASEAN). Member states include China, Japan, and South Korea, but not Taiwan. Other ADRC member countries are Armenia, Azerbaijan, Bangladesh, Bhutan, Cambodia, India, Indonesia, Iran, Kazakhstan, Kyrgyz Republic, Laos, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Russian Federation, Singapore, Sri Lanka, Tajikistan, Thailand, Turkey, Uzbekistan, Vietnam, and Yemen. ADRC also has five advisor countries: Australia, France, New Zealand, Switzerland, and the U.S.[506]

The United Nations (includes China, Japan, and South Korea)

China, Japan, and South Korea are UN member states, but Taiwan is not. Taiwan (Republic of China) was voted out in 1971 in favor of China (People's Republic of China), as both ruling governments at that time had claimed to represent all of China including Taiwan. Without UN membership, it is difficult

for Taiwan to officially participate in any UN agency, fund, office, or program. Taiwan may occasionally attend an event with observer status, but China often objects to more substantial participation. This was recently highlighted at the beginning of the COVID-19 pandemic, when Taiwan's email communication to the World Health Organization (WHO) on 31 December 2019 inquiring about the mysterious new virus was not acted upon quickly. The WHO defended itself that the communication was not a substantive early warning alert.[507] Taiwan argued it should be allowed to participate in the World Health Assembly (WHA), which is the decision-making body of the WHO and comprised of 194 member states. Taiwan points to the delay with its communication with WHO on COVID-19 to make the case that excluding it affects global health. However, China objects to Taiwan's increased participation, and despite U.S. support for Taiwan's greater participation,[508] the WHA continues to reject Taiwan's repeated bids.[509]

World Trade Organization (includes China, Japan, South Korea, and Taiwan)

The World Trade Organization (WTO) operates the global system of trade rules and helps developing countries build their trade capacity. It also provides a forum for its members to negotiate trade agreements and to resolve the trade problems they face with each other. China, Japan, South Korea, and Taiwan are all among the WTO's 164 members.[510] Japan and South Korea (Republic of Korea) joined the WTO on 1 January 1995; China on 11 December 2001; and Taiwan joined on 1 January 2002 (as "Separate Customs Territory of Taiwan, Penghu, Kinmen, and Matsu" though WTO sometimes shortens this to "Chinese Taipei").[511] Shortly after Taiwan joined, WTO membership was described as "Taiwan's most important achievement in revitalizing its status on the international plane."[512] Even as a member, China opposes certain types of participation by Taiwan. China used Hong Kong's veto power to block a Taiwan representative from taking up a leadership role in the WTO's Government Procurement Committee, of which China itself is not a member.[513] The European Union, backed by the U.S., Australia, and Taiwan, brought a case against China at the WTO regarding Beijing's alleged trade curbs on Lithuania in retaliation for Lithuania allowing Taiwan to open a de facto embassy using "Taiwanese" instead of "Taipei" in the office name.[514]

Regional and Global Agreements

The Bali Process (includes China, Japan, and South Korea)

The Bali Process on People Smuggling, Trafficking in Persons, and Related Transnational Crime (the Bali Process) is a regional, multilateral process designed to boost bilateral and regional cooperative efforts against people smuggling and trafficking in persons through technical workshops and increased cooperation between the 45 member countries and 4 member organizations. These member organizations include: UNHCR, the International Organization for Migration (IOM), the United Nations Office on Drugs and Crime (UNODC), and the International Labour Organization (ILO). Overall direction and coordination of the Bali Process is provided through an officials' level Steering Group comprising Indonesia and Australia as the two co-chairs, New Zealand, Thailand, UNHCR, and IOM.[515] China, Japan, and South Korea are among the member countries, but not Taiwan. Neither does Taiwan participate meaningfully with any of the member organizations, as UNHCR, IOM, UNODC, and ILO are all agencies with the UN, in which Taiwan is not a member state. The remaining 42 member states in the Bali Process are: Afghanistan, Australia, Bangladesh, Bhutan, Brunei Darrussalam, Cambodia, North Korea, Fiji, France, Hong Kong (Special Administrative Region of China), India, Indonesia, Iran, Iraq, Jordan, Kiribati, Laos, Macau (Special Administrative Region of China), Malaysia, Maldives, Mongolia, Myanmar, Nauru, Nepal, New Zealand, Pakistan, Palau, Papua New Guinea, Philippines, Samoa, Singapore, Solomon

Islands, Sri Lanka, Syria, Thailand, Timor-Leste, Tonga, Turkey, the United Arab Emirates, the U.S., Vanuatu, and Vietnam.

Global Cooperation and Training Framework

The Global Cooperation and Training Framework (GCTF) is jointly administered by the United States, Taiwan, the Japan-Taiwan Exchange Association, and Australia. The GCTF, established on 1 June 2015 via memorandum of understanding between the U.S. and Taiwan, serves as a platform for Taiwan to address global issues in international events, allowing Taiwan to build up partnerships with regional countries and expand its international presence. Japan became a full partner to the GCTF in 2019, followed by Australia also becoming a full GCTF partner in October 2021. The full partners – Taiwan, the U.S., Japan, and Australia – regularly hold GCTF Joint Committee meetings to review events of the year and decide on prospective areas of cooperation for the coming year.

The GCTF helps bridge a gap that prevented Taiwan from sharing its expertise with other countries due to its international status. The GCTF allows practitioners globally to benefit from Taiwan's knowledge and training to facilitate tackling contemporary problems that are not contained by borders, including disaster relief, public health, law enforcement, energy cooperation, women's empowerment, digital economy and cyber security, media literacy, and good governance.[516] As of February 2022, more than 3,500 participants from 100 participating countries have taken part in GCTF trainings, workshops, and seminars. In the areas of disaster prevention and HADR, events have included a 2021 seminar on building the resilience of nations and communities to disasters and HADR workshops in 2017 and 2018.[517, 518]

Regional Comprehensive Economic Partnership (includes China, Japan, South Korea)

The Regional Comprehensive Economic Partnership (RCEP) is the world's largest free-trade deal, signed in 2020.[519] RCEP accounts for about one-third of the world's population and economy but does not include the U.S. or Taiwan. It was proposed at a 2011 ASEAN meeting as a free trade agreement (FTA) among ASEAN member states and its FTA partners.[520] RCEP involves all 10 ASEAN states – Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam – and five of their FTA partners – Australia, China, Japan, New Zealand, and South Korea.[521] The RCEP represents the first-ever FTA among China, Japan, and South Korea – Asia's first, second, and fourth-largest economies. One original partner, India, declined to sign, and its absence may yield greater influence to China.[522] China blocked Taiwan's participation in the RCEP.

Comprehensive and Progressive Agreement for Trans-Pacific Partnership

As the region's other large FTA, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) is often compared to RCEP. Among the four countries profiled in this handbook, only Japan is a member of the CPTPP. The CPTPP was born out of the Trans-Pacific Partnership (TPP), which stalled out when the U.S. withdrew in 2017. The agreement was revived as the CPTPP and took effect at the end of 2018. It has been signed by Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Vietnam; the UK formally requested ascension in February 2021.[523] As of February 2022, China is in talks to join, as it continues to advance its accession bids.[524] Taiwan applied to join the CPTPP shortly after China did in September 2021. New membership decisions are made by consensus of existing members. China opposes Taiwan's membership, and Taiwan's prospects of joining the CPTPP are not high.[525] After China applied to join, South Korea also announced in December 2021that it is beginning the process to join CPTPP.[526]

CONCLUSION

China, Japan, South Korea, and Taiwan have a significant economic and political impact on the world and have demonstrated impressive growth in their capacities for disaster management and humanitarian relief. However, divisions among them also pose security concerns.

The risk landscape of Northeast Asia includes biological hazards alongside floods, storms, earthquakes, volcanic eruptions, and tsunamis. Climate change poses challenges for disaster management by exacerbating the effects of some hazards. Additionally, the potential is increasing for disasters to strike in quick succession or simultaneously, such as typhoons and floods, earthquakes and tsunamis, and any of the preceding together with the COVID-19 pandemic or other disease outbreaks.

Northeast Asia accounts for about one-third of all Asia-Pacific disaster-related fatalities over the past decade. Economic losses from disasters can be massive, and in this regard, China is most impacted economically by drought, Japan by earthquakes, and South Korea and Taiwan by typhoons. However, the disasters that have left the most visceral impact on communities are not necessarily thought of in these terms. Oftentimes, singular major events leave a strong legacy by sparking change to disaster management organization and approach. Japan's major event in the modern era was the 2011 Great East Japan earthquake, tsunami, and radiological disaster for its unexpected complexity as well as how many people were affected. One of China's largest disasters was the 2008 Sichuan earthquake, which tragically killed over 69,000 people, including many schoolchildren. Taiwan has been most impacted by the 1999 Chi-Chi earthquake and 2009's Typhoon Morakot. South Korea has experienced its share of typhoons but may have been more riveted by the 2014 Sewol ferry sinking, which disproportionately claimed the lives of children. All players have reacted to these and other events by instituting changes in how they prevent, mitigate against, prepare for, and respond to disasters and crises. While much of the focus on disaster management relates to natural hazards, a significant part of Northeast Asia's regional context is the security concerns over two potential conflict flashpoints – the nuclearized Korean Peninsula and tensions across the Taiwan Strait. Any regional instability resulting from conflict would include alarming scenarios of humanitarian need among the affected civilian population and would see similar international humanitarian actors involved to respond to natural disasters and other humanitarian crises.

The experiences of China, Japan, South Korea, and Taiwan in disasters and emergencies make them valuable partners in global HADR. However, unlike with ASEAN, there is not an overarching regional framework to streamline disaster management regionally in Northeast Asia. Each has its own developed approaches to domestic disaster management, providing foreign disaster relief to other countries, and integrating external aid if their own capacity is overwhelmed by a major disaster or crisis. The administrative structures and legal frameworks differ for providing international disaster relief, including the role played by civil society organizations and NGOs.

Based on experiences and frameworks, China, Japan, South Korea, and Taiwan all bring different levels of expertise to overseas HADR, but all provide valuable knowledge and resources.

APPENDICES

Information Sharing

Understanding how to overcome the information challenges that civilian and military agencies experience during a typical disaster response mission is important. Knowing what the available HADR resources are will assist Joint Task Force leaders and staff during mission planning.[527] Sharing information is critical since no single responding entity, NGO, International Governmental Organization, assisting country government, or the host government can be the source of all the required information.[528]

Collaboration, information sharing, and networking have been the backbone of successful disaster response and preparation. Disseminating information not only to those in-country and threatened by disaster, but also to those responding to assist in the emergency has been crucial to timely, efficient, and effective disaster response. Recent technology has advanced to aid predicting and alerting of disasters around the world which has resulted in early warning and evacuation measures as well as opportunities to react and prepare for incoming threats to countries. The following are some of the ways in which information regarding disaster risk management and response are shared. Managing information is central to the overall mechanisms within disaster preparedness and response. There are many resources, stakeholders, and components to consider with information sharing before, during, and after a natural disaster. This section will discuss country-specific, humanitarian, regional, government, and DoD information sources.

Local Information Sources

Red Cross Society of China (RCSC)

As a matter of law, the Chinese Red Cross Society conducts rescue and relief work for victims of war, natural disaster, or public health events. In non-emergency situations, it conducts training on emergency nursing, disaster prevention, first aid, and on-site rescue. In addition to domestic relief, it participates in international humanitarian relief and may assist Chinese government entities in carrying out HADR. The Chinese Red Cross website is not available in English for news of chapter operations. It does post information via China's Weibo and WeChat social media platforms.

Japanese Red Cross Society (JRCS)

JRCS's national headquarters is in Tokyo where it also houses its Public Relations section. Each chapter will have an office dealing with Disaster Response, and there are chapters in each of the 47 prefectures of the country. JRCS is incorporated into the legal framework for domestic disaster response. For international responses, it adds its capacity to other Japanese and international humanitarians, particularly other members of the International Red Cross and Red Crescent Movement. Foreign aid actions include providing funds, providing or delivering in-kind assistance, deploying trained delegates, and deploying Emergency Response Units (ERU).
Facebook: japaneseredcross
Twitter: @JRCS_PR
Instagram: japeneseredcross_official
YouTube: JapaneseRedCross_PR

Republic of Korea National Red Cross (KRC)

KRC is a partner of the government in disaster response and other issues. It run programs in disaster preparedness and response, blood transfusion, overseas relief and development, first aid and safety, restoring family links, and international humanitarian law. During major international disasters, KRC support other Red Cross Red Crescent Movement members in two ways: 1) mobilizing the Korea public via fundraising or information campaigns; and 2) sending KRC medical personnel or supplies.
Twitter: @KoreanRedCross

Taiwan Red Cross

The Taiwan Red Cross has not been recognized as an official member of the IFRC but does actively participate in international meetings and related activities. In has responded to international appeals for humanitarian relief and has maintained some exchange with the Red Cross Society of China, collaborating on major disaster relief and organizing small-scale safety and medical events and youth volunteer exchanges. It publicizes activities on-line both via its website and social media.
Web: *https://www.redcross.org.tw/english/* (News & Events tab)
Facebook: roc.redcross
YouTube: redcrossROC

Japan Meteorological Agency (JMA)

JMA is Japan's nodal agency for disaster information because of its troves of data, information, and research into the natural hazards that impact Japan. JMA issues specific hazard information for each type of event. The general warning structure runs Levels 1-5 with warnings, advisories, and instructions that go with each level, as illustrated in Figure 22.[529]

As a meteorological agency, JMA has

Alert level	Situation	Required action	Evacuation information
5	Disaster occurrence or urgency	Danger of life Secure safety immediately!	Emergency Safety Measures*1
	< Be sure to evacuate by alert level 4! >		
4	High risk of disaster	Everyone evacuates from hazardous places	Evacuation Instruction (note)
3	Risk of disaster	The elderly, etc. evacuate from hazardous places*2	Evacuation of the Elderly, etc.
2	Weather worsening	Check how to evacuate	Heavy rain, Flood, of Storm Surge Advisories (JMA)
1	Risk of weather worsening	Be prepare for disasters	Probability of Warnings (JMA)

* 1 Alert level 5 is not always issued, as municipalities may not be able to certainly understand the situation of disasters.
* 2 Alert level 3 is the timing for people other than elderly to suspend normal activities and begin evacuating voluntary when feel danger, as needed.
(note) Evacuation warning s are issued at the timing of current evacuation advisory.

Figure 22: JMA's Five Alert Levels

responsibility for assessing risk of flooding and landslides. Along with the public weather service, JMA issues severe weather warnings.[530] JMA's national network of seismometers allows it to estimate location and magnitude of an earthquake, and its seismic intensity meters measure the intensity of ground motion. As soon as an earthquake occurs in or around Japan, JMA analyzes information from its network and, if an earthquake of intensity 5 or greater is predicted, an Earthquake Early Warning alert is issued through television, radio, mobile phones, etc. When a tsunami is expected to cause coastal damage, JMA issues a tsunami warning or advisory within three minutes after the generating earthquake and then follows up with announcements to disaster management organizations and media outlets. JMA uses the Automated Meteorological Data Acquisition System to analyze the potential for storms and flooding and incorporates input from the Ministry of Land, Infrastructure, Transport, and Tourism and prefectural governments. Flood forecasts and water level information are provided via web and mobile phones. Twenty-four hours a day, JMA monitors the country's volcanoes. If eruptions that impact residential areas and areas surrounding the crater are predicted, JMA issues an eruption alert; five volcano alert levels are assigned for "zones that require vigilance" depending on status of volcano activity and distance between the crater and residence. Each level is clearly connected to a specific set of "Disaster Countermeasures,"[531] i.e., 5 – Evacuate, 4 – Prepare to Evacuate, 3 – Entry Restricted, 2 – Restricted Entry near Crater, and 1 – Caution but No Special Response.[532]
Twitter: @JMA_bousai
Languages on-line and via APP: *https://www.jma.go.jp/jma/kokusai/multi.html*

National Research Institute for Earth Science and Disaster Resilience (NIED)

Japan's Cabinet Office and NIED launched the Information Support Team (ISUT) in 2018. At times of large-scale disasters, the team aggregates damage information and evacuation

sites and plots this data on a map to support disaster response by administrative organizations and designated public organizations. The team provides an information aggregation website and creates and shares maps for disaster response personnel. For information collected by ISUT that can be made available to the public, the NIED Crisis Response Site (NIED) is operated by the NIED.[533] The homepage posts real-time hazard information: *https://www.bosai.go.jp/e/index.html*
Twitter: @C2010NIED
YouTube: C2010NIED
Korea's "Emergency Ready"

MOIS' Emergency Ready App (Android and iPhone) delivers disaster and safety information in Korean, English, and Chinese. It uses location-based search to provide information on shelter locations, emergency medical services, and embassies, and it has available safety manuals. In case of an emergency, those subscribed to the app will receive text notifications that advise on actions to be taken – e.g., avoid going outside, evacuate from shorelines, be careful of slippery roads, etc.[534]

Humanitarian Information Sources

United Nations Office for the Coordination of Humanitarian Affairs (OCHA) Regional Office for Asia and the Pacific (ROAP)

UN OCHA's ROAP seeks to optimize the speed, volume, and quality of humanitarian assistance and coordinates emergency preparedness and response in the world's most disaster-prone region in support of national governments. ROAP covers 41 countries, partnering with them for coordinated and effective international responses to emergency situations.
Website: *https://www.unocha.org/roap*

For OCHA situation reports, click on "Subscribe" button on bottom of page.

ReliefWeb

ReliefWeb is a service of UN OCHA that consolidates information and analysis from organizations, countries, and disasters for the humanitarian community.
Website: *https://reliefweb.int/*

PreventionWeb

PreventionWeb is provided by the UNDRR to consolidate DRR information into an online, easy to understand platform.
Website: *https://www.preventionweb.net/english/*

International Federation of Red Cross and Red Crescent Societies (IFRC)

IFRC is the world's largest humanitarian organization, comprised of its 192-member National Societies, including those of PRC, Japan, and ROK, a secretariat in Geneva, Switzerland, five regional offices, 50 country/cluster support offices, and three representative offices within other international organizations, i.e., the UN, the African Union, and the European Union.[535] The IFRC carries out relief operations to assist victims of disasters and combines this with long-term development work to strengthen the capacities of its member National Societies. IFRC's work focuses on building healthy and safe communities, reducing vulnerability, improving resilience, and promoting peace.[536]
Website: *https://www.ifrc.org/*

IFRC Asia Pacific Regional Office (APRO)

IFRC's APRO, located in Kuala Lumpur, Malaysia, works in support of 38 National Societies, including those in PRC, Japan, and ROK. Through six Country Cluster Delegations and eight Country Delegations, it provides coordination, financial and technical support for disaster operations, and longer-term development programs. The Country Cluster Delegation in Beijing, China, provides support to the Red Cross Society of China, Republic of Korea National Red Cross, Japanese Red Cross Society, and Mongolian Red Cross Society.
APRO on the web: *https://www.ifrc.org/national-societies-directory/374*

Via the IFRC "Go Platform," the organization publishes a dashboard regarding regional operations.
"Go Platform": *https://go.ifrc.org/regions/2#operations*
Twitter: @IFRCAsiaPacific

International Committee of the Red Cross (ICRC)

ICRC is an impartial, neutral, and independent organization whose mission is to protect the lives and dignity of victims of armed conflict and other situations of violence and to provide them with assistance. It also works to prevent suffering by promoting and strengthening humanitarian law and universal humanitarian principles.[537] ICRC, together with IFRC and the 192 Red Cross Red Crescent Societies, make up the Red Cross Red Crescent Movement.[538]
Website: *https://www.icrc.org/en/contact#media-contacts*

Humanitarian Response

Humanitarian Response is a platform providing the humanitarian community a means to aid in coordination of operational information and related activities.
Website: *https://www.humanitarianresponse.info*

Global Disaster Alert and Coordination System (GDACS)

GDACS is a cooperation framework between the United Nations, the European Commission, and disaster managers worldwide to improve alerts, information exchange, and coordination in the first phase after major sudden-onset disasters.
Website: *https://www.gdacs.org/alerts/*

Virtual OSOCC

The Virtual OSOCC is a real-time online coordination tool for disaster response professionals from USAR teams, national authorities, and regional and international organizations.
Website: *https://vosocc.unocha.org/*

The latest alerts can be found here: *http://www.gdacs.org/Alerts/default.aspx*
To subscribe: *http://www.gdacs.org/About/contactus.aspx*

Think Hazard

Think Hazard is a website that provides detailed information on a country. Hazard information is provided on risk, planning needs, technical specifications, and contact information for each country.
Website: *http://thinkhazard.org*

Humanitarian Country Teams (HCT)

HCT is a strategic and operational decision-making and oversight forum established and led by the Humanitarian Coordinator in each country. It is generally comprised of representatives from UN agencies including the IOM, international NGOs, and the IFRC as well as the respective National Society in the country. During a disaster response, HCTs often produce a Situation Report (SitRep), usually in conjunction with OCHA.

Most HCT SitReps can be found through ReliefWeb: *https://reliefweb.int/*

Humanitarian Data Exchange (HDX)

HDX is an open platform for sharing data across crises and organizations launched in 2014 with the goal of centralizing humanitarian data for easy access and analysis. HDX is managed by OCHA's Center for Humanitarian Data in The Hague.
Website: *https://data.humdata.org/*

U.S. Government Sources

U.S. Agency for International Development (USAID)

USAID is committed to responding to crises around the world to help people and places most in need. They aim to:

- Promote Global Health
- Support Global Stability
- Provide Humanitarian Assistance
- Catalyze Innovation and Partnership
- Empower Women and Girls

USAID produces a monthly newsletter called USAID Newsletter which is available digitally at *https://www.usaid.gov/news-information/newsletter.*

More information and updates from USAID are available via their blog, IMPACT, at https://blog.usaid.gov/ and on Facebook, Instagram, Twitter, and YouTube.
Website: *https://www.usaid.gov/*

USAID's Bureau for Humanitarian Assistance (BHA)

The Bureau for Humanitarian Assistance (BHA) is responsible for leading and coordinating the U.S. Government response to disasters overseas. BHA responds to an average of 75 disasters in 70 countries every year. BHA fulfils its mandate of saving lives, alleviating human suffering, and the reduction of the social and economic impact of disasters worldwide in partnership with USAID functional and regional bureaus and other U.S. government agencies. BHA works with the international population to assist countries prepare for, respond to, and recover from humanitarian crises.[539]

USAID/BHA products include situation reports and maps, which are available via email mailing lists as well as Reliefweb.org. Information products (HA Updates/Fact Sheets, etc.) are also available on USAID.gov (*https://www.usaid.gov/humanitarian-assistance*)

For BHA updates on a disaster response, ask the BHA representative for the respective DoD Geographic Combatant Command to add you to the email list, if you have a U.S. government email address:

- *BHA.INDOPACOM@usaid.gov*
- *BHA.SOUTHCOM@usaid.gov*
- *BHA.NORTHCOM@usaid.gov*
- *BHA.AFRICOM@usaid.gov*
- *BHA.SOCOM@usaid.gov*
- *BHA.CENTCOM@usaid.gov*
- *BHA.EUCOM@usaid.gov*

Pacific Disaster Center Global

Pacific Disaster Center (PDC) Global has trademarked an early warning and decision support system called DisasterAWARE®. DisasterAWARE® is primarily for disaster management practitioners and senior decision makers. It supports disaster risk reduction and best practices throughout all phases of disaster management from early warning to multi-hazard monitoring. It has a collection of scientifically verified, geospatial, data and modeling tools to assess hazard risks and impacts. A restricted version of DisasterAWARE® is the EMOPS (Emergency Operations) system, which is specifically for the disaster management community, including government agencies and humanitarian assistance organizations serving at local, state, federal, and regional levels.[540]

PDC also provides a public version, Disaster Alert, which offers open access to a world map documenting 18 hazard types.[541] Disaster Alert also has a free, early-warning app to receive customizable maps based visual alerts of active hazards. The app offers a global notification system covering natural and man-made hazards. It is available on both iPhone and Android.[542]
Website: *https://www.pdc.org/* and *https://www.pdc.org/apps/disasteraware/*
Emergency Operations (EMOPS) system (request account): *https://emops.pdc.org/emops/*

All Partners Access Network (APAN)

APAN is the Unclassified Information Sharing Service for the U.S. DoD. APAN provides the DoD and mission partners community space and collaboration tools to leverage information to effectively plan, train, and respond to meet their business requirements and mission objectives. Importantly, APAN's technology team has been supporting HADR operations for over 15 years. [543] APAN has played an integral role in the success of disaster responses, such as the 2015 California Wildfire Response and the 2013 Typhoon Haiyan Response in which they provided organizations and militaries

a centralized location to share information, increase situational awareness and decrease response time and duplicated efforts for best practices in HADR services.[544]
Website: *https://www.apan.org/*

Joint Typhoon Warning Center

The Joint Typhoon Warning Center provides advanced warning for U.S. Government agencies and organizations in relevant areas.
https://www.metoc.navy.mil/jtwc/jtwc.html

Daniel K. Inouye Asia-Pacific Center for Security Studies (DKI-APCSS)

DKI-APCSS is a U.S. DoD institute that addresses regional and global security issues, inviting military and civilian representatives of the U.S. and Asia-Pacific nations to its program of executive education and workshops.
Website: *https://apcss.org/*

The Center for Excellence in Disaster Management and Humanitarian Assistance (CFE-DM)

The Center for Excellence in Disaster Management and Humanitarian Assistance (CFE-DM) is a U.S. DoD organization that was established by U.S. Congress in 1994 and is a direct reporting unit to U.S. Indo-Pacific Command. CFE-DM provides training and education to help U.S. and foreign military personnel navigate complex issues in disaster management and humanitarian assistance. They produce country focused disaster management reference handbooks, after action reports, best practices, and lessons learned for advancement in response coordination. CFE-DM also works to improve cross-coordination and reduce duplication of efforts and promote U.S. involvement in civ-mil consultations and dialogues with relevant HADR parties such as the ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre), OCHA, and Changi Regional HADR Coordination Centre (RHCC). CFE-DM provides resources and updates at its website, as well as via their Facebook and Twitter accounts (@cfedmha).
Web: *https://www.cfe-dmha.org/*

Disaster Management Reference Handbooks are available for download at: *https://www.cfe-dmha.org/DMHA-Resources/Disaster-Management-Reference-Handbooks*

CFE-DM Disaster Information Reports are available for download at: *https://www.cfe-dmha.org/Publications/Reports*

Civil-Military Coordination in Foreign Disaster Relief Missions: Best Practices for Information Sharing is available here: *https://www.cfe-dmha.org/Publications*

Acronyms and Abbreviations

°C / °F	Degrees Celsius / Degrees Fahrenheit
¥	Chinese Yuan (Renminbi) / Japanese Yen
₩	Korean Won
$	U.S. Dollar / New Taiwan Dollar
AAR	Association for Aid and Relief, Japan
ACDR	Asian Conference on Disaster Reduction
ADB	Asian Development Bank
ADMM	ASEAN Defence Ministers' Meeting
ADRA	Adventist Development and Delivery Agency
ADRC	Asian Disaster Reduction Center
AEC	Atomic Energy Council
AFB	Air Force Base
AFD	French Development Agency
AfDB	African Development Bank
AHA Centre	ASEAN Coordinating Centre for Humanitarian Assistance on disaster management
AIT	American Institute in Taiwan
AMDA	Association of Medical Doctors of Asia
APAN	All Partners Access Network
APCEIU	Asia-Pacific Centre of Education for International Understanding
APCICT	Asian and Pacific Training Centre for Information and Communication Technology for Development
APEC	Asia-Pacific Economic Cooperation
APEX	Asian People's Exchange
APRO	Asia Pacific Regional Office
ARF	ASEAN Regional Forum
ASEAN	Association of Southeast Asian Nations
BAJ	Bridge Asia Japan
BCE	Before Common Era (formerly B.C. – Before Christ)
BHA	Bureau for Humanitarian Assistance (of USAID)
BRI	Belt & Road Initiative
BSR	Blue Sky Rescue
CAG/NIEM	Chinese Academy of Governance National Institute of Emergency Management
CBC	Capacity Building Centre
CBO	community-based organizations
CBRN / CBRNE	Chemical, Biological, Radiological, Nuclear (and Explosives)
CCP	Chinese Communist Party
CDC	U.S. Centers for Disease Control and Prevention
CDPPC	Central Disaster Prevention and Protection Council

CE	Common Era (formerly AD – Anno Domini)
CEA	China Earthquake Administration
CEOC	Central Emergency Operation Center
CERFP	CBRNE Enhance Response Force Package
CFE-DM	Center for Excellence in Disaster Management & Humanitarian Assistance
CFPA	China Foundation for Poverty Elimination
CIDCA	China International Development Cooperation Agency
CIFAL / JITC	Centre International de Formation des Autorités et Leaders Jeju/Jeju International Training Center
CMA	China Meteorological Administration
CMC	Central Military Commission (of China)
CNDR	Centre for Non-Governmental Disaster Response
CoE	Centre of Excellence for Statistics on Crime and Criminal Justice in Asia and Pacific
COVID-19	Coronavirus Disease 2019
CPF	Country Partnership Framework
CPX	Command Post Exchange
CRIMARIO	Critical Maritime Route Wider Indian Ocean (European Union)
CSO	civil society organization
CSSB	Combat Sustainment Support Battalion
DAC	Development Assistance Committee
DEAP	Disaster and Emergency Assistance Policy
DESA	Department of Economic and Social Affairs
DKI-APCSS	Daniel K. Inouye Asia-Pacific Center for Security Studies
DM	disaster management
DMAT	Disaster Medical Assistance Team
DME	Disaster Management Exchange
DMHA	Disaster Management and Humanitarian Assistance
DoD	U.S. Department of Defense
DPIDG	Division for Public Institutions and Digital Government
DPPA	Disaster Prevention and Protection Act
DPRK	Democratic People's Republic of Korea / North Korea
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DSD	Division for Sustainable Development
EBRD	European Bank for Reconstruction and Development
ECDF	Economic Development Cooperation Fund of the Export-Import Bank of Korea
EIU / GCED	Education for International Understanding / Global Citizenship Education
EMWG	Emergency Management Working Group
EMOPS	Emergency Operations
EOC	Emergency Operation Center

EPWG	Emergency Preparedness Working Group
ERU	Emergency Response Units
EU	European Union
EUD	Engineer Utility Detachment
EWBS	Emergency Warning Broadcast System
FAO	Food and Agriculture Organization
FDMA	Fire and Disaster Management Agency
FEMA	Federal Emergency Management Agency
FIDR	Foundation for International Development/Relief
FY	Fiscal Year
GCTF	Global Cooperation and Training Framework
GDACS	Global Disaster Alert and Coordination System
GDP	Gross Domestic Product
GFDRR	Global Facility for Disaster Reduction and Recovery
GONGO	government-organized NGO
HADR	humanitarian assistance and disaster relief
HCT	Humanitarian Country Team
HDX	Humanitarian Data Exchange
HuMA	Humanitarian Medical Assistance
IAEA	International Atomic Energy Agency
ICAO	International Civil Aviation Organization
ICHARM	International Centre for Water Hazard and Risk Management
ICRC	International Committee of the Red Cross
ICS	Incident Command System
ICT	information and communications technology OR Infection Control Team
IDB	Inter-American Development Bank
IDNDR	International Decade for Natural Disaster Reduction Initiative
IDP	internally displaced person
IEC	INSARAG External Classification
IFAD	International Fund for Agriculture Development
IFRC	International Federation of the Red Cross and Red Crescent Societies
IFC	International Finance Corporation
IHL	International Humanitarian Law
ILO	International Labour Organization
IMF	International Monetary Fund
INRB	National Institute of Biomedical Research (of Republic of Congo)
INSARAG	International Search and Rescue Advisory Group
IOC	UNESCO Intergovernmental Oceanographic Commission
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change

IRT	International Rescue Team
ISC	Integrated Situation Center
ISUT	Information Support Team
ITPO	Investment and Technology Promotion Office
JAFS	Japan Asian Association and Asian Friendship Society
JASDF	Japan Air Self-Defense Force
JBIC	Japan Bank for International Cooperation
JEN	Japan Emergency NGO
JCG	Japan Coast Guard
JDR	Japan Disaster Relief
JGSDF	Japan Ground Self-Defense Force
JICA	Japan International Cooperation Agency
JISP	Japan International Support Program
JMA	Japan Metrological Agency
JMSDF	Japan Maritime Self-Defense Force
JPF	Japan Platform
JRA	Japan Rescue Association
JRCS	Japanese Red Cross Society
JSDF	Japanese Self-Defense Forces
JTEA	Japan-Taiwan Exchange Association
KCG	Korea Coast Guard
KDCA	Korea Disease Control and Prevention Agency
KDRT	Korea Disaster Relief Team
KDSN	Korea Disaster Safety Network
KFHI	Korea Food for the Hungry International
km	kilometer(s)
km/h	kilometers per hour
KMA	Korea Meteorological Administration
KOICA	Korea International Cooperation Agency
KOSTAT	Statistics Korea
KRC	Republic of Korea National Red Cross
KRISO - KIOST	Korea Research Institute of Ships and Ocean Engineering - Korea Institute of Ocean Science and Technology
KVO	Korea International Volunteer Organization
LINZ	Land Information New Zealand
m	meter(s)
MAB	Medical Affairs Bureau
MDM	Medecins du Monde
MDRO	Mission Disaster Relief Officers
MEDDAC	Medical Department Activities

MEF	Marine Expeditionary Force
MEM	Ministry of Emergency Management
MERRAC	Marine Environmental Emergency Preparedness and Response Regional Activity Centre
MERS	Middle East Respiratory Syndrome
MEXT	Ministry of Education, Culture, Sports, Science and Technology
MIGA	Multilateral Investment Guarantee Agency
MLIT	Ministry of Land, Infrastructure Transport and Tourism
mm	millimeter(s)
MNCC	Multinational Coordination Center
MND	Ministry of National Defense
MOC	Memorandum of Cooperation
MOFA	Ministry for Foreign Affairs
MOFCOM	Ministry of Commerce (PRC)
MOHW	Ministry of Health and Welfare
MOIS	Ministry of the Interior and Safety
MOLIT	Ministry of Land, Infrastructure, and Transport
MOST	Ministry of Science and Technology
MOTIE	Ministry of Trade, Industry, and Energy
MOU	Memorandum of Understanding
mph	miles per hour
MTA	Maritime Training Activity
NCDR	National Committee for Disaster Reduction (PRC) OR National Science and Technology Center for Disaster Reduction (Taiwan)
NDSCC	National Disaster Safety Control Center
NDMI	National Disaster Management Research Institute
NDTI	National Civil Defense and Disaster Management Training Institute
NEASPEC	North-East Asian Subregional Programme for Environmental Cooperation
NFA	National Fire Agency
NGO	non-governmental organization
NGO-DPC	NGO Disaster Preparedness Centre
NGO-RCO	Sichuan NGO Earthquake Relief Coordinating Office
NHC	National Health Commission
NHMP	National Hazard Mitigation Program
NICCO	Nippon International Cooperation for Community Development
NIED	National Research Institute for Earth Science and Disaster Resilience
NOWPAP	Northwest Pacific Action Plan
OBOS	One Body One Soul
OCHA	UN Office for the Coordination of Humanitarian Affairs
ODA	overseas / official development assistance
OECD	Organisation for Economic Cooperation and Development

OFDA	Office of Foreign Disaster Assistance (now USAID BHA)
OHCHR	Office of the United Nations High Commissioner for Human Rights
ONEA-GETI	Office for Northeast Asia and Global Education and Training Institute
OPIC	Overseas Private Investment Corporation
PDC	Pacific Disaster Center
PFE	Practical Field Exchange
PLA	People's Liberation Army
PPE	personal protective equipment
PRC	People's Republic of China
RCSC	Red Cross Society of China
RHCC	Changi Regional HADR Coordination Centre
RIDEX	Remote Island Disaster Exercise
ROAP	Regional Office for Asia and the Pacific
ROK	Republic of Korea (South Korea)
RSOAP	Regional Support Office for Asia and the Pacific
SAR	Search and Rescue
SARS / SARS-CoV / SARS-CoV-2	Severe Acute Respiratory Syndrome – Coronavirus - 2
SATREPS	Science and Technology Research Partnership for Sustainable Development
SDG	Sustainable Development Goals
SIAP	United Nations Statistical Institute for Asia and the Pacific
SMEE	subject matter expert exchanges
SPJ	SDGs Promise Japan
SPNDA	Standard Procedures for Natural Disaster Assistance
TA	technical assistance
TAF	The Asia Foundation
TaiwanICDF	Taiwan International Cooperation and Development Fund
TREX	Tomodachi Rescue Exercise
TRMPC	Taiwan Root Medical Peace Corps
TTE	Tabletop Exchange
U.S.	United States
UHC	universal health coverage
UN	United Nations
UNAFEI	United Nations Asia and Far East Institute
UNCEGGIM	United Nations Committee of Experts on Global Geospatial Information Management
UNCITRAL RCAP	United Nations Commission on International Trade Law Regional Centre for Asia and the Pacific
UNCRD	United Nations Centre for Regional Development
UNDP	United National Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNEP	United Nations Environmental Programme

UNEP-IETC	United Nations Environment Programme's International Environmental Technology Centre
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Populations Fund
UNHCR	United Nations High Commissioner for Refugees
UNIC	United Nations Information Centre
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNODC	United Nations Office on Drugs and Crime
UNOPS	United Nations Office of Project Services
UNOSD	United Nations Office for Sustainable Development
UNPOG	United Nations Project Office on Governance
UNU	United Nations University
UNV	United Nations Volunteers
UNWTO	United Nations World Tourism Organization
UR	United Rescue
USAG	U.S. Army Garrison
USAID	United States Agency for International Development
USAR	urban search and rescue
USFJ	U.S. Forces, Japan
USGS	United States Geological Survey
USINDOPACOM (formerly USPACOM)	U.S. Indo-Pacific Command (formerly U.S. Pacific Command)
USNH	U.S. Naval Hospital
USPC	UNDP Seoul Policy Centre
WBG	World Bank Group
WFP	World Food Programme
WGTCDIS	Web-Based GIS Typhoon Committee Disaster Information System
WHA	World Health Assembly
WHO	World Health Organization
WIPO	World Intellectual Property Organization
WMO	World Meteorological Organization

Endnotes

1 UN Economic and Social Commission for Asia and the Pacific. Resilience in a Riskier World: Managing Systemic Risks from Biological and Other Natural Hazards. Asia-Pacific Disaster Report 2021. https://www.unescap.org/sites/default/d8files/knowledge-products/Asia-Pacific%20Disaster%20Report%202021-Full%20report.pdf

2 UN Economic and Social Commission for Asia and the Pacific. The Disaster Riskscape across East and North-East Asia: Key Takeaways for Stakeholders. Asia-Pacific Disaster Report 2019. https://www.unescap.org/sites/default/d8files/IDD-APDR-Subreport-ENEA.pdf

3 Tso, Yi-en and David A. McEntire. Emergency Management in Taiwan: Learning from Past and Current Experiences. FEMA Comparative Emergency Management Book Project. https://training.fema.gov/hiedu/downloads/compemmgmtbookproject/comparative%20em%20book%20-%20em%20in%20taiwan.pdf

4 UN Economic and Social Commission for Asia and the Pacific. The Disaster Riskscape across East and North-East Asia: Key Takeaways for Stakeholders. Asia-Pacific Disaster Report 2019. https://www.unescap.org/sites/default/d8files/IDD-APDR-Subreport-ENEA.pdf

5 UN Economic and Social Commission for Asia and the Pacific. The Disaster Riskscape across East and North-East Asia: Key Takeaways for Stakeholders. Asia-Pacific Disaster Report 2019. https://www.unescap.org/sites/default/d8files/IDD-APDR-Subreport-ENEA.pdf

6 UN Economic and Social Commission for Asia and the Pacific. Resilience in a Riskier World: Managing Systemic Risks from Biological and Other Natural Hazards. Asia-Pacific Disaster Report 2021. https://www.unescap.org/sites/default/d8files/knowledge-products/Asia-Pacific%20Disaster%20Report%202021-Full%20report.pdf

7 UN Economic and Social Commission for Asia and the Pacific. Resilience in a Riskier World: Managing Systemic Risks from Biological and Other Natural Hazards. Asia-Pacific Disaster Report 2021. https://www.unescap.org/sites/default/d8files/knowledge-products/Asia-Pacific%20Disaster%20Report%202021-Full%20report.pdf

8 UN Economic and Social Commission for Asia and the Pacific. The Disaster Riskscape across East and North-East Asia: Key Takeaways for Stakeholders. Asia-Pacific Disaster Report 2019. https://www.unescap.org/sites/default/d8files/IDD-APDR-Subreport-ENEA.pdf

9 UN Economic and Social Commission for Asia and the Pacific. Resilience in a Riskier World: Managing Systemic Risks from Biological and Other Natural Hazards. Asia-Pacific Disaster Report 2021. https://www.unescap.org/sites/default/d8files/knowledge-products/Asia-Pacific%20Disaster%20Report%202021-Full%20report.pdf

10 UN Economic and Social Commission for Asia and the Pacific. The Disaster Riskscape across East and North-East Asia: Key Takeaways for Stakeholders. Asia-Pacific Disaster Report 2019. https://www.unescap.org/sites/default/d8files/IDD-APDR-Subreport-ENEA.pdf

11 Wan J, Yan D, Fu G, Hao L, Yue Y, Li R, et al. (2016) Temporal and Spatial Variations of Drought in China: Reconstructed from Historical Memorials Archives during 1689-1911. PLoS ONE 11(2): e0148072. https://doi.org/10.1371/journal.pone.0148072

12 Sang-Min Lee, Hi-Ryong Byun and Hiroshi L. Tanaka. Spatiotemporal Characteristics of Drought Occurrences over Japan. Journal of Applied Meteorology and Climatology, Volume 51: Issue 6. 01 Jun 2012. https://doi.org/10.1175/JAMC-D-11-0157.1

13 Tortajada, Cecilia. Japan's Climate Change Preparedness an Example for Asian Countries. BRINK. 6 June 2018. https://www.brinknews.com/japans-climate-change-preparedness-an-example-for-asian-countries/

14 Sang-Min Lee, Hi-Ryong Byun and Hiroshi L. Tanaka. Spatiotemporal Characteristics of Drought Occurrences over Japan. Journal of Applied Meteorology and Climatology, Volume 51: Issue 6. 01 Jun 2012. https://doi.org/10.1175/JAMC-D-11-0157.1

15 Bae, H., Ji, H., Lim, YJ. et al. Characteristics of drought propagation in South Korea: relationship between meteorological, agricultural, and hydrological droughts. Nat Hazards 99, 1–16 (2019). https://doi.org/10.1007/s11069-019-03676-3

16 Hyun-Han Kwon, Upmanu Lall and Seong-Joon Kim. The unusual 2013–2015 drought in South Korea in the context of a multicentury precipitation record: Inferences from a nonstationary, multivariate, Bayesian copula model. Geophysical Research Letters. 08 August 2016 https://doi.org/10.1002/2016GL070270

17 Shien-Tsung Chen , Chun-Chao Kuo and Pao-Shan Yu. Historical trends and variability of meteorological droughts in Taiwan / Tendances historiques et variabilité des sécheresses météorologiques à Taiwan. Hydrological Sciences Journal, 54:3, 430-441. 2009. https://doi.org/10.1623/hysj.54.3.430

18 Hung, Chih-wen and Ming-Fu Shih. Analysis of Severe Droughts in Taiwan and its Related Atmospheric and Oceanic Environments. Atmosphere, MDPI. 25 March 2019. https://www.mdpi.com/2073-4433/10/3/159/pdf-vor

19 RMS. Earthquake Risk Across Asia and Australasia. Accessed 18 January 2022. https://www.rms.com/models/earthquake/asia-pacific

20 Hao, M., Li, Y. and Zhuang, W. Crustal movement and strain distribution in East Asia revealed by GPS observations. Sci Rep 9, 16797 (2019). https://doi.org/10.1038/s41598-019-53306-y

21 RMS. Earthquake Risk Across Asia and Australasia. Accessed 18 January 2022. https://www.rms.com/models/earthquake/asia-pacific

22 Hao, M., Li, Y. and Zhuang, W. Crustal movement and strain distribution in East Asia revealed by GPS observations. Sci Rep 9, 16797 (2019). https://doi.org/10.1038/s41598-019-53306-y

23 RMS. Earthquake Risk Across Asia and Australasia. Accessed 18 January 2022. https://www.rms.com/models/earthquake/asia-pacific

24 Rafferty, John P. Japan earthquake and tsunami of 2011. Encyclopedia Britannica. Accessed 18 January 2022. https://www.britannica.com/event/Japan-earthquake-and-tsunami-of-2011

25 RMS. Earthquake Risk Across Asia and Australasia. Accessed 18 January 2022. https://www.rms.com/models/earthquake/asia-pacific

26 UN Economic and Social Commission for Asia and the Pacific. The Disaster Riskscape across East and North-East Asia: Key Takeaways for Stakeholders. Asia-Pacific Disaster Report 2019. https://www.unescap.org/sites/default/d8files/IDD-APDR-Subreport-ENEA.pdf

27 UN Economic and Social Commission for Asia and the Pacific. The Disaster Riskscape across East and North-East Asia: Key Takeaways for Stakeholders. Asia-Pacific Disaster Report 2019. https://www.unescap.org/sites/default/d8files/IDD-APDR-Subreport-ENEA.pdf

28 UN Economic and Social Commission for Asia and the Pacific. The Disaster Riskscape across East and North-East Asia: Key Takeaways for Stakeholders. Asia-Pacific Disaster Report 2019. https://www.unescap.org/sites/default/d8files/IDD-APDR-Subreport-ENEA.pdf

29 UN Economic and Social Commission for Asia and the Pacific. Resilience in a Riskier World: Managing Systemic Risks from Biological and Other Natural Hazards. Asia-Pacific Disaster Report 2021. https://www.unescap.org/sites/default/d8files/knowledge-products/Asia-Pacific%20Disaster%20Report%202021-Full%20report.pdf

30 UN Economic and Social Commission for Asia and the Pacific. Resilience in a Riskier World: Managing Systemic Risks from Biological and Other Natural Hazards. Asia-Pacific Disaster Report 2021. https://www.unescap.org/sites/default/d8files/knowledge-products/Asia-Pacific%20Disaster%20Report%202021-Full%20report.pdf

31 JBA Risk Management. China Floods: "Plum Rain" And Typhoon In-Fa. July 2021. https://www.jbarisk.com/flood-services/event-response/china-floods-plum-rain-and-typhoon-in-fa/

32 Kobayashi, Yoshiaki and John W. Porter. Flood Risk Management in the People's Republic of China: Learning to Live with Flood Risk. Asian Development Bank. 2012. https://www.adb.org/sites/default/files/publication/29717/flood-risk-management-prc.pdf

33 SwissRe. Mitigating Flood Risk in Japan – When Strong is Not Enough. 14 May 2020. https://www.swissre.com/en/japan/news-insights/articles/natural-catastrophes/mitigating-flood-risk-in-japan.html

34 OECD. OECD Studies in Risk Management: Japan Floods. 2006. https://www.oecd.org/japan/37378001.pdf

35 SwissRe. Mitigating Flood Risk in Japan – When Strong is Not Enough. 14 May 2020. https://www.swissre.com/en/japan/news-insights/articles/natural-catastrophes/mitigating-flood-risk-in-japan.html

36 Lee, Hye-Kyoung et al. Analysis of Flood-Vulnerable Areas for Disaster Planning Considering Demographic Changes in South Korea. MDPI's Sustainability. 9 June 2020. file:///C:/Users/lsholler/Downloads/sustainability-12-04727-v2.pdf

37 Teng, Wei-Hsien & Hsu, Ming-Hsi & Wu, Chung-Hsing & Chen, Albert. Impact of Flood Disasters on Taiwan in the Last Quarter Century. Natural Hazards. 37. 191-207. February 2006. DOI: 10.1007/s11069-005-4667-7.

38 UN Economic and Social Commission for Asia and the Pacific. Resilience in a Riskier World: Managing Systemic Risks from Biological and Other Natural Hazards. Asia-Pacific Disaster Report 2021. https://www.unescap.org/sites/default/d8files/knowledge-products/Asia-Pacific%20Disaster%20Report%202021-Full%20report.pdf

39 OECD. OECD Reviews of Public Health: Korea: A Healthier Tomorrow. Chapter 4. Korea's preparedness for public health emergencies. 2020. https://www.oecd-ilibrary.org/sites/7ba9cad3-en/index.html?itemId=/content/component/7ba9cad3-en

40 Greenpeace. Research Briefing: Extreme Temperature Rise in East Asia Cities. August 2021. https://www.greenpeace.org/static/planet4-eastasia-stateless/2021/08/c0800bce-eahightemperaturesbriefing.pdf

41 M-T Kueh, C-Y Lin, Y-J Chuang, Y-F Sheng and Y-Y Chien. Climate variability of heat waves and their associated diurnal temperature range variations in Taiwan. Environmental Research Letters, Volume 12, Number 7. 10 July 2017. https://iopscience.iop.org/article/10.1088/1748-9326/aa70d9

42 Lin, Kwang-Yin. When Flooding, Heatwaves, Droughts Become the Norm in Taiwan. CommonWealth Magazine (vol. 686). 18 November 2019. https://english.cw.com.tw/article/article.action?id=2594

43 Lu, D. History of Epidemics in China. Asian Medicine, 16(1), 137-152. 13 August 2021. https://doi.org/10.1163/15734218-12341487

44 IPDForum. China a hotbed for pandemics historically, experts say. 21 March 2020. https://ipdefenseforum.com/2020/03/china-a-hotbed-for-pandemics-historically-experts-say/

45 Xu, Junfang, et al. China's public health system: time for improvement. The Lancet, Vol 6, Issue 12, E869-E870. 1 December 2021. https://doi.org/10.1016/S2468-2667(21)00250-4

46 Mitch Medical Healthcare. Diseases of the Premodern Period in Japan. 7 January 2022. https://www.mitchmedical.us/human-disease/diseases-of-the-premodern-period-in-japan.html

47 Katsuhisa, Saito. Forgotten Lessons of Past Diseases Lead to Fresh Threats. Nippon.com. 15 April 2020. https://www.nippon.com/en/in-depth/a06603/

48 Kim, June-Ho, et al. Emerging COVID-19 success story: South Korea learned the lessons of MERS. Our World in Data. 5 March 2021. https://ourworldindata.org/covid-exemplar-south-korea

49 Cheng, Tsung-Mei. How has Taiwan navigated the pandemic? Economics Observatory. 1 December 2021. https://www.economicsobservatory.com/how-has-taiwan-navigated-the-pandemic

50 UN Economic and Social Commission for Asia and the Pacific. The Disaster Riskscape across East and North-East Asia: Key Takeaways for Stakeholders. Asia-Pacific Disaster Report 2019. https://www.unescap.org/sites/default/d8files/IDD-APDR-Subreport-ENEA.pdf

51 OECD. OECD Reviews of Public Health: Korea: A Healthier Tomorrow. Chapter 4. Korea's preparedness for public health emergencies. 2020. https://www.oecd-ilibrary.org/sites/7ba9cad3-en/index.html?itemId=/content/component/7ba9cad3-en

52 UN Economic and Social Commission for Asia and the Pacific. Resilience in a Riskier World: Managing Systemic Risks from Biological and Other Natural Hazards. Asia-Pacific Disaster Report 2021. https://www.unescap.org/sites/default/d8files/knowledge-products/Asia-Pacific%20Disaster%20Report%202021-Full%20report.pdf

53 OECD. OECD Reviews of Public Health: Korea: A Healthier Tomorrow. Chapter 4. Korea's preparedness for public health emergencies. 2020. https://www.oecd-ilibrary.org/sites/7ba9cad3-en/index.html?itemId=/content/component/7ba9cad3-en

54 UN Economic and Social Commission for Asia and the Pacific. Resilience in a Riskier World: Managing Systemic Risks from Biological and Other Natural Hazards. Asia-Pacific Disaster Report 2021. https://www.unescap.org/sites/default/d8files/knowledge-products/Asia-Pacific%20Disaster%20Report%202021-Full%20report.pdf

55 OECD. OECD Reviews of Public Health: Korea: A Healthier Tomorrow. Chapter 4. Korea's preparedness for public health emergencies. 2020. https://www.oecd-ilibrary.org/sites/7ba9cad3-en/index.html?itemId=/content/component/7ba9cad3-en

56 UN Economic and Social Commission for Asia and the Pacific. The Disaster Riskscape across East and North-East Asia: Key Takeaways for Stakeholders. Asia-Pacific Disaster Report 2019. https://www.unescap.org/sites/default/d8files/IDD-APDR-Subreport-ENEA.pdf

57 Ye Yuan, Hongwei et al. Probabilistic Tsunami Hazard Assessment (PTHA) for Southeast Coast of Chinese Mainland and Taiwan Island. JGR Solid Earth. February 2021. https://doi.org/10.1029/2020JB020344

58 AIR Worldwide. Tsunami Risk in Japan: A Devastating Event 124 Years Ago Today. 15 June 2020. https://www.air-worldwide.com/blog/posts/2020/6/tsunami-risk-in-japan-a-devastating-event-124-years-ago-today/

59 Oskin, Becky. Japan Earthquake & Tsunami of 2011: Facts and Information. Live Science. 13 September 2017. https://www.livescience.com/39110-japan-2011-earthquake-tsunami-facts.html

60 Mulia, I.E., et al. Regional probabilistic tsunami hazard assessment associated with active faults along the eastern margin of the Sea of Japan. Earth Planets Space 72, 123. September 2020. https://doi.org/10.1186/s40623-020-01256-5

61 Yoon Min-sik. Is Korea a tsunami-free zone? Korea Herald. 17 January 2022. http://www.koreaherald.com/view.php?ud=20220117000916

62 Drillsma, Ryan. Reports suggest Taiwan could be hit by huge tsunami within next 100 years. Taiwan News. 7 October 2018. https://www.taiwannews.com.tw/en/news/3546974

63 Asia Insurance Review. Asia: Highest tsunami risk in Taiwan from major EQ in Manila Trench. April 2015. https://www.asiainsurancereview.com/Magazine/ReadMagazineArticle?aid=36275

64 UN Economic and Social Commission for Asia and the Pacific. The Disaster Riskscape across East and North-East Asia: Key Takeaways for Stakeholders. Asia-Pacific Disaster Report 2019. https://www.unescap.org/sites/default/d8files/IDD-APDR-Subreport-ENEA.pdf

65 Greenpeace East Asia. The 5 biggest typhoons to batter East Asia in recent history. 29 October 2021. https://www.greenpeace.org/eastasia/blog/6975/the-5-biggest-typhoons-to-batter-east-asia-in-recent-history/

66 UN Economic and Social Commission for Asia and the Pacific. Resilience in a Riskier World: Managing Systemic Risks from Biological and Other Natural Hazards. Asia-Pacific Disaster Report 2021. https://www.unescap.org/sites/default/d8files/knowledge-products/Asia-Pacific%20Disaster%20Report%202021-Full%20report.pdf

67 UN Economic and Social Commission for Asia and the Pacific. Resilience in a Riskier World: Managing Systemic Risks from Biological and Other Natural Hazards. Asia-Pacific Disaster Report 2021. https://www.unescap.org/sites/default/d8files/knowledge-products/Asia-Pacific%20Disaster%20Report%202021-Full%20report.pdf

68 Zhao, Dapeng and Lucy Liu. Deep structure and origin of active volcanoes in China. Geoscience Frontiers, Volume 1, Issue 1, 2010, Pages 31-44. https://doi.org/10.1016/j.gsf.2010.08.002.

69 Global Volcanism Program. Report on Changbaishan (China-North Korea) Dennen, R., and Wunderman, R., eds. Bulletin of the Global Volcanism Network, 36:8. 2011 Smithsonian Institution. https://doi.org/10.5479/si.GVP.BGVN201108-305060

70 Wei, H., et al. Three active volcanoes in China and their hazards. Journal of Asian Earth Sciences, Volume 21, Issue 5, 2003, Pages 515-526, ISSN 1367-9120. https://doi.org/10.1016/S1367-9120(02)00081-0

71 Global Volcanism Program. Wudalianchi. Bulletin of the Global Volcanism Network, Smithsonian Institution. Accessed 19 January 2022. https://volcano.si.edu/volcano.cfm?vn=305030

72 Wei, H., et al. Three active volcanoes in China and their hazards. Journal of Asian Earth Sciences, Volume 21, Issue 5, 2003, Pages 515-526, ISSN 1367-9120. https://doi.org/10.1016/S1367-9120(02)00081-0

73 Global Volcanism Program. Tengchong. Bulletin of the Global Volcanism Network, Smithsonian Institution. Accessed 19 January 2022. https://volcano.si.edu/volcano.cfm?vn=275110

74 Global Volcanism Program. Hainan Volcanic Field. Bulletin of the Global Volcanism Network, Smithsonian Institution. Accessed 19 January 2022. https://volcano.si.edu/volcano.cfm?vn=275001

75 Horikoshi, Masaki. Japan lacks coordinated effort to defuse volcanic time bomb. Nikkei Asia. 6 June 2021. https://asia.nikkei.com/Economy/Natural-disasters/Japan-lacks-coordinated-effort-to-defuse-volcanic-time-bomb

76 Korea Meteorological Administration. Volcanic Eruptions in Korea. Accessed 23 January 2022. https://web.kma.go.kr/eng/weather/current_state/volcano.jsp

77 Global Volcanism Program. Ulreung. Bulletin of the Global Volcanism Network, Smithsonian Institution. Accessed 23 January 2022. https://volcano.si.edu/volcano.cfm?vn=306030

78 Yang, Sophia. Scientists find Taipei's Tatun Volcanoes could potentially erupt at Dayoukeng. Taiwan News. 14 July 2020. https://www.taiwannews.com.tw/en/news/3966336

79 Shyu, Billy. The Magnificent Turtle Island in Taiwan. Nspirement. 16 May 2021. https://www.nspirement.com/2021/05/16/magnificent-turtle-island-taiwan.html

80 Yang, Sophia. Scientists find Taipei's Tatun Volcanoes could potentially erupt at Dayoukeng. Taiwan News. 14 July 2020. https://www.taiwannews.com.tw/en/news/3966336

81 Pu, H.C., et al. Active Volcanism Revealed from a Seismicity Conduit in the Long-resting Tatun Volcano Group of Northern Taiwan. Sci Rep 10, 6153. 2020. https://doi.org/10.1038/s41598-020-63270-7

82 Yang, Sophia. Scientists find Taipei's Tatun Volcanoes could potentially erupt at Dayoukeng. Taiwan News. 14 July 2020. https://www.taiwannews.com.tw/en/news/3966336

83 ECHO. China - Earthquake, update (GDCAS, MEM) (ECHO Daily Flash of 17 September 2021). 17 September 2021. https://reliefweb.int/report/china/china-earthquake-update-gdcas-mem-echo-daily-flash-17-september-2021

84 Yeung, Jessie. Earthquake leaves three dead and 60 injured in China's Sichuan. CNN. 16 September 2021. https://www.cnn.com/2021/09/16/china/sichuan-earthquake-intl-hnk/index.html

85 Reuters. China continues emergency operations as typhoon makes second landfall. 26 July 2021. https://nypost.com/2021/07/26/china-continues-emergency-operations-against-typhoon-in-fa/

86 Dill, Jackson and Deng, Sean. Typhoon In-fa impacting parts of Japan with its eye set on China by next week. CNN. 21 July 2021. https://www.cnn.com/2021/07/20/weather/typhoon-cempaka-in-fa-flood-china-taiwan-japan/index.html

87 Ni, Vincent. Two Chinese provinces hit by earthquakes, with three reported dead. The Guardian. 22 May 2021. https://www.theguardian.com/world/2021/may/21/two-chinese-provinces-hit-by-earthquakes-with-two-reported-dead

88 ECHO. China - Earthquake (GDACS, USGS, media) (ECHO Daily Flash of 26 March 2021). 26 March 2021. https://reliefweb.int/report/china/china-earthquake-gdacs-usgs-media-echo-daily-flash-26-march-2021

89 UN Economic and Social Commission for Asia and the Pacific. Resilience in a Riskier World: Managing Systemic Risks from Biological and Other Natural Hazards. Asia-Pacific Disaster Report 2021. https://www.unescap.org/sites/default/d8files/knowledge-products/Asia-Pacific%20Disaster%20Report%202021-Full%20report.pdf

90 AP. Typhoon adds to southern China's rain and flooding woes. 19 August 2020. https://abcnews.go.com/International/wireStory/typhoon-higos-hits-china-weakens-tropical-storm-72462400

91 Kelly, Maura. Hagupit lashes eastern China with flooding rain, strong winds. AccuWeather. 2 August 2020. https://news.yahoo.com/severe-tropical-storm-hagupit-crash-211153886.html

92 Xinhua. 1 died in 6.4-magnitude earthquake in Xinjiang. 20 January 2020. https://global.chinadaily.com.cn/a/202001/20/WS5e245d5fa3101282172720f9.html

93 CGTN. 18 injured after magnitude-5.2 earthquake hits southwest China's Sichuan Province. 18 December 2019. https://news.cgtn.com/news/2019-12-18/M5-2-quake-hits-SW-China-Mw2kdJq7Di/index.html

94 Xinhua. East China province ups emergency response amid unrelenting drought. 10 November 2019. https://reliefweb.int/report/china/east-china-province-ups-emergency-response-amid-unrelenting-drought

95 ECHO. China - Earthquake (GDACS, USGS, Weather China, Media) (ECHO Daily Flash of 09 September 2019). 9 September 2019. https://reliefweb.int/report/china/china-earthquake-gdacs-usgs-weather-china-media-echo-daily-flash-09-september-2019

96 BBC. Typhoon Lekima: 28 dead and a million evacuated in China. 11 August 2019. https://www.bbc.com/news/world-asia-china-49303877

97 Xinhua. China Focus: 31 injured in Sichuan 5.4-magnitude quake. 24 June 2019. https://reliefweb.int/report/china/china-focus-31-injured-sichuan-54-magnitude-quake

98 Xinhua. China allocates 100 million yuan to support rescue work in quake-hit province: ministry. 19 June 2019. https://reliefweb.int/report/china/china-allocates-100-million-yuan-support-rescue-work-quake-hit-province-ministry

99 Weather.com. At Least 5 Dead After Tropical Storm Ewiniar Battered China With Rain, Flooding. 8 June 2018. https://weather.com/news/news/2018-06-08-tropical-storm-ewiniar-china-impacts

100 ReliefWeb. China: Floods - Jul 2018. https://reliefweb.int/disaster/tc-2018-000110-chn

101 Cheung, Jane and Hui, Sophie. Monstrous Mangkhut: Super typhoon leaves more than 200 injured and paralyzes transport as it pummels Hong Kong with record-breaking winds. The Standard. 17 September 2018. https://www.thestandard.com.hk/section-news/section/11/200244/Monstrous-Mangkhut:-Super-typhoon-leaves-more-than-200-injured-and-paralyzes-transport-as-it-pummels-Hong-Kong-with-record-breaking-winds

102 BBC. Typhoon Mangkhut: Deadly typhoon lands in south China. 16 September 2018. https://www.bbc.com/news/world-asia-45539120

103 Shenzhen Daily. Mangkhut wreaks havoc on SZ. 17 September 2018. http://www.szdaily.com/content/2018-09/17/content_21086105.htm

104 Xinhua. 9 dead after Typhoon Rumbia hits China. 19 August 2018. http://www.xinhuanet.com/english/2018-08/19/c_137402637.htm

105 ReliefWeb. China: Floods and Landslides - Jun 2017. https://reliefweb.int/disaster/fl-2017-000075-chn

106 Al-Jazeera. Storm Pakhar hits southern China days after deadly Hato. 27 August 2017. https://www.aljazeera.com/news/2017/8/27/storm-pakhar-hits-southern-china-days-after-deadly-hato

107 AP. Typhoon Hato kills 12 in Macau and southern China. 24 August 2017. https://www.theguardian.com/world/2017/aug/23/typhoon-hato-hong-kong-battens-down-as-storm-closes-schools-and-stock-market

108 Hong Kong Red Cross. Sichuan (Jiuzhaigou) Earthquake 2017: Work Report 2, 14 August 2017. https://reliefweb.int/report/china/sichuan-jiuzhaigou-earthquake-2017-work-report-2

109 Froberg, Maude. Vital Early Warnings Saved Lives in Jiuzhaigou Earthquake. IFRC. 15 August 2017. https://reliefweb.int/report/china/vital-early-warnings-saved-lives-jiuzhaigou-earthquake

110 Hong Kong Red Cross. Sichuan (Jiuzhaigou) Earthquake 2017: Work Report 2, 14 August 2017. https://reliefweb.int/report/china/sichuan-jiuzhaigou-earthquake-2017-work-report-2

111 ECHO. China – Earthquake (GDACS, USGS, National Authorities, MCA, Local Media) (ECHO Daily Flash of 9 August 2017). 9 August 2017. https://reliefweb.int/report/china/china-earthquake-gdacs-usgs-national-authorities-mca-local-media-echo-daily-flash-9-0

112 Froberg, Maude. Vital Early Warnings Saved Lives in Jiuzhaigou Earthquake. IFRC. 15 August 2017. https://reliefweb.int/report/china/vital-early-warnings-saved-lives-jiuzhaigou-earthquake

113 Xinhua. Relief supplies sent to quake-hit Xinjiang. 13 May 2017. https://reliefweb.int/report/china/relief-supplies-sent-quake-hit-xinjiang

114 Xinhua. 8 dead, 23 injured in Xinjiang's 5.5-magnitude earthquake. 12 May 2017. https://reliefweb.int/report/china/8-dead-23-injured-xinjiangs-55-magnitude-earthquake

115 ReliefWeb. China: Floods and Landslides - Jun 2016. https://reliefweb.int/disaster/fl-2016-000044-chn

116 Reuters. Landslide slams into Chinese village after typhoon, 27 missing. 28 September 2016. https://www.gulf-times.com/story/515498/Landslide-slams-into-Chinese-village-after-typhoon

117 The Hindu. 16 now confirmed dead in China landslips following Typhoon Megi. 5 October 2016. https://www.thehindu.com/news/international/16-now-confirmed-dead-in-China-landslips-following-Typhoon-Megi/article15427016.ece

118 Reuters. Landslide slams into Chinese village after typhoon, 27 missing. 28 September 2016. https://www.gulf-times.com/story/515498/Landslide-slams-into-Chinese-village-after-typhoon

119 PTI. China braces for another typhoon after 'Meranti' kills 28. 17 September 2016. https://economictimes.indiatimes.com/news/international/world-news/china-braces-for-another-typhoon-after-meranti-kills-28/articleshow/54382607.cms

120 AFP. Super typhoon Nepartak: six dead in China as tens of thousands flee storm. 11 July 2016. https://www.theguardian.com/world/2016/jul/11/super-typhoon-nepartak-six-dead-china-storm

121 Kyodo. 7 hurt as Typhoon Chanthu traverses Japan, weakens. 18 September 2021. https://english.kyodonews.net/news/2021/09/bdb1cf3556d2-typhoon-traverses-west-japan-at-least-5-injured.html

122 ECHO. Japan – Earthquake (DG ECHO's partners, Japan Government, GDACS, USGS, media) (ECHO Daily Flash of 14 February 2021). 14 February 2021. https://reliefweb.int/report/japan/japan-earthquake-dg-echo-s-partners-japan-government-gdacs-usgs-media-echo-daily-flash

123 Kyodo. 1st death confirmed in Feb. 13 northeastern Japan earthquake. 25 February 2021. https://english.kyodonews.net/news/2021/02/27bcd1c39fd5-1st-death-confirmed-in-feb-13-northeastern-japan-earthquake.html

124 ECHO. Japan – Earthquake (DG ECHO's partners, Japan Government, GDACS, USGS, media) (ECHO Daily Flash of 14 February 2021). 14 February 2021. https://reliefweb.int/report/japan/japan-earthquake-dg-echo-s-partners-japan-government-gdacs-usgs-media-echo-daily-flash

125 Yamaguchi, Mari. Strong quake shakes Japan; minor injuries, no major damage. ABC News. 20 March 2021. https://abcnews.go.com/International/wireStory/strong-earthquake-shakes-japans-capital-usgs-72-76575287

126 ECHO. Japan, Korean Peninsula - Tropical Cyclone HAISHEN update. 8 September 2020. https://reliefweb.int/report/republic-korea/japan-korean-peninsula-tropical-cyclone-haishen-update-dg-echo-gdacs-jtwc-fdma

127 BBC. Typhoon Haishen batters South Korea after slamming Japan. 7 September 2020. https://www.bbc.com/news/world-asia-54046150

128 Kelly. Maura. Historic rainfall devastates Japan during 1st half of July. AccuWeather. 13 July 2020. https://www.accuweather.com/en/severe-weather/historic-rainfall-devastates-japan-during-1st-half-of-july/775560

129 BBC. Typhoon Hagibis: Japan suffers deadly floods and landslides from storm. 13 October 2019. https://www.bbc.com/news/world-asia-50020108

130 Leister, Eric. At least 3 dead as Krosa pounds Japan with 30 inches of rain and wind gusts of nearly 90 mph. AccuWeather. 17 August 2019. https://www.accuweather.com/en/weather-news/severe-tropical-storm-krosa-to-strike-southern-japan-with-flooding-rainfall-strong-winds/490865

131 BBC. Krosa: One dead, 49 injured as tropical storm hits Japan. 16 August 2019. https://www.bbc.com/news/world-asia-49354117

132 Leister, Eric. At least 3 dead as Krosa pounds Japan with 30 inches of rain and wind gusts of nearly 90 mph. AccuWeather. 17 August 2019. https://www.accuweather.com/en/weather-news/severe-tropical-storm-krosa-to-strike-southern-japan-with-flooding-rainfall-strong-winds/490865

133 Xu, Wang. Typhoon Francisco slams Kyushu Island. China Daily. 7 August 2019. https://www.chinadaily.com.cn/a/201908/07/WS5d4a2f11a310cf3e35564503.html

134 Weather.com. Typhoon Trami Struck Japan With High Winds and Flooding Rain (RECAP). 30 September 2018. https://weather.com/storms/typhoon/news/2018-09-23-typhoon-trami-forecast-taiwan-japan

135 IFRC. Japan: Earthquake - Information Bulletin no. 2. 14 September 2018. https://reliefweb.int/report/japan/japan-earthquake-information-bulletin-no-2

136 IFRC. Japan: Earthquake - Information Bulletin no. 1. 6 September 2018. https://reliefweb.int/report/japan/japan-earthquake-information-bulletin-no-1

137 Kusakabe, Motomi. Damage from deadly Hokkaido quake estimated at over 367.5 billion yen. Hokkaido News Department. 4 October 2018. https://mainichi.jp/english/articles/20181004/p2a/00m/0na/030000c

138 McKirdy, Euan. Typhoon Jebi leaves trail of destruction in Japan. CNN. 5 September 2018. https://www.cnn.com/2018/09/04/asia/japan-typhoon-jebi-intl/index.html

139 Kyodo. Typhoon leaves damage in western Japan, 13 injured. 24 August 2018. https://english.kyodonews.net/news/2018/08/45e6400928b8-typhoon-leaves-damage-in-western-japan-heads-for-hokkaido.html

140 Srinivas Bandaru, Shunji Sano, Yurika Shimizu, Yuka Seki, Yoshikazu Okano, Tamaki Sasaki, Hideho Wada, Takemi Otsuki and Tatsuo Ito. Impact of heavy rains of 2018 in western Japan: disaster-induced health outcomes among the population of Innoshima Island. Heliyon, Volume 6, Issue 5, 2020, e03942, ISSN 2405-8440, https://doi.org/10.1016/j.heliyon.2020.e03942

141 Tsukui, Toru, et al. With nearly 7,000 quake-damaged homes, focus shifts to rebuilding disaster-hit areas. Osaka City News Department. 25 June 2018. https://mainichi.jp/english/articles/20180625/p2a/00m/0na/021000c

142 Mainichi. Mt. Kusatsu-Shirane saw repeated eruptions in the past. 24 January 2018. https://mainichi.jp/english/articles/20180124/p2a/00m/0na/021000c

143 McCurry, Justin. Japan: fatal avalanche engulfs skiers after volcano erupts. Guardian. 23 January 2018. https://www.theguardian.com/world/2018/jan/23/japan-avalanche-engulfs-skiers-after-volcano-erupts-at-ski-resort

144 Enjoji, Kaori, Wakatsuki, Yoko and Yan, Holly. Typhoon Lan reaches Japan, bringing ferocious winds. CNN. 23 October 2017. https://www.cnn.com/2017/10/22/asia/typhoon-lan/index.html

145 Wright, Pam. Typhoon Lan Clobbers Japan With 100+ MPH Winds, Killing 2. Weather.com. 23 October 2017. https://weather.com/news/news/2017-10-23-typhoon-lan-tokyo-japan-rain-wind-impacts

146 AFP. 2 dead, 38 injured as Typhoon Talim rips through Japan. 18 September 2017. https://www.straitstimes.com/asia/east-asia/at-least-9-injured-1-missing-as-powerful-typhoon-talim-lashes-japan

147 Al-Jazeera. Typhoon Noru's epic journey comes to an end. 8 August 2017. https://www.aljazeera.com/news/2017/8/8/typhoon-norus-epic-journey-comes-to-an-end

148 Mainichi. Death toll from Kyushu rains hits 22 as searches, evacuations continue. 10 July 2017. https://mainichi.jp/english/articles/20170710/p2a/00m/0na/007000c

149 Kyodo. Typhoon rips through Japan archipelago, causing mudslides, blackouts. 4 July 2017. https://english.kyodonews.net/news/2017/07/75ca2a09ac7f-typhoon-nanmadol-makes-landfall-in-nagasaki.html?phrase=profile&words=

150 VOA. Deadly Floods Spawned by Typhoon-hit Japan. 5 July 2017. https://www.voanews.com/a/deadly-floods-spawned-typhoon-japan/3929923.html

151 Kyodo. Typhoon rips through Japan archipelago, causing mudslides, blackouts. 4 July 2017. https://english.kyodonews.net/news/2017/07/75ca2a09ac7f-typhoon-nanmadol-makes-landfall-in-nagasaki.html?phrase=profile&words=

152 AFP. Typhoon Malakas slams Japan, heading toward Tokyo. 20 September 2016. https://www.yahoo.com/news/typhoon-malakas-slams-japan-leaving-south-waterlogged-042125453.html?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAEG80kDkNI4BgdiKxaTcRy3Aj7q7zMfqX-7agyW3HuOAc1cYgevNyn-1jwaex94ClUuVojAWLl43iB-ncuD92v3xyEHtRTNsY7QH6fot2_xsqcD8frkj0XffcjSsiZ-StE3JjYcwf17IfcCL4fpt77p5v1__twFzqYlNkbeWhUnP8vE

153 Saudi Gazette. Typhoon dumps heavy rain on northern Japan. 24 August 2016. https://saudigazette.com.sa/article/161917/%D8%A7%D9%84%D8%B9%D8%B1%D8%A8%D9%8A%D8%A9/Typhoon-dumps-heavy-rain-on-northern-Japan

154 Wakatsuki, Yoko and McKirdy, Euan. At least nine dead as Typhoon Lionrock pummels Japan. CNN. 31 August 2016. https://www.cnn.com/2016/08/31/asia/japan-typhoon-lionrock/index.html

155 IFRC. Japan: Kumamoto Earthquakes - Information Bulletin n° 2. 21 April 2016. https://reliefweb.int/report/japan/japan-kumamoto-earthquakes-information-bulletin-n-2

156 CBC. 2nd Japanese earthquake leaves at least 6 dead, 400 injured. 15 April 2016. https://www.cbc.ca/news/world/earthquake-japan-friday-1.3537576

157 Japan Platform. JPF Flash Report: Kumamoto Earthquake, May 1, 2016. 1 May 2016. https://reliefweb.int/report/japan/jpf-flash-report-kumamoto-earthquake-may-1-2016

158 UN Economic and Social Commission for Asia and the Pacific. Resilience in a Riskier World: Managing Systemic Risks from Biological and Other Natural Hazards. Asia-Pacific Disaster Report 2021. https://www.unescap.org/sites/default/d8files/knowledge-products/Asia-Pacific%20Disaster%20Report%202021-Full%20report.pdf

159 Travis, Courtney and Gilbert, Mary. Formidable Typhoon Haishen triggers landslides in Japan, deluges South Korea. AccuWeather. 7 September 2020. https://www.accuweather.com/en/hurricane/formidable-typhoon-haishen-triggers-landslides-in-japan-deluges-south-korea/808662

160 Korea JoongAng Daily. Typhoon Maysak finishes, as Haishen gathers force. 3 September 2020. https://koreajoongangdaily.joins.com/2020/09/03/national/socialAffairs/typhoon-Maysak-Haishen/20200903171900410.html

161 Khaliq, Riyaz ul. Typhoon Jangmi strikes South Korea. Anadolu. 8 September 2020. https://www.aa.com.tr/en/asia-pacific/typhoon-jangmi-strikes-south-korea/1937212

162 Al-Jazeera. South Korea floods, landslides kill dozens, displace thousands. 9 August 2020. https://www.aljazeera.com/news/2020/8/9/south-korea-floods-landslides-kill-dozens-displace-thousands

163 Jun, Ji-hye. Gov't to declare heavy rain-hit regions special disaster zones. Korea Times. 5 August 2020. https://www.koreatimes.co.kr/www/nation/2020/08/113_293867.html

164 ECHO. South Korea – Floods. 31 July 2020. https://reliefweb.int/report/republic-korea/south-korea-floods-kma-floodlist-media-echo-daily-flash-31-july-2020

165 ECHO. South Korea - Flash floods. 16 July 2020. https://reliefweb.int/report/republic-korea/south-korea-flash-floods-kma-floodlist-media-echo-daily-flash-16-july-2020

166 AP. Powerful typhoon causes minor injuries, damage in S. Korea. 22 September 2019. https://apnews.com/article/3ee32713c4b443d4908498beecc199d1

167 Yonhap. 3 dead amid hundreds of accidents due to Typhoon Lingling. 7 September 2019. http://www.koreaherald.com/view.php?ud=20190907000022

168 CBS News. Typhoon Lingling knocks out power for thousands in South Korea. 7 September 2019. https://www.cbsnews.com/news/typhoon-lingling-knocks-out-power-for-thousands-in-south-korea-2019-09-07/

169 Wright, Pam. Tropical Storm Kong-rey Leaves 2 Dead, 1 Missing In South Korea. Weather.com. 6 October 2018. https://weather.com/news/news/2018-10-06-tropical-storm-kong-rey-south-korea-impacts

170 Bernama. Typhoon Chaba leaves seven dead, three missing in S. Korea. 7 October 2016. https://www.malaymail.com/news/world/2016/10/07/typhoon-chaba-leaves-seven-dead-three-missing-in-s.-korea/1222473

171 Internal Displacement Monitoring Centre. Taiwan's displacement risk from drought. 29 October 2021. https://reliefweb.int/report/china-taiwan-province/taiwans-displacement-risk-drought

172 Blaskovic, Teo. Intense cold waves bring rare snowfall to Taiwan. Watchers.com. 10 January 2021. https://watchers.news/2021/01/10/intense-cold-waves-bring-rare-snowfall-to-taiwan/

173 Weather.com. Typhoon Mitag Impacted Taiwan, Japan's Southernmost Ryukyu Islands With Wind and Rain, Then Brushed by Eastern China, 1 October 2019. https://weather.com/storms/hurricane/news/2019-09-27-tropical-storm-typhoon-mitag-forecast-japan-south-korea-taiwan

174 Garda World. Taiwan: Several injured by Typhoon Mitag October 1 /update 4. 1 October 2019. https://www.garda.com/crisis24/news-alerts/272296/taiwan-several-injured-by-typhoon-mitag-october-1-update-4

175 Straits Times. One dead after 5.9-magnitude quake jolts Taiwan; island also bracing itself for rainstorms brought by typhoon. 8 August 2019. https://www.straitstimes.com/asia/east-asia/59-magnitude-quake-jolts-taiwan-0

176 Everington, Keoni. 1 dead, 8 injured from Typhoon Maria in Taiwan. Taiwan News. 11 July 2018. https://www.taiwannews.com.tw/en/news/3479808

177 Xinhua. Taiwan earthquake claims 17 lives. 12 February 2018. https://reliefweb.int/report/china-taiwan-province/taiwan-earthquake-claims-17-lives

178 VOA. Nine Dead, 10 Still Missing in Aftermath of Taiwan Earthquake. 8 February 2018. https://reliefweb.int/report/china-taiwan-province/nine-dead-10-still-missing-aftermath-taiwan-earthquake

179 ECHO. China - Tropical Cyclones Nesat and Haitang – DG ECHO Daily map | 31/07/2017. 31 July 2017. https://reliefweb.int/map/china-taiwan-province/china-tropical-cyclones-nesat-and-haitang-dg-echo-daily-map-31072017

180 AFP. Typhoon leaves 5 dead in China and Taiwan. 29 September 2016. https://www.straitstimes.com/asia/east-asia/typhoon-leaves-5-dead-in-china-and-taiwan

181 CNA. Over NT$1.3 bil. in typhoon losses for agricultural sector. 30 September 2016. https://chinapost.nownews.com/20160930-3267

182 Fox, Everton. Thousands evacuated as Typhoon Malakas clips Taiwan. Al-Jazeera. 18 September 2016. https://www.aljazeera.com/news/2016/9/18/thousands-evacuated-as-typhoon-malakas-clips-taiwan

183 Weather.com. Super Typhoon Meranti Recap. 15 September 2016. https://weather.com/storms/typhoon/news/tropical-depression-sixteen-w-tropical-storm-typhoon-meranti-sep2016

184 Al-Jazeera. Super Typhoon Meranti: 2016's most powerful cyclone. 15 September 2016. https://www.aljazeera.com/news/2016/9/15/super-typhoon-meranti-2016s-most-powerful-cyclone

185 Phillips, Tom. Super typhoon Nepartak causes devastation across Taiwan's coastline. The Guardian. 8 July 2016. https://www.theguardian.com/world/2016/jul/08/super-typhoon-nepartak-landfall-taiwan-china

186 Westcott, Ben and Kam, Vivian. 'Like a bomb's gone off:' Super Typhoon Nepartak slams Taiwan. CNN. 8 July 2016. https://www.cnn.com/2016/07/06/world/super-typhoon-nepartak-taiwan/index.html

187 Red Cross Society of the Republic of Taiwan. Canada PWS&D provides education and livelihood supports for 0206 Tainan Earthquake Program. 4 January 2017. https://www.redcross.org.tw/english/home.jsp?pageno=201402140002&acttype=view&dataserno=201701040001

188 BBC. East Asia cold snap 'kills 85 in Taiwan'. 25 January 2016. https://www.bbc.com/news/world-asia-35397763

189 Lavey, Jo-Hannah. Unpacking China's overseas aid program. Lowy Institute: The Interpreter. 1 May 2020. https://www.lowyinstitute.org/the-interpreter/china-and-humanitarian-aid

190 Humanitarian Advisory Group and International Council of Voluntary Agencies. Positive Disruption? China's Humanitarian Aid. Humanitarian Horizons Practice Paper Series. December 2019. https://humanitarianadvisorygroup.org/insight/positive-disruption-chinas-humanitarian-aid/

191 Kurtzer, Jacob and Grace Gonzales. China's Humanitarian Aid: Cooperation amidst Competition. Commentary; Center for Strategic and International Studies. 1 November 2020. https://www.csis.org/analysis/chinas-humanitarian-aid-cooperation-amidst-competition

192 Zhang, Denghua. Working with China on humanitarian aid in the Pacific. East Asia Forum. 26 July 2019. https://www.eastasiaforum.org/2019/07/26/working-with-china-on-humanitarian-aid-in-the-pacific/

193 Southerland, Matthew. The Chinese Military's Role in Overseas Humanitarian Assistance and Disaster Relief: Contributions and Concerns. U.S.-China Economic and Security Review Commission: Staff Research Report. 11 July 2019. https://www.uscc.gov/research/chinese-militarys-role-overseas-humanitarian-assistance-and-disaster-relief-contributions

194 Hongbo, Ji. Beyond Borders: China's NGOs Respond to World's Natural Disasters. Asia Foundation. 26 October 2016. https://asiafoundation.org/2016/10/26/beyond-borders-chinas-ngos-respond-worlds-natural-disasters/

195 Japan International Cooperation Agency. Emergency Disaster Relief. August 2021. https://www.jica.go.jp/english/our_work/types_of_assistance/emergency.html

196 Japan International Cooperation Agency. Disaster Relief and JICA: Striving to Make a Difference. May 2017. https://www.jica.go.jp/english/our_work/types_of_assistance/c8h0vm0000anzjxh-att/emergency_02.pdf

197 Kim, Felix. Japan's defense forces master disaster relief skills with heavy workload. Indo-Pacific Defense Forum. 29 August 2021. https://ipdefenseforum.com/2021/08/japans-defense-forces-master-disaster-relief-skills-with-heavy-workload/

198 Japan International Cooperation Agency. News: FY2017-2022. https://www.jica.go.jp/english/news/field/index.html

199 Permanent Mission of the Republic of Korea to the United Nations. Human Rights and Humanitarian Assistance. Accessed 24 January 2022. https://overseas.mofa.go.kr/un-en/wpge/m_5162/contents.do

200 Korea International Cooperation Agency. Humanitarian Assistance. Accessed 24 January 2022. http://www.koica.go.kr/koica_en/3443/subview.do

201 Lee, Wooyoung. South Korea sends second disaster relief team to Laos. UPI. 7 August 2018. https://www.upi.com/Top_News/World-News/2018/08/07/South-Korea-sends-second-disaster-relief-team-to-Laos/6451533603812/?sl=1

202 Coleman, Liam. Korean Air provides relief for Laos dam collapse victims. DFNI Frontier. 3 August 2018. https://www.dfnionline.com/latest-news/korean-air-provides-relief-laos-dam-collapse-victims-03-08-2018/

203 Lee, K., et al. Stressors of Korean Disaster Relief Team Members during the Nepal Earthquake Dispatch: a Consensual Qualitative Research Analysis. Journal of Korean medical science, 32(3), 507–513. 2017 https://doi.org/10.3346/jkms.2017.32.3.507

204 Korea International Cooperation Agency. Humanitarian Assistance. Accessed 24 January 2022. http://www.koica.go.kr/koica_en/3443/subview.do

205 Kim, Hoon, et al. Disaster medical assistance in super typhoon Haiyan: Collaboration with the local medical team that resulted in great synergy. Short Report. Ulus Travma Acil Cerrahi Derg, March 2015, Vol. 21, No. 2. https://jag.journalagent.com/travma/pdfs/UTD-54770-SHORT_REPORT-AHN.pdf

206 Amazona, Roel. Korean Army official returns to 'Yolanda'-hit Leyte areas. Philippine News Agency. 30 March 2019. https://www.pna.gov.ph/articles/1066052

207 Coleman, Liam. Korean Air provides relief for Laos dam collapse victims. DFNI Frontier. 3 August 2018. https://www.dfnionline.com/latest-news/korean-air-provides-relief-laos-dam-collapse-victims-03-08-2018/

208 Thim, Michael. New Ship Boosts Taiwan's HADR Capabilities. CIMSEC. 25 July 2015. https://cimsec.org/new-ship-boosts-taiwans-hadr-capabilities/

209 Ministry of Foreign Affairs, Republic of China. International Cooperation and Development Report: 2020. 10 May 2021. https://ws.mofa.gov.tw/Download.ashx?u=LzAwMS9VcGxvYWQvNDAzL3JlbGZpbGUvMjM2LzQxNS9hZTUyYTBkMS1hNjhmLTQzNzQtYmM2Yy0xNDEyNjRkND-VmNmUucGRm&n=MTEwMTAwNS0xMDnlubTluqblnIvlkIjloLHlkYroi7HmlofniYgt57ay6Lev54mILnBkZg%3d%3d

210 Ministry of Foreign Affairs, Republic of China. International Cooperation and Development Report 2018. 28 May 2019. https://ws.mofa.gov.tw/Download.ashx?u=LzAwMS9VcGxvYWQvT2xkRmlsZS9SZWxGaWxlLzExMjAvNTg4LzhlMjdhMDYzLWY0NjUtNDMzYy05ZGJkLWEwNGE1NzhkNjJkYi5wZGY%3d&n=SW50ZXJuYXRpb25hbCBDb29wZXJhdGlvbiBhbmQgRGV2ZWxvcG1lbnQgUmVwb3J0IDIwMTgucGRm

211 Yi-hsuan, Lu and William Hetherington. Official touts Middle East humanitarian aid efforts. Taipei Times. 30 June 2020. https://www.taipeitimes.com/News/taiwan/archives/2020/06/30/2003739105

212 Ministry of Foreign Affairs, Republic of China. Taiwan can help, and Taiwan is helping! Accessed 24 January 2022. https://en.mofa.gov.tw/cp.aspx?n=2318

213 Denghua Zhang, Messages from China's third white paper on foreign aid, Lowy Institute, The Interpreter, 5 February 2021, https://www.lowyinstitute.org/the-interpreter/messages-china-s-third-white-paper-foreign-aid

214 Global Facility for Disaster Risk Reduction (GFDRR). The Evolution of National Disaster Risk Reduction Plans in China. August 2020. https://www.gfdrr.org/en/feature-story/evolution-national-disaster-risk-reduction-plans-china

215 Francis Ghesquiere et al. Learning from experience: Insights from China's progress in disaster risk management. World Bank Blog. 9 September 2020. https://blogs.worldbank.org/eastasiapacific/learning-experience-insights-chinas-progress-disaster-risk-management

216 U.S. Centers for Disease Control. SARS Response Timeline. Last reviewed 26 April 2013. https://www.cdc.gov/about/history/sars/timeline.htm

217 Wang, Zhe; Chan, Emily Y.Y.; Liu, Kevin Sida; Yeung, May P.S. The Disaster and Emergency Management System in China. Chinese University of Hong Kong, the Collaborating Centre for Oxford University and CUHK for Disaster and Medical Humanitarian Response. Policy Brief May 2016. https://www.preventionweb.net/publication/disaster-and-emergency-management-system-china

218 Xiangnan Hu, Kapucu Naim, Shi Jia, Zhu Zhengwei. Disaster policy and emergency management reforms in China: From Wenchuan earthquake to Jiuzhaigou earthquake. International Journal of Disaster Risk Reduction, Volume 52, 2021, 101964, ISSN 2212-4209, https://www.sciencedirect.com/science/article/abs/pii/S2212420920314667

219 Cao Yue. A turning point in China's disaster preparedness? China Dialogue. 6 August 2018. https://chinadialogue.net/en/cities/10768-a-turning-point-in-china-s-disaster-preparedness

220 Francis Ghesquiere et al. Learning from experience: Insights from China's progress in disaster risk management. World Bank Blog. 9 September 2020. https://blogs.worldbank.org/eastasiapacific/learning-experience-insights-chinas-progress-disaster-risk-management

221 Tao Ye and Qingyan Mu, Academy of Disaster Reduction and Emergency Management, Faculty of Geographical Science, Beijing Normal University. The Development of Catastrophe Insurance in China: An Exploration. GFDRR. Feature. August 2020. https://www.gfdrr.org/en/feature-story/development-catastrophe-insurance-china-exploration

222 Cao Yue. A turning point in China's disaster preparedness? China Dialogue. 6 August 2018. https://chinadialogue.net/en/cities/10768-a-turning-point-in-china-s-disaster-preparedness

223 Xiaoli Lu and Ziqiang Han, Emergency management in China: towards a comprehensive model?, Taylor & Francis Online, 9 October 2018. https://www.tandfonline.com/doi/abs/10.1080/13669877.2018.1476901

224 UNDRR. China cuts disaster mortality by half and calls for strengthening cooperation around risk reduction, News and Press Release. 12 May 2021. https://reliefweb.int/report/china/china-cuts-disaster-mortality-half-and-calls-strengthening-cooperation-around-risk

225 Wikipedia. Chinese Character Name: Ministry of Emergency Management. Accessed 14 February 2022. https://en.wikipedia.org/wiki/Ministry_of_Emergency_Management

226 Office for Outer Space Affairs, UN-SPIDER Knowledge Portal, Ministry of Emergency Management of the People's Republic of China, Accessed 14 February 2022. https://un-spider.org/ministry-emergency-management-people%E2%80%99s-republic-china

227 Hoa Liqian. Ministry to improve emergency response. China Daily. 17 April 2018. http://www.chinadaily.com.cn/a/201804/17/WS5ad52e9fa3105cdcf65189b6.html

228 MEM. Main Duty. Accessed 14 February 2022, https://www.mem.gov.cn/jg/

229 MEM. Main Duty. Accessed 14 February 2022, https://www.mem.gov.cn/jg/

230 Center for International Knowledge on Development. Q61: What role does the Ministry of Emergency Management play in COVID-19 prevention and control? 13 April 2020. http://www.cikd.org/english/detail?leafId=213&docId=1391

231 Cao Yue. A turning point in China's disaster preparedness? China Dialogue. 6 August 2018. https://chinadialogue.net/en/cities/10768-a-turning-point-in-china-s-disaster-preparedness

232 ICRC. China: International seminar enhances cooperation on emergency response. 28 May 2019. https://www.icrc.org/en/document/china-first-training-disaster-health-emergency-response-system; UNDRR. Strengthening and learning from China's work in Disaster Risk Reduction. 4 September 2020. https://reliefweb.int/report/world/strengthening-and-learning-china-s-work-disaster-risk-reduction

233 Global Facility for Disaster Risk Reduction (GFDRR). The Evolution of National Disaster Risk Reduction Plans in China. August 2020. https://www.gfdrr.org/en/feature-story/evolution-national-disaster-risk-reduction-plans-china

234 Global Facility for Disaster Risk Reduction (GFDRR). The Evolution of National Disaster Risk Reduction Plans in China. August 2020. https://www.gfdrr.org/en/feature-story/evolution-national-disaster-risk-reduction-plans-china

235 The State Council of the PRC. National disaster reduction committee reshuffled. 13 May 2020. http://english.www.gov.cn/policies/latestreleases/202005/13/content_WS5ebb9628c6d0b3f0e9497913.html

236 PRC State Council. China Earthquake Administration. 12 September 2014. http://english.www.gov.cn/state_council/2014/10/01/content_281474991089800.htm

237 Institute of Geology, China Earthquake Administration. Introduction. Accessed 15 February 2022. http://en.igl.earthquake.cn/wwwroot/c_000000010001/

238 Humanitarian Advisory Group, the International Council of Voluntary Agencies, the Innovation Center for Risk Governance at Beijing Normal University, Dr Denghua Zhang, Positive Disruption? China's Humanitarian Aid, December 2019, Humanitarian Advisory Group, the International Council of Voluntary Agencies, the Innovation Center for Risk Governance at Beijing Normal University, December 2019, https://humanitarianadvisorygroup.org/wp-content/uploads/2020/12/HH_China-Practice-Paper_Final-December-2019.pdf, 5.

239 Humanitarian Advisory Group, the International Council of Voluntary Agencies, the Innovation Center for Risk Governance at Beijing Normal University, Dr Denghua Zhang, Positive Disruption? China's Humanitarian Aid, December 2019, Humanitarian Advisory Group, the International Council of Voluntary Agencies, the Innovation Center for Risk Governance at Beijing Normal University, December 2019, https://humanitarianadvisorygroup.org/wp-content/uploads/2020/12/HH_China-Practice-Paper_Final-December-2019.pdf, 7.

240 Humanitarian Advisory Group, the International Council of Voluntary Agencies, the Innovation Center for Risk Governance at Beijing Normal University, Dr Denghua Zhang, Positive Disruption? China's Humanitarian Aid, December 2019, Humanitarian Advisory Group, the International Council of Voluntary Agencies, the Innovation Center for Risk Governance at Beijing Normal University, December 2019, https://humanitarianadvisorygroup.org/wp-content/uploads/2020/12/HH_China-Practice-Paper_Final-December-2019.pdf, 7.

241 Taylor Tielke, The Evolving Nature of China's Humanitarian Assistance, Center for Excellence in Disaster Relief and Humanitarian Assistance, Liaison, Vol X, Winter 2018, 35.

242 Center for Excellence in Humanitarian Assistance, China's Foreign Assistance: An Introduction, 2021 (unpublished)

243 Denghua Zhang and Hongbo Ji, The New Chinese Aid Agency After its First Two Years, Dev Policy Blog, 22 April 2020, https://devpolicy.org/the-new-chinese-aid-agency-after-its-first-two-years-20200422-2/

244 According to aid experts, CIDCA rekindled hope among Chinese NGOs that there would finally be a designated agency for China's foreign aid and that the agency might lead the way in defining the role of (and allocating aid budget to) Chinese NGOs in the delivery of Chinese aid. See Denghua Zhang and Hongbo Ji, The New Chinese Aid Agency After its First Two Years, Dev Policy Blog, 22 April 2020, https://devpolicy.org/the-new-chinese-aid-agency-after-its-first-two-years-20200422-2/

245 Denghua Zhang and Hongbo Ji, The New Chinese Aid Agency After its First Two Years, Dev Policy Blog, 22 April 2020, https://devpolicy.org/the-new-chinese-aid-agency-after-its-first-two-years-20200422-2/

246 Jennifer Hillman and David Sacks, China's Belt and Road: Implications for the United States, Updated March 2021, accessed 16 March 2022, https://www.cfr.org/report/chinas-belt-and-road-implications-for-the-united-states/

247 Singh, Bhopinder. "Alternative BRI may not only be feasible, but completely unavoidable: Statesman columnist," The Straits Times, 6 April 2021. https://www.straitstimes.com/asia/alternative-bri-may-not-only-be-feasible-but-completely-unavoidable-statesman-columnist

248 ICRC, Why there should be a humanitarian dimension to China's Belt and Road project, 15 May 2017, https://www.icrc.org/en/document/humanitarian-dimension-belt-and-road-initiative; ICRC, ICRC President: to integrate a humanitarian dimension in Belt and Road initiatives, ICRC President Video Speech, 3 November 2021, https://www.icrc.org/en/document/china-peter-maurer-speech-belt-and-road-initiative

249 Matthew Southerland, The Chinese Military's Role in Overseas Humanitarian Assistance and Disaster Relief: Contributions and Concerns, U.S.-China Economic and Security Review Commission, 11 July 2019, https://www.uscc.gov/research/chinese-militarys-role-overseas-humanitarian-assistance-and-disaster-relief-contributions

250 China Red Cross Society to send aid team to Nepal, The State Council, People's Republic of China, 29 April 2015, http://english.www.gov.cn/news/international_exchanges/2015/04/29/content_281475097980554.htm

251 Jo-Hannah Lavey, Unpacking China's overseas aid program, Lowy Institute, The Interpreter, 1 May 2020, https://www.lowyinstitute.org/the-interpreter/china-and-humanitarian-aid

252 ADRC. Information on Disaster Risk Reduction of the Member Countries. Accessed 14 February 2022. https://www.adrc.asia/nationinformation.php?NationCode=156&Lang=en

253 Article 2. Accessed 14 February 2022. http://www.lawinfochina.com/display.aspx?looktype=3&lib=law&Cgid=96791#:~:text=Article%201%20This%20Law%20has,and%20maintain%20the%20national%20security%2C

254 Article 3. Accessed 14 February 2022. http://www.lawinfochina.com/display.aspx?looktype=3&lib=law&Cgid=96791#:~:text=Article%201%20This%20Law%20has,and%20maintain%20the%20national%20security%2C

255 Article 4. Accessed 14 February 2022. http://www.lawinfochina.com/display.aspx?looktype=3&lib=law&Cgid=96791#:~:text=Article%201%20This%20Law%20has,and%20maintain%20the%20national%20security%2C

256 Article 1. Accessed 14 February 2022. http://www.asianlii.org/cn/legis/cen/laws/wascl305/

257 Articles 34, 35 & 36. Accessed 14 February 2022. http://www.asianlii.org/cn/legis/cen/laws/wascl305/

258 Articles 35 and 39. See also Library of Congress, Global Legal Monitor. China: Law on Earthquake Prevention and Disaster Relief Amended. 2009. https://www.loc.gov/item/global-legal-monitor/2009-01-13/china-law-on-earthquake-prevention-and-disaster-relief-amended/

259 Library of Congress, Global Legal Monitor. China: Law on Earthquake Prevention and Disaster Relief Amended. 2009. https://www.loc.gov/item/global-legal-monitor/2009-01-13/china-law-on-earthquake-prevention-and-disaster-relief-amended/

260 Article 1. EcoLex. Accessed 15 February 2022. https://www.ecolex.org/details/legislation/fire-protection-law-of-the-peoples-republic-of-china-lex-faoc146588/

261 Daniel Little. 'Fire safety in urban China.' Understanding Society Blog. 15 October 2021. https://understandingsociety.blogspot.com/2021/10/fire-safety-in-urban-china.html

262 Article 1. LawInfoChina. Accessed 15 February 2022. http://www.lawinfochina.com/display.aspx?lib=law&id=6240&CGid=

263 China Meteorological Administration. Brochure. Accessed 15 February 2022. http://www.hkssb.com/en/aboutcma/brochure/201203/P020120319791316093320.pdf

264 LawInChina. Production Safety Law of the People's Republic of China. Accessed 15 February 2022. http://www.lawinfochina.com/display.aspx?lib=law&id=2387&CGid=#menu5; International Labor Organization. Accessed 15 February 2022. https://www.ilo.org/dyn/natlex/docs/ELECTRONIC/76096/79572/F1970823603/

265 ADRC. Information on Disaster Risk Reduction of the Member Countries. Accessed 14 February 2022. https://www.adrc.asia/nationinformation.php?NationCode=156&Lang=en

266 Global Facility for Disaster Risk Reduction (GFDRR). The Evolution of National Disaster Risk Reduction Plans in China. August 2020. https://www.gfdrr.org/en/feature-story/evolution-national-disaster-risk-reduction-plans-china

267 GFDRR. National Demonstration Communities for Disaster Risk Reduction: Progress and Challenges. August 2020. https://www.gfdrr.org/en/feature-story/national-demonstration-communities-disaster-risk-reduction-progress-and-challenges

268 GFDRR. The Evolution of National Disaster Risk Reduction Plans in China. August 2020. https://www.gfdrr.org/en/feature-story/evolution-national-disaster-risk-reduction-plans-china

269 IFRC and UNDP. Effective Law and Regulation for Disaster Risk Reduction: A Multi-Country Study. June 2014. https://reliefweb.int/sites/reliefweb.int/files/resources/drr-full-report.pdf

270 USAID. Operational Policy, the Automated Directives System (ADS): ADS Chapter 251 International Disaster Assistance. Functional Series 200 – Programming. Revision date: 21 July 2020. https://www.usaid.gov/ads/policy/200/251

271 USAID. Where we work: China. 27 June 2019. https://www.usaid.gov/china

272 USAID. East Asia and the Pacific-Disaster Risk Reduction. 30 September 2017. https://www.usaid.gov/sites/default/files/documents/1866/09.30.17_-_USAID-OFDA_EAP_DRR_Fact_Sheet_-_FY_2017.pdf, 6.

273 National Committee on American Foreign Policy (NCAFP). September 2021. Barron, Daniels, Hulme, et al. https://www.ncafp.org/2016/wp-content/uploads/2021/09/NCAFP_China_Engagement_final_Sept-2021.pdf

274 Hao Shanli, U.S.-China Cooperation on Disaster Management Training, the Asia Foundation, InAsia Insights & Analysis, 23 September 2015, https://asiafoundation.org/2015/09/23/u-s-china-cooperation-disaster-management-training/

275 Congressional Research Service, China's Military: The People's Liberation Army (PLA), 4 June 2021, https://crsreports.congress.gov/product/details?prodcode=R46808, 7.

276 Congressional Research Service, China's Military: The People's Liberation Army (PLA), 4 June 2021, https://crsreports.congress.gov/product/details?prodcode=R46808, 8.

277 Matthew Southerland, The Chinese Military's Role in Overseas Humanitarian Assistance and Disaster Relief: Contributions and Concerns, U.S.-China Economic and Security Review Commission, 11 July 2019, https://www.uscc.gov/research/chinese-militarys-role-overseas-humanitarian-assistance-and-disaster-relief-contributions 2

278 Shi Baoyin, Zhao Lei, and He Wei. Spirits rise as floods subside. China Daily. 22 July 2021. https://www.chinadaily.com.cn/a/202107/22/WS60f8b104a310efa1bd663855_2.html

279 Zhao Lei. PLA deploys 5,700 to aid disaster relief efforts after C China floods. China Daily.com. 21 July 2021. https://www.chinadaily.com.cn/a/202107/21/WS60f81577a310efa1bd6637bf.html

280 Shi Baoyin, Zhao Lei, and He Wei. Spirits rise as floods subside. China Daily. 22 July 2021. https://www.chinadaily.com.cn/a/202107/22/WS60f8b104a310efa1bd663855_2.html

281 Reuters, China, West rush tsunami relief supplies to tsunami-hit Tonga, 26 January 2022, https://www.reuters.com/world/asia-pacific/china-west-rush-tsunami-relief-supplies-tsunami-hit-tonga-2022-01-27/

282 China Military Online, China-US seminar on humanitarian assistance and disaster reduction wraps up, 14 November 2020, http://eng.mod.gov.cn/news/2020-11/14/content_4874112.htm

283 Maj. Oliver Schuster, US-China hold 15th Annual Disaster Management Exchange, U.S. Army, News, 27 November 2019, https://www.army.mil/article/230491/us_china_hold_15th_annual_disaster_management_exchange

284 Defense Visual Information Distribution Service, 2018 U.S. China Disaster Management Exchange [Image 9 of 17], 17 November 2018, https://www.dvidshub.net/image/4928481/2018-us-china-disaster-management-exchange

285 Sgt. 1st Class April Davis. National Guard partners with Chinese in disaster drill. Oregon National Guard. 27 November 2017. https://www.nationalguard.mil/News/Article/1381168/ore-national-guard-partners-with-chinese-in-disaster-drill/

286 Staff Sgt. Michael Behlin, U.S.-China Disaster Management Exchange Participants Hold Expert Academic Exchange, U.S. INDPACOM, News, 14 December 2016, https://www.pacom.mil/Media/News/News-Article-View/Article/1029989/us-china-disaster-management-exchange-participants-hold-expert-academic-exchange/

287 Defense Visual Information Distribution Service (DVIDS). CFE-DMHA joins US delegation to China on disaster management. 13 January 2015. https://www.dvidshub.net/image/1752931/cfe-dmha-joins-us-delegation-china-disaster-management

288 DVIDS. People's Liberation Army Senior Medical Delegation Visit PACOM and Pearl Harbor Day 2. 11 March 2014. Photo by Petty Officer 1st Class Jay Chu. USINDOPACOM. https://www.dvidshub.net/image/1185217/peoples-liberation-army-senior-medical-delegation-visit-pacom-and-pearl-harbor-day-2

289 Tech. Sgt. Chris Vadnais. Air Guard delivers 200,000 lbs of relief to China. Air Force News Agency. 19 May 2008. https://www.nationalguard.mil/News/Article/573250/air-guard-delivers-200000-lbs-of-relief-to-china/

290 Peng, L., & Wu, F. Building Up Alliances and Breaking Down the State Monopoly: The Rise of Non-Governmental Disaster Relief in China. The China Quarterly, 234, 463-485, 2018. https://www.cambridge.org/core/journals/china-quarterly/article/abs/building-up-alliances-and-breaking-down-the-state-monopoly-the-rise-of-nongovernmental-disaster-relief-in-china/BB0BD19CA808472BE18A3D4EEA6FA2BE

291 Peng, L., & Wu, F. Building Up Alliances and Breaking Down the State Monopoly: The Rise of Non-Governmental Disaster Relief in China. The China Quarterly, 234, 463-485, 2018. https://www.cambridge.org/core/journals/china-quarterly/article/abs/building-up-alliances-and-breaking-down-the-state-monopoly-the-rise-of-nongovernmental-disaster-relief-in-china/BB0BD19CA808472BE18A3D4EEA6FA2BE

292 Peng, L., & Wu, F. Building Up Alliances and Breaking Down the State Monopoly: The Rise of Non-Governmental Disaster Relief in China. The China Quarterly, 234, 463-485, 2018. https://www.cambridge.org/core/journals/china-quarterly/article/abs/building-up-alliances-and-breaking-down-the-state-monopoly-the-rise-of-nongovernmental-disaster-relief-in-china/BB0BD19CA808472BE18A3D4EEA6FA2BE

293 China Development Brief. Chinese NGOs Cross the Himalayas: From Tangshan to Wenchuan to Nepal? 29 April 2015. https://chinadevelopmentbrief.org/reports/chinese-ngos-cross-the-himalayas-from-tangshan-to-wenchuan-to-nepal/

294 Peng, L., & Wu, F. Building Up Alliances and Breaking Down the State Monopoly: The Rise of Non-Governmental Disaster Relief in China. The China Quarterly, 234, 463-485, 2018. https://www.cambridge.org/core/journals/china-quarterly/article/abs/building-up-alliances-and-breaking-down-the-state-monopoly-the-rise-of-nongovernmental-disaster-relief-in-china/BB0BD19CA808472BE18A3D4EEA6FA2BE

295 China Development Brief. Chinese NGOs Cross the Himalayas: From Tangshan to Wenchuan to Nepal? 29 April 2015. https://chinadevelopmentbrief.org/reports/chinese-ngos-cross-the-himalayas-from-tangshan-to-wenchuan-to-nepal/

296 Peng, L., & Wu, F. Building Up Alliances and Breaking Down the State Monopoly: The Rise of Non-Governmental Disaster Relief in China. The China Quarterly, 234, 463-485, 2018. https://www.cambridge.org/core/journals/china-quarterly/article/abs/building-up-alliances-and-breaking-down-the-state-monopoly-the-rise-of-nongovernmental-disaster-relief-in-china/BB0BD19CA808472BE18A3D4EEA6FA2BE

297 Peng, L., & Wu, F. Building Up Alliances and Breaking Down the State Monopoly: The Rise of Non-Governmental Disaster Relief in China. The China Quarterly, 234, 463-485, 2018. https://www.cambridge.org/core/journals/china-quarterly/article/abs/building-up-alliances-and-breaking-down-the-state-monopoly-the-rise-of-nongovernmental-disaster-relief-in-china/BB0BD19CA808472BE18A3D4EEA6FA2BE

298 Peng, L., & Wu, F. Building Up Alliances and Breaking Down the State Monopoly: The Rise of Non-Governmental Disaster Relief in China. The China Quarterly, 234, 463-485, 2018. https://www.cambridge.org/core/journals/china-quarterly/article/abs/building-up-alliances-and-breaking-down-the-state-monopoly-the-rise-of-nongovernmental-disaster-relief-in-china/BB0BD19CA808472BE18A3D4EEA6FA2BE

299 Peng, L., & Wu, F. Building Up Alliances and Breaking Down the State Monopoly: The Rise of Non-Governmental Disaster Relief in China. The China Quarterly, 234, 463-485, 2018. https://www.cambridge.org/core/journals/china-quarterly/article/abs/building-up-alliances-and-breaking-down-the-state-monopoly-the-rise-of-nongovernmental-disaster-relief-in-china/BB0BD19CA808472BE18A3D4EEA6FA2BE

300 Peng, L., & Wu, F. Building Up Alliances and Breaking Down the State Monopoly: The Rise of Non-Governmental Disaster Relief in China. The China Quarterly, 234, 463-485, 2018. https://www.cambridge.org/core/journals/china-quarterly/article/abs/building-up-alliances-and-breaking-down-the-state-monopoly-the-rise-of-nongovernmental-disaster-relief-in-china/BB0BD19CA808472BE18A3D4EEA6FA2BE

301 Peng, L., & Wu, F. Building Up Alliances and Breaking Down the State Monopoly: The Rise of Non-Governmental Disaster Relief in China. The China Quarterly, 234, 463-485, 2018. https://www.cambridge.org/core/journals/china-quarterly/article/abs/building-up-alliances-and-breaking-down-the-state-monopoly-the-rise-of-nongovernmental-disaster-relief-in-china/BB0BD19CA808472BE18A3D4EEA6FA2BE

302 Red Cross Society of China. Accessed 17 February 2022. http://www.china.org.cn/english/MATERIAL/132108.htm; For "Disaster Relief Coordinating Alliance of Foundations" see: China Development Brief. Chinese NGOs Cross the Himalayas: From Tangshan to Wenchuan to Nepal? 29 April 2015. https://chinadevelopmentbrief.org/reports/chinese-ngos-cross-the-himalayas-from-tangshan-to-wenchuan-to-nepal/ and The Asia Foundation. China's NGOs Essential to Disaster Preparedness. InAsia Blog. 8 January 2014. https://asiafoundation.org/2014/01/08/chinas-ngos-essential-to-disaster-preparedness/; "NGODPC." NGO Disaster Preparedness Center (NGODPC). China Development Brief. Accessed 17 February 2022. https://chinadevelopmentbrief.org/ngos/ngo-disaster-preparedness-center-ngodpc-ngo/; "Shangming" see Peng, L., & Wu, F. Building Up Alliances and Breaking Down the State Monopoly: The Rise of Non-Governmental Disaster Relief in China. The China Quarterly, 234, 463-485, 2018. https://www.cambridge.org/core/journals/china-quarterly/article/abs/building-up-alliances-and-breaking-down-the-state-monopoly-the-rise-of-nongovernmental-disaster-relief-in-china/BB0BD19CA808472BE18A3D4EEA6FA2BE; "Blue Sky Rescue" see China Daily. Accessed 17 February 2022, https://watchthis.chinadaily.com.cn/content/WS5af4002da310cc9200067ee1.html and Tang Ailin, Zhu Tianyi AND Denise Jia. Caixin Nikkei Asia. 26 October 2021. https://asia.nikkei.com/Spotlight/Caixin/How-China-s-Blue-Sky-rescuers-try-to-save-the-day

303 Daniel Tam-Claiborne. China Foundation for Poverty Alleviation. China Foundation for Poverty Alleviation takes mission to 'disseminate good' overseas. SupChina. 24 August 2021. https://supchina.com/2021/08/24/china-foundation-for-poverty-alleviation-takes-mission-to-disseminate-good-overseas/#:~:text=In%20China%2C%20CFPA%20alleviates%20poverty,efforts%20aimed%20at%20disaster%20relief; Ruth Wang. Disaster Relief Committee of China Charity Alliance Founded in Beijing. China Christian Daily. 18 June 2016. http://chinachristiandaily.com/news/china/2016-06-18/disaster-relief-committee-of-china-charity-alliance-founded-in-beijing_1502; Narada Foundation. AVPN. Accessed 16 February 2022. https://avpn.asia/organisation/narada-foundation/; One Foundation. AVPN. Accessed 16 February 2022. https://avpn.asia/organisation/one-foundation/; YouChange China Social Entrepreneur Foundation. Accessed 17 February 2022. http://en.youcheng.org/index/about/about.html

304 ADB. Asian Development Bank and the People's Republic of China: Fact Sheet. Accessed 17 February 2022. https://www.adb.org/countries/prc/main and ADB. Integrated Framework for Cost-Effective Disaster Risk Management: Technical Assistance Report. July 2021. https://www.adb.org/projects/documents/prc-54447-001-tar; United Nations in China. Accessed 16 February 2022. http://www.un.org.cn/pages/UnitedNationsInChina.html and UN Country Team. Accessed 16 February 2022. http://www.un.org.cn/pages/UNCountryTeamInChina.

html; UNDRR. Strengthening and learning from China's work in Disaster Risk Reduction. 4 September 2020. https://www.undrr.org/news/strengthening-and-learning-chinas-work-disaster-risk-reduction; UNDP. Our Focus: Disaster Management. Accessed 16 February 2022. https://www.cn.undp.org/content/china/en/home/development-impact.html; ICRC. Accessed 15 February 2022. https://www.icrc.org/en/where-we-work/asia-pacific/china and ICRC Regional Delegation for East Asia. Accessed 15 February 2022. https://www.icrc.org/en/document/regional-delegation-for-east-asia-leaflet; China Care International. Accessed 16 February 2022. https://chinacareinternational.com/proposal-for-bridge-in-da-yang-village/; Plan International. China. Accessed 16 February 2022. https://plan-international.org/china; Save the Children. Humanitarian Response. Accessed 16 February 2022. https://china.savethechildren.net/what-we-do/humanitarian-response; The World Bank. World Bank in China. Updated 12 October 2021. https://www.worldbank.org/en/country/china/overview#2 and World Bank Open Knowledge Repository. Learning from Experience: Insights from China's Progress in Disaster Risk Management. 25 June 2020. https://openknowledge.worldbank.org/handle/10986/34090; World Vision. Who We Serve. Accessed 17 February 2022. http://www.worldvision.org.cn/en/Children-Affected-by-Disasters

305 World Bank. Learning from Disaster Simulation Drills in Japan. 2016. https://www.recoveryplatform.org/assets/publication/GFDRR/2017_Learning-From-Disaster-Simulation-Drills-in-Japan.pdf

306 Cabinet Office. Important Councils. Accessed 25 January 2022. https://www.cao.go.jp/en/importantcouncil.html

307 Cabinet Office. Disaster Management in Japan. Accessed 25 January 2022. http://www.bousai.go.jp/en/about/index.html

308 World Bank. Learning from Disaster Simulation Drills in Japan. 2016. https://www.recoveryplatform.org/assets/publication/GFDRR/2017_Learning-From-Disaster-Simulation-Drills-in-Japan.pdf

309 Cabinet Office. Disaster Management in Japan. Accessed 25 January 2022. http://www.bousai.go.jp/en/about/index.html

310 Japanese Law Translation. Basic Act on Disaster Management: Law number: Act No. 223 of 1961. Translated on 31 March 2018. http://www.japaneselawtranslation.go.jp/law/detail/?ft=4&re=02&dn=1&ty[]=A&ia=03&org_x=88&org_y=26&ta=b0&ky=&page=10

311 Cabinet Office. White Paper on Disaster Management 2021. http://www.bousai.go.jp/en/documentation/white_paper/index.html

312 Ministry of Foreign Affairs of Japan. Humanitarian Assistance / Emergency Assistance. 21 January 2021. https://www.mofa.go.jp/policy/emergency/index.html

313 Ministry of Foreign Affairs. Dispatch of Japan Disaster Relief Team. 12 June 2019. https://www.mofa.go.jp/policy/emergency/assistance1.html

314 Ministry of Foreign Affairs. Japan Disaster Relief Rescue Team was awarded IER "Heavy" classification. 5 March 2015. https://www.mofa.go.jp/press/release/press4e_000665.html

315 Ministry of Foreign Affairs. Emergency Relief Goods. 14 January 2016. https://www.mofa.go.jp/policy/emergency/assistance2.html

316 Japan International Cooperation Agency. Emergency Disaster Relief. Accessed 25 January 2022. https://www.jica.go.jp/english/our_work/types_of_assistance/emergency.html

317 Ministry of Foreign Affairs. Emergency Grant Aid. Accessed 25 January 2022. https://www.mofa.go.jp/policy/emergency/assistance3.html

318 Securities and Exchange Commission. Japan International Cooperation Agency. 27 September 2019. https://www.sec.gov/Archives/edgar/data/1679198/000119312519256488/d736920dex1.htm#toc

319 Japan International Cooperation Agency. Emergency Disaster Relief. Accessed 25 January 2022. https://www.jica.go.jp/english/our_work/types_of_assistance/emergency.html

320 World Bank. Learning from Disaster Simulation Drills in Japan. 2016. https://www.recoveryplatform.org/assets/publication/GFDRR/2017_Learning-From-Disaster-Simulation-Drills-in-Japan.pdf

321 Japan International Cooperation Agency. Emergency Disaster Relief. Accessed 25 January 2022. https://www.jica.go.jp/english/our_work/types_of_assistance/emergency.html

322 Fire and Disaster Management Agency. Accessed 27 January 2022. https://www.fdma.go.jp/en/post1.html

323 World Bank. Learning from Disaster Simulation Drills in Japan. 2016. https://www.recoveryplatform.org/assets/publication/GFDRR/2017_Learning-From-Disaster-Simulation-Drills-in-Japan.pdf

324 Cabinet Office. White Paper on Disaster Management 2021. http://www.bousai.go.jp/en/documentation/white_paper/index.html

325 Cabinet Office. Disaster Management in Japan. April 2021. http://www.bousai.go.jp/1info/pdf/saigaipamphlet_je.pdf

326 Cabinet Office. White Paper on Disaster Management 2021. http://www.bousai.go.jp/en/documentation/white_paper/index.html

327 Ministry of Foreign Affairs. Inauguration of New JICA (Japan International Cooperation Agency). 1 October 2008. https://www.mofa.go.jp/announce/announce/2008/10/1183666_1060.html

328 Ministry of Foreign Affairs. Disaster Prevention. Accessed 25 January 2022. https://www.mofa.go.jp/policy/disaster/21st/3.html

329 World Bank. Learning from Disaster Simulation Drills in Japan. 2016. https://www.recoveryplatform.org/assets/publication/GFDRR/2017_Learning-From-Disaster-Simulation-Drills-in-Japan.pdf

330 Cabinet Office. White Paper on Disaster Management 2021. http://www.bousai.go.jp/en/documentation/white_paper/index.html

331 Cabinet Office. Disaster Management in Japan. April 2021. http://www.bousai.go.jp/1info/pdf/saigaipamphlet_je.pdf

332 Grantham Research Institute on Climate Change and the Environment. Climate Change Laws of the World: Japan, Laws, Basic Act for National Resilience Contributing to Preventing and Mitigating Disasters for Developing Resilience in the Lives of the Citizenry. 2013. https://www.climate-laws.org/geographies/japan/laws/basic-act-for-national-resilience-contributing-to-preventing-and-mitigating-disasters-for-developing-resilience-in-the-lives-of-the-citizenry#:~:text=Disaster%20Risk%20Management-,Basic%20Act%20for%20National%20Resilience%20Contributing%20to%20Preventing%20and%20Mitigating,the%20Lives%20of%20the%20Citizenry&text=This%20law%20defines%20the%20Japanese,resilient%20to%20large%2Dscale%20disasters.

333 Cabinet Secretariat. Fundamental Plan for National Resilience - For Building a Strong and Flexible Country. 14 December 2018. https://www.cas.go.jp/jp/seisaku/kokudo_kyoujinka/en/fundamental_plan.pdf

334 Ishiwatari, Mikio. Disaster Risk Reduction to Adapt to Climate Change: Approaches and Challenges. Japan Institute of International Affairs. 1 November 2021. https://www.jiia.or.jp/en/column/2021/11/Global-Issues-fy2021-01.html

335 USAID. Operational Policy, the Automated Directives System (ADS): ADS Chapter 251 International Disaster Assistance. Functional Series 200 – Programming. Revision date: 21 July 2020. https://www.usaid.gov/ads/policy/200/251

336 USAID. Office of Civilian-Military Cooperation. 15 October 2020. https://www.usaid.gov/military

337 Cabinet Office. White Paper on Disaster Management 2021. http://www.bousai.go.jp/en/documentation/white_paper/index.html

338 Fleishman, Rachel, et al. The Japan-U.S. Alliance and Climate Security: Building on the Alliance's History for Future Preparedness and Response. Sasakawa USA. 4 September 2020. https://spfusa.org/research/the-japan-u-s-alliance-and-climate-security-building-on-the-alliances-history-for-future-preparedness-and-response/

339 Cabinet Office. White Paper on Disaster Management 2021. http://www.bousai.go.jp/en/documentation/white_paper/index.html

340 Ministry of Foreign Affairs. Signing of a Memorandum of Cooperation (MOC) between Japan International Cooperation Agency (JICA) and the Overseas Private Investment Corporation (OPIC) of the United States of America. 27 September 2018. https://www.mofa.go.jp/press/release/press4e_002170.html

341 Ministry of Defense. Response to Various Disasters. Accessed 26 January 2022. https://www.mod.go.jp/en/publ/answers/rvd/index.html

342 Reconstruction Agency. Message from the Chief of Staff of the Joint Staff of the Japan Self-Defense Forces. 11 March 2021. https://www.reconstruction.go.jp/10year/en/self-defense-force.html

343 Japan International Cooperation Agency. Emergency Disaster Relief. Accessed 25 January 2022. https://www.jica.go.jp/english/our_work/types_of_assistance/emergency.html

344 International Policy Division, Bureau of Defense Policy, Ministry of Defense. Japan's Defense Capacity Building Assistance. February 2016. https://www.mofa.go.jp/files/000146830.pdf

345 Fleishman, Rachel, et al. The Japan-U.S. Alliance and Climate Security: Building on the Alliance's History for Future Preparedness and Response. Sasakawa USA. 4 September 2020. https://spfusa.org/research/the-japan-u-s-alliance-and-climate-security-building-on-the-alliances-history-for-future-preparedness-and-response/

346 World Bank. Learning from Disaster Simulation Drills in Japan. 2016. https://www.recoveryplatform.org/assets/publication/GFDRR/2017_Learning-From-Disaster-Simulation-Drills-in-Japan.pdf

347 Bosack, Michael. SECURITY The Legacy of 3/11 and the U.S.-Japan Alliance. Tokyo Review. 9 March 2018. https://www.tokyoreview.net/2018/03/the-legacy-of-3-11-and-the-u-s-japan-alliance/

348 Burke, Matthew M. and Mari Higa. In a first, US and Japanese troops practice disaster response together on Okinawa. Stars and Stripes. 4 November 2021. https://www.stripes.com/theaters/asia_pacific/2021-11-03/earthquake-exercise-marine-corps-air-force-okinawa-3487401.html

349 Ministry of Defense. Japan-U.S. Search and Rescue Training. November 2021. https://www.mod.go.jp/en/article/2021/11/7b7f6fe4606deb7cc24edc40bc691c7adcb1a9df.html

350 Chatmas, Lt.Cmdr. Lauren. Philippine-U.S. Exercise MTA Sama Sama Kicks-off with Japan, France. Command Destroyer Squadron 7. 12 October 2021. https://www.pacom.mil/Media/News/News-Article-View/Article/2807855/philippine-us-exercise-mta-sama-sama-kicks-off-with-japan-france/

351 Ministry of Defense. JGSDF joined U.S.-Philippine-hosted exercise KAMANDAG 21. October 2021. https://www.mod.go.jp/en/article/2021/10/35bf5f52280ca2247b4f30b3db6047e6e40d6640.html

352 Ministry of Defense. Tomodachi Rescue Exercise 21. February 2021. https://www.mod.go.jp/en/article/2021/02/c65ea02f480704bb2b1a45ff14c24caf56054ff7.html

353 Reconstruction Agency. Message from the Chief of Staff of the Joint Staff of the Japan Self-Defense Forces. 11 March 2021. https://www.reconstruction.go.jp/10year/en/self-defense-force.html

354 Workman, Staff Sgt. Taylor A. US, JSDF team up for humanitarian exercise in Komaki. 374th Airlift Wing. 2 March 2020. https://www.yokota.af.mil/News/Article-Display/Article/2098703/us-jsdf-team-up-for-humanitarian-exercise-in-komaki/

355 Cano, By Cpl. Gerardo. Marines learn from JSDF disaster relief exercise. 1st Marine Aircraft Wing. 31 August 2019. https://www.dvidshub.net/news/341050/marines-learn-jsdf-disaster-relief-exercise

356 Cano, By Cpl. Gerardo. Marines learn from JSDF disaster relief exercise. 1st Marine Aircraft Wing. 31 August 2019. https://www.dvidshub.net/news/341050/marines-learn-jsdf-disaster-relief-exercise

357 Brown, Wendy. USAG Japan works with Japanese emergency services during disaster drill. U.S. Army Garrison Japan Public Affairs. 4 September 2019. https://www.army.mil/article/226639/usag_japan_works_with_japanese_emergency_services_during_disaster_drill

358 Figueroa, Erika. USNH Yokosuka's Emergency Response Team Supports Kanagawa's Annual "Big Rescue" Drill Big Rescue Kanagawa. U.S. Naval Hospital Yokosuka . 31 August 2019. https://www.dvidshub.net/news/345992/usnh-yokosukas-emergency-response-team-supports-kanagawas-annual-big-rescue-drill

359 Kudo, Noriko. USAG Japan conducts HADR evacuation drill with host-nation partners. U.S. Army Garrison Japan Public Affairs. 28 March 2019. https://www.army.mil/article/219367/usag_japan_conducts_hadr_evacuation_drill_with_host_nation_partners

360 Handa Hospital. We participated in the 2018 Japan-US Joint Integrated Disaster Prevention Drill (30TREX). http://www.handa-hospital.jp/topics/2018/1013-bousai.html

361 Osakabe, Yasuo. Yokota Airmen demonstrate rescue capabilities during the 2017 Big Rescue Kanagawa. 374 Airlift Wing Public Affairs. 6 September 2017. https://www.yokota.af.mil/News/Article-Display/Article/1301233/yokota-airmen-demonstrate-rescue-capabilities-during-the-2017-big-rescue-kanaga/

362 Dornfeld, Cpl. Kelsey. U.S.-Japan Conduct Aerial Integration Training during Forest Light 17-1. III Marine Expeditionary Force. 10 March 2017. https://www.pacom.mil/Media/News/News-Article-View/Article/1109924/us-japan-conduct-aerial-integration-training-during-forest-light-17-1/

363 7th Fleet Public Affairs. U.S. Navy, U.S. Marine Corps Team Up to Support Sasebo Disaster Drill. 2 September 2016. https://www.pacom.mil/Media/News/News-Article-View/Article/934573/us-navy-us-marine-corps-team-up-to-support-sasebo-disaster-drill/

364 Greg Mitchell, Greg. USNH Yokosuka Teams with Multiple US, Japan Forces During Big Rescue Kanagawa 2016. U.S. Naval Hospital Yokosuka Public Affairs. 15 September 2016. https://www.navy.mil/Press-Office/News-Stories/Article/2260196/usnh-yokosuka-teams-with-multiple-us-japan-forces-during-big-rescue-kanagawa-20/

365 Quezada, Sgt. Jessica Quezada. Exercise Habu Sentinel 16 Tests Marines' Chemical, Biological, Radiological and Nuclear Response Capabilities. Marine Corps Air Station Iwakuni. 8 June 2016. https://www.pacom.mil/Media/News/News-Article-View/Article/794870/exercise-habu-sentinel-16-tests-marines-chemical-biological-radiological-and-nu/

366 Cabinet Office. White Paper on Disaster Management 2021. http://www.bousai.go.jp/en/documentation/white_paper/index.html

367 Japan International Cooperation Agency. Partnership with Other Development Partners. Accessed 25 January 2022. https://www.jica.go.jp/english/our_work/partnership/activity.html

368 JANIC. What is JANIC. Accessed 1 February 2022. https://www.janic.org/janic/

369 Ministry of Foreign Affairs. International Cooperation and NGOs: Partnership between the Ministry of Foreign Ministry of Japan and Japanese NGOs. 2013. https://www.mofa.go.jp/files/000024755.pdf

370 Ministry of Foreign Affairs. International Cooperation and NGOs: Partnership between the Ministry of Foreign Ministry of Japan and Japanese NGOs. 2013. https://www.mofa.go.jp/files/000024755.pdf

371 Japan Platform. About Japan Platform. Accessed 1 February 2022. https://www.japanplatform.org/E/about/

372 United Nations Information Centre. UN Organizations in Japan. Accessed 25 January 2022. https://www.unic.or.jp/info/un_agencies_japan/?lang=en

373 EM-DAT. The International Disasters Database. 2017. Via OECD. OECD Reviews of Public Health: Korea: A Healthier Tomorrow. Chapter 4. Korea's preparedness for public health emergencies. 2020. https://www.oecd-ilibrary.org/sites/7ba9cad3-en/index.html?itemId=/content/component/7ba9cad3-en

374 OECD. OECD Reviews of Public Health: Korea: A Healthier Tomorrow. Chapter 4. Korea's preparedness for public health emergencies. 2020. https://www.oecd-ilibrary.org/sites/7ba9cad3-en/index.html?itemId=/content/component/7ba9cad3-en

375 Permanent Mission of the Republic of Korea to the United Nation. Human Rights and Humanitarian Assistance. Accessed 10 February 2022. https://overseas.mofa.go.kr/un-en/wpge/m_5162/contents.do

376 Ministry of the Interior and Safety. Disaster and Safety Management in Korea. 4 January 2021. https://www.mois.go.kr/eng/bbs/type002/commonSelectBoardArticle.do?bbsId=BBSMSTR_000000000022&nttId=83751

377 Song, Young Seok, et al. Improvement Measure of Integrated Disaster Management System Considering Disaster Damage Characteristics: Focusing on the Republic of Korea. Sustainability 2020, 12, 340; doi:10.3390/su12010340

378 Ministry of the Interior and Safety. Disaster and Safety Management in Korea. 4 January 2021. https://www.mois.go.kr/eng/bbs/type002/commonSelectBoardArticle.do?bbsId=BBSMSTR_000000000022&nttId=83751

379 OECD. OECD Reviews of Public Health: Korea: A Healthier Tomorrow. Chapter 4. Korea's preparedness for public health emergencies. 2020. https://www.oecd-ilibrary.org/sites/7ba9cad3-en/index.html?itemId=/content/component/7ba9cad3-en

380 OECD. OECD Reviews of Public Health: Korea: A Healthier Tomorrow. Chapter 4. Korea's preparedness for public health emergencies. 2020. https://www.oecd-ilibrary.org/sites/7ba9cad3-en/index.html?itemId=/content/component/7ba9cad3-en

381 OECD. OECD Reviews of Public Health: Korea: A Healthier Tomorrow. Chapter 4. Korea's preparedness for public health emergencies. 2020. https://www.oecd-ilibrary.org/sites/7ba9cad3-en/index.html?itemId=/content/component/7ba9cad3-en

382 Organisation for Economic Co-operation and Development. Risk Communication within the National Disaster Management System in Korea. Accessed 8 February 2022. https://www.oecd.org/governance/toolkit-on-risk-governance/goodpractices/page/riskcommunicationwithinthenationaldisastermanagementsysteminkorea.htm

383 OECD. OECD Reviews of Public Health: Korea: A Healthier Tomorrow. Chapter 4. Korea's preparedness for public health emergencies. 2020. https://www.oecd-ilibrary.org/sites/7ba9cad3-en/index.html?itemId=/content/component/7ba9cad3-en

384 Development Co-Operation Directorate of OECD. Korea Mid-term Review, 7-10 June 2021, Seoul – Paris. 15 July 2021. https://www.oecd.org/dac/peer-reviews/DAC-mid-term-Korea-2021.pdf

385 KOICA. What we Do. Accessed 10 Feb 2022. http://www.koica.go.kr/koica_en/3443/subview.do

386 KOICA. What we Do. Accessed 10 Feb 2022. http://www.koica.go.kr/koica_en/3444/subview.do

387 OECD. OECD Development Co-operation Peer Reviews: Korea 2018. Chapter 7. Korea's Humanitarian Assistance. https://www.oecd-ilibrary.org/sites/9789264288829-12-en/index.html?itemId=/content/component/9789264288829-12-en

388 INSARAG. IEC. Accessed 10 February 2022. https://www.insarag.org/iec/iec/

389 National Institute for Disaster Prevention. South Korea. 2014. https://nidm.gov.in/easindia2014/err/pdf/country_profile/south_korea.pdf

390 OECD. OECD Reviews of Public Health: Korea: A Healthier Tomorrow. Chapter 4. Korea's preparedness for public health emergencies. 2020. https://www.oecd-ilibrary.org/sites/7ba9cad3-en/index.html?itemId=/content/component/7ba9cad3-en

391 UN Food and Agriculture Organization. Overseas Emergency Relief Act. Last amended November 2014. http://extwprlegs1.fao.org/docs/pdf/kor168036.pdf

392 Statutes of the Republic of Korea. Overseas Emergency Relief Act. 19 November 2014. https://elaw.klri.re.kr/kor_service/ebook.do?hseq=33535#2

393 OECD. OECD Development Co-operation Peer Reviews: Korea 2018. Chapter 7. Korea's Humanitarian Assistance. https://www.oecd-ilibrary.org/sites/9789264288829-12-en/index.html?itemId=/content/component/9789264288829-12-en

394 Inter-Agency Standing Committee. The Republic of Korea joins the Grand Bargain. 2 March 2020. https://interagencystandingcommittee.org/grand-bargain-official-website/republic-korea-joins-grand-bargain

395 USAID. Operational Policy, the Automated Directives System (ADS): ADS Chapter 251 International Disaster Assistance. Functional Series 200 – Programming. Revision date: 21 July 2020. https://www.usaid.gov/ads/policy/200/251

396 U.S. Embassy and Consulate in the Republic of Korea. U.S.-South Korea Relations. Accessed 14 February 2022. https://kr.usembassy.gov/our-relationship/policy-history/us-country-relations/

397 Ministry of the Interior and Safety. Disaster and Safety Management in Korea. 4 January 2021. https://www.mois.go.kr/eng/bbs/type002/commonSelectBoardArticle.do?bbsId=BBSMSTR_000000000022&nttId=83751

398 U.S. Embassy and Consulate in the Republic of Korea. The U.S. and ROK on Working Together to Promote Cooperation between the Indo-Pacific Strategy and the New Southern Policy. Accessed 14 February 2022. https://kr.usembassy.gov/111320-the-u-s-and-rok-on-working-together-to-promote-cooperation-between-the-indo-pacific-strategy-and-the-new-southern-policy/

399 U.S. Embassy and Consulate in the Republic of Korea. U.S.-South Korea Relations. Accessed 14 February 2022. https://kr.usembassy.gov/our-relationship/policy-history/us-country-relations/

400 U.S. Embassy and Consulate in the Republic of Korea. The U.S. and ROK on Working Together to Promote Cooperation between the Indo-Pacific Strategy and the New Southern Policy. Accessed 14 February 2022. https://kr.usembassy.gov/111320-the-u-s-and-rok-on-working-together-to-promote-cooperation-between-the-indo-pacific-strategy-and-the-new-southern-policy/

401 IOM-UN Migration. Republic of Korea. Accessed 13 March 2022. https://www.iom.int/countries/republic-korea

402 Ministry of National Defense. 2018 Defense White Paper. https://www.mnd.go.kr/user/mndEN/upload/pblictn/PBLICTNEBOOK_201908070153390840.pdf

403 Queen, Sgt. 1st Class John. Operation Pacific Reach Exercise 2017 begins. U.S. Forces, Korea. 11 April 2017. https://www.usfk.mil/Media/News/Article/1147209/operation-pacific-reach-exercise-2017-begins/

404 30th Naval Construction Regiment Public Affairs. 30th Naval Construction Regiment Partners with Republic of Korea Seabees for Foal Eagle. 11 March 2016. https://www.pacom.mil/Media/News/Article/691743/30th-naval-construction-regiment-partners-with-republic-of-korea-seabees-for-fo/

405 OECD. Development Assistance Committee Members and Civil Society, The Development Dimension. 2020. https://doi.org/10.1787/51eb6df1-en

406 Jung, Do-Young and Kyoo-Man Ha. A Comparison of the Role of Voluntary Organizations in Disaster Management. Sustainability 13, no. 4: 1669. 2021. https://doi.org/10.3390/su13041669

407 United Nations in the Republic of Korea. United Nations Offices in the ROK. Accessed 7 February 2022. https://un-rok.org/#:~:text=About%20the%20United%20Nations%20in,UN%20agencies%20and%20international%20organizations.

408 Photo Source: Introduction, Hope Bridge, https://relief.or.kr/eng/hope/intro.php

409 Country Reports. Taiwan Geography. https://www.countryreports.org/country/Taiwan/geography.htm

410 Dilley, Maxx; Chen, Robert S.; Deichmann, Uwe; Lerner-Lam, Arthur L.; Arnold, Margaret. Natural Disaster Hotspots: A Global Risk Analysis. Washington, DC: World Bank. 2005. p.4. https://openknowledge.worldbank.org/handle/10986/7376

411 INFORM. https://drmkc.jrc.ec.europa.eu/inform-index.

412 World Risk Report 2021. https://weltrisikobericht.de/wp-content/uploads/2021/09/WorldRiskReport_2021_Online.pdf

413 Geography of Taiwan. http://twgeog.ntnugeog.org/en/natural_hazard/

414 Chan, Mignonne. Risk Management for Disasters in Taiwan. Japan SPOTLIGHT. September / October 2012. p. 10-13. https://www.jef.or.jp/journal/pdf/185th_cover03.pdf

415 Britannica. Taiwan earthquake of 1999. https://www.britannica.com/event/Taiwan-earthquake-of-1999

416 Government Portal of the Republic of China. History. https://taiwan.gov.tw/content_3.php

417 BBC News. Taiwan Profile: Timeline. https://www.bbc.com/news/world-asia-16178545

418 Shattuck, Thomas. Taiwan's White Terror: Remembering the 228 Incident. Foreign Policy Research Institute. 27 February 2017. https://www.fpri.org/article/2017/02/taiwans-white-terror-remembering-228-incident/

419 John Fuh-sheng Hsieh, Emerson M.S. Niou. Taiwan's March 1996 elections. Electoral Studies, Volume 15, Issue 4, 1996, Pages 545-550. https://doi.org/10.1016/S0261-3794(96)80472-0.

420 Freedom House. Countries and Territories: Global Freedom Scores. 2021. https://freedomhouse.org/countries/freedom-world/scores?sort=desc&order=Total%20Score%20and%20Status

421 Hale, Erin. Taiwan Ranks Among Top 10 Democracies in Annual Index. Voice of America. 11 February 2021. https://www.voanews.com/a/taiwan-ranks-among-top-10-democracies-in-annual-index-/6438806.html

422 Hsu, Crystal. Economy ranked 'Free' for first time. Taipei Times. 16 February 2022. https://taipeitimes.com/News/front/archives/2022/02/16/2003773204

423 Taipei Times. Taiwan No. 1 in Asia, world No. 6 for gender equality. 9 January 2021. https://www.taipeitimes.com/News/taiwan/archives/2021/01/09/2003750242

424 Executive Yuan, Gender Equality Committee. Gender at a Glance in R.O.C. (Taiwan). https://gec.ey.gov.tw/Page/8996A23EDB9871BE

425 Lee, Hsin-Chi. Taiwan's "Warm Power": Gender Equality and The New Southbound Policy. Taiwan Insight: The online magazine of the Taiwan Studies Programme. 20 May 2020. https://taiwaninsight.org/2020/05/20/taiwans-warm-power-gender-equality-and-the-new-southbound-policy/

426 Hollingsworth, Julia. Taiwan legalizes same-sex marriage in historic first for Asia. CNN. 17 May 2019. https://edition.cnn.com/2019/05/17/asia/taiwan-same-sex-marriage-intl/index.html

427 Bosner, Leo, and I-wei Jennifer Chang. "Taiwan's Disaster Preparedness and Response: Strengths, Shortfalls, and Paths to Improvement." Global Taiwan Institute. October 2020. p. 9. https://globaltaiwan.org/wp-content/uploads/2020/10/GTI-Taiwans-Disaster-Preparedness-and-Response-Oct-2020-final.pdf?mc_cid=518eb59a56&mc_eid=ad991f7720

428 Bosner and Chang. October 2020. p. 14.

429 "Evidence-based emergency response and disaster risk management in Taiwan" brief, by Wei-Sen Li, Secretary General, National Science and Technology Center for Disaster Reduction (NCDR), 2017.03.14

430 Johnson, Casey. "Taiwan's HADR Posture: Context, Capacity and GPC Implications." Liaison: A Journal of Civil-Military Disaster Management & Humanitarian Relief Collaborations. Volume 13, Issue 1, 2021. pp. 12-23. https://www.cfe-dmha.org/LinkClick.aspx?fileticket=ZY-0LUUs74Uo%3d&portalid=0

431 Bosner and Chang. October 2020. p. 13.

432 National Fire Agency. http://tc.nfa.gov.tw

433 Johnson, 2021, p. 17.

434 INSARAG. "Report on the Meeting of the INSARAG Regional Group Asia/Pacific." November 2001. https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.insarag.org%2Fwp-content%2Fuploads%2F2016%2F04%2F2001_INSARAG_Asia-Pacific_Meeting_Report_English.doc&wdOrigin=BROWSELINK

435 Lee, Hsin-fang, and Sherry Hsiao. "Taiwan's UN-certified search-and-rescue dogs a rarity in Asia, firefighters say." Taipei Times. 22 September 2018. https://www.taipeitimes.com/News/taiwan/archives/2018/09/22/2003700926

436 NASC. https://www.nasc.gov.tw/

437 Dolbow, Jim. "World's Coast Guards - Taiwan CGA Committed to Maritime Security." USNI. August 2016. https://www.usni.org/magazines/proceedings/2016/august/worlds-coast-guards-taiwan-cga-committed-maritime-security

438 Morris, Lyle. "History and Current Developments Regarding Taiwan's Coast Guard Administration." RAND. 15 February 2017. https://www.rand.org/blog/2017/02/history-and-current-developments-regarding-taiwans.html

439 Chen, Liang-Chung, Jie-Ying Wu, and Mei-Ju Lai (2006). "The Evolution of the Natural Disaster Management System in Taiwan," Journal of the Chinese Institute of Engineers. Vol. 29, No. 4, pp. 633-638, 2006.

440 Laws and Regulations Database of The Republic of China. "Disaster Prevention and Protection Act." https://law.moj.gov.tw/ENG/LawClass/LawAll.aspx?pcode=D0120014

441 Bosner and Chang. October 2020. p. 8.

442 Laws and Regulations Database of The Republic of China. "Disaster Prevention and Protection Act: Article 3."

443 Bosner and Chang. October 2020. p. 10.

444 National Science and Technology Center for Disaster Reduction. About NCDR: "Primary Missions" and "Scope of Mandates." https://www.ncdr.nat.gov.tw/Page?itemid=61&mid=75

445 Wen, Jet-Chau, Shao-Yang Huang, Chi-Feng Lin, Chia-Chen Hsu, and Wen-Ni Chen. "Typhoon Morakot and institutional changes in Taiwan." In: Shaw R. (eds.) Disaster Recovery. Disaster Risk Reduction (Methods, Approaches and Practices). Springer, Tokyo. 14 September 2013. https://doi.org/10.1007/978-4-431-54255-1_4

446 Lin, Sheng-feng. Translated by Elizabeth Gardner. U.S. Aid and The Origins Of Taiwanese Wheat Culture. Originally by the National Museum of Taiwan History, 25 March 2021. Translation in Taiwan Gazette, 21 November 2021. https://www.taiwangazette.org/news/2021/11/21/us-aid-and-the-origins-of-taiwanese-wheat-culture ; https://collections.nmth.gov.tw/article.aspx?a=244

447 USAID. Operational Policy, the Automated Directives System (ADS): ADS Chapter 251 International Disaster Assistance. Functional Series 200 – Programming. Revision date: 21 July 2020. https://www.usaid.gov/ads/policy/200/251

448 USAID. U.S., Taiwan Collaborate to Boost COVID-19 Case Management in the Pacific Islands. 25 January 2022. https://www.usaid.gov/pacific-islands/press-releases/01-25-2022-united-states-taiwan-collaborate-boost-covid-19-case-management-in-the-pacific-islands

449 USAID. USAID-SUPPORTED E-GOVERNMENT PROGRAM FEATURED IN TRAINING FOR PACIFIC ISLANDS. 15 October 2021. https://www.usaid.gov/vietnam/program-updates/oct-2021-usaid-supported-e-government-program-featured-training-pacific-islands

450 AIT. "The United States, Taiwan, Japan, Australia, and the UK Cohost Virtual GCTF workshop on Building Disaster Resilience at Global and National Levels." 24 September 2021. https://www.ait.org.tw/us-tw-jp-au-uk-cohost-vgctf-building-disaster-resilience-at-global-and-national-levels/?_ga=2.106971010.1290199088.1645141690-368971194.1641254855

451 USAID. U.S., Taiwan Collaborate to Boost Capacity of Health Workers in the Pacific Islands. 13 July 2021. https://www.usaid.gov/pacific-islands/press-releases/july-13-2021-united-states-taiwan-collaborate-boost-capacity-health-workers-pacific-islands

452 Taiwan MOFA. "Taiwan, US, Japan, UK stage GCTF forum on building disaster resilience." 11 March 2021. https://nspp.mofa.gov.tw/nsppe/news.php?post=196142&unit=370&unitname=Government-News&-US,-Japan,-UK-stage-GCTF-forum-on-building-disaster-resilience

453 U.S., Taiwan launch disaster preparedness cooperation. Focus Taiwan. 11 March 2021. https://focustaiwan.tw/politics/202103110004 ; https://www.intellasia.net/us-taiwan-launch-disaster-preparedness-cooperation-882607

454 DKI APCSS. "US, Taiwan Lead Multilateral Workshop on Private, Civil and Public Disaster Response Cooperation." https://apcss.org/us-taiwan-lead-multilateral-workshop-on-private-civil-and-public-disaster-response-cooperation/

455 AIT. "Global Cooperation and Training Framework (GCTF) International Workshop Held on December 14." 14 December 2018. https://www.ait.org.tw/global-cooperation-and-training-framework-gctf-international-workshop-on-humanitarian-assistance-and-disaster-relief-held-on-december-14/?_ga=2.182858022.1290199088.1645141690-368971194.1641254855

456 GCTF. Remarks by Vice Minister Der-li Liu for GCTF Workshop on Humanitarian Assistance and Disaster Relief. 5 July 2017. https://gctf.tw/en/issues_detail20_0.htm

457 "Peace Winds Joins Disaster Relief Forum in Taiwan." Peace Winds America. 18 July 2017. http://peacewindsamerica.org/taiwan-hadr-forum/

458 Johnson, 2021, p. 22.

459 BBC. Taiwan Receives International Aid. 17 August 2009. http://news.bbc.co.uk/2/hi/asia-pacific/8205447.stm

460 Lin, Chun-Yuan. "WORKING PAPER: Disaster Risk Management System and the Role of Insurance in the Climate Change Era—the Perspective of Taiwan," Climate Change Law in the Asia Pacific Conference. Center for Law, Energy and the Environment, University of California, Berkeley. September 2019. https://www.law.berkeley.edu/research/clee/resources/scholarship/climate-change-law-in-the-asia-pacific/

461 Johnson, 2021, p. 22.

462 Wang, Yu-Chen. "The Armed Forces took part in the "Min'an No. 7 Exercise" in Hsinchu to verify the results of integrated disaster relief." Military News Agency. 13 May 2021. https://mna.gpwb.gov.tw/en/news/detail/?UserKey=f42ae61b-96e5-443b-9a35-2c1c8bd17eea

463 Medical Affairs Bureau, Ministry of National Defense. "Humanitarian Assistance and Disaster Relief (HADR) Health Support." 22 March 2017. https://mab.mnd.gov.tw/pageview.aspx?c=2&language=en&subject=Humanitarian%20Assistance%20and%20Disaster%20Relief%20(HADR)%20Health%20Support

464 Relief aid from Taiwan arrives in Philippines. 12 November 2013. https://www.globalsecurity.org/military/library/news/2013/11/mil-131112-cna02.htm

465 "Taiwan donates food and water to aid Philippines." Taipei Times. 27 December 2021 https://www.taipeitimes.com/News/taiwan/archives/2021/12/27/2003770267

466 Lagunda, Kevin. "Taiwan sends aid to Cebu, other areas hit by 'Odette'." SunStar. 13 February 2022. https://www.sunstar.com.ph/article/1920870/cebu/local-news/taiwan-sends-aid-to-cebu-other-areas-hit-by-odette

467 U.S. Indo-Pacific Command. "Pacific Partnership 2021 Mission Concludes in Palau." 13 August 2021. https://www.pacom.mil/Media/News/News-Article-View/Article/2731776/pacific-partnership-2021-mission-concludes-in-palau/

468 BBC. Taiwan Receives International Aid. 17 August 2009. http://news.bbc.co.uk/2/hi/asia-pacific/8205447.stm

469 USAID. "Taiwan: Most recent disaster declaration - Typhoon, 11 Aug 2009." https://reliefweb.int/report/china-taiwan-province/taiwan-most-recent-disaster-declaration-typhoon-11-aug-2009

470 USAID. "Taiwan - Typhoon Fact Sheet #2, Fiscal Year (FY) 2009." 26 August 2009. https://reliefweb.int/report/china-taiwan-province/taiwan-typhoon-fact-sheet-2-fiscal-year-fy-2009

471 Stars and Stripes. U.S. sends troops, aid for victims of typhoon in Taiwan. 19 August 2009. https://www.stripes.com/news/u-s-sends-troops-aid-for-victims-of-typhoon-in-taiwan-1.94026

472 Captain Cathal O'Connor, "Foreign Humanitarian Assistance And Disaster-Relief Operations: Lessons Learned And Best Practices," Naval War College Review, Winter 2012, Vol. 65, No. 1, pp. 152-160. https://apps.dtic.mil/dtic/tr/fulltext/u2/1001888.pdf

473 USAID. "Taiwan - Typhoon Fact Sheet #2, Fiscal Year (FY) 2009."

474 OCHA. "China - Earthquake OCHA Situation Report No. 7," 27 September 1999. https://reliefweb.int/report/china-taiwan-province/china-earthquake-ocha-situation-report-no-7

475 TaiwanICDF. About Us. Accessed 21 February 2022. https://www.icdf.org.tw/ct.asp?xItem=4470&CtNode=29840&mp=2

476 TaiwanICDF. http://www.icdf.org.tw/ct.asp?xItem=4470&CtNode=29840&mp=2

477 TaiwanICDF. http://www.icdf.org.tw/lp.asp?ctNode=29883&CtUnit=207&BaseDSD=104&mp=2

478 IFRC. National Societies. https://www.ifrc.org/national-societies

479 The Red Cross Society of the Republic of China (Taiwan). About: Taiwan Red Cross. https://www.redcross.org.tw/english/home.jsp?pageno=201403100001

480 Taiwan Red Cross. "Inauguration ceremony of Hualien's Disaster Preparedness Center and "house relief funds" have been sent out." 19 February 2019. https://reliefweb.int/report/china-taiwan-province/inauguration-ceremony-hualien-s-disaster-preparedness-center-and-house

481 Taiwan Red Cross. Disaster Preparedness Centers. http://www.redcross.org.tw/english/home.jsp?pageno=201403060013

482 Taiwan Red Cross. http://www.redcross.org.tw/english/home.jsp?pageno=201402140002

483 USAID. "EAST ASIA AND THE PACIFIC – DISASTER RISK REDUCTION FISCAL YEAR (FY) 2018. https://reliefweb.int/sites/reliefweb.int/files/resources/09.30.18%20-%20USAID-OFDA%20EAP%20DRR%20Fact%20Sheet%20-%20FY%202018.pdf

484 "Dashing to the Rescue." Taiwan Today. 1 July 2007. https://taiwantoday.tw/news.php?post=22164&unit=12,29,33,45

485 Taiwan Red Cross. International Relief. https://www.redcross.org.tw/english/home.jsp?pageno=201403060004

486 Table 12 sources: **Tzu Chi:** "Tzu Chi Missions," Buddhist Compassion Relief Tzu Chi Foundation, 1 December 2009, https://www.tzuchi.org.tw/en/index.php?option=com_content&view=article&id=293%3Atzu-chi-missions&catid=58%3Atzuchi&Itemid=283&lang=en ; Allen, Elise Ann, "Taiwan donates food, medical supplies to Vatican amid virus outbreak," Crux, 2 April 2020, https://cruxnow.com/church-in-asia/2020/04/taiwan-donates-food-medical-supplies-to-vatican-amid-virus-outbreak/ ; "Tzu Chi Q&A: A Glimpse into the Missions and Spirit of Tzu Chi," Tzu Chi Culture and Communication Foundation, http://tzuchiculture.org/qa-international-relief/ ; "Tzu Chi Becomes the Co-chair of the Multi-Faith Advisory Committee," https://www.tzuchi.org.tw/en/index.php?option=com_content&view=article&id=1577%3Atzu-chi-becomes-the-co-chair-of-the-multi-faith-advisory-committee&catid=76%3Aamerica&Itemid=205&lang=en ; **Taiwan Root Medical Peace Corps (TRMPC):** "Peace Winds America Partners With Taiwan Root Medical Peace Corps," Peace Winds America, 24 August 2009, http://peacewindsamerica.org/typhoon-morakot/ ; TRMPC website, http://taiwanroot.org/?l=en# ; **International Headquarters S.A.R. Taiwan**: "91st Basic Search and Rescue Training (Malaysia International Ambulance Team/Special Class), http://www.rescue.org.tw/internal%20reports/Internal_activities-malaysia1-1.html ; "Cooperation with the Ministry of Foreign Affairs to Set Up a Search and Rescue Training Center in Nepal," http://www.rescue.org.tw/internal%20reports/Internal_activities--Nepal%20b1.html ; "Taiwan Assisted Nepal in Handling Basic and First Aid Training in Disaster Areas," http://www.rescue.org.tw/internal%20reports/Internal_news--international--108001.html ; Conducting training at Kathmandu school, http://www.rescue.org.tw/internal%20reports/Internal_activities--Nepal-school.html; **Taiwan AID**: "Who We Are," http://www.taiwanaid.org/en/book/125 ; "2016 Asian NGOs International Development Conference," http://www.taiwanaid.org/en/news/420 ; "Latest Activities," http://www.taiwanaid.org/en/activities ; "Members," http://www.taiwanaid.org/en/book/186 ; **Chinese Christian Relief Association**: "Members," Taiwan AID, http://www.taiwanaid.org/en/member/183 ; "About - 1919 Disaster Relief," https://www.1919.org.tw/2021/e-ccra/relife.html

487 Table 13 sources: **World Vision**: https://www.worldvision.org.tw/english/index.php ; **Mercy Corps**: Brookings, https://www.brookings.edu/opinions/taiwans-humanitarian-aiddisaster-relief-wither-or-prosper/ ; **Peace Winds Japan**, https://peace-winds.org/en/ ; **Peace Winds America**: "Peace Winds Continues Dialogue with Japan, U.S., and Taiwan on Disaster Relief," 6 April 2017, http://peacewindsamerica.org/japantaiwandialogue/ ; "PWA Meets with U.S. Pacific Command (PACOM) Senior Officials," 29 June 2016, https://peacewindsamerica.org/sed-porttitor-lectus-nibh/ ; "PWA Meets with Taiwan Delegation," 10 June 2016, http://peacewindsamerica.org/pwa-meets-with-taiwan-delegation/ ; **The Asia Pacific Alliance for Disaster Management (A-PAD)**: http://apadm.org/ ; Emergency Project List, http://apadm.org/emergency/4304/ ; **ARROWS (Airborne Rescue & Relief Operations With Search)**: A-PAD, "Updates from Japan," 28 January 2020, http://apadm.org/about/japan/updates/5342/ ; Civic Force: https://www.civic-force.org/english/ ; **GlobalMedic**: "China - Taiwan Province: Response for Typhoon Morakot," ReliefWeb, 31 August 2009, https://reliefweb.int/report/china-taiwan-province/china-taiwan-province-response-typhoon-morakot ; **Presbyterian World Service & Development**: "Canada PWS&D provides education and livelihood support for 0206 Tainan Earthquake Program," 4 January 2017, Taiwan Red Cross, https://www.redcross.org.tw/english/home.jsp?pageno=201402140002&acttype=view&-dataserno=201701040001 ; https://reliefweb.int/report/china-taiwan-province/canada-pwsd-provides-education-and-livelihood-support-0206-tainan ; **Salvation Army**: "The Salvation Army in Taiwan responding after 6.4 magnitude earthquake," 7 February 2016, https://www.salvationarmy.org/ihq/news/inr070216 ; https://reliefweb.int/report/china-taiwan-province/salvation-army-taiwan-responding-after-64-magnitude-earthquake ; **Operation Blessing International**: "China/Taiwan: Typhoon terror," 19 August 2009, https://reliefweb.int/report/china-tai-

wan-province/chinataiwan-typhoon-terror ; **Baptist World Aid**: "Baptists aid typhoon victims in Taiwan" https://reliefweb.int/report/china-taiwan-province/baptists-aid-typhoon-victims-taiwan

488 Photo source: "Hualien Earthquake a Serious Disaster," The Red Cross Society of the Republic of China (Taiwan), 9 February 2018, https://www.redcross.org.tw/english/home.jsp?pageno=201402140002&act-type=view&dataserno=201802090001

489 UN DPPA. Northeast Asia. https://dppa.un.org/en/northeast-asia

490 The Economist. "The most dangerous place on Earth." 1 May 2021. https://www.economist.com/leaders/2021/05/01/the-most-dangerous-place-on-earth

491 Rigger, Shelley, Lev Nachman, Chit Wai John Mok, and Nathan Kar Ming Chan. "How are people feeling in the 'most dangerous place on Earth'?" 13 October 2021. Brookings. https://www.brookings.edu/blog/order-from-chaos/2021/10/13/how-are-people-feeling-in-the-most-dangerous-place-on-earth/

492 Ferdinando, Lisa. "North Korea Poses 'Most Urgent Security Threat,' PACOM Chief Says." DoD News, Defense Media Activity. 15 March 2018. https://www.pacom.mil/Media/News/News-Article-View/Article/1467723/north-korea-poses-most-urgent-security-threat-pacom-chief-says/

493 Ho, Grace. "A trade pact nearly 10 years in the making: 5 things to know about RCEP." Straits Times. 15 November 2020. https://www.straitstimes.com/asia/a-trade-pact-nearly-10-years-in-the-making-5-things-to-know-about-rcep

494 MOFA. "Taiwan ranks 6th, achieves best-ever score in Index of Economic Freedom," Taiwan Today. 17 February 2022. https://taiwantoday.tw/news.php?unit=6&post=215043&unitname=Politics-Top-News&postname=Taiwan-ranks-6th%2C-achieves-best-ever-score-in-Index-of-Economic-Freedom

495 Inter-Agency Standing Committee (IASC). The Grand Bargain. Signatories, Last update: December 2021. https://interagencystandingcommittee.org/system/files/2021-12/Grand%20Bargain%20Signatories%20December%202021.pdf

496 AidData, College of William and Mary. https://china.aiddata.org/

497 JICA. https://www.jica.go.jp/english/about/history/index.html

498 GCTF. https://gctf.tw/en/IdeaPurpose.htm

499 United Nations Office for the Coordination of Humanitarian Affairs. Humanitarian Civil-Military Coordination. Accessed 5 July 2021. https://www.unocha.org/fr/themes/humanitarian-civil-military-coordination

500 UN Office for Disaster Risk Reduction (UNDRR). What is the Sendai Framework for Disaster Risk Reduction? Accessed 6 July 2021. https://www.undrr.org/implementing-sendai-framework/what-sendai-framework

501 UN Office for Disaster Risk Reduction (UNDRR). Sendai Framework for Disaster Risk Reduction 2015-2030. 2015 https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf

502 ASEAN Regional Forum. About ARF. Accessed 13 March 2022. https://aseanregionalforum.asean.org/about-arf/

503 ASEAN Regional Forum. Areas of Cooperation. Accessed 13 March 2022. https://aseanregionalforum.asean.org/librarycat/areas-of-cooperation/

504 Asian Development Bank. https://www.adb.org/who-we-are/about/disaster-emergency-assistance-policy-review

505 APEC. https://www.apec.org/about-us/about-apec

506 Asian Disaster Reduction Center. "Information on Disaster Risk Reduction of the Member Countries." https://www.adrc.asia/disaster/

507 Watt, Louise. "Taiwan Says It Tried to Warn the World About Coronavirus. Here's What It Really Knew and When." Time. 19 May 2020. https://time.com/5826025/taiwan-who-trump-coronavirus-covid19/

508 Blinken, Antony. Restoring Taiwan's Appropriate Place at the World Health Assembly. U.S. Department of State, 7 May 2021. https://www.state.gov/restoring-taiwans-appropriate-place-at-the-world-health-assembly/

509 Qin, Amy. "WHA rejects Taiwan island for 5 straight years, dooms secessionism." New York Times. 24 May 2021. https://www.nytimes.com/2021/05/24/world/asia/taiwan-excluded-from-a-world-health-forum-blames-chinese-interference.html

510 WTO. Members and Observers. https://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm

511 WTO. "Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu (Chinese Taipei) and the WTO." https://www.wto.org/english/thewto_e/countries_e/chinese_taipei_e.htm

512 Charnovitz, Steve. Taiwan's WTO Membership and its International Implications, 1 Asian J. of WTO & Int'l

Health L. & Pol'Y 401. 2006. https://scholarship.law.gwu.edu/cgi/viewcontent.cgi?article=1436&context=faculty_publications

513 Lester, Simon. "More Details Emerge on WTO Debate Over Appointment of Taiwanese Delegate as Committee Chair." China Trade Monitor. 19 November 2021. https://www.chinatrademonitor.com/more-details-emerge-on-wto-debate-over-appointment-of-taiwanese-delegate-as-committee-chair/

514 SCMP. "Taiwan opens de facto embassy in Lithuania, despite angry reaction earlier from Beijing." 18 November 2021. https://www.scmp.com/news/china/diplomacy/article/3156561/taiwan-opens-de-facto-embassy-lithuania-despite-angry-reaction?module=inline&pgtype=article

515 Australian DFAT. The Bali Process. https://www.dfat.gov.au/international-relations/themes/people-smuggling-trafficking/Pages/the-bali-process

516 American Institute in Taiwan. Global Cooperation and Training Framework (GCTF) Programs. https://www.ait.org.tw/our-relationship/global-cooperation-and-training-framework-programs-gctf/#:~:text=Global%20Cooperation%20and%20Training%20Framework%20%28GCTF%29%20Programs%20The,share%20its%20expertise%20with%20partners%20around%20the%20world

GCTF, Building Disaster Resilience at Global and National Levels (24 September 2021), https://www.gctf.tw/en/news_detail43_1.htm

517 GCTF. https://www.gctf.tw/en/issues7_0.htm

518 AIT. GCTF Programs. https://www.ait.org.tw/our-relationship/global-cooperation-and-training-framework-programs-gctf/#:~:text=Global%20Cooperation%20and%20Training%20Framework%20%28GCTF%29%20Programs%20The,share%20its%20expertise%20with%20partners%20around%20the%20world

519 Wong, Catherine. “15 Asian nations sign RCEP, world’s biggest free-trade deal, after eight years.” SCMP. 15 November 2020. https://www.scmp.com/news/china/diplomacy/article/3109939/china-declares-victory-15-asian-nations-sign-worlds-biggest

520 https://www.business-standard.com/about/what-is-rcep

521 Zhou, Laura. “Explainer: What is RCEP and what does an Indo-Pacific free-trade deal offer China?” SCMP. 12 November 2020. https://www.scmp.com/news/china/diplomacy/article/3109436/what-rcep-and-what-does-indo-pacific-free-trade-deal-offer?module=perpetual_scroll_1&pgtype=article&campaign=3109436

522 Ho, Grace. “A trade pact nearly 10 years in the making: 5 things to know about RCEP.” Straits Times. 15 November 2020. https://www.straitstimes.com/asia/a-trade-pact-nearly-10-years-in-the-making-5-things-to-know-about-rcep

523 Australia DFAT. CPTPP. https://www.dfat.gov.au/trade/agreements/in-force/cptpp/comprehensive-and-progressive-agreement-for-trans-pacific-partnership

524 China’s CPTPP trade-pact aspirations bring vows for reform as Beijing reaches out to members. SCMP. 18 February 2020. https://www.scmp.com/economy/china-economy/article/3167436/chinas-cptpp-trade-pact-aspirations-bring-vows-reform-beijing

525 Ohlberg, Mareike. “Taiwan Tensions and Deepening Transatlantic Cooperation,” The German Marshall Fund of the U.S., 10 January 2022. https://www.gmfus.org/news/taiwan-tensions-and-deepening-transatlantic-cooperation

526 Bernama. “South Korea launches process to join CPTPP,” The Edge Markets. 13 December 2021. https://www.theedgemarkets.com/article/south-korea-launches-process-join-cptpp

527 Center for Excellence in Disaster Management & Humanitarian Assistance. Humanitarian Assistance Response Training (HART) Module: HA/DR Information. September 2018.

528 Joint Publication 3-29. Foreign Humanitarian Assistance. 14 May 2019. https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_29.pdf?ver=2019-05-21-150525-607

529 Cabinet Office. Disaster Management in Japan. April 2021. http://www.bousai.go.jp/1info/pdf/saigaipamphlet_je.pdf

530 UN Economic and Social Commission for Asia and the Pacific. The Disaster Riskscape across East and North-East Asia: Key Takeaways for Stakeholders. Asia-Pacific Disaster Report 2019. https://www.unescap.org/sites/default/d8files/IDD-APDR-Subreport-ENEA.pdf

531 Cabinet Office. Disaster Management in Japan. April 2021. http://www.bousai.go.jp/1info/pdf/saigaipamphlet_je.pdf

532 Cabinet Office. Disaster Prevention Book "Tokyo Disaster Prevention," Chapter 3. 27 February 2020. https://www.bousai.metro.tokyo.lg.jp/book/pdf/en/03_Other_Disasters_and_Countermeasures.pdf

533 Cabinet Office. Disaster Prevention Book "Tokyo Disaster Prevention," Chapter 3. 27 February 2020. https://www.bousai.metro.tokyo.lg.jp/book/pdf/en/03_Other_Disasters_and_Countermeasures.pdf

534 Ministry of the Interior and Safety. Disaster Management System of Korea. 16 May 2018. https://www.mois.go.kr/eng/bbs/type002/commonSelectBoardArticle.do;jsessionid=WO93iC7B0U+ZdPFZc4lU98r0.node50?bbsId=BBSMSTR_000000000022

535 IFRC. Where are we based. Accessed 12 January 2022. https://www.ifrc.org/people-and-structures

536 IFRC. About the IFRC. Accessed 12 January 2022. https://www.ifrc.org/about-ifrc

537 ICRC. Mandate and Mission. Accessed 12 January 2022. https://www.icrc.org/en/mandate-and-mission

538 ICRC. Who we are: Movement. Accessed 12 January 2022. https://www.icrc.org/en/who-we-are/movement

539 U.S. Agency for International Development (USAID). Humanitarian Assistance. Accessed 23 March 2021. https://www.usaid.gov/humanitarian-assistance

540 Pacific Disaster Center. About DisasterAWARE. Accessed 23 March 2021. https://www.pdc.org/apps/disasteraware/about-disasteraware/

541 Pacific Disaster Center. Disaster Alert. Accessed 23 March 2021. https://disasteralert.pdc.org/disasteralert/

Pacific Disaster Center (PDC Global). DisasterAWARE Quick Start User Guide, 2019, Version 6.5. https://disasteraware.pdc.org/help/Quick-Start-Guide-DisasterAWARE-screen.pdf

542 Pacific Disaster Center. DisasterAlert™. Accessed 23 March 2021. https://www.pdc.org/apps/disaster-alert/

543 All Partners Access Network (APAN). About Us. Accessed 23 March 2021. https://www.apan.org/pages/about

544 All Partners Access Network (APAN). Solutions. Accessed 23 March 2021. https://www.apan.org/pages/solutions-hadr

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