

# RECONSTRUCTION AFTER THE GREAT EAST JAPAN EARTHQUAKE

On March 11, 2011, East Japan was struck by the largest earthquake ever recorded in or around Japan. With magnitude 9.0, it triggered enormous tsunamis that caused immense, widespread damage, primarily along the Pacific coast of the Tohoku region. The tsunami caused accidents at the Tokyo Electric Power Company (TEPCO) Fukushima Daiichi Nuclear Power Plant, which resulted in the release of large amounts of radioactive materials into the environment. This remains the greatest environmental challenge in Japan.

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# PROGRESS IN RESTORATION OF THE ENVIRONMENT

## Natural environment

Studies of flora and fauna in the tsunami disaster area where important habitats remain indicate ongoing restoration of the natural environment, with all areas showing an increase in the number of species found.

## Radiation levels

Findings from environmental radiation (in air) monitoring by aircraft conducted within the 80-kilometer zone of the Tokyo Electric Power Company (TEPCO) Fukushima Daiichi Nuclear Power Plant show that radiation levels in September 2015 had decreased 65% (to approximately one third) compared to seven months after the accident. (see Figure below) The main reasons for the decrease, besides the physical decay of radionuclides, are thought to be the influence of rainfall and other natural phenomena, and the impact of decontamination efforts.

**Legend**

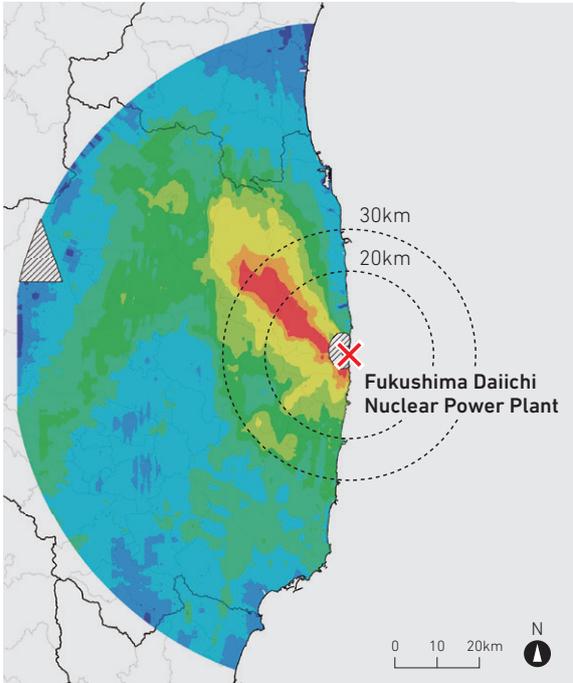
Radiation dose rates in air ( $\mu\text{Sv}$ ) at 1 m above the ground

- 19.0 <
- 9.5 – 19.0
- 3.8 – 9.5
- 1.9 – 3.8
- 1.0 – 1.9
- 0.5 – 1.0
- 0.2 – 0.5
- 0.1 – 0.2
- $\leq 0.1$

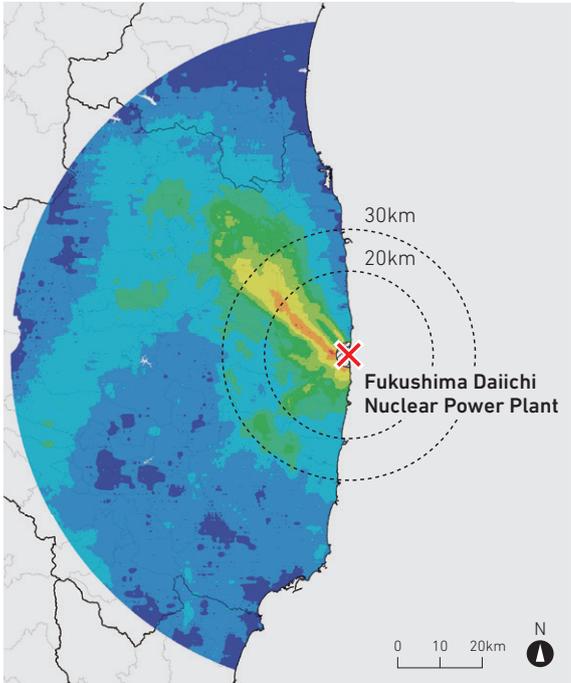
⊙ Area where radiation dose rate in air was not surveyed

\* Radiation dose rates in air observed in the zone include radiation from natural radionuclides.

Distribution maps of radiation dose rates in air within 80-km zone



1 month after accident  
(April 29, 2011)



54 months after accident  
(September 29, 2015)

Source: The Secretariat of the Nuclear Regulation Authority

# RESTORATION OF THE ENVIRONMENT IN AREAS CONTAMINATED BY RADIOACTIVE MATERIALS

## Handling of waste in the management area

The government estimates that there was, as of January 2016, approximately 1.16 million tons of disaster-related waste in the region designated as the management area, which covers part or all of 11 municipalities in Fukushima Prefecture. By the

end of February 2016, approximately 770,000 tons of this waste, equivalent to approximately 66%, had been transported to temporary storage areas. The volume of waste is being reduced by incineration at temporary incineration facilities.

## Disposal of designated waste

As of December 2015, a total of approximately 170,000 tons of incinerator ash, sewage sludge, and by-products of agriculture and forestry (rice straw, manure, etc.) in 12 prefectures has been labeled “designated waste” by the Minister of the Environment. Japanese government policy is for disposal of designated waste to take place in the prefecture in which the waste was generated. Designated waste is currently being temporarily stored at waste

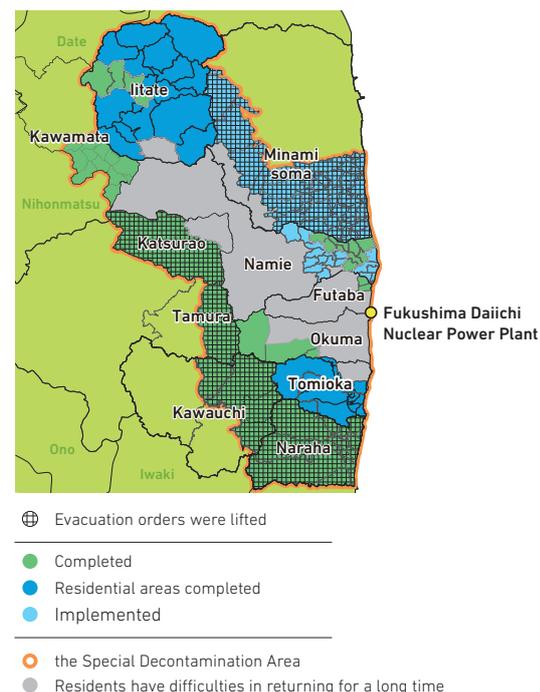
incineration facilities and sewage treatment facilities, and on agricultural land in these prefectures, while storage managers follow national guidelines, and prevent scattering/leaking by covering the waste meticulously with seepage control sheets, etc., and by measuring air dose rates and confirming that the waste is not affecting the surrounding area.

## Decontamination of soil contaminated by radioactive materials

The Ministry of the Environment is conducting decontamination on the basis of decontamination implementation plans in the 11 municipalities in Fukushima Prefecture designated as the Special Decontamination Area. By the end of March 2016, whole area decontamination had been completed in Tamura, Okuma, Naraha, Kawauchi, Katsurao, Kawamata, and Futaba. The target for completing whole area decontamination in the remaining municipalities (except for designated difficult-to-return areas) is the end of March 2017.

As of the end of March 2016, 93 municipalities in eight prefectures in the Intensive Contamination Survey Area had formulated decontamination implementation plans of their own supported by the Ministry of the Environment. The implementation of decontamination in all municipalities is planned to be completed by the end of March 2017.

**Decontamination Progress in the Special Decontamination Area (as of the end of March 2016)**



## Naraha—An example of the effectiveness of decontamination work

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In Naraha, decontamination work commenced in September 2012 on the basis of the decontamination implementation plans, and was completed in March 2014. Air dose rates decreased after decontamination, and monitoring has confirmed that

these effects were maintained. Then, in September 2015, Naraha became the first of the municipalities that had been totally evacuated to have its evacuation orders lifted.

## Interim Storage Facility

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The Interim Storage Facility will be established as a centralized facility for safely managing and storing soil containing radioactive materials generated from decontamination work in Fukushima Prefecture, and designated waste exceeding 100,000 bq/kg being stored in Fukushima Prefecture, until final disposal is conducted.

The Ministry of the Environment confirmed safe and secure transportation from 43 municipalities

in Fukushima Prefecture in 2015 and 2016. The Five-year Ad-hoc Policy on Interim Storage Facility, published in March 2016, shows that approximately 5 million to 12.5 million m<sup>3</sup> of contaminated soil is expected to be delivered to the facility by FY 2020.

## Recycling and reducing volume of contaminated soil

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Necessary measures should be taken for the final disposal outside Fukushima Prefecture within 30 years after operations start at the Interim Storage Facility. In preparation for final disposal outside Fukushima Prefecture, it is important to raise the proportion that can be recycled and reduce the amount requiring final disposal to the greatest extent possible through the development and use

of technology that reduces the volume of contaminated soil. Consequently, the Ministry of the Environment is investigating strategy for the development of technology applicable to recycling and volume reduction, and is conducting demonstration projects for newly-developed technologies.

# HEALTH MANAGEMENT FOR PEOPLE EXPOSED TO RADIATION

## Health management in Fukushima Prefecture

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The government provides support to Fukushima Prefecture for health management, including grants to the Fukushima Residents Health Management Fund. One of the ways that Fukushima Prefecture has been utilizing those grants is to conduct the Fukushima Health Management Survey.

With regard to external exposure, the Fukushima Health Management Survey's basic survey had covered 460,000 of the 2.02 million residents of the prefecture by the end of 2015, estimating external exposure doses during the four months after the accident. Fukushima Prefectural Oversight Committee Meeting for the Fukushima Health Management Survey evaluated the results and concluded that the radiation doses estimated so far are unlikely to cause adverse effects on health, although this conclusion is based on external radiation doses estimated only for the first four months following accident.

Surveys of internal exposure covered approximately 280,000 residents by March 2016, and Fukushima

Prefecture made the assessment that the internal exposure dose levels of those who were examined "are not high enough to affect their health conditions".

In addition, thyroid examinations have been performed on approximately 370,000 residents who were about 18 years old or younger at the time of the disaster. The committee's interim report on the Fukushima Health Management Survey (published March 2016) made the assessment that judging from an overall perspective, the cases of thyroid cancer discovered to date are unlikely to be due to the effects of radiation. This conclusion was reached because a) exposure doses were small overall compared to the Chernobyl accident, b) the period from exposure to discovery of cancer was short, at about one to four years, c) cancer was not discovered in individuals who were 5 years old or younger at the time of the accident, and d) there were no significant differences in prevalence from one area to another. The interim report also stated that the thyroid examinations should continue.

## Studies by experts regarding health management

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The government organized an Expert Meeting (group of experts) to examine health management after the accident from a medical and scientific perspective. The Interim Report by the Expert Meeting published in December 2014 stated,

"We have not found any evidence of biological effects due to the radiation exposure up to this time, and have concluded that there was little possibility that the risk of some diseases would increase by radiation exposure going forward."

## PREPAREDNESS FOR ENVIRONMENTAL RISKS CAUSED BY DISASTERS

In light of the lessons learned from the Great East Japan Earthquake and recent natural disasters, actions are being taken in order to be prepared for environmental risks due to disasters.

### Revision of Waste Management and Public Cleansing Act and Disaster Countermeasures Basic Act

Massive amounts of disaster waste are generated in the event of a large-scale disaster, as might be caused by large earthquakes predicted as “the Nankai-Trough Large-scale Earthquake” or “Tokyo Inland Earthquake”. To prepare for such disasters, it is necessary to take measures such as formulation of disaster waste disposal plans before an emergency occurs. In order to ensure the formulation of such plans, and to ensure the proper and rapid treatment of disaster waste, the Waste Management and Public Cleansing Act and the Disaster Countermeasures Basic Act were revised in August 2015. The revisions included simplifying the procedures for installation and utilization of waste treatment facilities in times of disaster and proxy measures for waste treatment by the Minister of the Environment.

### Disaster Waste Treatment Network

The Disaster Waste Treatment Network (D.Waste-Net) was established in September 2015 to enhance support for disaster waste management by local governments. With a membership including experts on disaster waste, engineers, and members of relevant industry groups, D.Waste-Net supports local governments to cooperate in appropriate disaster waste management by sharing the latest scientific and technical knowledge.

In September 2015, experts and engineers of this network gave advice to local governments in disaster areas affected by heavy rain and flooding in the Kanto and Tohoku regions.

### Regional councils for disaster wastes management

In order to promote wide-area coordination across prefectural boundaries, as well as to strengthen regional disaster waste management, regional councils have been established in eight blocks across Japan to build frameworks for disaster waste treatment. Participants in these councils include the representatives of prefectural governments, major municipalities, local private-sector enterprises, and disaster waste management experts.

### Ecosystem-based Disaster Risk Reduction

In the face of intensifying meteorological disasters due to climate change and growing areas of under-used or unused land due to declining population, the Japanese government has issued a handbook on the concept of Ecosystem-based Disaster Risk Reduction (Eco-DRR) and compiled a set of examples in order to disseminate Eco-DRR.

 <http://www.env.go.jp/nature/biodic/eco-drr/pamph04.pdf>

### Disaster-resistant renewable energy

The Japanese government is supporting the installation of decentralized and self-reliant energy systems at evacuation centers and disaster prevention centers. By the end of March 2015, over 600 local governments had installed self-reliant energy systems at a total of approximately 2,400 locations. Most installations combine solar power generation with batteries for storage, enabling them to provide renewable energy under normal circumstances, and continue to provide sufficient power for lighting and communications from batteries after a disaster and at other times when mains electricity is unavailable.



Solar panel installation subsidized by the government

Photo: Minamisoma City