# Progress on Off-site Cleanup Efforts in Japan

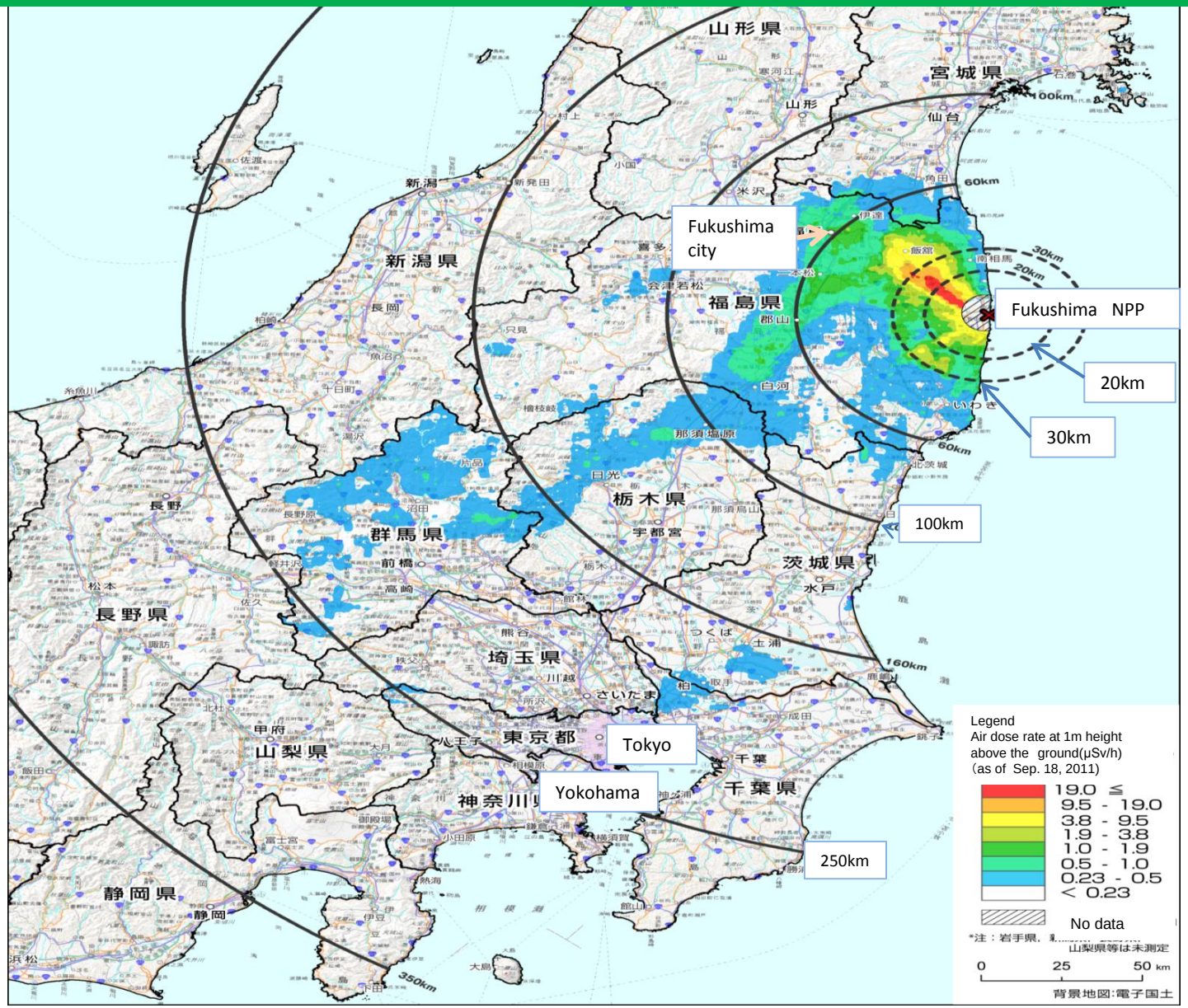
February, 2015

Ministry of the Environment, Japan

# Outline

- **Policy Framework**
- Progress in Special Decontamination Area
- Progress in Intensive Contamination Survey Area
- Decontamination technology
- New policies announced in Sep 2013
- Efforts to secure Interim Storage Facility
- Public Communication

# Radioactive Pollution Caused by the Accident at TEPCO's Fukushima Dai-ichi NPP



# Framework of Decontamination

## Legislation for Promoting Decontamination

- The Act on Special Measures Concerning the Handling of Radioactive Pollution came into force on January 1, 2012.
- Based on this Act, the followings are carried out:
  - Planning and implementation of decontamination work
  - Collection, transfer, temporary storage, and final disposal

## Special Decontamination Area

- 11 municipalities in (former) restricted zone or planned evacuation zone (<20km from the NPP, or annual cumulative dose is >20mSv )
- Decontamination is implemented by the national government

(*) Entire area of Naraha, Tomioka, Okuma, Futaba, Namie, Katsurao, and Iitate.
Some area of Tamura, Minami Soma, Kawamata, and Kawauchi.

## Intensive Contamination Survey Area

- 104 municipalities in 8 prefectures (*), in which over 0.23 μSv/hour of air dose rate (estimated from the long-term target of annual additional exposure dose, 1 mSv/year, under a certain condition) is observed, were designated.
- Decontamination is implemented by each municipality. The national government will take financial and technical measures.

(*) Iwate, Miyagi, Fukushima, Ibaraki, Tochigi, Gunma, Saitama, and Chiba

# Decontamination based on the “Act on Special Measures”

## 1) Special Decontamination Area

Designation of SDA by the Minister of the Environment

Development of the decontamination implementation plan in the SDA by the Minister of the Environment


Implementation of decontamination by the national government

## 2) Intensive Contamination Survey Area

Designation of ICSA by the Minister of the Environment

Survey measurement by the mayors of municipalities

Development of the decontamination implementation plan in the ICSA by the mayors of municipalities

Implementation of decontamination by the municipalities, etc.

## Decontamination of soil and disposal of generated soil at NPP

Implemented by the nuclear power plant operating company in charge (TEPCO)

# Outline

- Policy Framework
- **Progress in Special Decontamination Area**
- Progress in Intensive Contamination Survey Area
- Decontamination technology
- New policies announced in Sep 2013
- Efforts to secure Interim Storage Facility
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# Status of the Areas to Which Evacuation Order have been Issued (as of Aug., 2013)

Prior to the decontamination in the Special Decontamination Area, the decontamination plans were elaborated taking into account the progress of rearrangement of the Restricted Area and the Deliberate Evacuation Area.

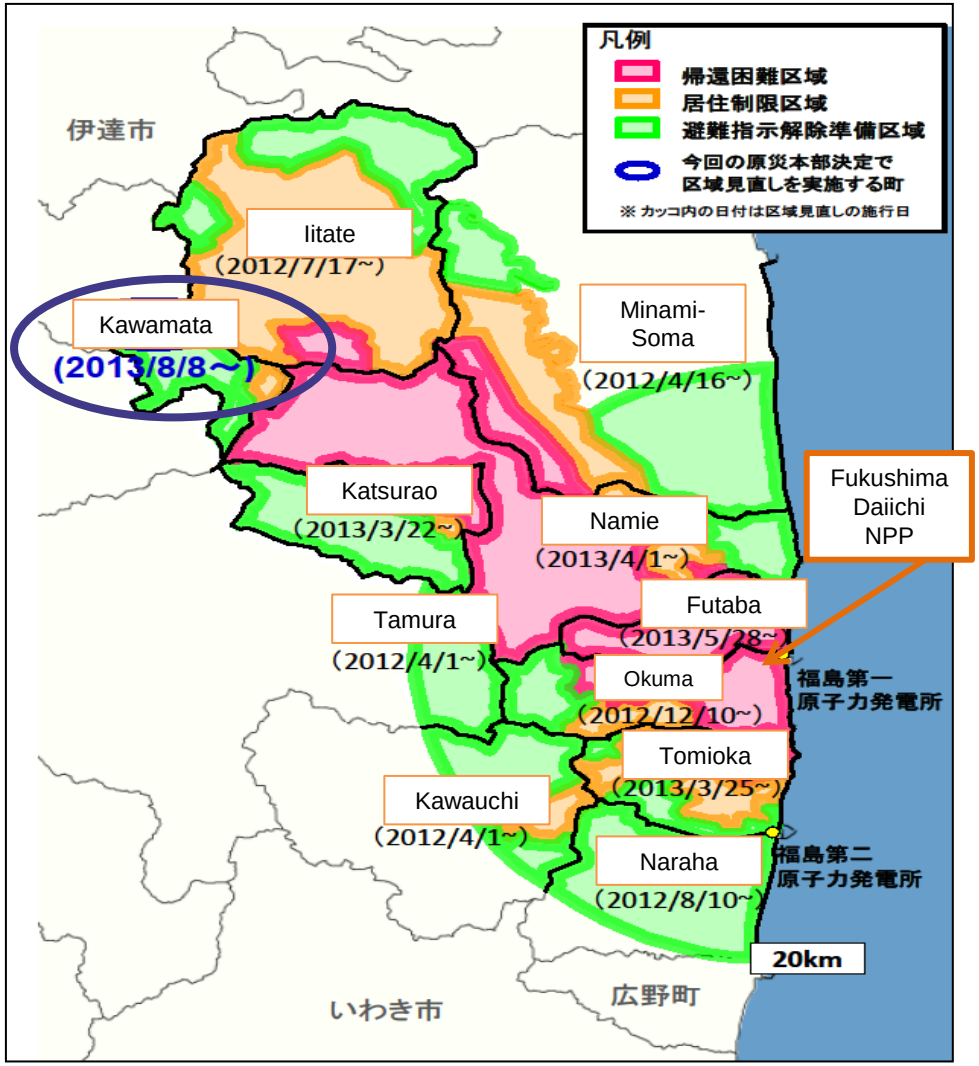
The rearrangement was completed on Aug. 7, 2013.

**3 categories after the rearrangement:**

**Area 1: <20mSv/yr**
**Evacuation orders are ready to be lifted:**

**Area 2: 20 – 50 mSv/yr**
**Residents are not permitted to live:**

**Area3: >50 mSv/yr**
**Residents will have difficulties in returning for a long time:**



# Decontamination Policy for the Special Decontamination Area

Decontamination should be implemented taking into account the level of air dose rate

- **Area where additional exposure rate is higher than 50mSv/year:** MOE conducts demonstration model projects and studies the future demonstration policy based on the lessons learned from the projects.
- **Area where additional exposure rate is between 20-50mSv/year:** Decontamination is implemented, aiming to reduce exposure dose in residential areas and farmlands to be less than 20mSv/year.
- **Area where additional exposure rate is lower than 20mSv/year:** Decontamination is implemented for the area as well.

- **MOE reviewed the progress of decontamination in the SDA and announced on September 10, 2013 that it will revise the previous policy that aimed to complete decontamination and transfer generated materials to temporary storage sites in two years (by the end of March 2014) for all municipalities and will promote decontamination in accordance with reconstruction activities depending on the situation of each municipality.**
- **MOE announced on December 26, 2013 that it will revise the decontamination plans for Minami-Soma, Iitate, Kawamata, Katsurao, Namie and Tomioka and set realistic schedules in accordance with the situation of each municipality, in consultation with them.**

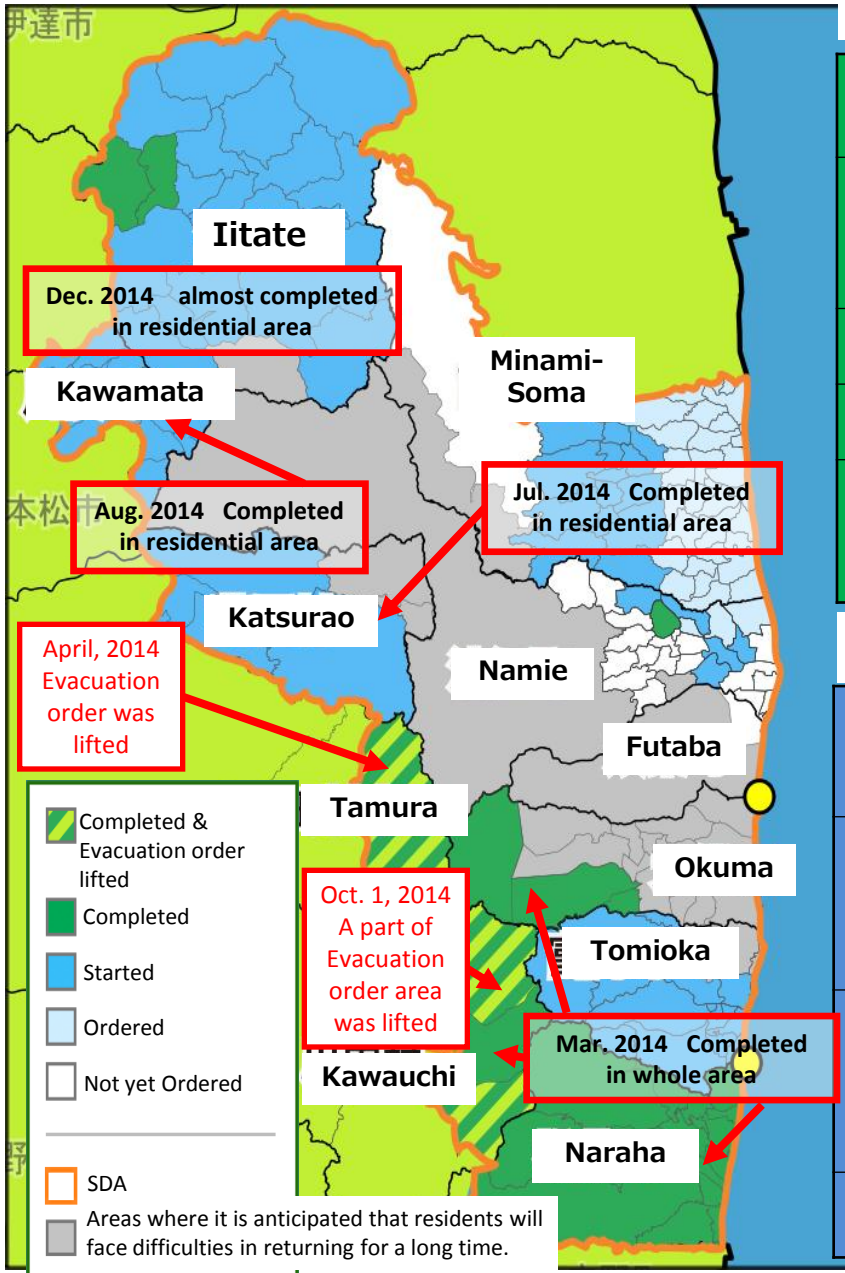
# Progress in the Special Decontamination Area ①

Decontamination Plan has been established in all the 11 municipalities, and the progress has been made.
Decontamination has been completed in Tamura in June, 2013, and in Naraha / Kawauchi / Okuma in March, 2014.

| | | Population in Decontamination Target Area(person) (approx. Figure) | Decontamination Target Area (ha) (approx. figure) | Rearrangement of the Restricted areas, etc. | Progress of the Decontamination Work < as of the end of December, 2014 > | | | | Schedule | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Decontamination Plan | Temporary Storage Site | Consent of landowners, etc. | Decontamination activities | Residential Areas completed | The rest of other areas completed |
| Whole area decontamination was completed | Tamura | 400 | 500 | Apr. 2012 | Apr. 2012 | Secured | Completed | Completed in June. 2013 | FY2013 | |
| | Kawauchi | 400 | 500 | Apr. 2012 | Apr. 2012 | Secured | Completed | Completed in March, 2014 | FY2013 | |
| | Naraha | 7,700 | 2,100 | Aug. 2012 | Apr. 2012 | Secured | completed | Completed in March, 2014 | FY2013 | |
| | Okuma | 400 | 400 | Dec. 2012 | Dec. 2012 | Secured | Completed | Completed in March, 2014 | FY2013 | |
| Decontamination of residential area was completed | Katsurao | 1,400 | 1,700 | Mar. 2013 | Sep. 2012 | Secured | Almost completed | In progress | Summer, 2014 (completed) | Within 2015 |
| | Kawamata | 1,200 | 1,600 | Aug. 2012 | Aug. 2013 | approx. 90% Secured | Almost completed | In progress | Summer, 2014 (completed) | Within 2015 |
| | Iitate | 6,000 | 5,600 | Jul. 2012 | May 2012 | secured | approx. 90% | In progress | Almost completed | Within2016 |
| Decontamination is under operation & in preparation | Minami-Soma | 13,300 | 6,100 | Apr.2012 | Apr.2012 | approx. 80% secured | approx.60% | In progress | FY2015 | FY2016 |
| | Namie | 18,800 | 3,300 | Apr. 2013 | Nov. 2012 | approx. 40% Secured | approx. 60% | In progress | FY2015 | FY2016 |
| | Tomioka | 11,300 | 2,800 | Mar. 2013 | Jun. 2013 | approx. 90% secured | approx. 90% | In progress | FY2015 | FY2016 |
| | Futaba | 300 | 200 | May, 2013 | Jul. 2014 | Under coordination | Under preparation | Under preparation | FY 2015 | |

Note 1: Necessary areas for securing Temporary Storage Sites might be reviewed in future survey
Note 2: In the municipalities where decontamination was completed, such as Tamura, Kawauchi, Naraha, and Okuma, remaining decontamination shall be implemented for the residents who did not yet consent but newly request decontamination.

# Progress in the Special Decontamination Area ①
## (as of Jan., 2015)




< Completed decontamination >

| | |
|---|---|
| Tamura | Whole area decontamination was completed in June, 2013. Evacuation order was lifted on April 1, 2014 |
| Kawauchi Naraha Okuma | Whole area decontamination was completed in March, 2014<br>※ As for Kawauchi, a part of the evacuation order was lifted on October 1, 2014 |
| Katsurao | Decontamination of residential area was completed in July,2014 |
| Kawamata | Decontamination of residential area was completed in August,2014 |
| Joban Expressway | Decontamination was completed<br>※ Reopened between Hirono and Joban-Tomioka on Feb. 22, 2014<br>※ Opened between Namie and Minami-Soma on Dec. 6, 2014<br>※ Will be opened between Namie and Joban-Tomioka on Mar. 1, 2015 |

< Schedules of decontamination ahead >

| | |
|---|---|
| Kawamata Katsurao | Aiming at the completion of decontamination of remaining areas within 2015 |
| Iitate | Decontamination of residential area was almost completed at the end of Dec., 2014 aiming at the completion of decontamination of remaining area within 2016 |
| Minami-soma Namie Tomioka | Aiming at the completion of decontamination of residential area within FY 2015 and the completion of decontamination of remaining area within FY 2016 |
| Futaba | Aiming at the completion of decontamination within FY 2015 |

# Progress in the Special Decontamination Area ③-1

Progress on decontamination works (executing ratio and ordering ratio) is as follows:

| As of the end of Dec., 2014 < Unit: % > | Tamura | | Naraha | | Kawauchi | | Iitate | | Kawamata | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Executing ratio | Ordering ratio | Executing ratio | Ordering ratio | Executing ratio | Ordering ratio | Executing ratio | Ordering ratio | Executing ratio | Ordering ratio |
| **Residential area** | 100 | 100 | 100 | 100 | 100 | 100 | 96 (76) | 100 | 100 | 100 |
| **Farmland** | 100 | 100 | 100 | 100 | 100 | 100 | 18 (16) | 40 | 17 (15) | 100 |
| **Forest** | 100 | 100 | 100 | 100 | 100 | 100 | 33 (31) | 45 | 52 (43) | 100 |
| **Road** | 100 | 100 | 100 | 100 | 100 | 100 | 17 (14) | 28 | 4 | 100 |

Note 1: Executing ratio is calculated as follows: ①Areas in which decontamination works (weeding, removal of sediment, and cleaning, etc.) are completed / ②Target areas to be decontaminated

Note 2: Ordering ratio is calculated as follows: ③Areas already contracted for decontamination / ②Target areas to be decontaminated

Note 3: ①, ②, ③ might be modified with further review

Note 4: The number in () was the number in last month. When there is no change, it is skipped

# Progress in the Special Decontamination Area ③-2

| As of the end of Dec., 2014 | Katsurao | | Okuma | | Minami-Soma | | Tomioka | | Namie | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Executing ratio | Ordering ratio | Executing ratio | Ordering ratio | Executing ratio | Ordering ratio | Executing ratio | Ordering ratio | Executing ratio | Ordering ratio |
| Residential area | 100 | 100 | 100 | 100 | 6 | 99.9 | 10 (8) | 100 | 8 (7) | 48 |
| Farmland | 62 (42) | 100 | 100 | 100 | 4 (3) | 65 | 5 (3) | 100 | 11 (7) | 35 |
| Forest | 99 | 100 | 100 | 100 | 27 (24) | 79 | 17 (12) | 100 | 13 (11) | 43 |
| Road | 23 (11) | 100 | 100 | 100 | 1 (0.5) | 65 | 58 (55) | 100 | 17 (13) | 46 |

Note 1: Executing ratio is calculated as follows: ①Areas in which decontamination works (weeding, removal of sediment, and cleaning, etc.) are completed / ②Target areas to be decontaminated

Note 2: Ordering ratio is calculated as follows: ③Areas already contracted for decontamination / ②Target areas to be decontaminated

Note 3: ①, ②, ③ might be modified with further review

Note 4: The number in () was the number in last month. When there is no change, it is skipped

# New schedule to be targeted for Special Decontamination Area ①

- **Among 11 municipalities, Decontamination works in Tamura has been completed June, 2013 and the one of in Naraha / Kawauchi / Okuma has been completed in March, 2014**
- **For Minami-Soma, Iitate, Kawamata, Katsurao, Namie, and Tomioka, the decontamination plans were revised in Dec. '13 and a realistic schedule that meets the condition of each area were set up in consultation with each municipality and community.**
- **Decontamination of residential areas and their surroundings will be prioritized for the evacuees to return home.**
- **The decontamination works of the infrastructure which are important for the evacuees to return home(such as water supply, sewage, and major roads) will be started in advance.**
- **The decontamination projects should be implemented in an accelerated and smooth manner and the project terms should be shortened as much as possible. The work process should be fully controlled and the progress status should be made open to public.**

| | |
|---|---|
| **Minami-Soma** | ● The residential areas and their surroundings will be decontaminated on a priority basis by the end of March, 2016.<br>● The rest will be decontaminated by the end of March, 2017. The decontamination will be made in an accelerated and smooth manner and the work term will be shortened as much as possible. |
| **Iitate** | ● The residential areas and their surroundings will be decontaminated on a priority basis by the end of March, 2015. The decontamination will be made in an accelerated and smooth manner and the work term will be shortened as much as possible to be completed by the end of 2014.<br>● The rest will be decontaminated by the end of March, 2017. The decontamination will be made in an accelerated and smooth manner and the work term will be shortened as much as possible to be completed by the end of 2016. |

Note: Decontamination work in a municipality is to be implemented based on the premises of formulation of the decontamination plan, securing of temporary storage sites, consent of land owners ,and the ensuring of workers.

# New schedule to be targeted for Special Decontamination Area ②

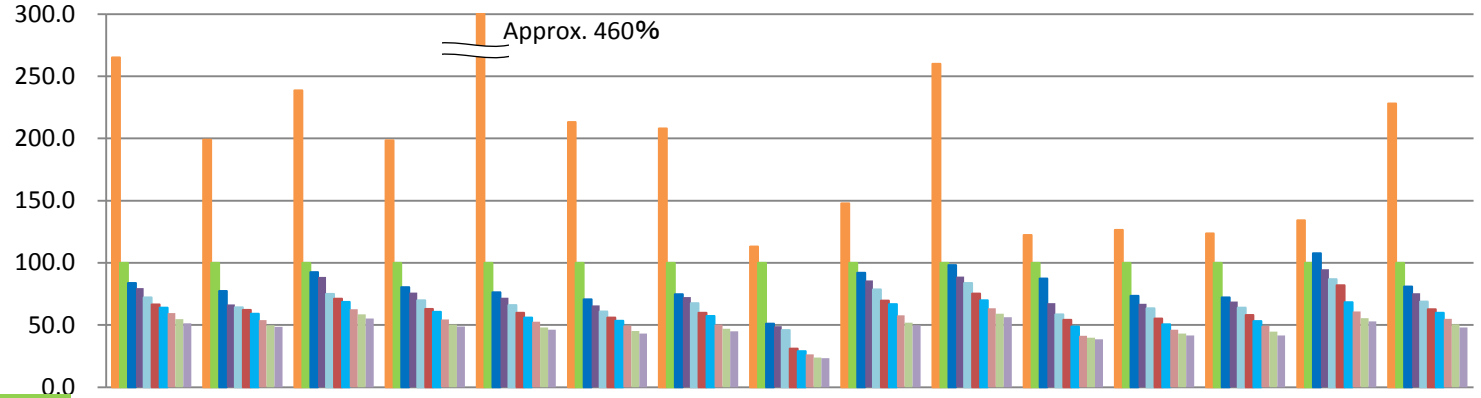
| | |
|---|---|
| **Kawamata** | ● The residential areas and their surroundings will be decontaminated on a priority basis by the end of March, 2015.The decontamination will be made in an accelerated and smooth manner and the work term will be shortened as much as possible to be completed by the end of summer in 2014.<br>● The rest will be decontaminated by the end of March 2016. The decontamination will be made in an accelerated and smooth manner and the work term will be shortened as much as possible to be completed by the end of 2015. |
| **Katsurao** | ● The residential areas and their surroundings will be decontaminated on a priority basis by the end of March, 2015. The decontamination will be made in an accelerated and smooth manner and the work term will be shortened as much as possible to be completed by the end of summer in 2014.<br>● The rest will be decontaminated by the end of March, 2016. The decontamination will be made in an accelerated and smooth manner and the work term will be shortened as much as possible to be completed by the end of 2015. |
| **Namie** | ● Areas to be decontaminated, other than the tsunami-devastated areas (Minami-Tanashio, Ukedo-Kita, Ukedo-Minami, Nakahama, Morotake), will be decontaminated on a priority basis by the end of March, 2016.<br>● For the tsunami-devastated areas, the residential areas and their surroundings will be decontaminated on a priority basis by the end of March, 2016 by paying attention to the treatment of disaster waste. The rest will be decontaminated by the end of March, 2017. The decontamination will be made in an accelerated and smooth manner and the work term will be shortened as much as possible. |
| **Tomioka** | ● The residential areas and their surroundings will be decontaminated on a priority basis by the end of March, 2016.<br>● The rest will be decontaminated by the end of March, 2017. The decontamination will be made in an accelerated and smooth manner and the work term will be shortened as much as possible. |
| **Futaba** | ● Decontamination in residential houses and its' vicinity is aimed to be completed within FY 2015. |

Note: Decontamination work in a municipality is to be implemented based on the premises of formulation of the decontamination plan, securing of temporary storage sites, consent of land owners ,and the ensuring of workers.

# The result of Post-Decontamination Monitoring

**○The dose rate is the averaged value measured in each of the sites. The value immediately after decontamination [green column] is normalizes to be 100%.**

Comparison of average figure on air dose rate
(assuming the figure after the work as 100)




| | Ottozawa, Okuma | Okuma municipal office | Tsushima, Namie * | Yorunomori Park, Tomioka | Tomioka Daini junior high school | Gongendo, Namie | Kusano, Iitate * | Hayashi factory, Iitate * | Ichibankan, nursing home, in Iitate * | Kikuchi factory, Iitate * | Kainosaka, Kawauchi | Around municipal office in Katsurao | Around Kanabusa elementary school, Minami-Soma | Minami factory complex in Naraha | Average Value of 14 districts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Just after the work | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1st follow-up survey | 84 | 77 | 93 | 81 | 76 | 71 | 75 | 51 | 92 | 98 | 87 | 73 | 72 | 108 | 81 |
| 2nd follow-up survey | 80 | 67 | 89 | 76 | 72 | 66 | 73 | 49 | 86 | 89 | 68 | 67 | 69 | 95 | 75 |
| 3rd follow-up survey | 72 | 64 | 75 | 70 | 66 | 61 | 68 | 46 | 79 | 84 | 58 | 63 | 64 | 87 | 69 |
| 4th follow-up survey | 66 | 62 | 71 | 63 | 60 | 56 | 60 | 31 | 70 | 75 | 54 | 55 | 58 | 82 | 63 |
| 5th follow-up survey | 64 | 59 | 69 | 61 | 56 | 53 | 57 | 29 | 67 | 70 | 49 | 51 | 53 | 68 | 60 |
| 6th follow-up survey | 60 | 54 | 63 | 55 | 53 | 49 | 50 | 26 | 58 | 64 | 41 | 46 | 49 | 61 | 55 |
| 7th follow-up survey | 55 | 50 | 59 | 50 | 48 | 45 | 47 | 24 | 52 | 59 | 40 | 43 | 45 | 55 | 51 |
| 8th follow-up survey | 51 | 48 | 55 | 49 | 46 | 43 | 45 | 23 | 50 | 56 | 39 | 41 | 42 | 53 | 48 |

- Measured result just before the work(Nov.&Dec., 2011)
- Measured result just after the work(Dec., 2011~Apr., 2014)
- 1st follow-up survey (Oct., 2012)
- 2nd follow-up survey (Mar., 2013)
- 3rd follow-up survey (May., 2013~Jul., 2013)
- 4th follow-up survey (Sep.&Oct., 2013)
- 5th follow-up survey (Dec., 2013)
- 6th follow-up survey (Mar.&Apr., 2014)
- 7th follow-up survey (Jun.&Jul., 2014)
- 8th follow-up survey (Sep., 2014)

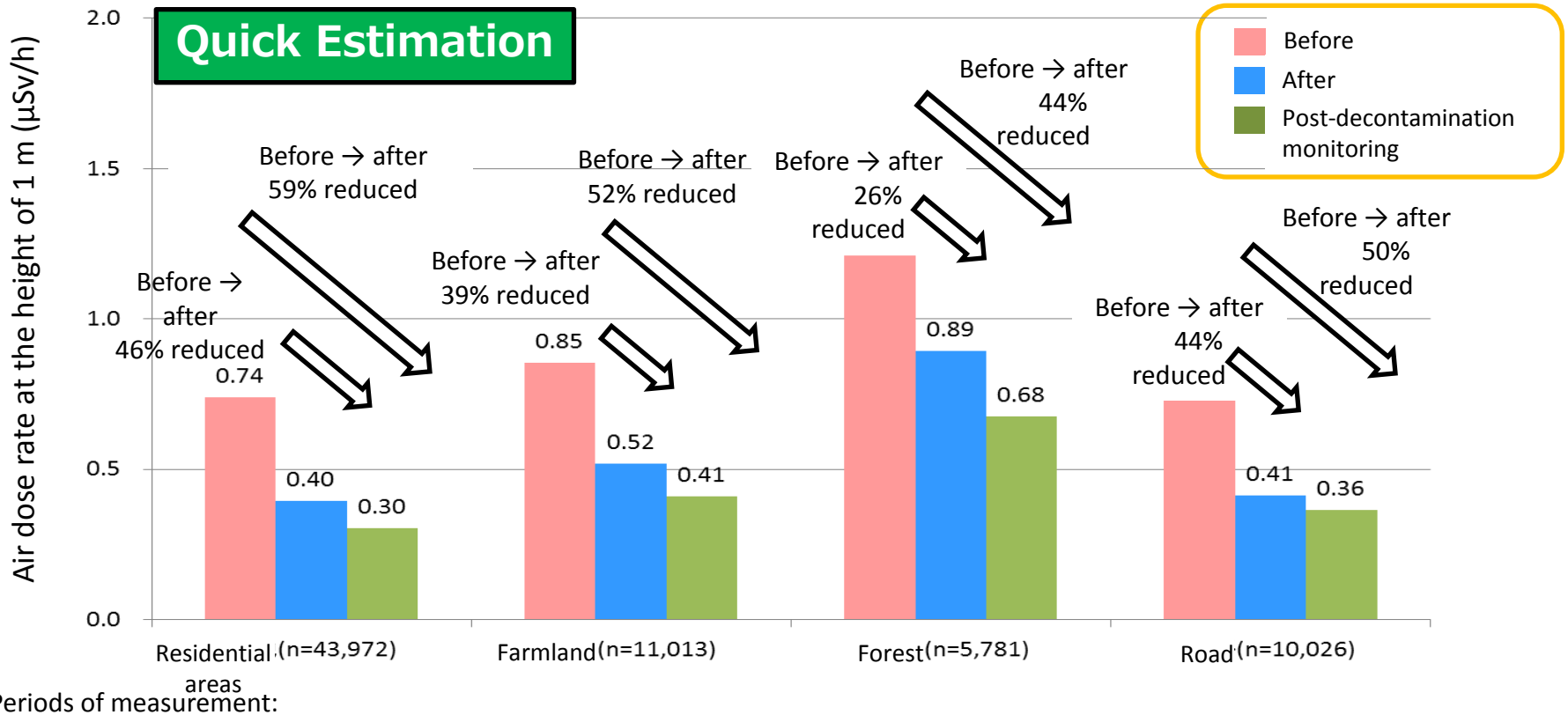
＊: Measurement result just after the decontamination work in Tsushima, Namie and Iitate, might be possibly low because of accumulated snow

Note 1: Measurement figure might be changed by environmental condition, e.g. climate condition, such as rainfall, snowfall,

Note 2: It's have passed about one year and nine months from measurement result just after the decontamination work until 5th follow-up survey, during that time, the dose rate resulting from radiocaesium, about 30% of reduction is expected by physical attenuation.

# Effects of Decontamination Work in Naraha

- Decontamination work decreased radiation dose: e.g. approx. 46% in residential area
- Post-decontamination monitoring confirmed that effects of the whole area decontamination have been maintained and that radiation dose has been continuously decreasing




Periods of measurement:

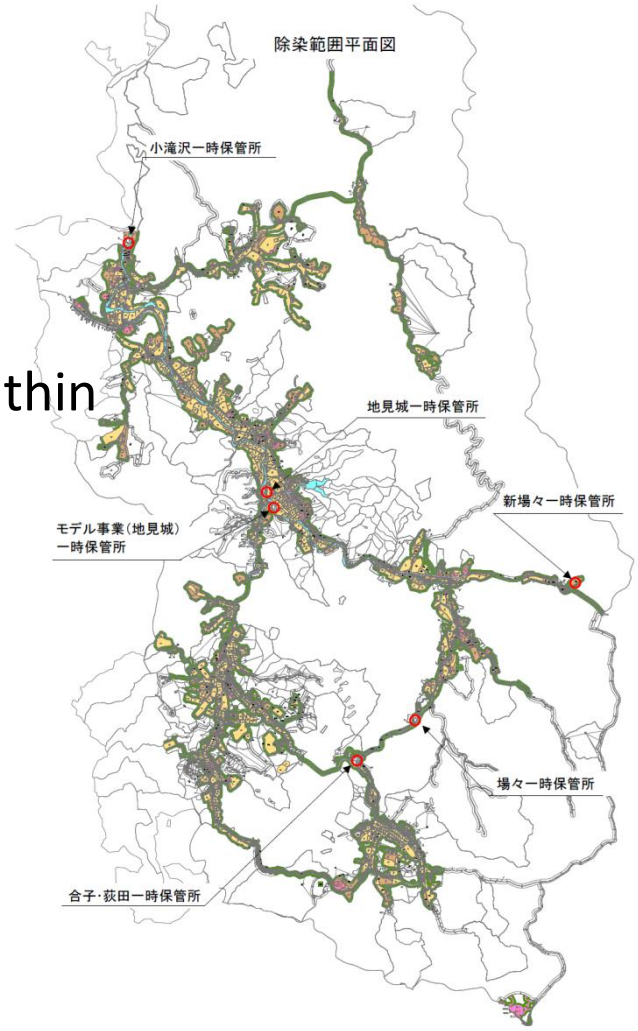
Before decontamination: Jun. 2012-Mar. 2014, After decontamination: Jun. 2012-May. 2014, Post-decontamination monitoring: Jul. 2014-Nov. 2014

- It is the policy that the whole area decontamination is not to be conducted in principle. However, if post-decontamination monitoring finds hot spots where decontamination effects are not maintained and whose high radiation affects air dose rates of surrounding environment, follow-up decontamination is to be conducted upon each situation, taking into account rationality and feasibility.

# Overview of the Decontamination Project in Tamura City

Decontamination work based on the Decontamination Implementation Plan has been finished in Tamura City.

- Work Period：July 5, 2012～June 28, 2013
- Number of Workers：Max. 1,300/day
  （A total of 120,000 man day）
- Decontamination target area：
  residential area and a part of forests (area within 20m from the edge) in Furumichi, Miyakoji district
- Volumes of work
  - Buildings　228,249㎡(121 family unit)
  - Roads　95.6km
  - Farmland　1,274,021㎡
  - Forests　1,921,546㎡



# Lift of Evacuation Order in Tamura City

**April 2012** Designated as areas to which evacuation orders are ready to be lifted after the Rearrangement of Evacuation Order Areas
Formulation of a decontamination implementation plan

**July 2012-** Full-scale decontamination work based on the plan was started

**June 2013-** Decontamination work was completed

**Aug.-Nov. 2013-** Post-decontamination monitoring

**October 2013** Explanatory meeting to local residents
<Reported the result of post-decontamination monitoring of residential houses>

**February 2014-** Explanatory meeting to local residents
<Set up an inquiry counter and carried out measurement upon residents' requests>

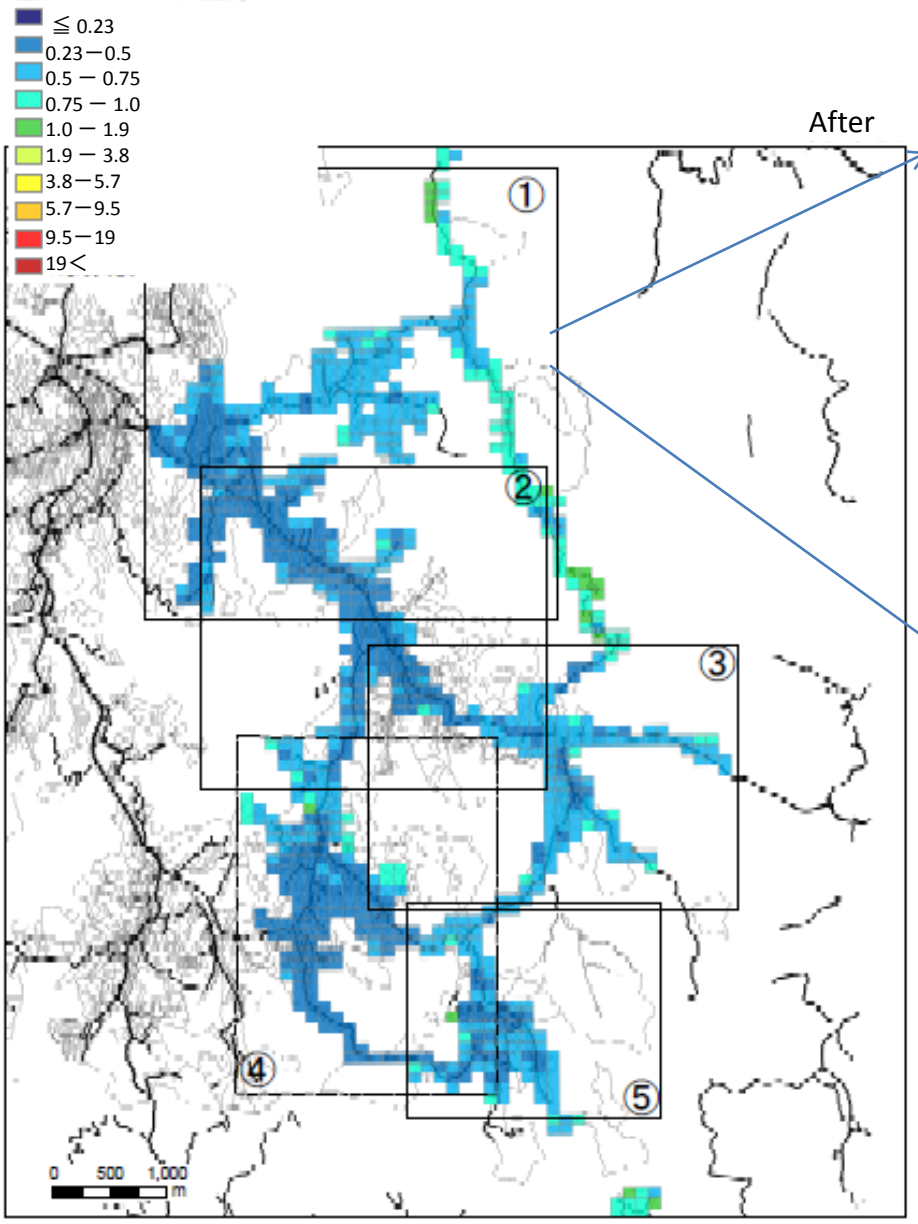
**April 2014** **The evacuation order was lifted**

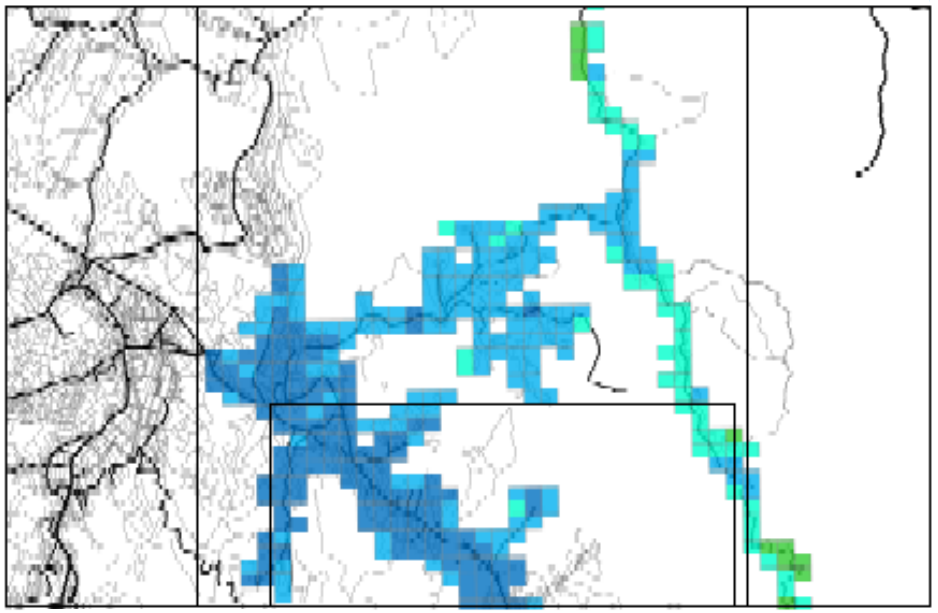
## Decontamination follow-up

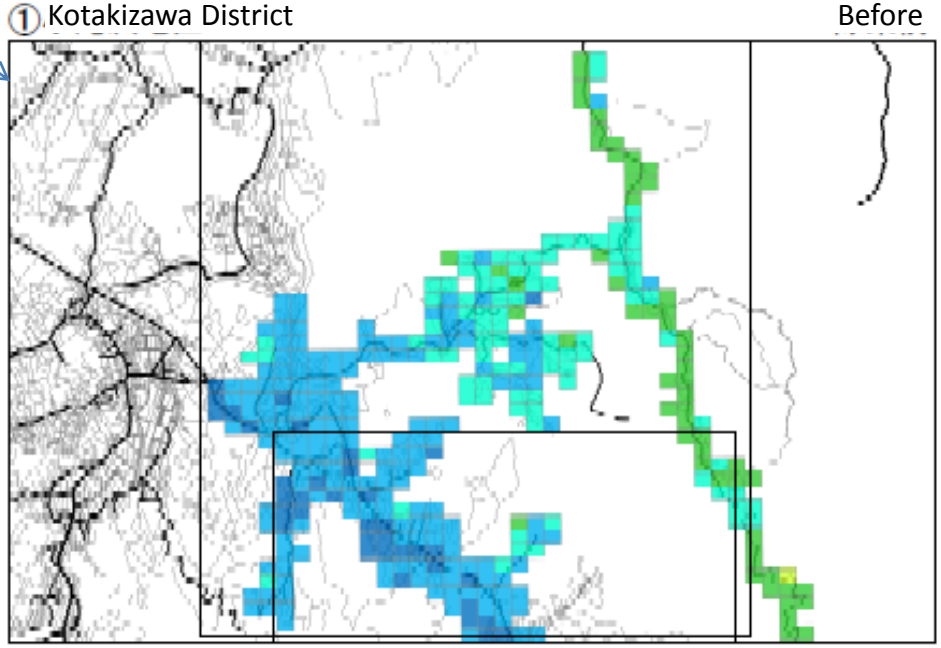
1. **Consultation counter for decontamination**
   <Started to measure air dose rate and to check the extent of contamination upon residents' requests>
2. **Continuous Post-decontamination monitoring**
3. **Removal of contaminated soil depending on the situation**

# Effect of Radiation Dose Reduction by Decontamination Work in Tamura City

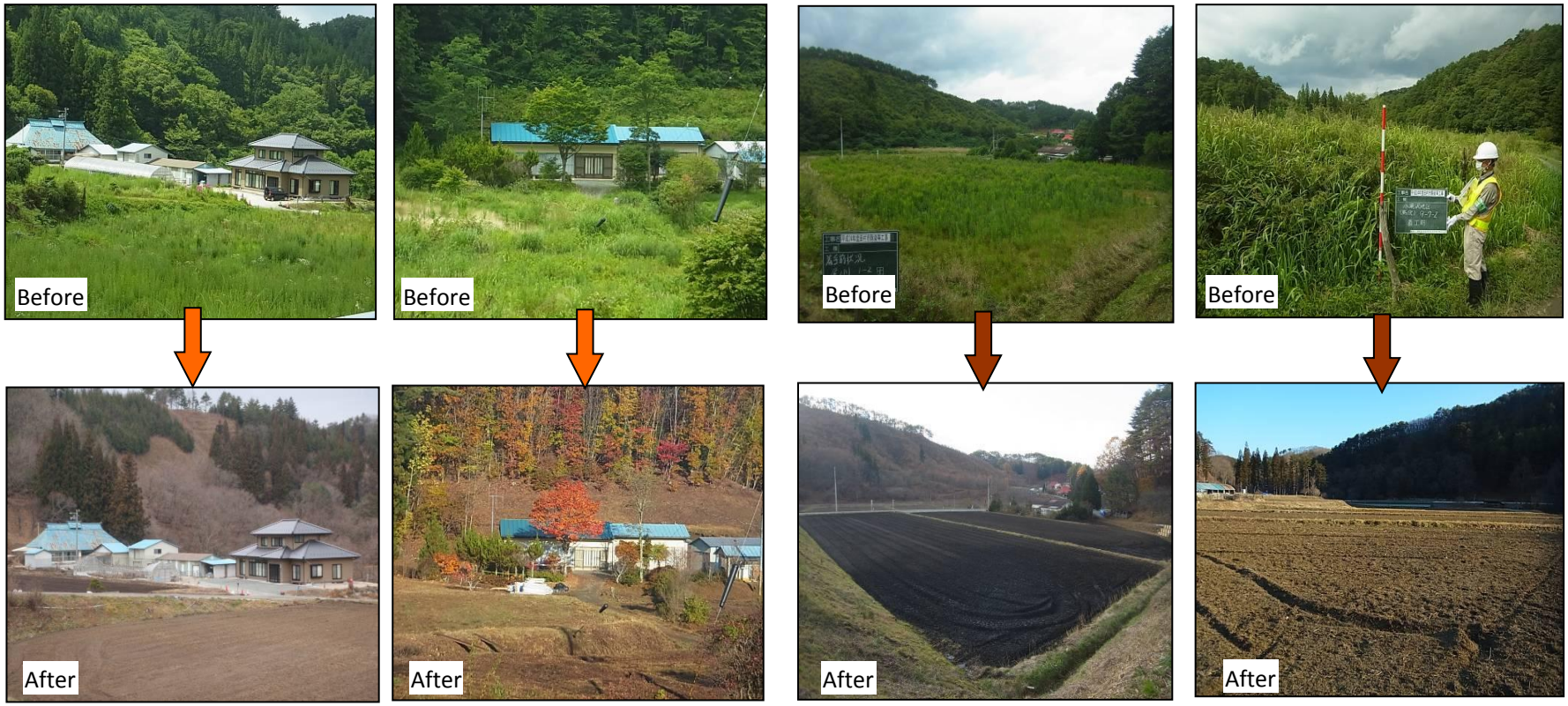
(Average of Air Dose Rate at the height of 1m above ground)



# Before & After the Decontamination Work in Tamura City



# Decontamination Activities in Tamura City

Wiping off rooftop and walls

Wiping off a gutter

High pressure water cleaning of a drain pipe

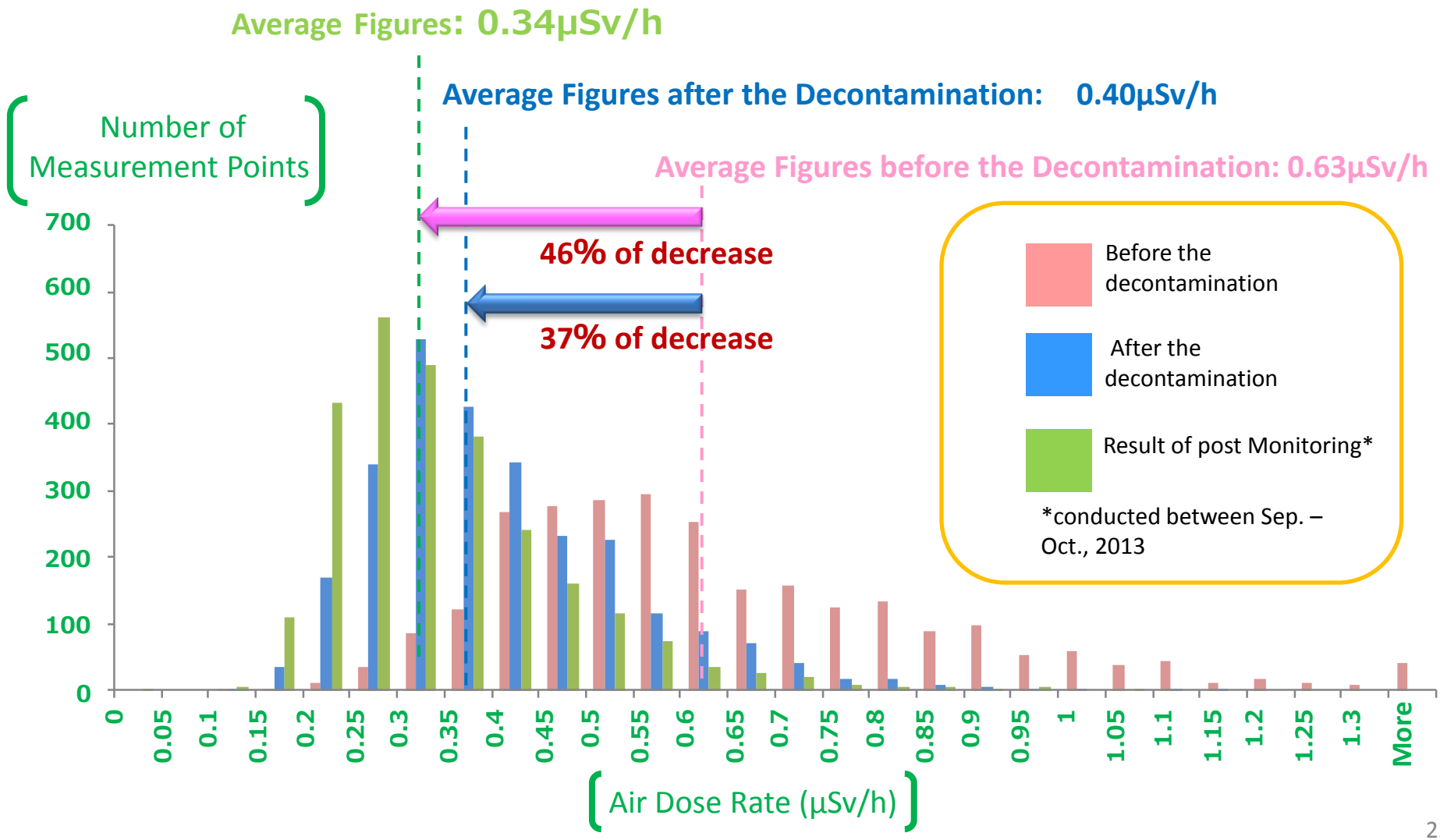
High pressure water cleaning of paved road

Mowing and removal of sludge

Removal of crushed stones and topsoil, and cover with clean soil

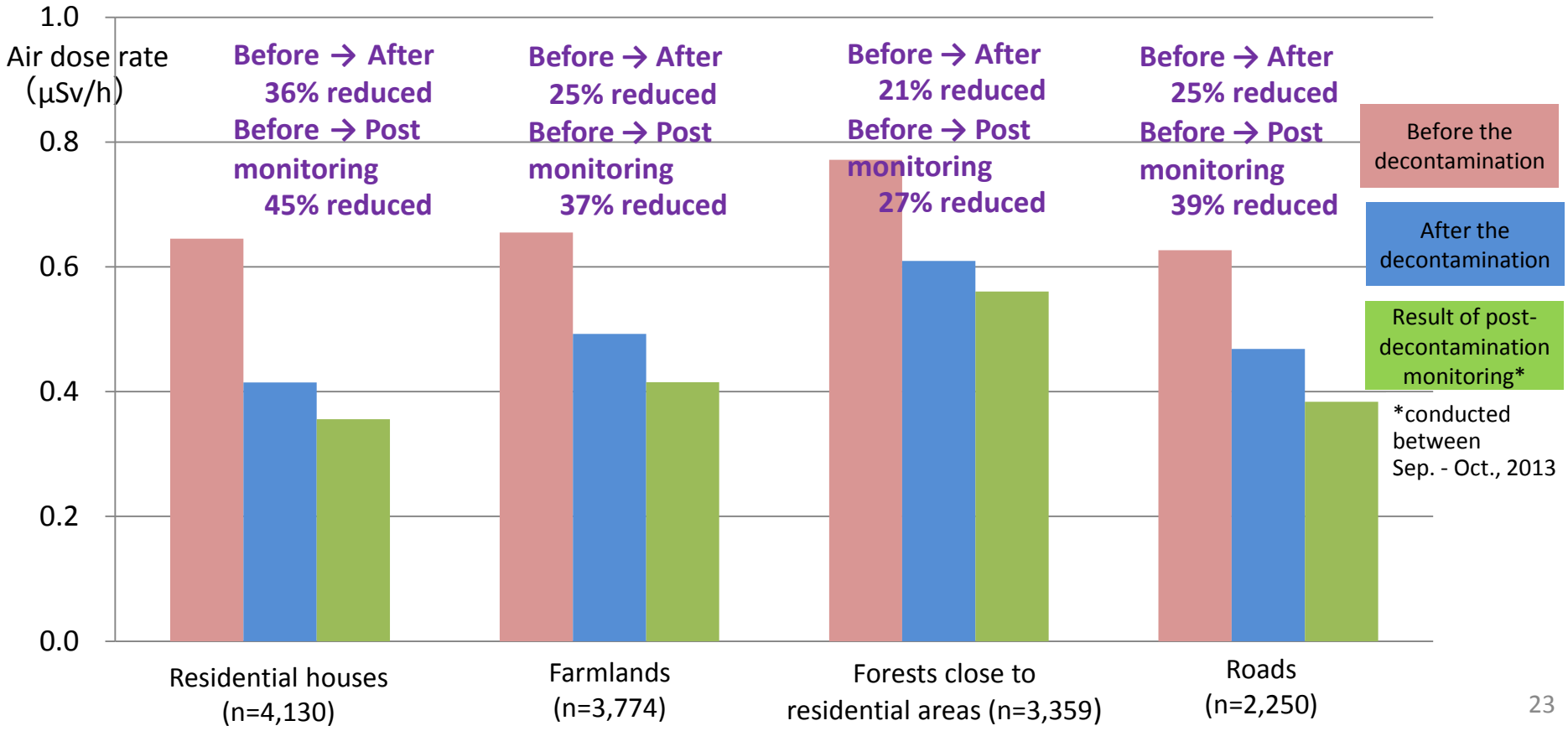
# Effect on Decontamination Work in Tamura City ①

Air Dose Rate 1m above surface



# Effects on Decontamination Work in Tamura City ②

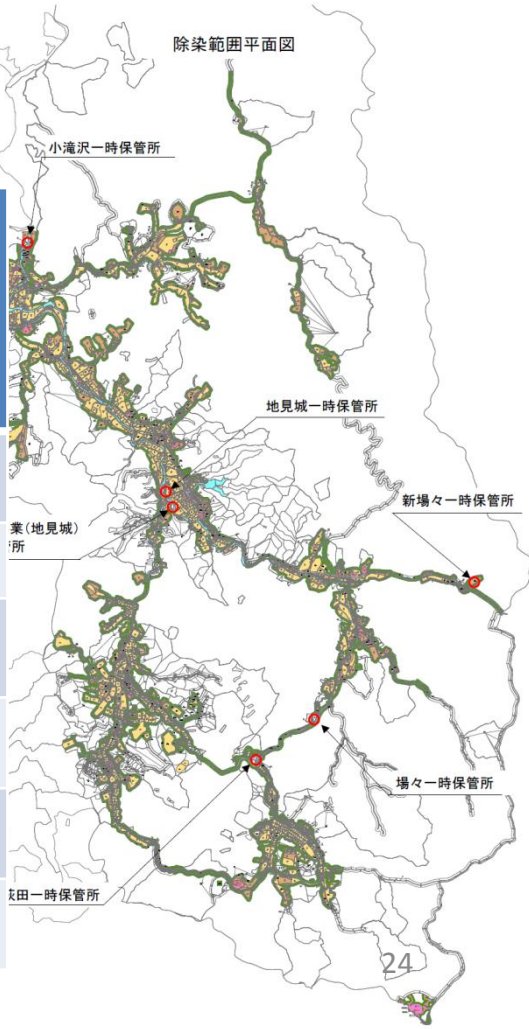
- Decontamination work has reduced air dose rates.
  e.g. by approx. 36% for residential houses
- The data from the post-decontamination monitoring confirm that the effects of whole area decontamination have been maintained and show that air dose rates have been continuously decreasing.



# Overview of Temporary Storage Site in Tamura City

- Removed soil has been collected and stored in temporary storage sites.
- Air dose rate at the entrance of the sites shows no difference after removed soil is stored.
- Radioactive materials has never been detected from leachate or groundwater under the sites.

| District | Air Dose Rate just after Installation (1m) | Latest (5/27) Air dose Rate（1m） | Amount of Removed soil （㎥） | Measurement Result of Leachate | Measurement Result of Groundwater |
|---|---|---|---|---|---|
| Kotakizawa | 0.36 | 0.36 | 4,242 | ND | ND |
| Jikenjo | 0.32 | 0.38 | 2,743 | ND | ND |
| Jikenjo (Model Project) | 0.38 | 0.34 | 2,626 | ND | ND |
| Shin-Baba | 0.60 | 0.56 | 7,985 | ND | ND |
| Baba | 0.40 | 0.45 | 1,974 | ND | ND |
| Goshi, Ogita | 0.39 | 0.43 | 12,149 | ND | ND |



# Results of decontamination on Joban Expressway

After the synergistic work of decontamination by MOE and restoration by East Nippon Expressway Company Limited, the air dose rates have been decreased and fallen much below the targets in the "Decontamination Policy".

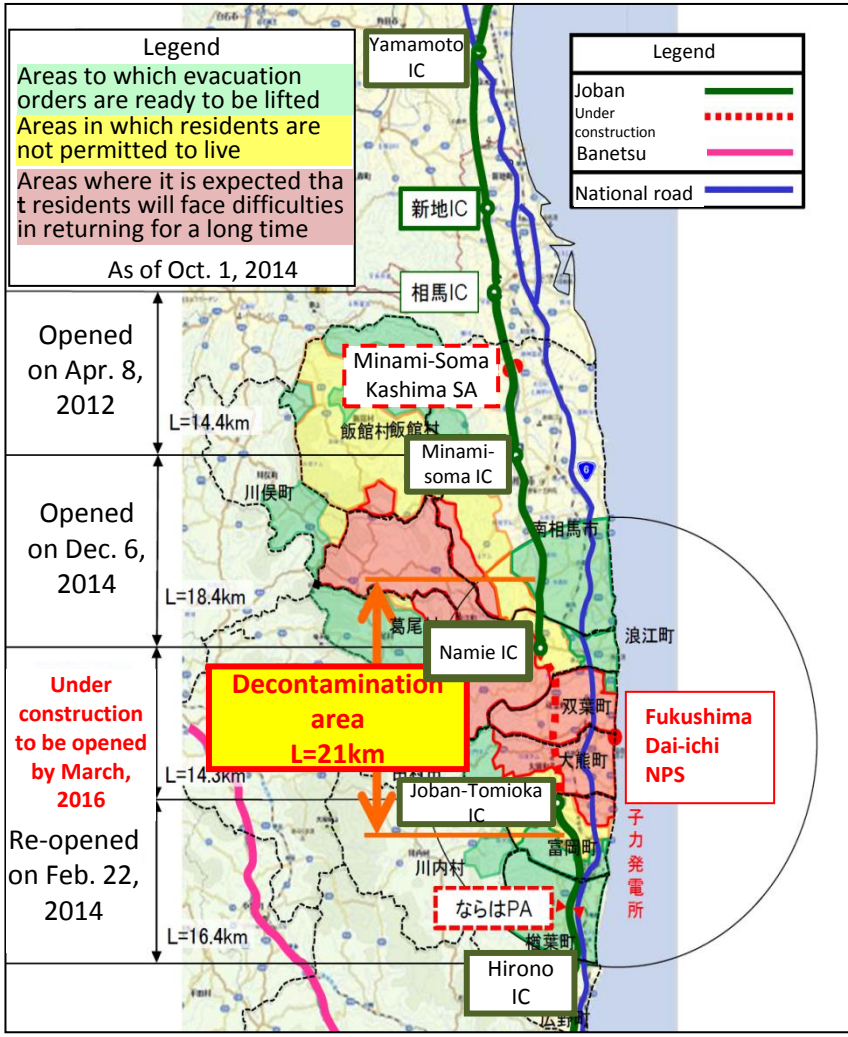
## ●Outline of decontamination

| | |
|---|---|
| Period | December, 2012 ～ June, 2013 |
| Decontamination area | Areas where air dose rates exceeded 3.8 μSv/h (equivalent to 20 mSv/year) on the roads |
| Main Decontamination method | **Side slope** : Weeding (removing vegetation)<br>**Road surface** : High pressure water jet washing<br>**Future site** : Weeding, Soil mixture, Surface compaction<br>**Bridge (handrail, safety fence)** : Wiping out<br>※Top soil removal of road surface was omitted for the not-yet-opened areas of the main line. |

## ●Result of decontamination

| Section (as of June, 2012) | Target (μSv/h) | Average air dose rate at the height of one meter (μSv/h) | | | Decreasing rate for Oct.2014 to pre-decontamination |
|---|---|---|---|---|---|
| | | Before | After | Oct. 2014 | |
| ①3.8 μSv/h＜～≦9.5 μSv/h | ≦3.8 | 4.3 | 2.8 | 0.9 | 79% |
| ②＞9.5 μSv/h | ≦9.5 | 15.7 | 9.9 | 2.3 | 85% |

## ●Zones of decontamination on Joban Expressway

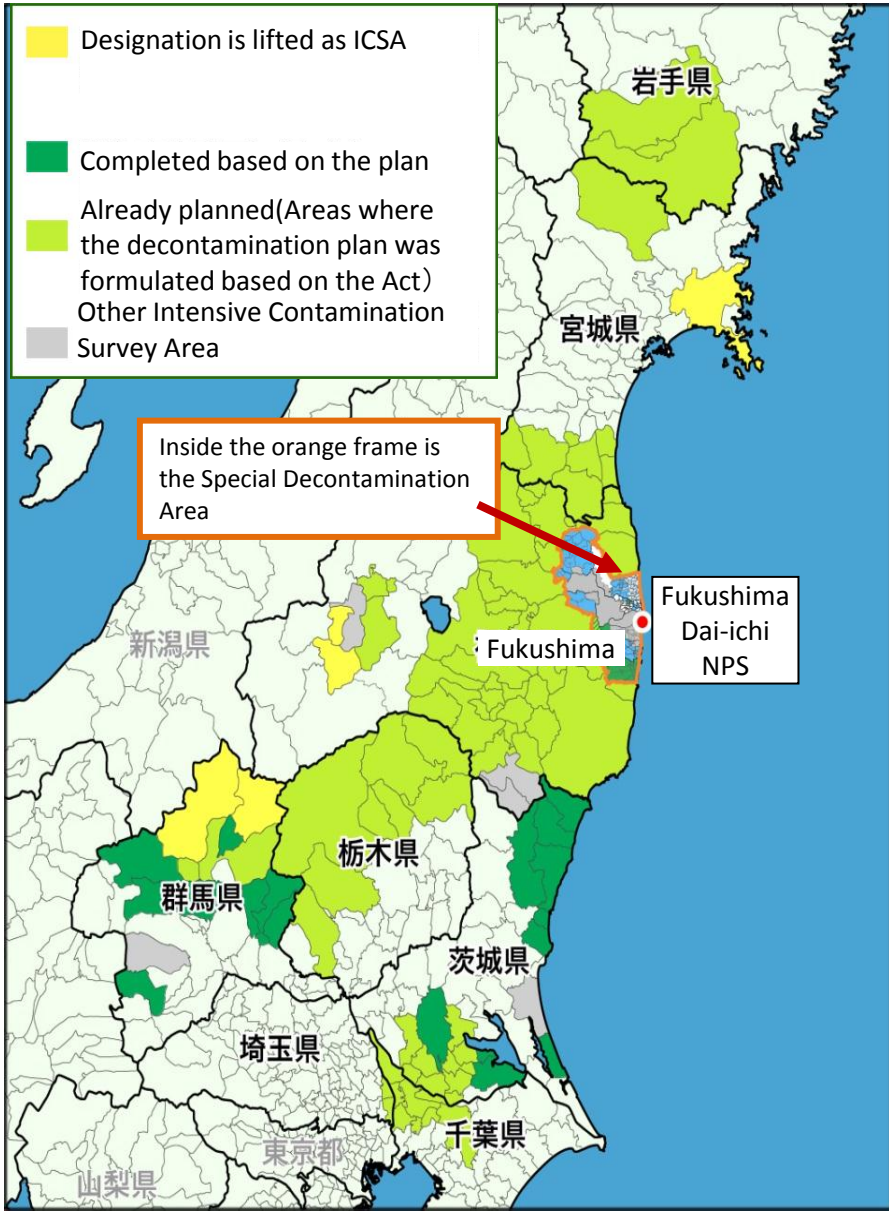


# Outline

- Policy Framework
- Progress in Special Decontamination Area
- **Progress in Intensive Contamination Survey Area**
- Decontamination technology
- New policies announced in Sep 2013
- Efforts to secure Interim Storage Facility
- Public Communication

# Progress in Intensive Contamination Survey Area ①

As of the end of December, 2014




## < In Fukushima prefecture >

◇ Number of municipalities designated as the Intensive Contamination Survey Area:
41 (at the start) → 39 (at present)
When the situation becomes different from the required condition of designation , the designation can be lifted. The designation was lifted in two municipalities up to now because of the radiation dose decrease, etc.

◇ Municipalities that formulated decontamination implementation plans
(all municipalities that had intended to do):
36 municipalities

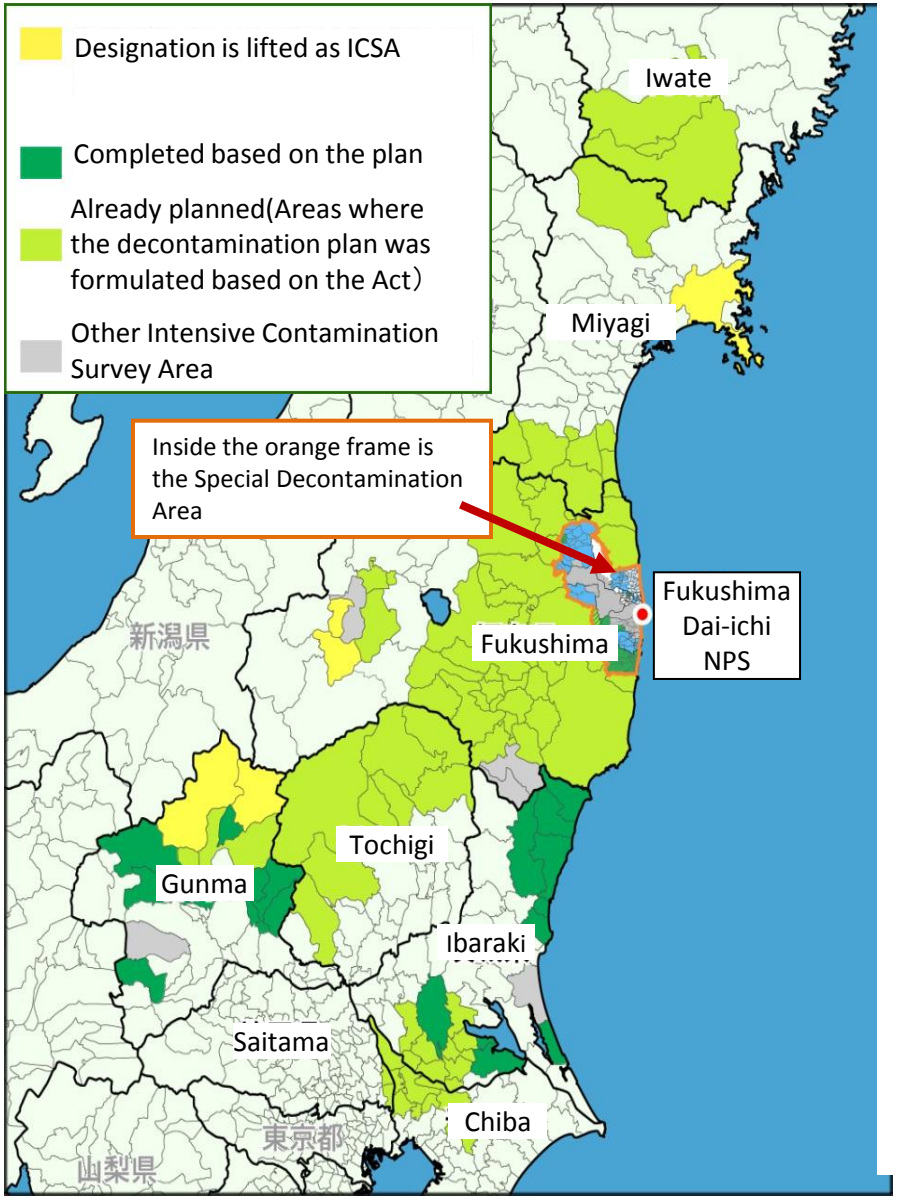
◇ Municipalities in process of implementing decontamination based on the plans:
36 municipalities

◇ The progress of decontamination (as of the end of December 2014)
Public facilities: approx. 80%
Residential houses: approx. 60%
Roads: approx. 40%

◇ The end of most of the decontamination plans are set between FY2015- FY2016.

# Progress in Intensive Contamination Survey Area ②

As of the end of December, 2014




## < Outside Fukushima prefecture >

◇ Number of municipalities designated as the Intensive Contamination Survey Area:
63 (at the start) → 60 (at present)

When the situation becomes different from the required condition of designation , the designation can be lifted. The designation was lifted in two municipalities up to now because of the radiation dose decrease, etc.

◇ Municipalities that formulated decontamination implementation plans
(all municipalities that had intended to do):
58 municipalities

◇18 out of 58 municipalities have completed their plans (and continued monitoring of air dose rates).

◇27 out of 58 municipalities have almost completed.

◇ The progress of decontamination (as of the end of December 2014)
Schools & nurseries: almost completed
Residential houses: approx. 90%
Roads: approx. 90%

# Progress in Intensive Contamination Survey Area ③

Decontamination implementation plans were formulated in 94municipalities, and progress has been made ( As of the end of Dec., 2014 )

| | Number of municipalities | Municipalities designated as Intensive Contamination Survey Area | | | |
|---|---|---|---|---|---|
| | | Already formulated the plans | | | No plan at present |
| | | decontamination work in progress | Almost completed | Completed | |
| Iwate | 3 | 1 | 2 | | |
| Miyagi | 8 | 5 | 3 | | |
| Fukushima | 39 | 36 | | | 3 |
| Ibaraki | 20 | 1 | 7 | 11 | 1 |
| Tochigi | 8 | 4 | 4 | | |
| Gunma | 10 | 1 | 1 | 7 | 1 |
| Saitama | 2 | | 2 | | |
| Chiba | 9 | 1 | 8 | | |
| Total | 99 | 49 | 27 | 18 | 5 |

# Progress in Intensive Contamination Survey Area ④

| Within Fukushima prefecture (As of the end of Dec., 2014) | Ordering Ratio (Number of ordering/Number of planning | Executing Ratio (Number of actual achievement/Number of planning) |
|---|---|---|
| Public facilities, etc. | approx. 90% | approx. 80% |
| Residential houses | approx. 90% | approx. 60% |
| Roads | approx. 70% | approx. 40% |
| Farmlands & meadows | approx. 90% | approx. 70% |
| Forests(in living areas) | approx. 80% | approx. 50% |

Note: The table is based on the investigation result conducted by Fukushima prefecture.
The number of planning is the total number until the end of FY2013, which might be increased in future depending on each municipality's status.

| **Outside Fukushima pref. (As of the end of Dec., 2014)** | **Ordering Ratio （Number of Ordering/number of planning）** | **Executing Ratio (Number of actual achievement/number of planning）** |
|---|---|---|
| Schools and nurseries | ordered | almost completed |
| Park, Sports facilities | mostly ordered | approx. 90% |
| Residential houses | mostly ordered | approx. 90% |
| Other facilities | approx. 90% | approx. 90% |
| Roads | approx. 90% | approx. 90% |
| Farmlands & meadows | ordered | almost completed |
| Forests( in living areas) | mostly ordered | approx.70% |

Note: The number of planning is the total number including future plan as of the end of 2013, and might be increased aftertime

# Result of the review on decontamination in Sep. 2013

Checkup the status of municipalities tackling leading decontamination and completing decontamination work based on on-going decontamination plan. Effective information shall be shared widely among municipalities in consideration of municipalities' status.

○The municipalities, implementing leading decontamination work, have been accumulating various original and innovative measures and know-hows, from the view point of the promotion of effective and efficient decontamination work and mutual understanding between local residents.

Example: Excerpted from " Good Practice Collection"(compiled by Fukushima Office for Environmental Restoration, MOE)

・Volume reduction of the waste(twigs, etc.) discharged from decontamination work (in Date city)

Chipping operation in decontamination site

・Cooperation with local residents, delivery of Q &A materials for smooth operation for explanatory meetings (in Fukushima city)

Committee for countermeasures for decontamination area

Questionnaire booth

○There are municipalities of which decontamination work have completed according to the plan as of Jun., 2013

With accelerating and streamlining of decontamination work in consideration of each municipality's status, information shall be shared by updating Good Practice Collection and by guidelines, and also exchanging opinions among municipalities.

# Dissemination of Information regarding Decontamination Progress on the Website

## In case of Fukushima City:


Information Site on Decontamination
URL: http://josen.env.go.jp/en/

# For Acceleration of Decontamination and Reconstruction①
## - Interim report of the strategies of the national government and the 4 cities -

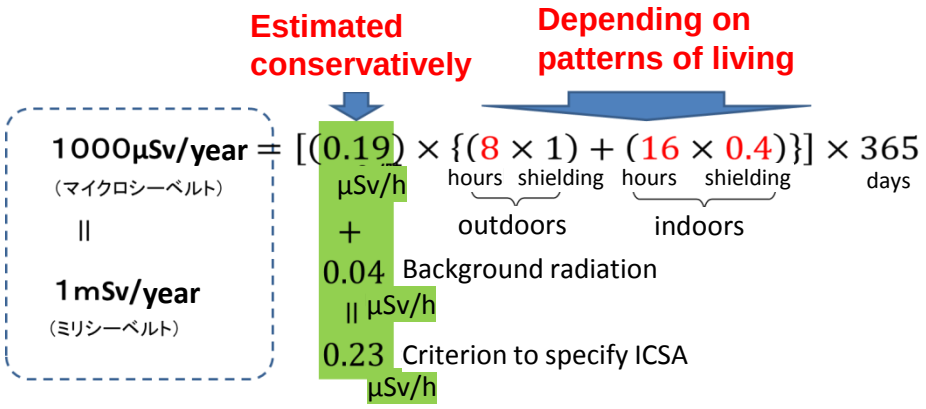
### Background

・The 4 cities (Fukushima, Koriyama, Soma, Date) requested the national government to accelerate the decontamination and reconstruction and to provide accurate information that could remove public misinterpretation of the target of decontamination.

・The national government and the 4 cities developed together an interim report as their common view of the strategies.

### What the national government could not correctly convey

The long term target of radiation protection is the additional exposure dose of 1 mSv/yr. Decontamination is only one of the radiation protection methods. 1 mSv/yr is not a limit of exposure or a boundary between safety and danger. The government uses the value of air dose rate 0.23 μSv/h as a criterion to specify the Intensive Contamination Survey Area but does not set it as a goal to be achieved only by decontamination activities. 0.23 μSv/h is a numerical value conservatively estimated based on a hypothetical life pattern.



# For Acceleration of Decontamination and Reconstruction②
## - Interim report of the strategies of the national government and the 4 cities -

## New findings

### (1) Air dose rate

Decontamination and radioactive decay over the past three years have decreased air dose rates.

### (2) Individual exposure dose

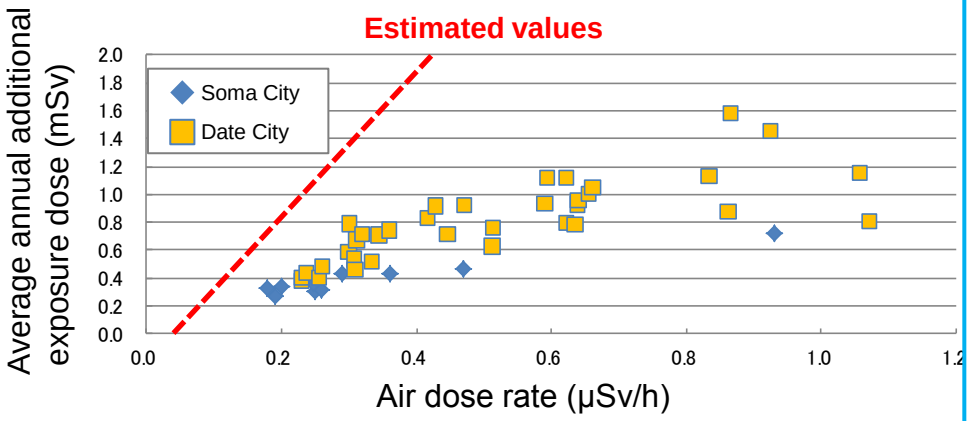
The level of annual individual additional exposure is about 1 mSv for many residents. Individual additional exposure is approx. 1 mSv/yr for the residents living in the area where the air dose rate is about 0.3-0.6 μSv/h. Actual exposure dose tends to be lower than that is estimated from the air dose rate. (Based on the estimation, annual additional exposure of 1 mSv is converted to air dose rate of 0.23 μSv/h.

### (3) Change of contamination situation

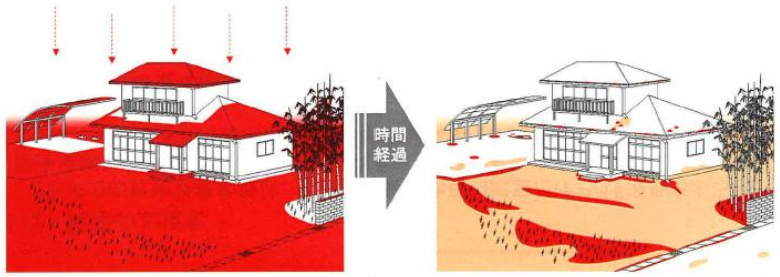
Contamination tends to be topically concentrated under rain gutters etc. in a garden due to weathering and human activities, while it was widespread early on in the incident.

Correlation between the Average Air Dose Rate and the Average Annual Additional Exposure Dose

- Soma City (elementary school pupils) and Date City (0 to 15 years old) -




Change of contamination situation



# For Acceleration of Decontamination and Reconstruction③
## - Interim report of the strategies of the national government and the 4 cities -

### Direction of the future strategies

**(1) Promote radiation protection of the public, focusing on individual exposure dose**

- Enhance activities for radiation protection, focusing on individual exposure dose in areas where decontamination was done as planned.
- Promote monitoring of individual doses by providing residents with personal dosimeters.

**(2) Enhance risk communication**

- Convey clearly and deliberately the government policy on decontamination, scientific knowledge about radiation, and new findings on effects of decontamination and relationships between air dose rate and individual exposure dose.
- Improve officials' knowledge about decontamination and health impacts of radiation.
- Secure and cultivate human resources who can convey knowledge and ideas of the government and experts.

**(3) Conduct decontamination effectively, depending on the situation of contamination**

- Determine whether to conduct decontamination and select appropriate measures, depending on the radiation level.
- Improve effectiveness and efficiency of decontamination activities.

**(4) Enhance comprehensive policies to secure radiation protection and address anxieties of the public**

- By effectively combining policies of (1)-(3), address people's concern and retrieve their sense of security.

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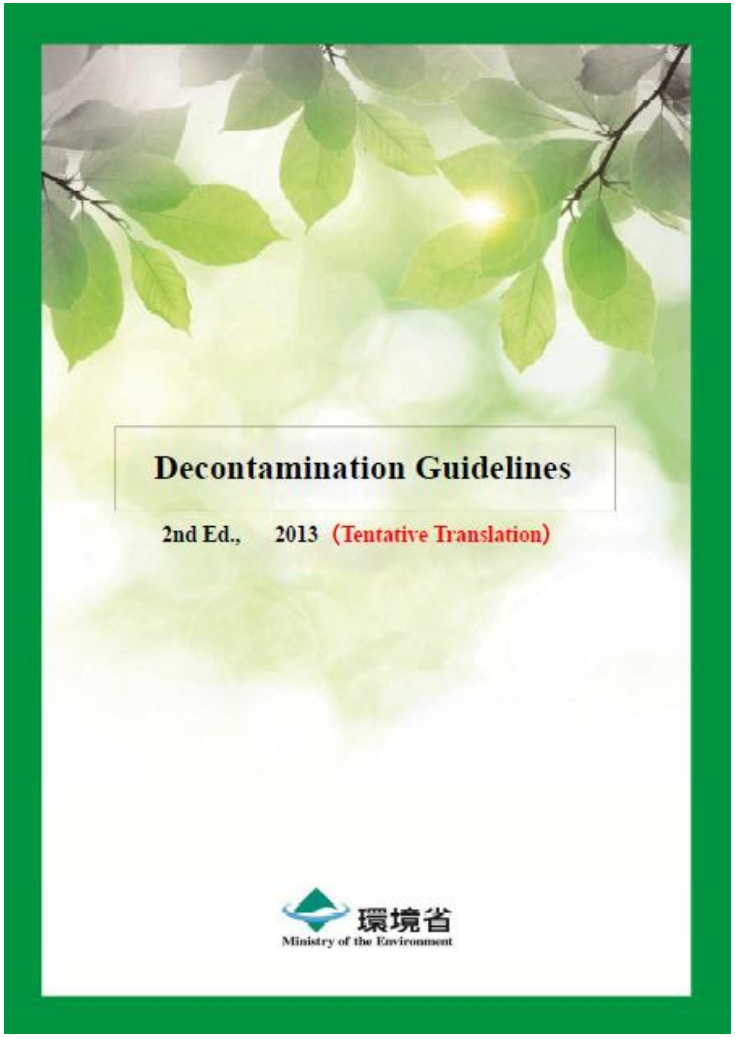
# Formulation of the Decontamination Guidelines




- Technical guidelines for carrying out decontamination
- Developed to complement the Ordinance of the Ministry of the Environment
- Used as reference when ordering decontamination projects and the like

Contents

1. Guidelines on the methods of investigating and measuring the status of environmental pollution in intensive survey areas
2. Guidelines pertaining to measures on decontamination and the like
3. Guidelines pertaining to the collection and transportation of the removed soil
4. Guidelines pertaining to the storage of the removed soil

**URL:**
**http://josen.env.go.jp/en/framework/pdf/decontamination_guidelines_2nd.pdf**

# Techniques Used for Decontamination ①

- **Houses, buildings**
  **Removal of deposits from the roof, deck , and gutters**
  **Wiping off the roofs and walls, high-pressure washing etc.**
- **Gardens and standing trees**
  **Mowing, removal of fallen leaves, topsoil stripping etc.**
- **Roads**
  **Removal of deposits in the ditch, high-pressure washing etc.**

Decontaminating paved surfaces (by a collective type high-pressure water cleaner)

Decontaminating roofing tiles (by wiping-off)

Decontaminating gardens (by removing soils etc.)

Photos provided by: Date City

# Techniques Used for Decontamination ②

- **Schoolyards, gardens and parks**
  **Stripping of soils and topsoil etc.**
- **Farmlands**
  **Reversal tillage, stripping of topsoil etc.**
- **Forests and woods**
  **Removal of fallen leaves and lower twigs, pruning etc.**

Decontaminating a schoolyard

Photo provided by: JAEA

Decontaminating a grass plot

Photo provided by: Japanese Society of Turf grass Science

Decontaminating a forest (by removing fallen leaves)

Photo provided by: JAEA

# Summary on Decontamination Effect

Effect of decontamination works by national and local governments (Major results)

| | | | |
|---|---|---|---|
| **Air dose rate*1,2 (Measured at 1m height)** | Before decontamination: **0.36-0.93** μSv/h<br>↓<br>After decontamination: **0.25-0.57** μSv/h | | |
| **Reduction rate (average) of air dose rate*2,3** | <1μSv/h before decontamination | 1-3.8μSv/h before decontamination | > 3.8μSv/h before decontamination |
| | **32%** | **43%** | **51%** |
| **Example of reduction rate of surface concentration of contamination *4** | Asphalt-paved roads: 50-70% by washing, 30-70% by high-pressure washing<br>Playground(Soil): 80-90% by stripping off surface-dirt | | |

*1: Range from 25 to 75 percentile values of the air dose rate.
*2: Data measured at 50cm height in children's living environment are not included.
*3: Average reduction rate of the air dose rate for different dose levels before decontamination.
(Reduction rate (%)= (1-air dose rate after decontamination / air dose rate before decontamination) x100.)
*4: Already in press release of "Announcement on 'Effectiveness of decontamination work which is implemented by the national government and relevant municipalities in decontamination project'（Jan. 18, 2013）"

**<Original Data>**

○Projects: Mostly, decontamination projects after FY2012

(Projects by national government: 10 municipalities;
Projects by municipalities: 90 municipalities in 8 prefectures)

○Data measurement term : Roughly from Mar. 2012 to Oct. 2013

○Measured item: Air dose rate (measured at 1m and 50cm heights; Unit: μSv/h)

○Number of data: About 250,000 (A pair of data collected before and after decontamination is counted as one item of data)

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# New Policies announced in Sep 2013

MOE has announced new policies for two items below in September 2013.

**1. Follow-up policy after decontamination work is completed**

Follow-up policy has newly been established by MOE, according to the completion of decontamination work based on the decontamination plans in several municipalities.

**2. Decontamination policy in forest areas**

Decontamination in forest area has been limited to within 20 m from the residential area under the current policy.
Taking into account voices from Fukushima that hope to widen decontamination target area, decontamination policy for forest areas is also renewed based on relevant results of research.

# Follow up Measures after Completion of Decontamination Work Based on a Plan

**(Confirmation of maintenance of decontamination effects)**

- Conduct relevant monitoring so as to confirm whether air dose reduction by decontamination would be maintained.

**(Follow-up decontamination work)**

- Implement decontamination work in the case of that newly-found contaminated areas(*) or areas in which un-decontaminated points are found, while considering radiation level there.

  (*) Supposing such area whose air dose rate is higher than that of surrounding area because contaminated soil, etc. is re-accumulated there associated with fallen leaves or rain water and, as a result, air dose rate goes up significantly after the decontamination.

- Require a careful judgment to decide the follow-up decontamination implementation, considering various circumstances of each case. MOE will publish guidance for it by analyzing actual cases.

**(Others)**

- Take relevant measures including risk communication matters based on the ongoing discussion at the Nuclear Emergency Response Headquarters on radiation protection measures.
- In regard with measures on rivers and lakes, monitoring will have been conducted.

# . Measures on forest areas

## A. Around residential areas

- Make an additional measure possible to remove organic residuals 5m in width from the edge in the case the effects of prior decontamination (by removing organic deposits such as fallen leaves 20m in width) is found to be limited.
- Make an exceptional measure possible to widen the area of decontamination to over 20m in case relatively high air dose rate is monitored around the house even though prior decontamination has been done, supposing such a house located in a valley, etc.

⇒ Reflected to “Decontamination Guidelines” (December, 2013)

## B. Cultivating farm for mushroom

- Make the implementation of standard decontamination method possible, which have been approved around residential areas (20m wide), in a case where cultivating business is expected to be sustained.

⇒ Described a decontamination method clearly in “Q&A for decontamination” (October, 2013)

## C. Forest in whole

- Collaborative measures will be conducted by the Ministry of the Environment and the Forestry Agency.

MOE: measures regarding monitoring on runoff and/or diffusion of contaminated soil as well as countermeasures against them

Forestry Agency: measures to take proper forestry management

⇒ Implementation planned in FY2014

# (Reference) Related Responses towards Evacuees Returning Home

"The Policy for accelerating Fukushima's reconstruction from the nuclear disaster" (Cabinet Decision, December 20, 2013)

Integrated and multi-tiered protective actions are taken by the related ministries in collaboration with each other. The ministries conduct, or continue to examine, measures of measuring and managing individual doses, reducing radiation exposure in various manners, and establishing a consultation system. With these measures, we continue to pursue the long-term goal (additional individual dose of 1mSv per year or below) for the returned evacuees.

URL; http://www.kantei.go.jp/foreign/96_abe/actions/201312/20gensiryoku_e.html

"Practical Measures for Evacuees to Return Their Homes" (Nuclear Regulation Authority, November 20, 2013)

One of the practical measures for evacuees to return their home is to focus on the individual dose. For the evacuees to return home, measures that contribute to measure, manage the individual dose, and to reduce radiation exposure of residents are suggested. Also, to establish a system of supporting the evacuees who choose to return home in a comprehensive manner, the necessity of allocating counseling staff and developing a system of supporting them was suggested.

URL; http://www.nsr.go.jp/english/library/data/special-report_20140204.pdf

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# Process regarding the Interim Storage Facility ①

Oct., 2011 MOE announced the Basic Principles of the roadmap of the Interim Storage Facility (ISF).

**※Main Contents**

- The National Government will secure, maintain and manage the ISF
- The National Government will make utmost efforts to start operating of the ISF in about 3 years after start of full-scale collection of soil to the temporary storages sites
- Only soil and waste generated in Fukushima prefecture will be stored in the ISF
- The above materials will be finally treated outside Fukushima prefecture within 30 years after launch of interim storage

Mar., 2012 MOE explained the Fukushima prefecture and the 8 towns that the ISF may be located separately in 3 towns (Futaba, Okuma and Naraha).

Nov., 2012 The Governor of Fukushima announced the acceptance of the investigation proposed by MOE, subject to in-depth explanation to the local communities.

Apr., 2013 MOE started the field survey including boring survey, obtaining the consent from the local communities.

Jun.-Sep., 2013 The study groups on safety measures and environmental protection were held.

Dec., 2013 MOE requested the Fukushima prefecture and the 3 towns (Futaba, Okuma and Naraha) to accept the establishment of the ISF (and also requested Tomioka and Naraha at the same time to utilize the Eco-Tec Clean Center).

Dec.-Sep., 2014 MOE reviewed transportation of removed soil, etc. in a study group.

Sep.1, 2014 The Governor accepted the construction of the ISF, and both mayors of Okuma and Futaba conveyed that they took the Governor's acceptance seriously and agreed that the government would explain to the landowners. The Prime Minister Abe met the Governor of Fukushima and the both mayors and the Governor told the Prime Minister the acceptance as well.

# Process regarding the Interim Storage Facility ②

Sep.- Oct., 2014 MOE held explanatory meetings for landowners. (12 times in total: 9 times in Fukushima and 3 times outside Fukushima)

Oct.- Nov., 2014 In Oct., the amendment bill for the Japan Environmental Safety Corporation (JESCO) Law in order to legislate the final disposal of contaminated soil and waste outside Fukushima prefecture was approved by the Cabinet and submitted to the Diet. The amendment of JESCO Law was enacted in Nov. and implemented in Dec..

Nov.-Dec., 2014 MOE finalized the Basic Transportation Plan and proposed a transportation implementation plan in a transportation liaison and coordination meeting consisted of relevant ministries and organizations.

Nov.-Jan., 2015 It announced tender of construction work for stockyard. The contracts were concluded in Jan..

Dec.-Jan., 2015 Both Okuma and Futaba accepted the construction of the ISF.

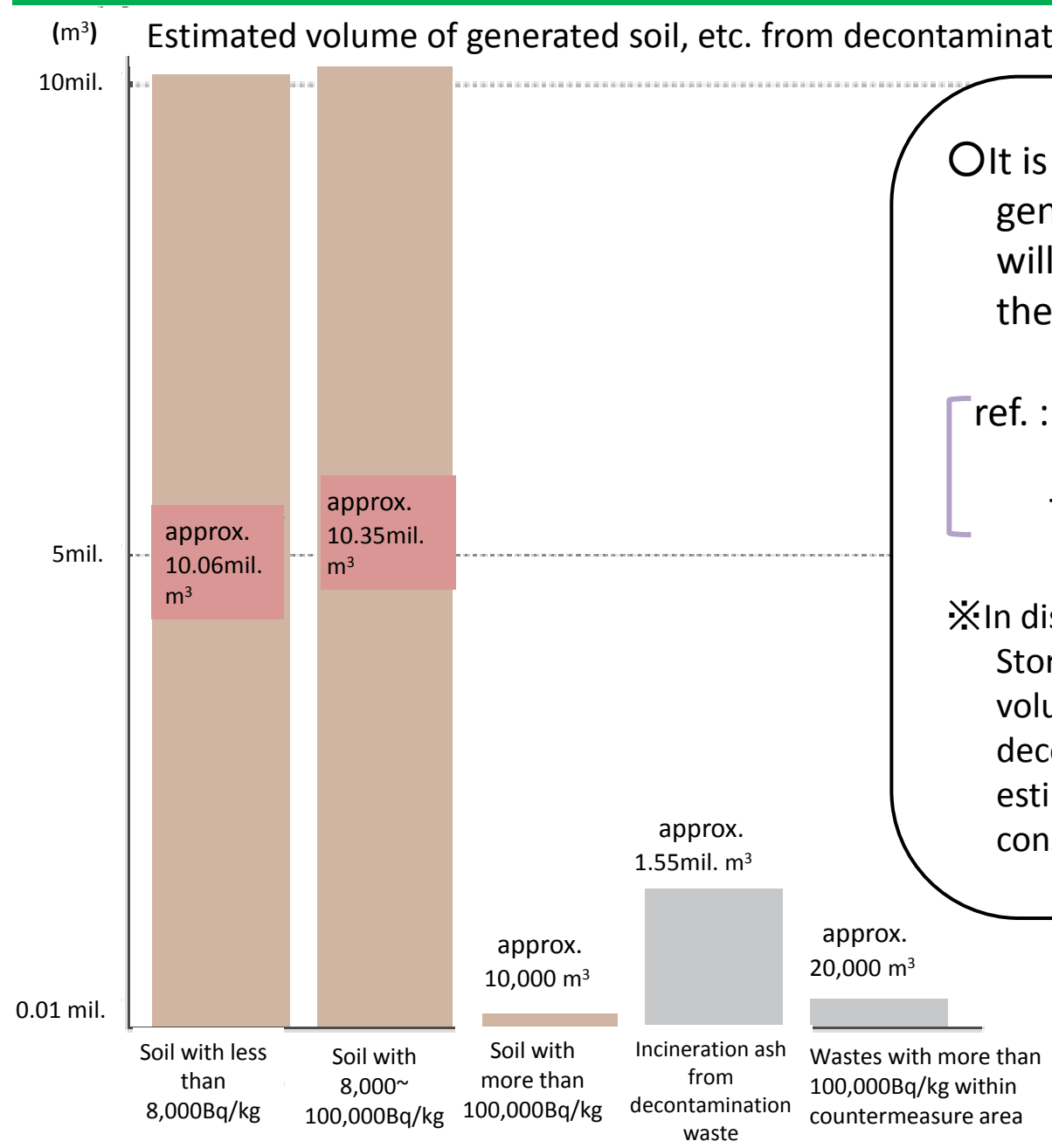
Jan. 16, 2015 MOE confirmed the commencing time of delivery of removed soil to the ISF, announcing if things go according to the plan, it will start the construction of stock yards at the beginning of Feb. and will make every efforts to start the delivery of soil through the pilot-scale transportation before Mar. 11, 2015, if the 5 conditions requested from Fukushima prefecture be fulfilled.

Jan., 2015 On the basis of transportation liaison and coordination meeting held on 26th, MOE finalized the transportation implementation plan.

Feb. 3, 2015 The construction of a stock yard started.

Feb. 8, 2015 The Minister of the Environment and the Minister for Reconstruction explained to the Governor of Fukushima the progress related to 5 conditions which should be confirmed before the delivery of soil and waste to the ISF.

# Possible Stockpile in the Interim Storage Facility



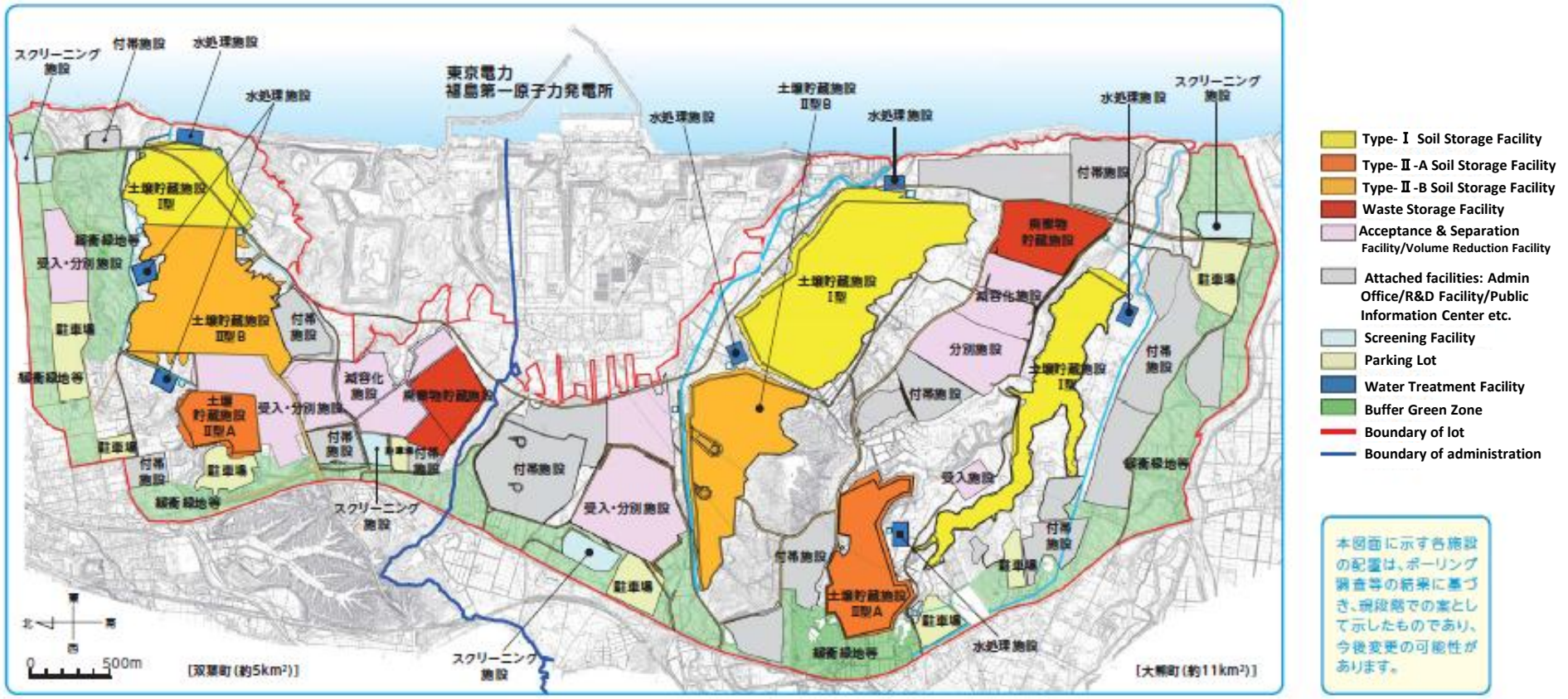

○It is estimated that stockpile of soil generated from decontamination will be approx. 16 ~22 mil. m³ after the volume reduction (incineration)

[ref. : approximately 13~18 times as much as the volume of Tokyo Dome (1.24 mil. m³)]

※In discussing the plan for the Interim Storage Facility, possible increase in volume of soil due to additional decontamination that is difficult to estimate for now will be also considered.

# Layout Drawing of Interim Storage Facilities (draft)

- Interim Storage Facility will be consisted of facilities with various functions.
- Those facilities will be developed in accordance with the consent of landowners and the generation of removed contaminated soil, etc.



# Concept of Structure of Storage Facility ①

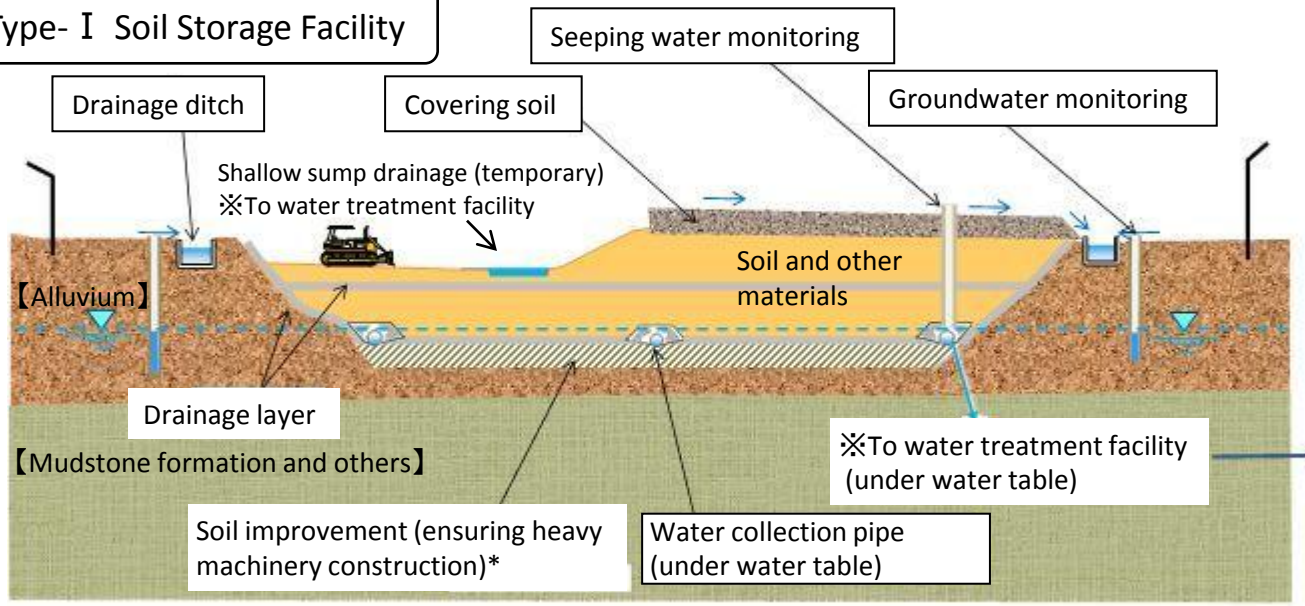
| | Type-I Soil Storage Facility | Type-II Soil Storage Facility | Waste Storage Facility |
|---|---|---|---|
| Main substances for storage (Radioactive cesium concentration) | Soil and other materials that do not risk polluting public water area and groundwater with radioactive cesium （ 8,000Bq/kg or less ） | Soil and other materials exceeding the condition shown in left column (More than 8,000Bq/kg ) | ・Incinerated ashes coming from decontamination or specified waste generated in Fukushima Prefecture<br>・More than 100,000 Bq/kg |
| Measures to prevent water seeping into ground water | — | Seepage control and other infrastructure (Seepage control sheet and other infrastructure or low-permeability soil layer) | To prevent dispersion and spillage by enclosing into container |

Schematic View of Type- Ⅰ Soil Storage Facility

<Type-I >

Applicable geography and geology
Any low land

Radioactive cesium concentration
8,000Bq/kg or less




*Basement: In the case of alluvium, soil improvement (approximately up to 1m depth) will be performed. In the case of mudstone formation, no action will be needed.

# Concept of Structure of Storage Facility ②

## Schematic View of Type- II Soil Storage Facility

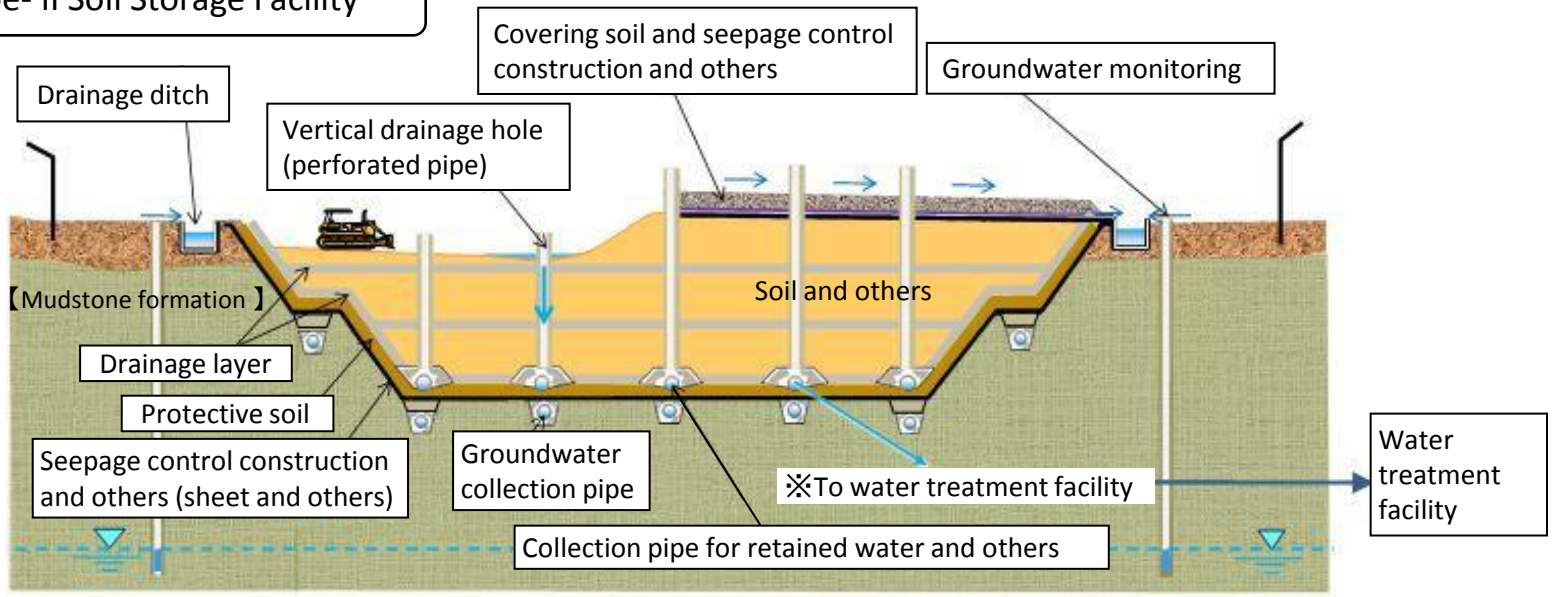
<Type – II >

Leakage control
Seepage control sheet patterns

Applicable geography and geology

Hill , Tableland

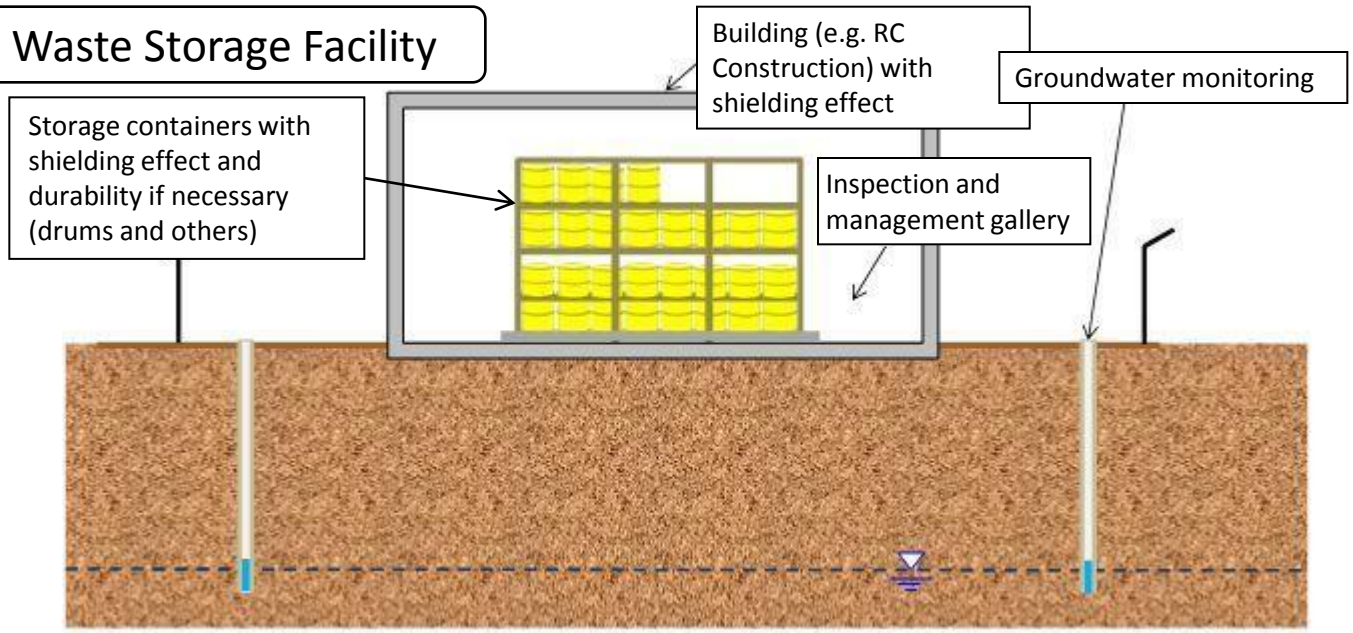
Radioactive cesium concentration
more than 8,000Bq/kg




## Schematic View of Waste Storage Facility

Applicable geography and geology
Hill, Tableland

Radioactive cesium concentration
More than 100,000Bq/kg



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# Public Communication

## WEB

- Comprehensive and instantaneous information



## Pamphlets and other materials

- Easy-to-understand and detailed information
- Distributed at meetings, workshops, city offices, banks, convenience stores, etc.
- Available on the Web


## Newspaper ads and TV programs

- Media is the largest information source for people in FP



## Decontamination Information Plaza

- Information hub of decontamination run by MOE and FP (located near the Fukushima Station)
- Providing people inside and outside of FP and municipalities with comprehensive and latest information of decontamination and radiation


**Interactive exhibition, demonstration, and workshops**

**Dispatch of experts to municipalities, communities, schools, etc.**