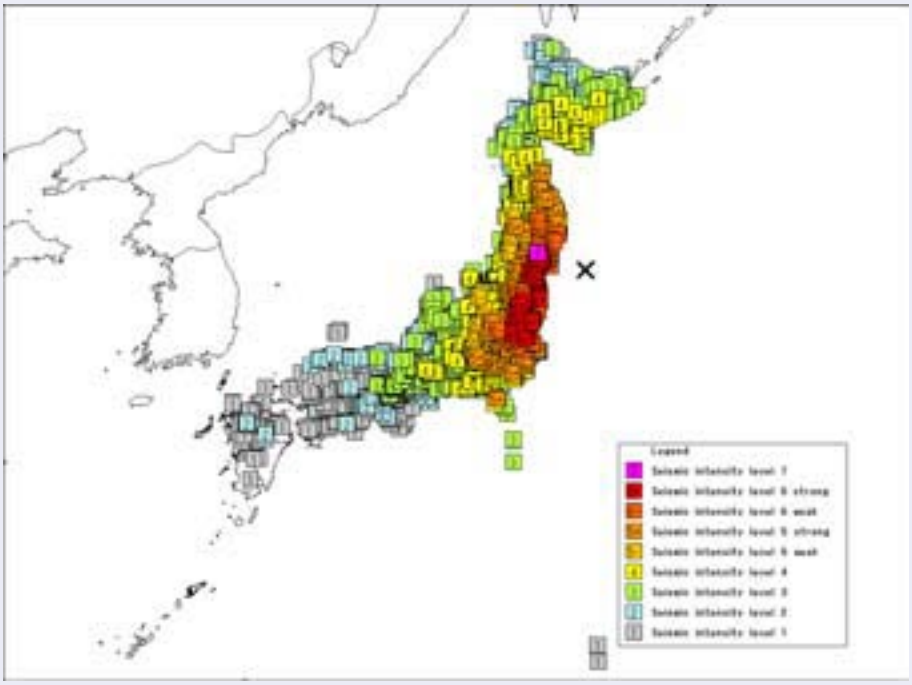
Great East Japan Earthquake

("The 2011 off the Pacific coast of Tohoku Earthquake" and Tsunami)

"The 2011 off the Pacific coast of Tohoku Earthquake" struck at a magnitude of 9.0 degrees at 14:46 on March 11, 2011. The hypocenter of the earthquake was at a site approximately 24km deep off the Sanriku Coast, which was approximately 130km east-southeast from the Oshika Peninsula (Ishinomaki City, Miyagi Prefecture). The seismic intensity level of this tremor was 6 in Miyagi Prefecture, Fukushima Prefecture, Ibaraki Prefecture and Tochigi Prefecture and 7 in Kurihara City, Miyagi Prefecture, where the most violent shaking was recorded. Shaking was observed all over the country. Even in Kagoshima City and the Ogasawara Islands (Chichi-jima and Haha-jima) recorded level 1 (Figure1) . The disaster caused by this earthquake and the catastrophe brought about by the Fukushima Nuclear Power Plants accident is referred to as the "Great East Japan Earthquake."[1]

Figure 1 Intensity Distribution in Each Location



Source: Created by the Japan Meteorological Agency

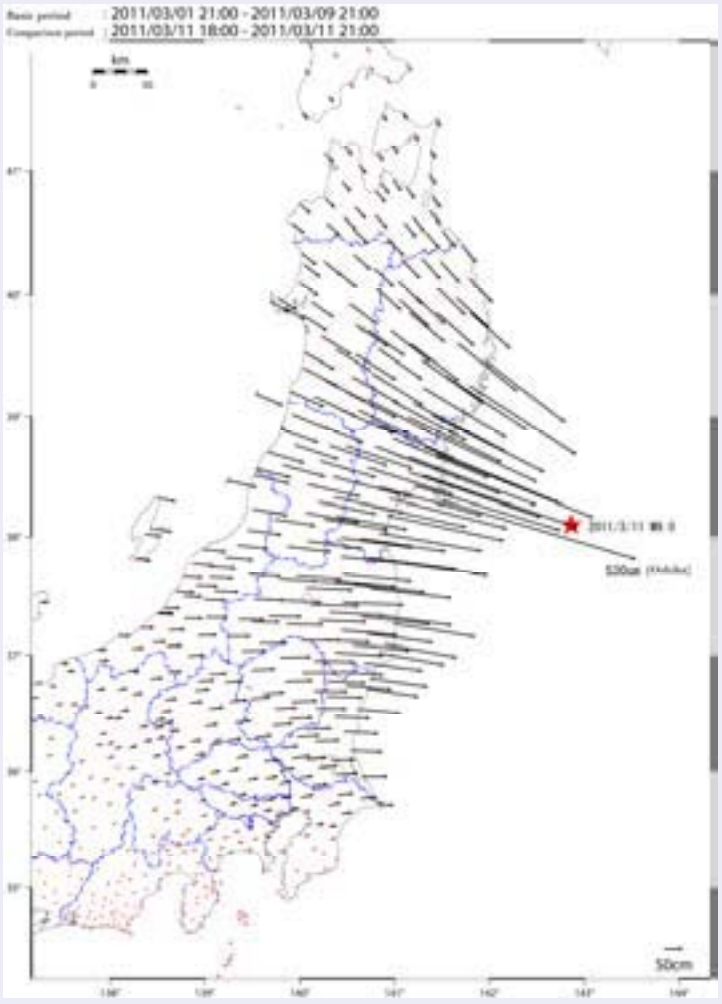
According to the Japan Meteorological Agency, the earthquake vibrations continued for a long time in many places. For instance, in Onahama, Iwaki City in Fukushima Prefecture, shaking at intensity level 4 or higher continued for 190 seconds. Furthermore, the size of the hypocentral region in this earthquake was approximately 450km long and 200km wide. The destruction moved from the hypocenter off the coast of Miyagi Prefecture in the direction of the sea offshore of Iwate Prefecture and the sea offshore of

1 This White Paper described the situation of and the measures taken after this great earthquake up to the end of June 2011.

Fukushima and Ibaraki Prefectures. According to the Geospatial Information Authority of Japan, due to the crustal movement caused by this earthquake, the GPS-based control station on the Oshika Peninsula moved approximately 5.3m (Figure 2) horizontally in the direction of east-southeast and in the vertical direction there was subsidence of approximately 1.2m. In addition, according to the Japan Coast Guard, the seafloor observation point, that was located almost directly above the hypocenter, moved east-southeast approximately 24m and rose approximately 3m.

The occurrence of aftershocks concentrated in a range of approximately 500km long and 200km wide corresponding to the hypocentral region, from the offshore of Iwate Prefecture to the offshore of Ibaraki Prefecture. In addition, there were also aftershocks in a wide region including the east side of the trench axis near the hypocentral region and low land locations in Fukushima Prefecture and Ibaraki Prefecture. By May 27, aftershocks with the magnitude of 5.0 or above have been observed 494 times.

Figure 2 Diastrophism by the Main Shock (Magnitude 9.0) (Horizontal) (Oshika) (Provisional)



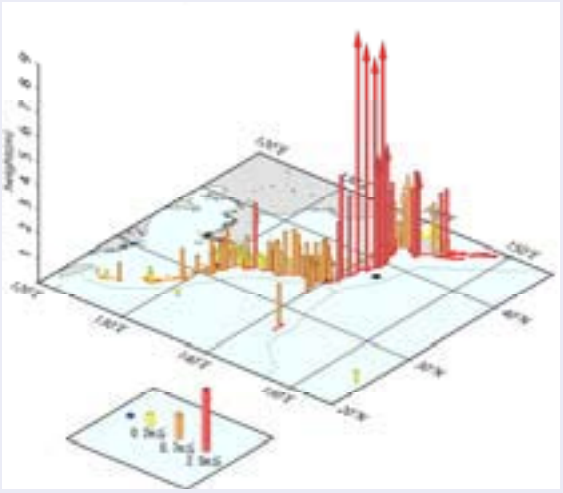
Source: Geospatial Information Authority of Japan "Diastrophism with the Earthquake (March 19, 2011)"

High tsunami that accompanied the earthquake were observed on the Pacific Ocean coast from Hokkaido to Okinawa, but many sites that were devastated by the tsunami were not able to measure the maximum height of the tsunami accurately (Figure 3). According to surveys of the trace of the tsunami conducted by the research institutions such as the Japan Meteorological Agency and the Port and Airport Research

Institute, the tsunami at its highest had an inundation height exceeding 13m from Motoyoshi, Kesennuma City to Onagawacho in Miyagi Prefecture. In addition, it is understood that there was a tsunami with an inundation height of close to 10m in the coast from Miyako City to Ofunato City in Iwate Prefecture and from Sendai City in Miyagi Prefecture to Soma City in Fukushima Prefecture. On the other hand, the GPS wave recorder installed by the Port and Harbor Bureau of the Ministry of Land, Infrastructure, Transport and Tourism, succeeded in obtaining tsunami waveform data since the earthquake to the morning of March 13. It was observed that 20km off the coast of Kamaishi, the largest wave was 6.7m and the water level rapidly rose above 4m in the space of 4 minutes.

Furthermore, in surveys of the inundation area caused by the tsunami that were conducted by the Geospatial Information Authority of Japan, it has been estimated that the inundation area was 561km² (approximate value) and this is equivalent to approximately one-quarter of the 2188km² area of Tokyo (Figure 4).

Figure 3 Tsunami Observation Status



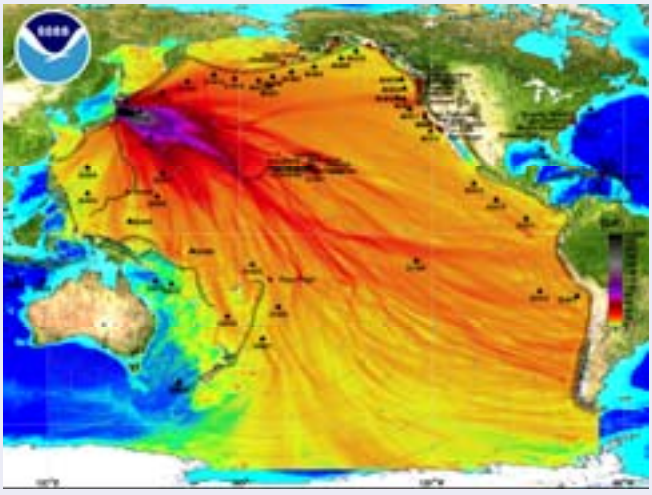
Note: As tsunami observation facilities were damaged by the tsunami, the arrows indicate the potential for even higher subsequent waves.
Source: Created by the Japan Meteorological Agency

Figure 4　Overview Map of the Inundation Area in the Vicinity of the Natori River Estuary, Miyagi Prefecture

Source: Geospatial Information Authority of Japan "Overview Map of the Inundation Area"

The tsunami was not only observed on the Pacific Ocean Coast, but was also seen on the Sea of Japan Coast and the Sea of Okhotsk Coast. It also crossed the Pacific Ocean to reach the Pacific Ocean Coast on the North and South American continents (Figure 5).

Figure 5　Spread of the Tsunami to the Pacific Ocean



Source: NOAA Center for Tsunami Research (National Oceanic and Atmospheric Administration)

This earthquake was the largest among recorded domestic earthquakes since the Meiji Period (1868 - 1912), and globally, earthquakes of magnitude of 9.0 or higher have only occurred four times since 1900 (excluding this earthquake). The damage due to this earthquake was also extremely serious and widespread (Table 6). With regard to this earthquake, the Earthquake Research Committee considers that the hypocentral region spread over a wide area from the offshore of Iwate Prefecture to that of Ibaraki Prefecture. The committee has assessed the seismic motions and the tsunami for individual regions. However, the committee thinks that there was no consideration of the interaction of interrelated earthquakes in different regions that span across those regions for the long-term assessment of ocean trench earthquakes like this one. In addition, there was no consideration of the tsunami height and inundation area related to this type of earthquake. It is believed that there have been such problems.

Table 6 Earthquakes of Magnitude 9.0 or Higher that have Occurred in the World Since 1900

Occurrence Year	Earthquake Name	Magnitude
1952	Kamchatka Earthquake	9.0
1960	Chile Earthquake	9.5
1964	Alaska Earthquake	9.2
2004	Sumatra Earthquake	9.1
2011	Great East Japan Earthquake	9.0

Source: Created by MEXT

(Damage Caused by the Earthquake and Tsunami)

The number of people, who were killed, went missing or were injured due to the earthquake and tsunami, was 15,511, 7,189 and 5,388, respectively as of June 30. These figures far exceed the human suffering in the Great Hanshin-Awaji Earthquake (6,434 dead and 41,500 injured). When we consider the damage to buildings, 620,802 houses suffer total or partial destruction or damage. 256 houses were totally or partially burnt down. This was not only residential houses; fires also broke out in industrial oil complexes in two locations. 11 specially designated major port and major ports and 19 local harbors were damaged. In addition, according to the National Police Agency, there were mountain landslides in 197 places.

It also hit the transportation network severely. The Tohoku Shinkansen line was brought to a standstill with damage to approximately 1,200 locations such as tunnels, station buildings, railroad tracks and transformers. In conventional lines of JR East Japan, damage was sustained in a total of approximately 4,400 locations from inspections that lasted until March 28. As a result, all train services were stopped in virtually the whole of the Tohoku region. Additionally, all railroads and subway lines in the capital region suspended their operations immediately after the earthquake. As for ports, breakwaters, wharfs and cargo-handling machineries of each port also suffered a great deal of damage and the port functions were temporarily suspended in 11 major ports and specially designated major port on the coast of the Pacific Ocean, from Hachinohe City, Aomori Prefecture to Ibaraki Prefecture. With respect to air routes, Sendai Airport became inoperative as its runways were flooded by the tsunami. Facilities were also damaged at the Fukushima Airport and Ibaraki Airport. In roads as well, disasters such as slope collapse, subsidence and falling bridges lead to the closure of 15 expressway routes, 69 sections of directly controlled national highways, 102 sections of prefectural controlled national highways and 536 sections of prefectural roads

(as of April 18).

Essential utilities were also dealt a devastating blow, and immediately after the earthquake (March 11) virtually the whole of the Tohoku area (within the jurisdiction of the Tohoku Electric Power Co., Inc.: 4,660,000 homes) and 3,950,000 homes in the Kanto area suffered electricity outages. Regular gas (otherwise known as town gas) was completely suspended in Sendai City and supply of regular gas in other surrounding areas was also stopped. In addition, approximately 35,000 homes within the jurisdiction of Tokyo Gas Co., Inc. faced the suspension of gas service. The water supply also suffered outages in a cumulative total of at least 2,290,000 homes, including damages caused by aftershocks. Affected area spread across 19 prefectures, from the whole of Tohoku to Kanto. There was a great impact on lives of the Japanese public and industrial activities. From March 14, "planned power outages" were conducted in the capital and eight prefectures within the jurisdiction of the Tokyo Electric Power Company, Incorporated (TEPCO). The majority of railroad lines in the metropolitan area were suspended or partially operated, and the operations of factories were stopped and curtailed.

In S&T, the impact on Japan's research bases was significant. According to the investigation by the Cabinet Office on April, there were damages to research facilities and equipments in 34 independent administrative institutions or national research institutions, and 177 universities in eastern Japan, especially in the Tohoku and Kanto areas with severe destruction.

(The Accidents at TEPCO Fukushima Daiichi and Daini Nuclear Power Plants)

This earthquake and tsunami also caused serious damage to nuclear power facilities. Nuclear reactors in operation at each nuclear power plants of Onagawa, Fukushima Daiichi, Fukushima Daini and Tokai Daini automatically shut down. As TEPCO reported abnormality occurrence, the government issued a Declaration of Nuclear Emergency Situation based on the Act on Special Measures Concerning Nuclear Emergency Preparedness for the TEPCO Fukushima Daiichi Nuclear Power Plant on March 11, and for the TEPCO Fukushima Daiini Nuclear Power Plant on March 12. In Units 1 to 4 of the TEPCO Fukushima Daiichi Nuclear Power Plant, abnormalities such as the loss of power, the accompanying loss of cooling capabilities, exposure of the fuel rods and a rise in temperature, a temperature increase in the spent fuel pool and hydrogen explosions occurred. At units 1 to 3 in the same power plant, it was not able to pour water into the nuclear reactor pressure vessels for certain amount of time. This meant that the nuclear fuel in the nuclear reactor core of each unit was exposed without being covered with water, and subsequently, nuclear meltdown occurred. Part of the molten fuel accumulated in the lower part of the nuclear reactor pressure vessels. Despite the attempts to restore the nuclear reactor cooling functions by TEPCO and the firefighting and water pouring activities by the fire department and the Japan Self-Defense Force, this series of accidents lead to the emission of radioactive materials into the surrounding atmosphere and ocean. As for the TEPCO Fukushima Daini Nuclear Power Plant, facilities such as the residual heat removal systems in units 1, 2 and 4 were damaged, but all these units achieved the cold shutdown condition by March 15.

The government has conducted radiation monitoring surveys in every prefecture of Japan, especially around the TEPCO Fukushima Daiichi Nuclear Power Plant. Based on the monitoring results, the government has done preliminary calculations of cumulative radiation dose and then published them as the occasion calls. It was detected that the concentration of radioactive materials in the fallout over the eastern

Japan was higher than usual. In addition, there were regions where radioactive materials that exceeded the regulation index related to intake restrictions were detected from tap water. Furthermore, from some agricultural produce, raw milk and marine products that were produced in the vicinity, radioactive materials were detected that were higher than the interim regulatory values under the Food Sanitation Act established by the Ministry of Health, Labour and Welfare, which is originally based on an index related to food and drink intake restrictions indicated by the Nuclear Safety Commission of Japan. Restrictions were imposed on the shipping and intake of some agricultural produce. There was a falling in price for agricultural produce and marine products from regions where no radioactive materials exceeded the interim regulatory values.

The government issued evacuation instructions to residents within a 20km radius from the TEPCO Fukushima Daiichi Nuclear Power Plant and within a 10km radius from the TEPCO Fukushima Daini Nuclear Power Plant on March 12. On March 15, the government issued instructions to take shelter indoors to residents living in a radius of 20km to 30km from the TEPCO Fukushima Daiichi Nuclear Power Plant. On April 22, the government set up a restricted area[1] within a 20km radius from the TEPCO Fukushima Daiichi Nuclear Power Plant, including the ocean, and prohibited entry into this area in principle. In addition, planed evacuation areas and prepared emergency evacuation areas have been created in the surrounding areas that are beyond the 20km radius from the TEPCO Fukushima Daiichi Nuclear Power Plant. It was based on the consideration presented by the Nuclear Safety Commission of Japan. Preparations have been sought in order to be able to evacuate in a time of emergency. For example, the planned evacuations to out of bounds area and the closure of nursery schools and kindergartens, along with elementary, junior high and high schools. Furthermore, the System for Prediction of Environmental Emergency Dose Information (SPEEDI) was unable to demonstrate its original function of quantitative prediction on changes in the concentration of radioactive materials in the atmosphere because it was impossible to acquire the information on the radiation source. This has been used to complement in various forms the usage as reference settings in preliminary calculations of estimated dosages and regional monitoring surveys that are based on estimates of release source information and estimation results, but many challenges remain in this application system and the state of publication.

The government, in accordance with the recommendations of the International Commission on Radiological Protection (ICRP), gave a preliminary indication about its decision on usage of school buildings and schoolyards in Fukushima Prefecture and considered it appropriate to reduce the dose received by pupils and students as far as possible in the future. Moreover, it decided to strengthen continuous monitoring, by distributing integrating dosimeters, show specific measures to reduce radiation dose and take financial support measures with regard to soil treatment in kindergarten and schoolyards.

On April 12, the government made preliminary calculations about the aggregate amount of radioactive material that had been released into the atmosphere from the nuclear reactors so far, and assigned a tentative assessment equivalent to Level 7, which is a serious accident on the International Nuclear Event

1 The restricted area has been created in accordance with the provisions set forth in the Disaster Countermeasures Basic Act, Article 63, Paragraph 1, which applies to change the wording found in the Act on Special Measures concerning Nuclear Emergency Preparedness, Article 28, Paragraph 2.

Scale (INES[1]). This is the most serious assessment that is the same level as that of the 1986 Chernobyl Nuclear Power Plant Disaster in the same assessment scale. In June, the government compiled the "Report of Japanese Government to IAEA Ministerial Conference on Nuclear Safety - Accident at TEPCO's Fukushima Nuclear Power Plant", and made a report at the International Atomic Energy Agency (IAEA) "Ministerial Conference on Nuclear Safety" that was held from June 20 to June 24. This report showed the accident assessment based on the facts that had been obtained and compiled a total of 28 lessons. These include assumptions about the appropriate frequency and adequate height of tsunami in consideration of a sufficient reoccurrence period for achieving safety targets and discloser of the data and results from SPEEDI and other systems from the initial stage.

Furthermore, in light of this accident, the government made a request to the Chubu Electric Power Co., Inc. Hamaoka Nuclear Power Plant to suspend operations on May 6. This power station is located adjacent to the anticipated Tokai earthquake hypocentral region and there were fears about the strong possibility of a large tsunami hitting the plant. Chubu Electric Power Co., Inc. suspended all operations by May 14.

(Initiatives taken by the Government's Emergency Headquarters, and International Concern and Assistance)

Immediately after the earthquake, the government established an Emergency Disaster Response Headquarters and a Nuclear Emergency Response Headquarters with the Prime Minister as the Chief of the Headquarters. With a central focus on these two headquarters, while taking the advice of the Nuclear Safety Commission of Japan and others into account, all ministries and government offices have been cooperating and working to provide a systematic response. This included victim livelihood support, disaster waste disposal treatment, securing temporary housing, handling of food, electric power supply measures, evaluating the economic climate, coordinating with disaster volunteers, responding to and consulting with assistance from overseas and governmental announcements. On May 17, the Nuclear Emergency Response Headquarters formulated the "Roadmap for Immediate Actions for the Verification of and Restoration from the Accident at Fukushima Dai-ichi Nuclear Power Station" which states that the government and TEPCO are going to carry out countermeasures, such as cooling the nuclear reactors and spent fuel pools, containment of water including radioactive materials and conducting monitoring. On the same day, the headquarters also formulated the "policies for immediate responses for those affected by the nuclear incident"[2] and the "Roadmap for Immediate Actions for the Assistance of Residents Affected by the Nuclear Incidents." The current challenges related to the response toward the victims of the disaster and the affected local governments along with policy for these efforts were compiled and as immediate efforts of the government for various challenges, to start with, there was decision to generate steady progress on the policies that were compiled here[3]. The documents included efforts related to evacuation areas, securing the safety and security of evacuees, employment opportunities, assistance for agriculture and industries, assistance for local governments in the disaster areas, compensation to victims and affected business

1 International Nuclear Event Scale (INES): This is a scale that is shown in levels from 0 to 7 in order to simply and objectively determine the degree of impact of accidents and incidents that have occurred in nuclear power facilities and similar. This was formulated by the International Atomic Energy Agency and the Nuclear Energy Agency, Organization for Economic Co-operation and Development. The Three Mile Island Nuclear Power Plant accident in 1979 that occurred in the USA was level 5.

2 http://www.meti.go.jp/earthquake/nuclear/pdf/torikumihoushin_110517_03.pdf

3 http://www.meti.go.jp/earthquake/nuclear/kinkyu.html.

operators and efforts to return people to their home towns.

Additionally, on May 13, the Headquarters for Emergency Response for Power Supply and Demand determined the "Summer Power Supply and Demand Measures." This set the target of a 15% reduction based on the average peak demand in the previous year[1] in relation to the control of demand in businesses and home in the areas under the jurisdiction of TEPCO and Tohoku Electric Power Co., Inc. This report also aimed to spread the necessity of energy conservation measures and examples of these measures.

In addition, on May 24, there was a Cabinet decision to establish the "Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company." The decision stated that the committee was going to conduct a diverse investigation and verification to establish the causes of the accident and the causes of the damage from the said accident. This was going to be performed from a neutral stance considering the perspective of the Japanese public. Then, it is going to make a policy proposal with regard to the prevention of damage caused by the said accident and prevention of the reoccurrence of similar accidents.

Moreover, on June 25, "The Reconstruction Design Council in Response to the Great East Japan Earthquake[2]" presented a report to the Prime Minister with the title "Towards Reconstruction – Hope Beyond the Disaster." This report indicated three items deeply connected with S&T, 1) In "Chapter 2: Restore Life and Livelihood", there were proposals for businesses and innovations geared toward reviving local economic activities in the disaster-hit areas; and to promote use of renewable energy and improve energy efficiency in the disaster-hit areas, 2) In "Chapter 3: Work Towards Reconstruction After The Nuclear Accident," there were proposals about measurements and public disclosure of radiation dosages; responses to soil contamination; and the health management of residents and 3) In "Chapter 4: Open Reconstruction[3]", there were proposals to; review the energy strategy toward the revival of the economy and society; academic surveys on disasters and preparations for future earthquakes and tsunami disasters geared for reconstructing a disaster-resilient nation; and a reconstruction open to the world.

In relation to such an earthquake, tsunami and the nuclear power plant accident, there has been extremely high concern from countries around the world with the overseas media covering this in detail. Furthermore, in manufacturing industries overseas, there are companies suffered by the delay in parts and components supply from Japanese companies. They have been forced to reduce production or to take alternative measures. On the other hand, immediately after the earthquake, emergency supplies for those affected by the disaster were promptly delivered from all around the world and there has also been a great amount of various pieces of equipment and human assistance, including heavy machinery to control the situation at the nuclear power plants. Moreover, at the G8 summit held in Deauville, France from May 26, discussions took place on "Solidarity with Japan", "Global Economy and Trade", "Nuclear Safety" and "Climate Change." Each leader renewed their heartfelt sympathy to and solidarity with Japan, paying tribute to the courage and dignity shown by Japanese people amid the difficult situation. Concerning nuclear safety, they shared the need for joint efforts to promote the highest levels of safety.

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1 The peak demand in the previous year for the Tokyo Electric Power Company was estimated at 60 million KW and 14.8 million KW for the Tohoku-Electric Power Company.

2 There was a Cabinet decision to establish the "The Reconstruction Design Council in response to the Great East Japan Earthquake" on April 11, 2011. On June 24, 2011, with the execution of the Basic Act on Reconstruction from the Great East Japan Earthquake, there was a switch to the council based on this law.

3 In this proposal, "the image of open reconstruction is one where recovery is not limited to the disaster-hit areas, rather, various creative initiatives in the disaster-hit areas would be spread all across Japan and also all over the world."

(Great East Japan Earthquake, S&T ,and S&T Policy)

The Great East Japan Earthquake is a problem that affects the safety and security of the Japanese public and the foundations of society. It has had a significant impact on the life of the Japanese public, and social and economic systems. Residents in the vicinity have shown fears on the impact of radioactive materials on their health in the future, and strong demands for efforts toward the recovery of the foundations of their life and the revival of regional vitality. Under such circumstances, it is certain that S&T is required to contribute to recovery, revival, and new development.

With regard to S&T, relevant organizations such as Japan Atomic Energy Agency, the National Institute of Radiological Sciences, universities and many researchers have involved in the provision of disaster medical care; radiation emergency medicine; and radiation monitoring from the land, sea, and air. Furthermore, as an immediate response, it is planned to utilize existing technologies that could possibly solve problems such as, the reconstruction of land and social infrastructure; environmental monitoring on radioactive materials; contaminated soil purification; contaminated water treatment; health surveys of residents in the areas around the nuclear power plants; securing of stable electric power supply; and promotion of energy conservation. In a response to the current earthquake, there were cases that accumulated S&T knowledge and outcome are utilized or on the way to utilization, while there were cases that it was not possible to utilize existing S&T outocomes sufficiently.

From now on, in order to meet various challenges arising in the process of recovery and reconstruction from this earthquake, various S&T activities are to be performed among the administrative bodies, academic societies, researchers, and the Japanese public. Discussions have to be deepened, and roles of those who are concerned with S&T and S&T policy have to be reviewed.

In the government, not only the review on energy policy including nuclear power, but also the review on S&T policy has to be considered. Researchers, technicians, and policy makers, based on their respective positions, are asked to sincerely verify these issues related to current disaster through bird's eye view regardless of existing specialties such as science, engineering, agriculture, medicine, humanities and social sciences, And they, as a united body, are required to contribute to efforts aimed at recovery, reconstruction, and renewed development. The Council for Science and Technology Policy is also carrying out a re-examination of the 4th Basic Plan under such an understanding.

(S&T and Society)

Part I of this White Paper, under the featured theme of "Science and Technology to Be Created with Society", presented the current situation and challenges of S&T communication activities by the relevant parties for obtaining the understanding, confidence and support of the Japanese public for S&T. Contrary to the desires of these relevant parties, the Fukushima Nuclear Power Plant accident imposed a major challenge upon their activities for the understanding, confidence and support of the Japanese public.

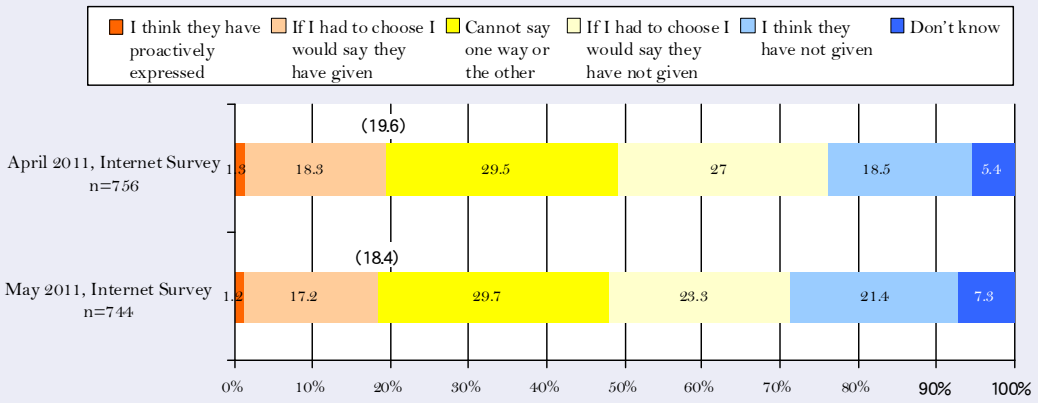
As for communication related to the accident, transparency, accuracy and speed are important, but at the initial stage of the accident occurrence, there were delays in the timely and accurate notification of information to the local governments. It indicates that issues remained in communication related to the accident.

Moreover, one of the major factors of the financial damage caused by harmful rumors or misinformation since this earthquake has been the fact that information was not communicated to consumers with regard to

the safety of agriculture produce, marine products and industrial goods and in relation to proper safety based on the foundations of S&T. The S&T community and relevant parties are required to appropriately deliver information that is easy to understand (Figure 7). In addition, given that ensuring safety in the peaceful use of nuclear power is a global concern, it is important for the government to share data related to this nuclear power plant accident with the S&T community in Japan and overseas. After the earthquake, there were some examples of efforts to disseminate information, such as to hold lectures and science cafés about radiation by S&T communicators, but in years to come, with regard to whether or not it was possible to disseminate information in a form such as that could be correctly understood by the public from the scientific community of scientists and scientific societies, it is necessary to understand and verify the true state of activities that have been incurred by this earthquake. In the future, it is important to take advantage of this for future S&T communication activities.

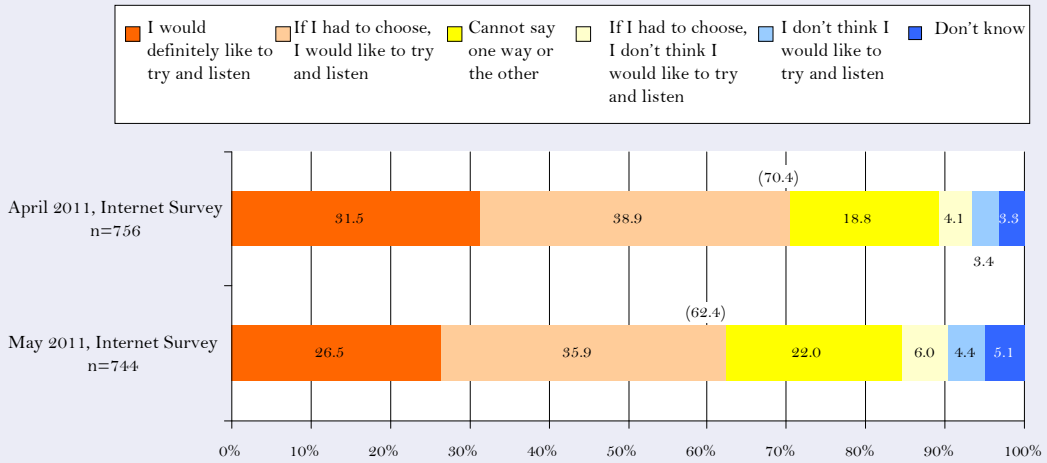
Figure 7 Provision of Information to the Japanese Public

Question: In relation to the nuclear accident, do you think opinions have been expressed by scientists and scientific societies?



Note: The question has a preface of "We would like to ask about whether or not Japanese scientists and scientific societies have expressed opinions (delivered messages) as experts and expert organizations in their respective fields in relation to the current Fukushima Daiichi Nuclear Power Plant accident" and then asks "What do you think about the opinions expressed by scientists and scientific societies toward the government and the Japanese public from their perspective as experts and expert organizations in relation to the current Fukushima Daiichi Nuclear Power Plant accident? Please choose the answer that most closely matches your opinion from the choices below."

Question: Do you think you would like to try and listen to opinions expressed by scientists and scientific societies in relation to the nuclear accident?



Note: This question asks "Would you like to try and listen to opinions expressed by scientists and scientific societies as experts and expert organizations in relation to the current Fukushima Daiichi Nuclear Power Plant accident? Please choose the answer that most closely matches your opinion from the choices below.

Note: Emails of the survey request were sent to registered participants with an Internet research company and the participants that responded to the request accessed a survey screen on the Internet and gave their answers. Furthermore, in each survey, answers are obtained from over 60 male and female each and from those in their teens to those in their 60s (a total of more than 720 people).

Source: National Institute of Science and Technology Policy, "Monthly Opinion Poll"

Based on these experiences, in normal times as well as in times of emergency like this, it is vital to aim to improve risk communication in order to provide information in an easy-to-understand format that has been verified by S&T according to the demands of society in normal times as well as in times of emergency like this. To do so, researchers, technicians, and policy makers should have in-depth discussions with an overarching perspective regardless of the specialty of each. They need to go through impact assessments on society and the life of the Japanese public and on scientific evaluations of risk brought about by S&T, Therefore, it is essential that they should strive to realize even better S&T management based on appropriate risk assessments and risk management.

(The role of S&T in the future)

The top priority is to control the situation and bring back the safe and secure life of the Japanese public. But in the future, as noted above, there shall be investigations and verification of the nuclear power plant accident and verification into the activities and policies of S&T so far.

The Japanese government has to take on board current situation, in other words the national crisis, as a major lesson. In addition, the government, researchers, and technicians need to discuss deeply with the public about the future role of S&T with is the understanding that it a driving force in the recovery and reconstruction from this disaster. Through playing this role, it is strongly demanded for the government to obtain the understanding, confidence and support of the Japanese public for S&T.