Progress on Off-site Cleanup Efforts in Japan

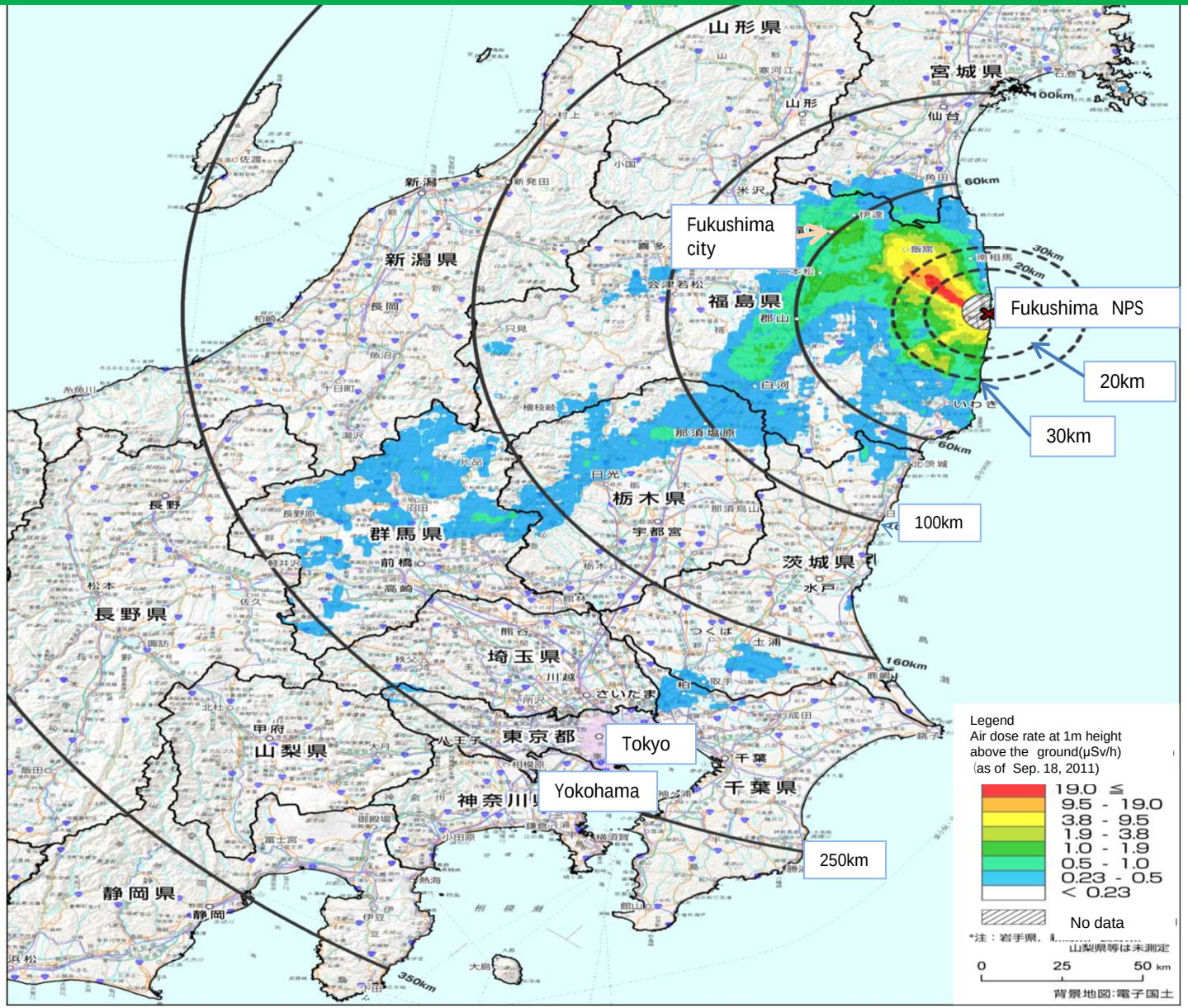
July 17th, 2013

Ministry of the Environment, Japan

Outline

- Framework of Decontamination
- Progress in Special Decontamination Area
- Progress in Intensive Contamination Survey Area
- Efforts to secure Interim Storage Facility

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



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 NPS, 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

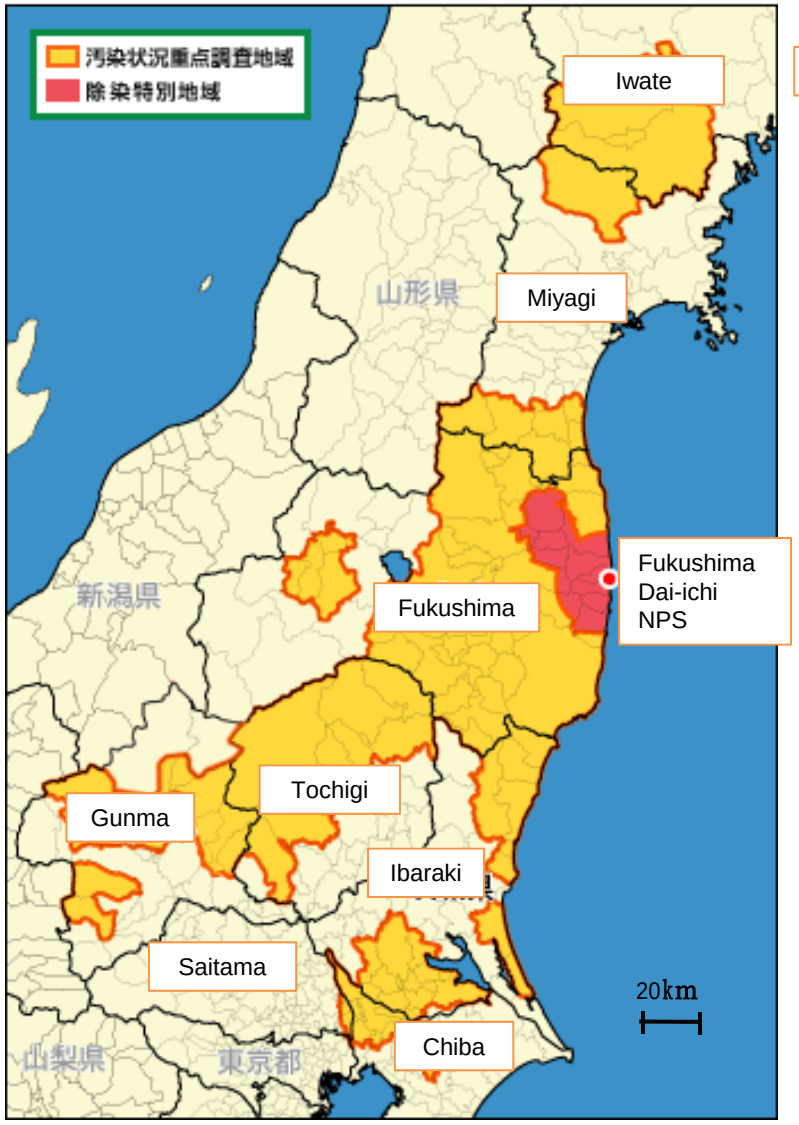
- 100 municipalities in 8 prefectures (*), in which over 0.23 μSv/hour of air dose rate (equivalent to over 1 mSv/Year) is observed, were designated.
- Decontamination is implemented by each municipality. The national government will take financial and technical measures.

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

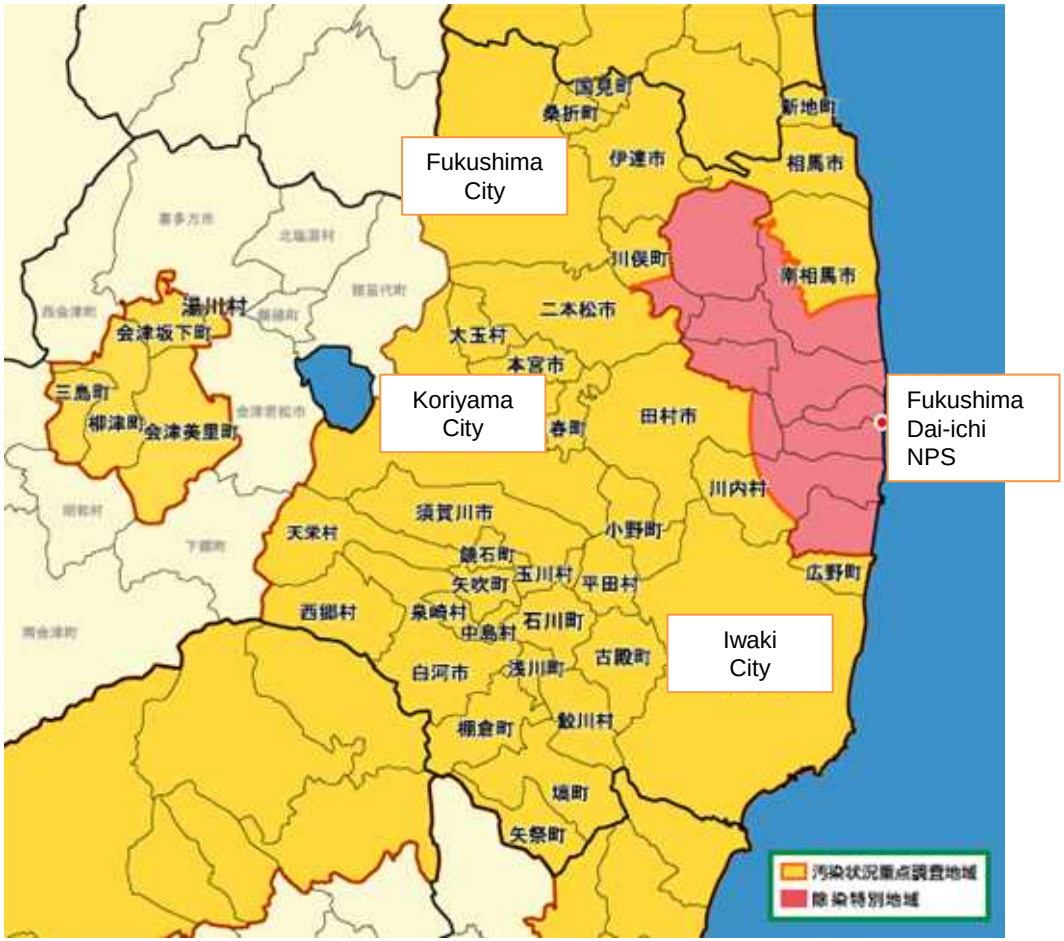
Special Decontamination Area and Intensive Contamination Survey Area

・・Special Decontamination Area

・・Intensive Contamination Survey Area



Fukushima Pref.



Progress
in Special Decontamination Area

Restricted Areas and Areas to Which Evacuation Orders have been Issued (as of End of June, 2013)

Ahead of the decontamination in the Special Decontamination Area, Decontamination Plans are to be elaborated taking into account the progress of rearrangement of the Restricted Areas and Deliberate Evacuation Area.

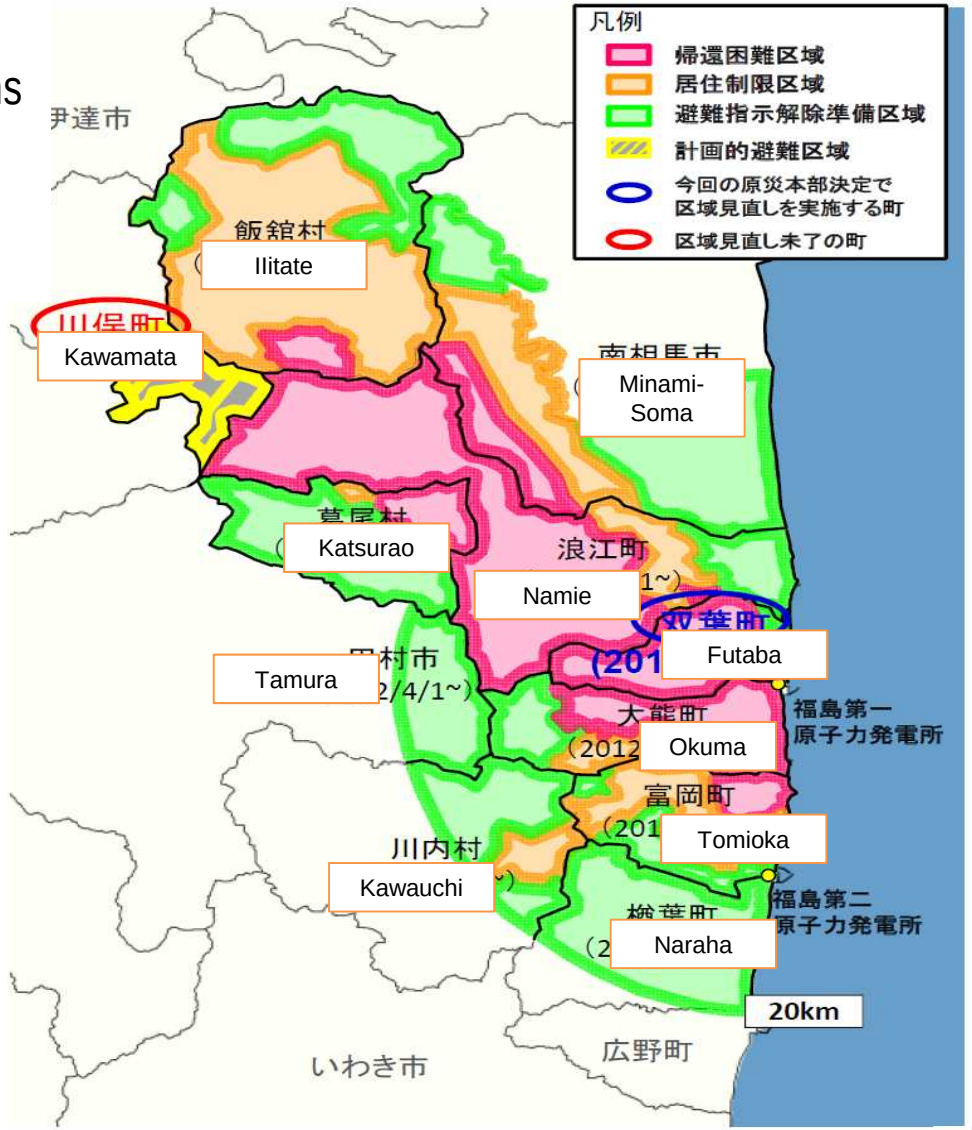
Area 1: <20mSv/yr
Evacuation orders are ready to be lifted:

Area 2: 20 – 50 mSv/yr
Areas in which residents are not permitted to live:

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

Restricted Area:

Deliberate Evacuation Area:



Decontamination Policy for Special Decontamination Area

Policy in FY2012 and 2013

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

- ◆Area less than 20mSv/year：Aiming for reducing additional exposure dose less than 1mSv/year as long-term goal.
- ◆Area from 20～50mSv/year：Aiming for reducing exposure dose in residential and farmland area less than 20mSv/year by the end of FY 2013.
- ◆Area more than 50mSv/year：Demonstration projects will be implemented. Lessons learned will be reflected into future decontamination policy.

Policy After FY 2014

- ◆ Aiming for reducing additional exposure dose less than 1mSv/year as a long-term goal
- ◆ Check and evaluate two-year decontamination results, consider proper actions, and revise implementation plans as needed.

Progress in the Special Decontamination Area

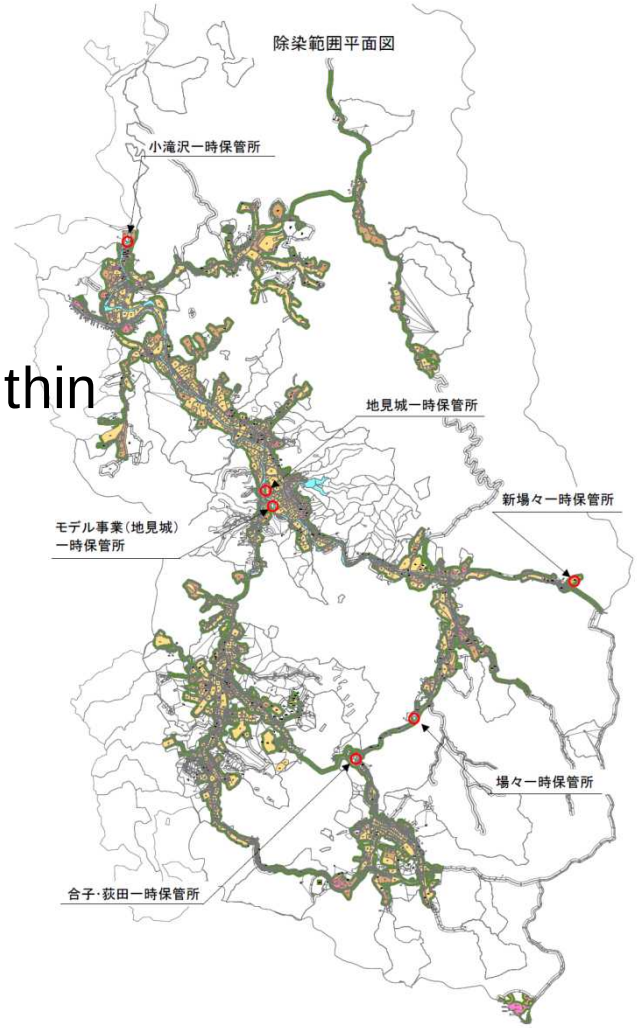
Progress Status		Preliminary Decontamination	Full Scale Decontamination Work		
			Plan	Temporary Storage Site	Decontamination Work
on full -scale decontamination work/on plan	Tamura city	✓	✓(2012 Apr. 13)	✓(secured)	Ending of Planned Work
	Naraha town	✓	✓(2012 Apr. 13)	✓(secured)	✓(under implementation)
	Kawauchi village	✓	✓(2012 Apr. 13)	✓(secured)	✓(under implementation)
	Iitate village	✓	✓(2012 May. 24)	✓(partially secured)	✓(under implementation)
	Kawamata town	✓	✓(2012 Aug. 10)	✓(partially secured)	✓(under implementation)
	Katsurao village	✓	✓(2012 Sep. 28)	✓(partially secured)	✓(under implementation)
	Okuma town	✓	✓(2012 Dec. 28)	✓(secured)	preparation of work
	Minami-Soma city	✓	✓(2012 Apr. 18)	✓(partially secured)	preparation of work
	Tomioka town	✓	✓(2013 Jun. 26)	✓(partially secured)	public announcement of order
Prepared to order	Namie town	✓	✓(2012 Nov. 21)	under coordination process	
Plans not yet formulated	Futaba town		under coordination process		

*Decontamination works in a municipality are to be implemented based on the premises of formulation of the decontamination implementation plan, consent of land owners and securing of temporary storage sites.

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㎡

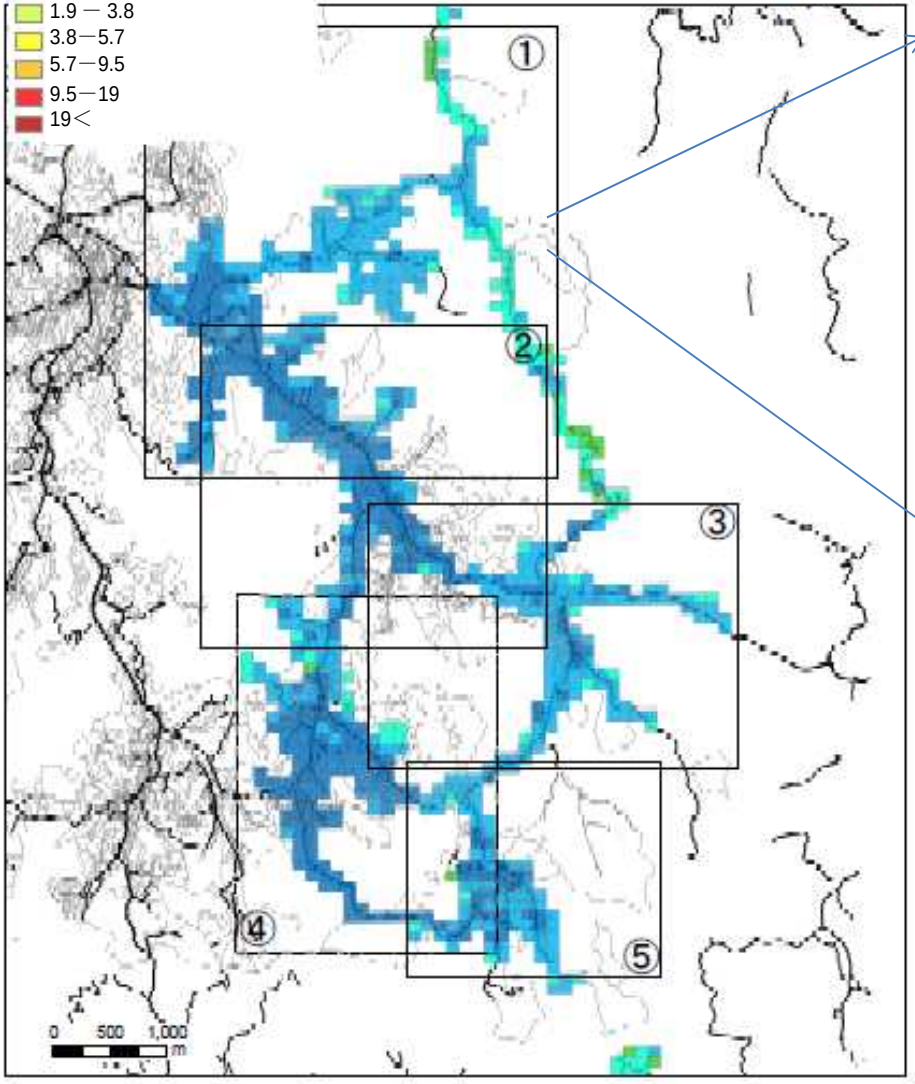


Effect of Radiation Dose Reduction by Decontamination Work in Tamura City

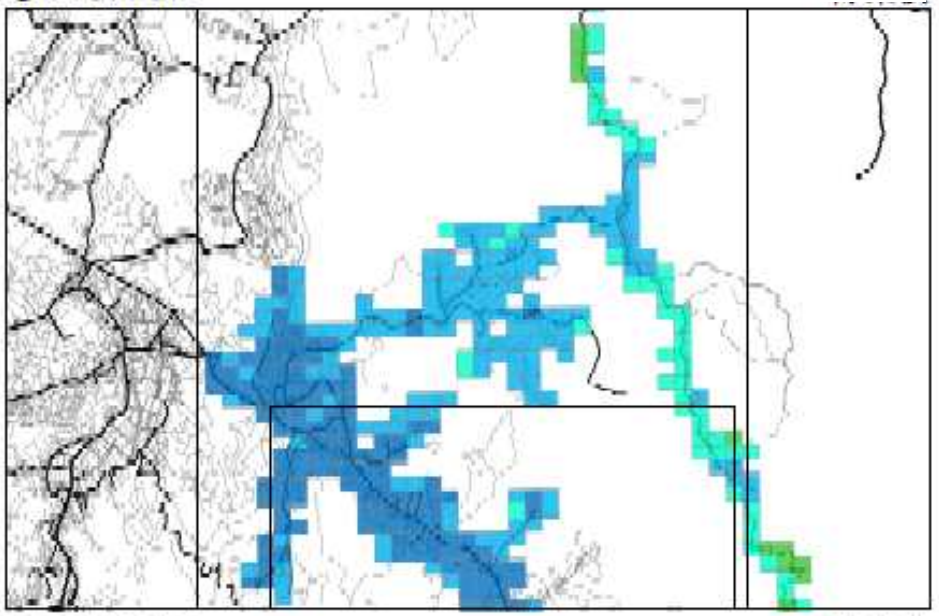
(Average of Air Dose Rate at the height of 1m above ground)

≦ 0.23
0.23－0.5
0.5 － 0.75
0.75 － 1.0
1.0 － 1.9
1.9 － 3.8
3.8－5.7
5.7－9.5
9.5－19
19＜

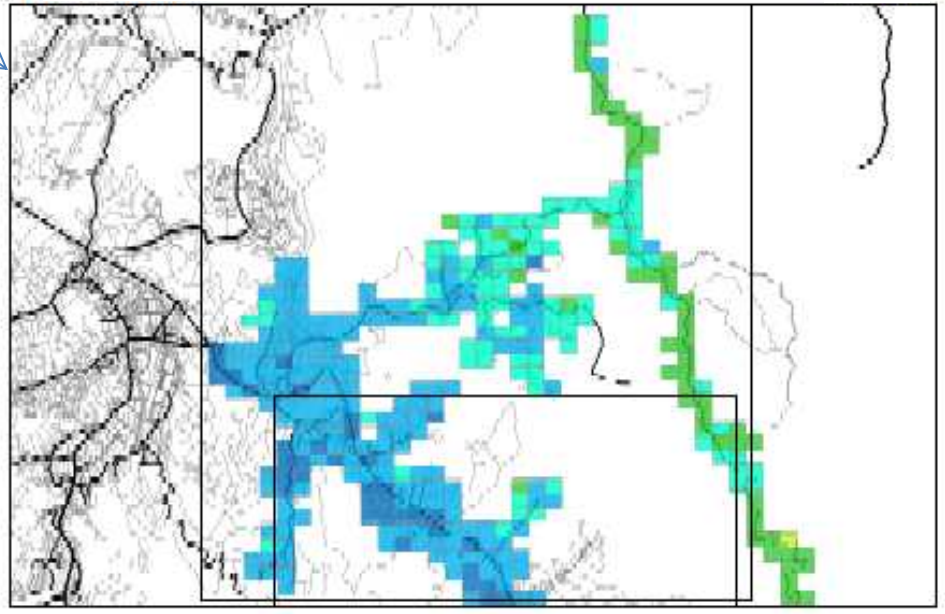
After



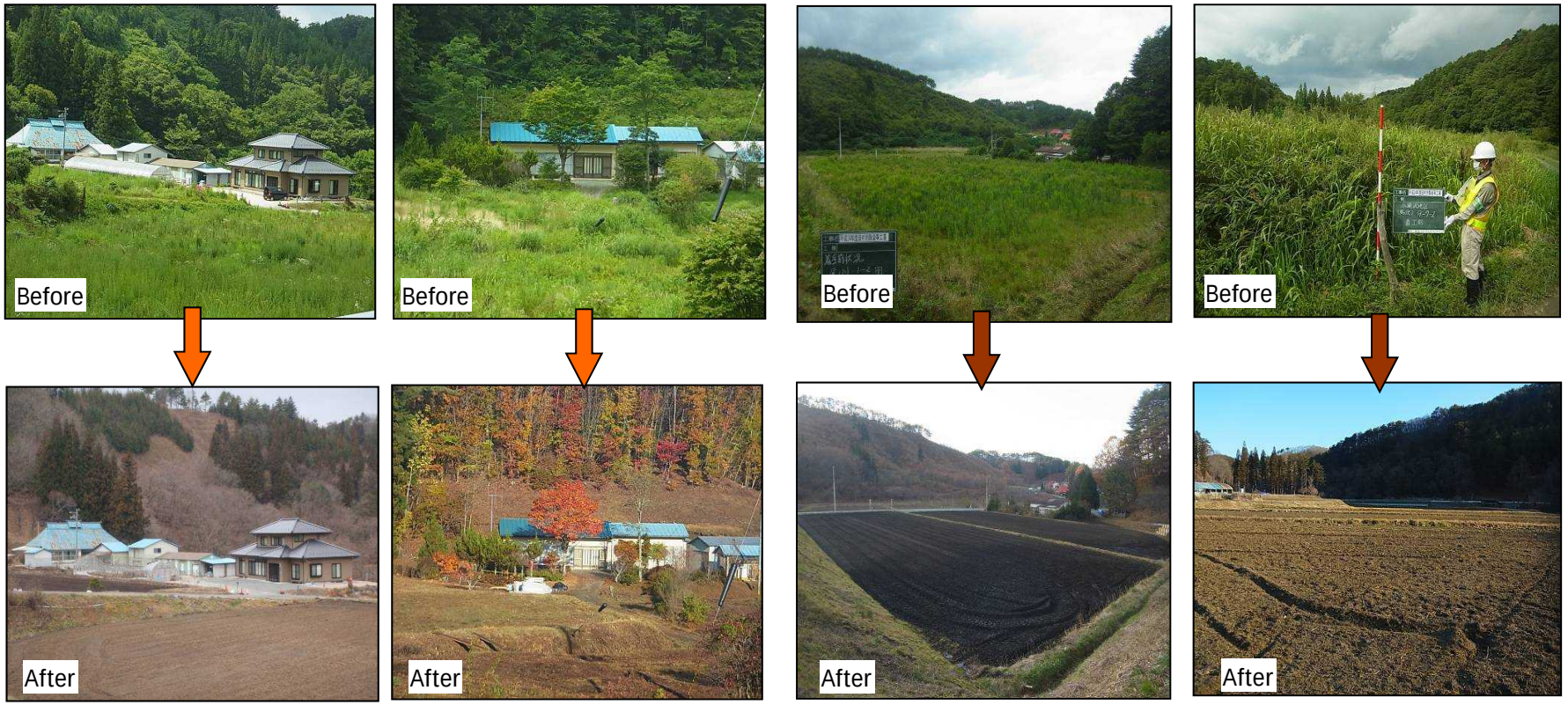
①Kotakizawa District After



①Kotakizawa District Before



Before & After the Decontamination Work



Decontamination Activities

Wiping off rooftop and walls

Wiping off a gutter

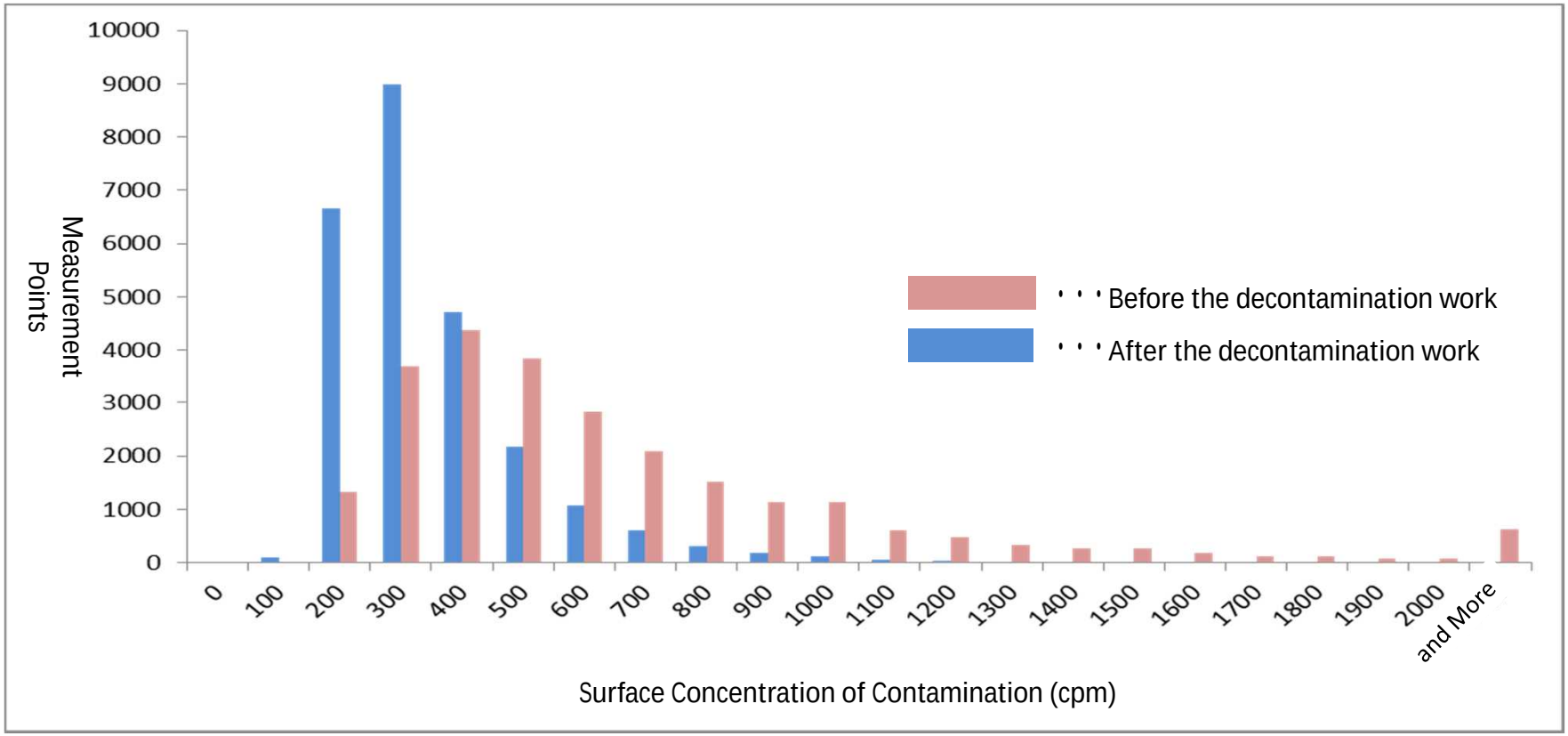
High pressure water cleaning of a drain pipe

High pressure water cleaning of paved road

Mowing and removal of sludge

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

Effect of Reducing Radiation Dose by Decontamination Work (Surface Concentration of contamination*)

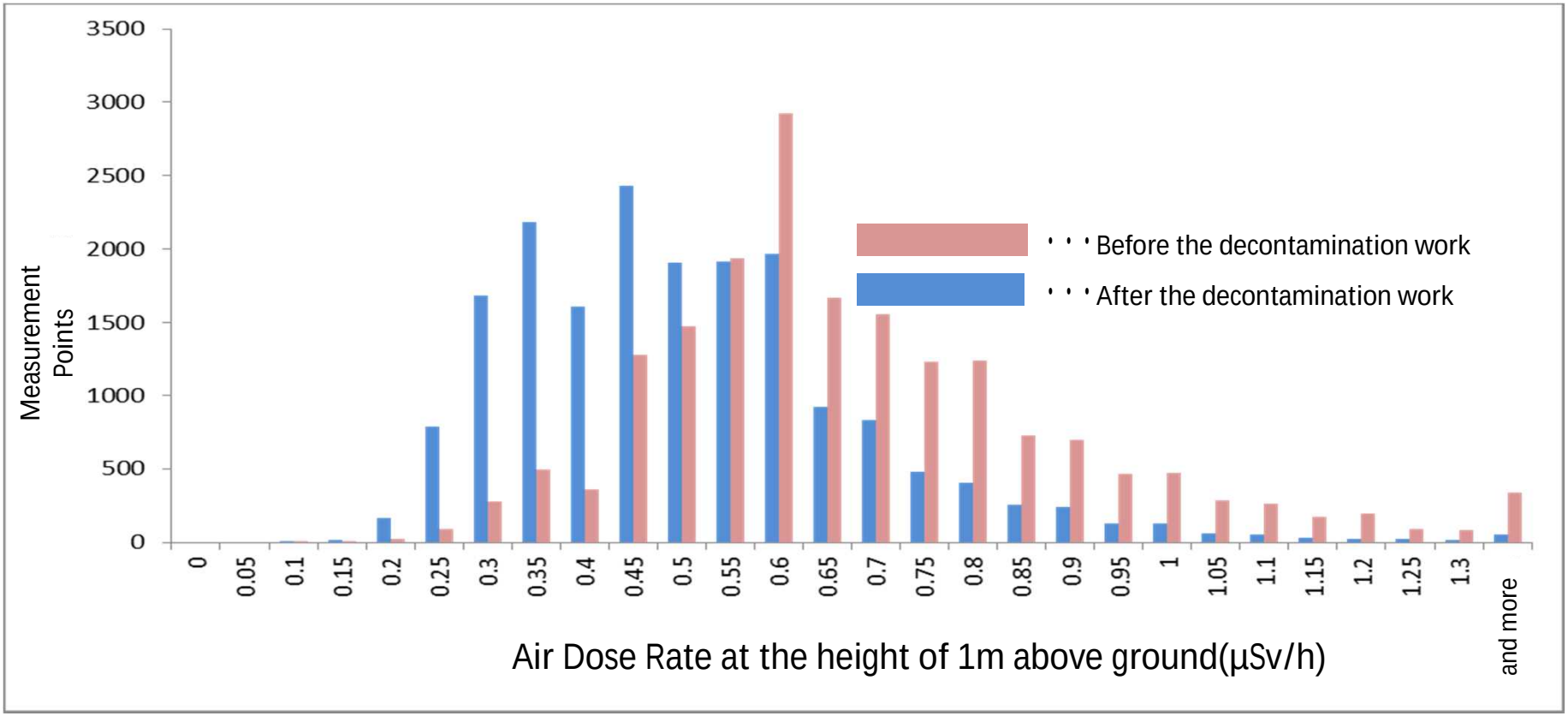


*Surface concentration of contamination is the number of radiation per minute counted by a detector . As it is detected at the level above 1cm from decontaminated surface, changes due to the figures can be clearly evaluated.

※The measurement was taken before and after the decontamination work so that natural attenuation effect after the work was not included.

- Measurement period before the decontamination work：July 25, 2012～May 23, 2013
- Measurement period after the decontamination work ：August 7, 2012～May 30, 2013

Effect of Radiation Dose Reduction by Decontamination Work (Air Dose Rate at the height of 1m above ground)



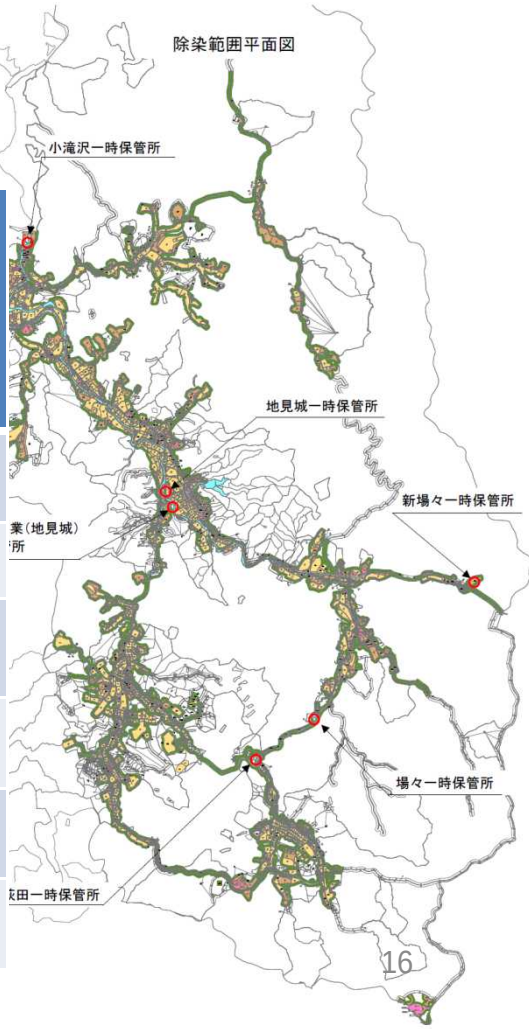
※ The measurement was taken before and after the decontamination work so that natural attenuation effect after the work was not included.

- Measurement period before the decontamination work: July 25, 2012～May 23, 2013
- Measurement period after the decontamination work: August 7, 2012～May 30, 2013

Overview of Temporary Storage Site in Tamura City

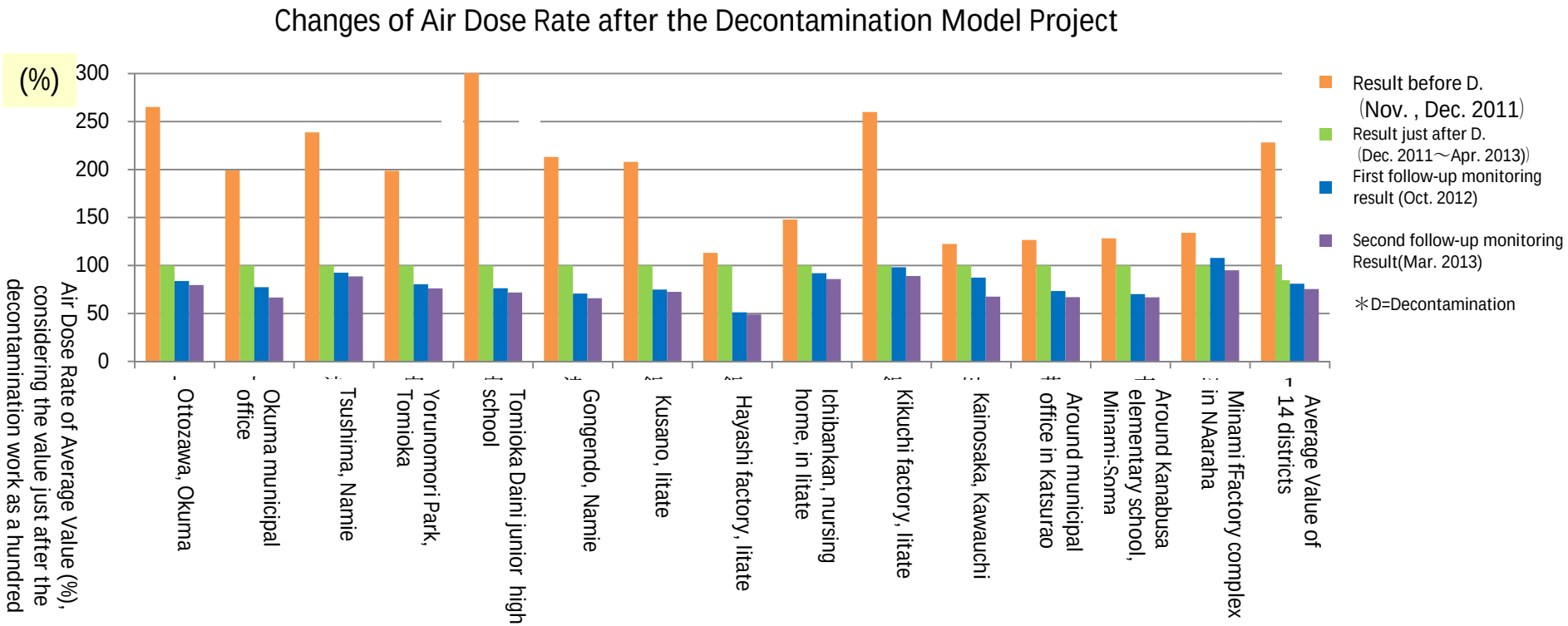
- Removal soil and etc. has been collected and stored in temporary storage sites.
- Air dose rate at the entrance of the sites shows no difference after removed soil, tec. are stored.
- Radioactive materials has never been detected from leachate or groundwater under the sites.

District	Air Dose Rate just after Installation (1m)	Latest (5/27) Air dose Rate (1m)	Amount of Removed soil (m³)	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



Post-Decontamination Monitoring

- Post-Decontamination Monitoring will be conducted in coming autumn at the same points of the previous monitoring in Tamura Coty.
- Average value of air dose rate has not been increased according to the investigation results up to now.



Progress of Decontamination Work in Joban Expressway

Decontamination work has been completed by the end of June, 2013.

■ Future Schedule

○Parallel to decontamination work, reconstruction and maintenance projects are in progress based on premise that adjustment with related agencies will be set aiming for in-service time as follows:

・Between Hirono IC～Joban Tomioka IC(17km)：within FY2013
・Between Namie IC ～Minami Soma IC(18km)：within FY2014
・Between Joban Tomioka～Namie(14km)：
Plan for opening to traffic will be at certain period not greatly delayed from other combined section aiming for 2014

Summary on Decontamination Effect

Information for decontamination effect of early decontamination project(mainly in 2012), e.g. model project and preliminary decontamination work implemented in Fukushima by the national government and relevant municipalities, were collected. As a result, reduction rate of surface concentration of contamination(cpm) were;

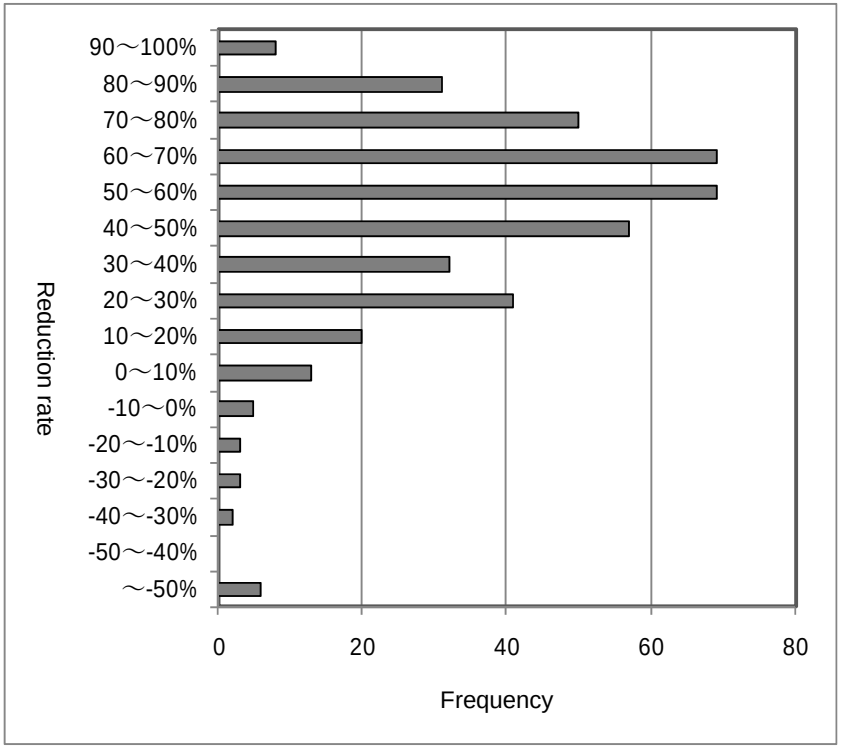
- 50-70% reduction by washing,
- 30-70% reduction by high-pressure washing,
- 70-90% reduction by scraping on surface decontamination of asphalt-paved roads, and

as for decontamination work of playground, 80-90% reduction by top soil removal, which are acknowledged as a certain effectiveness.

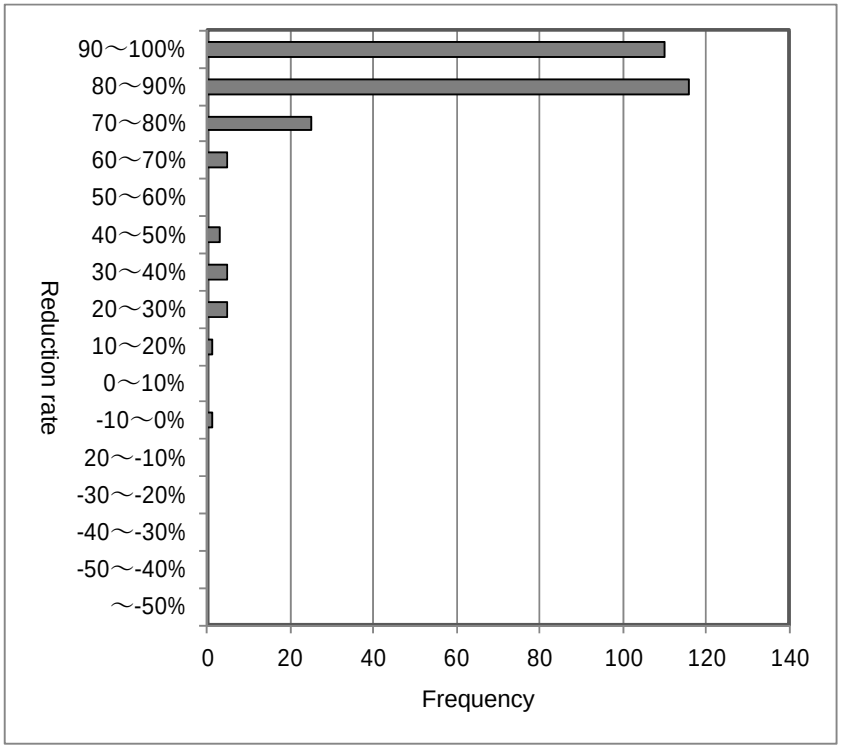
※the data is based on reduction rate of surface concentration of contamination on each decontamination method.

※The result of this analysis is tentative. The methods were not consolidated and not up-dated at that time.

Example) Decontamination work on asphalt-paved roads



Example) Decontamination Work on Playground



Reference：Announcement on “Effectiveness of decontamination work which is implemented by the national government and relevant municipalities in decontamination project” (Jan. 18, 2013)

Progress in Intensive Contamination Survey Area

Intensive Contamination Survey Area

100 municipalities, designated as Intensive Contamination Survey Area, shall implement monitoring survey and formulate the decontamination implementation plan (the plan) which stipulates area, method and contractors to implement decontamination work.

○As of the end of March 2013, the plans have been formulated in 94 municipalities.

○As decontamination target covers large area including public facilities, residential houses, roads, farmland and forest, municipalities shall clarify the objects and priorities, in consideration with the protection of public health.

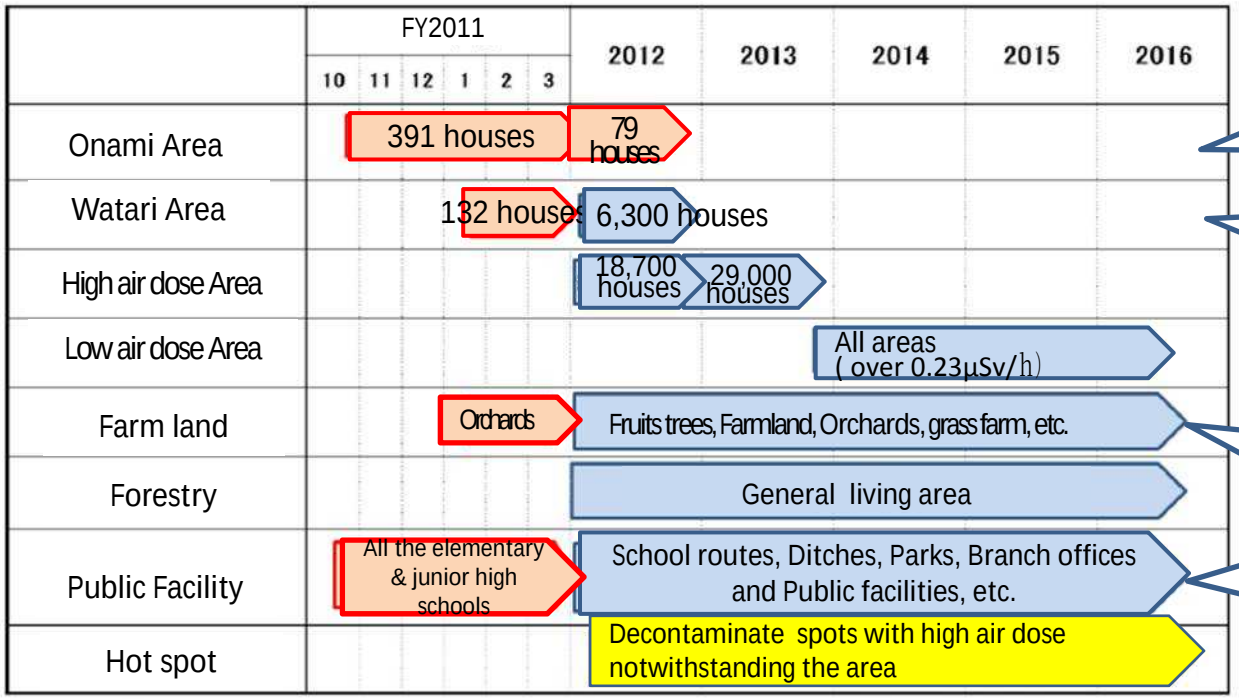
⇒Decontamination work is implemented based on the Plan developed by each municipality.

the Decontamination Implementation Plan

- 94 out of 100 municipalities finalized their Plans under the Act (as of Apr. 1, 2013)

<Example of Fukushima City>

- Planning term : 5 years until Sep. 2016 (2 years as an intensive term)
- Priority: Houses in high air dose areas, public facilities, especially for children



＜Progress as of Apr. 1,2013 ＞

Completed in 470 houses (100%)

completed in approx. 4,000 houses

Completed in 5,276 ha of farmland, etc. (ca.93%)

Completed in 206 schools and nurseries (100%)

: Decontamination completed

Reference: Fukushima Furusato Decontamination Implementation Plan

Decontamination Progress in Intensive Contamination Survey Area

Implementation of decontamination is in progress along the Plans. Especially in space related to children and in public facilities, the works are getting close to the end. Continuous implementation of decontamination work is indispensable for another few years.

In Fukushima pref. (As of the end of Jan.,2013)	**Ordering Ratio**	**Implementation Ratio**
Public facility, etc.	more than 90%	approx. 75%
Residence	approx. 80%	approx. 60%
Road	approx. 75%	approx. 60%
Farmland & meadow	approx. 80%	approx. 60%
Forest(living area)	nearly 20%	less than 10%
Outside Fukushima pref. (As of the end of Dec.., 2012)	**Ordering Ratio**	**Implementation Ratio**
School, nursery school	almost ordered	more than 80%
Park, sports facility	approx. 80%	approx. 60%
Residence	approx. 40%	approx. 20%
Public facility, etc.	approx. 70%	approx. 70%
Road	approx. 60%	approx. 60%
Farmland & meadow	approx. 70%	approx. 30%
Forest(living area)	Partially ordered	Partially implemented

Note: Decontamination plans are as of the end of FY2012.
The numbers could be changed according to adjustment by the municipalities.

※Please refer to the Information Site on Decontamination for individual municipality status. http://josen.env.go.jp/zone/index.html

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/

Efforts to secure Interim Storage Facility

Efforts to secure Interim Storage Facility

Oct., 2011 Ministry of the Environment announced the Basic Principles for Interim Storage Facility (ISF) (the roadmap), and explained to the heads of relevant municipalities

Main Contents

- The National Government shall secure, maintain and manage ISF
- The National Government shall make utmost efforts to start the operation of ISF within about 3 years(by January, 2015)
- Materials to be stored are limited to soil and waste generated in Fukushima prefecture

Dec., 2011 The Ministry requested Fukushima Pref. and 8 towns in Futaba County to examine location sites within Futaba county

Mar., 2012 The Ministry explained the Fukushima Pref. and 8 towns that IFS may be located separately in 3 towns (Futaba, Okuma and Naraha)

Aug., 2012 The Ministry proposed the investigation for ISF to Fukushima Pref. and 8 towns

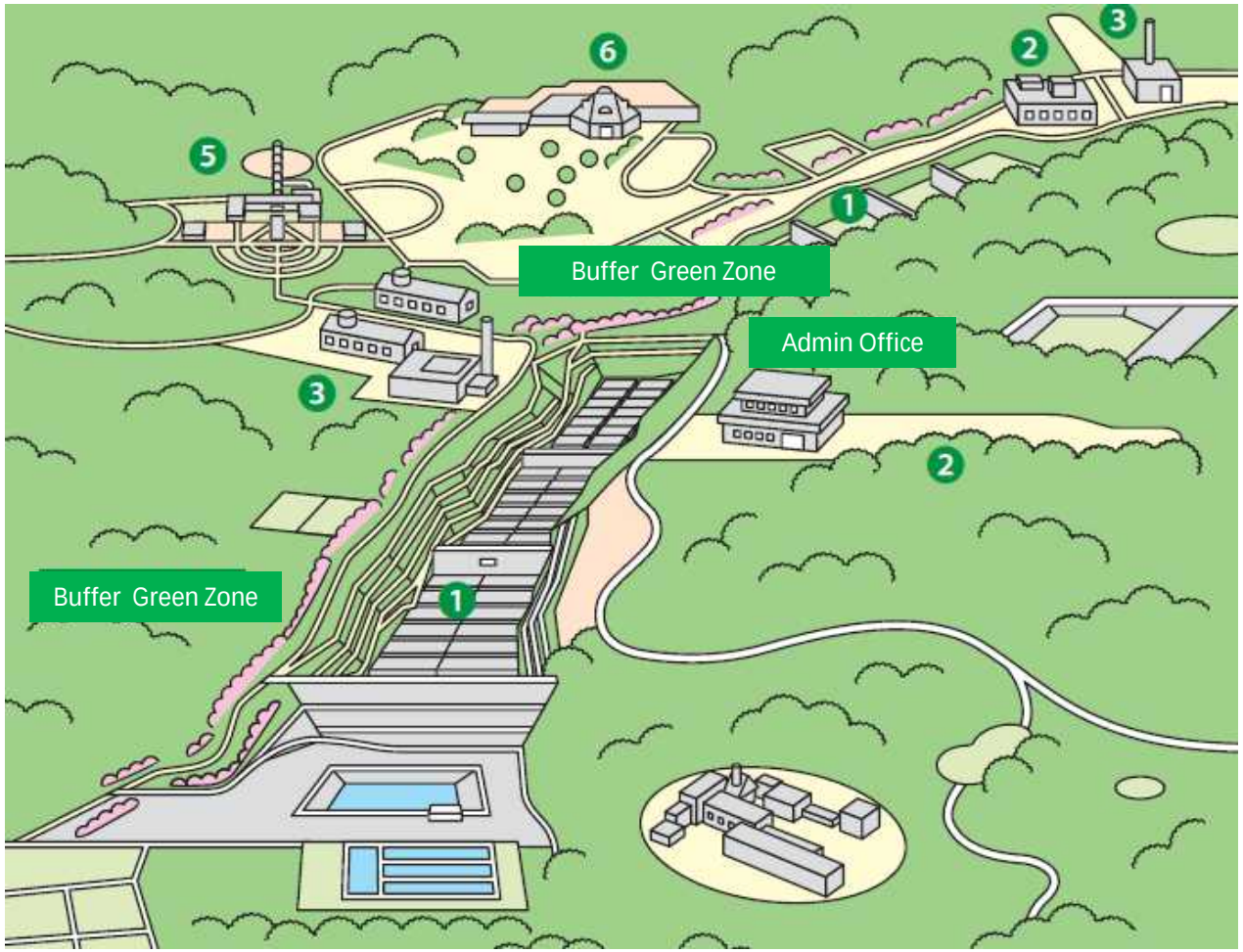
Nov., 2012 The Fukushima Pref. announced the acceptance of the investigation proposed by the Ministry at the consultation meeting with the mayors of Futaba County's towns and villages

Mar., 2013 The Ministry selected contractors, who will implement the investigations

Apr., 2013 On-site exploratory survey has started in Naraha

Interim Storage Facility: Bird's-Eye View

ISF will be consisted of facilities with various functions



①Storage Facility

②Emplacement & Segregation Facility

③Volume Reduction Facility

④24hour monitoring Equipment(placed in several points, not specifically indicated)

⑤R & D Facility

⑥Public information Center

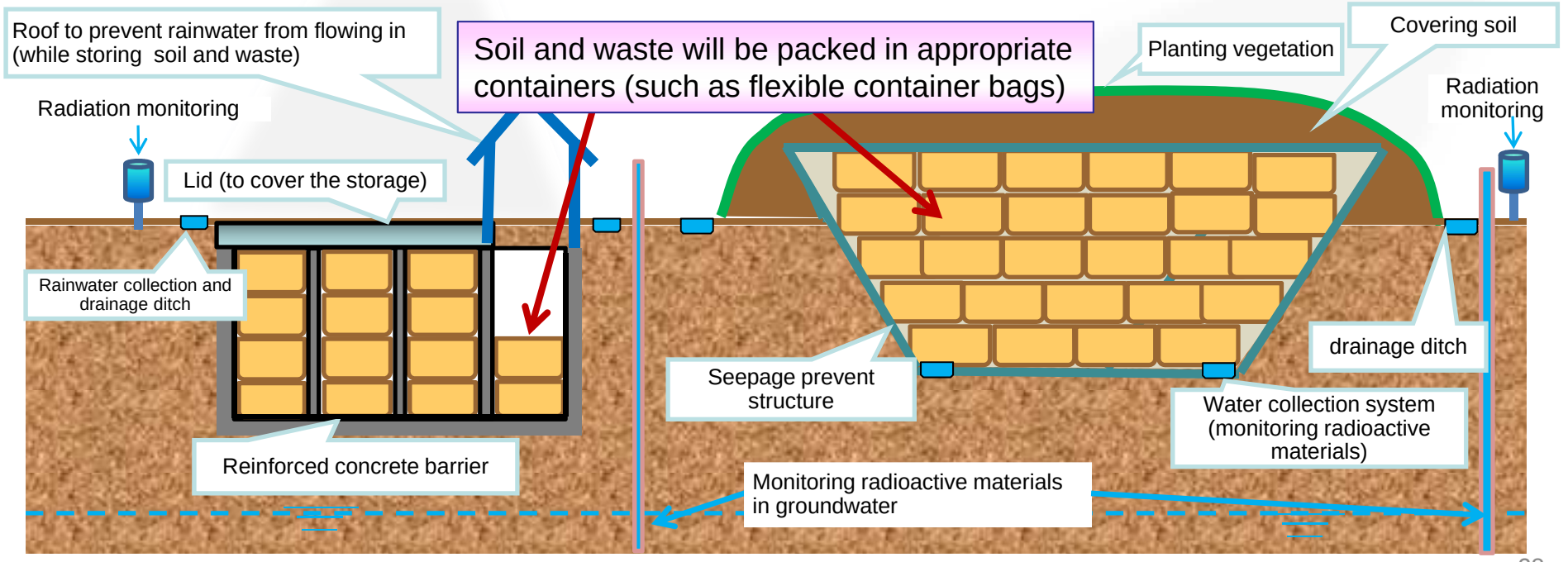
Scale of the whole facility (estimation)
Total storage volume ranges between 15-28 million m^3, which is 12-23 times big as a baseball stadium(approx. 1.24million m^3)

Storage Facility Image in ISF

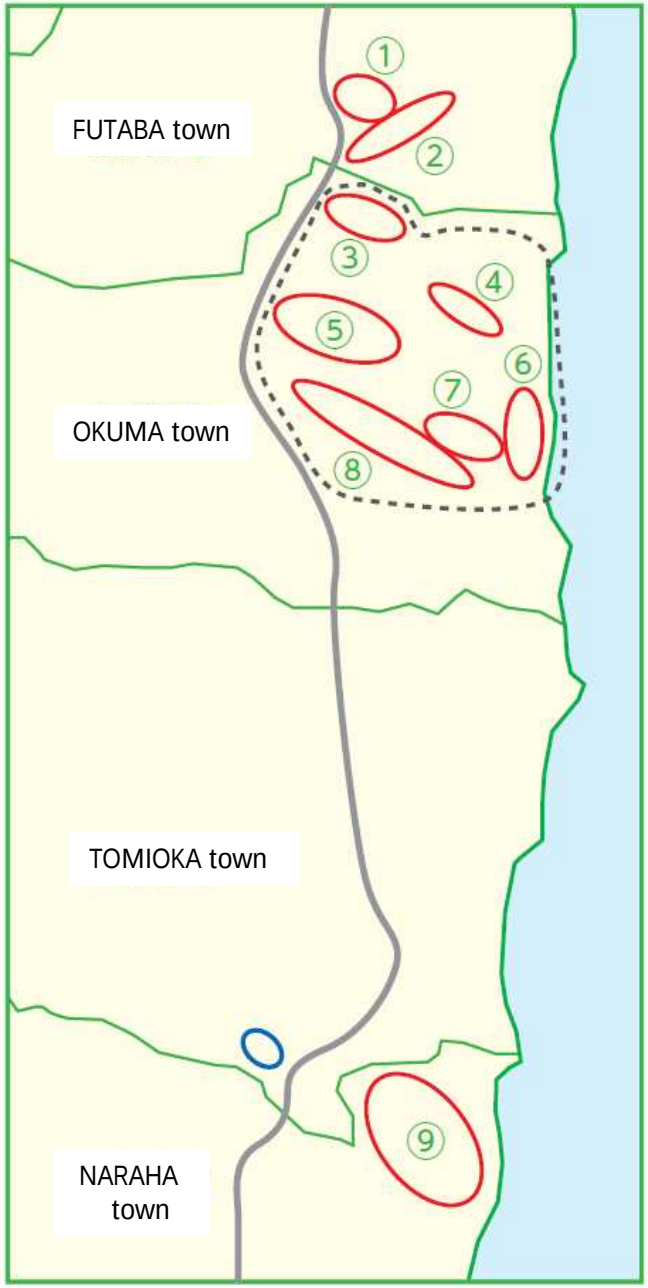
- Several types of storage facilities may be installed according to the characteristics of stored soil and waste.
  - ✓・Level of contamination
  - ✓・Leachate traits under various environmental scenario.

Example of facilities for radioactive waste which can generate leachate

Example of facilities for radioactive waste which does not generate leachate



Outlook for Selecting Potential Survey Sites for ISF



Potential sites will be selected from 3 towns (Futaba, Okuma and Naraha).
Survey sites are selected in consideration with existing data and following conditions:

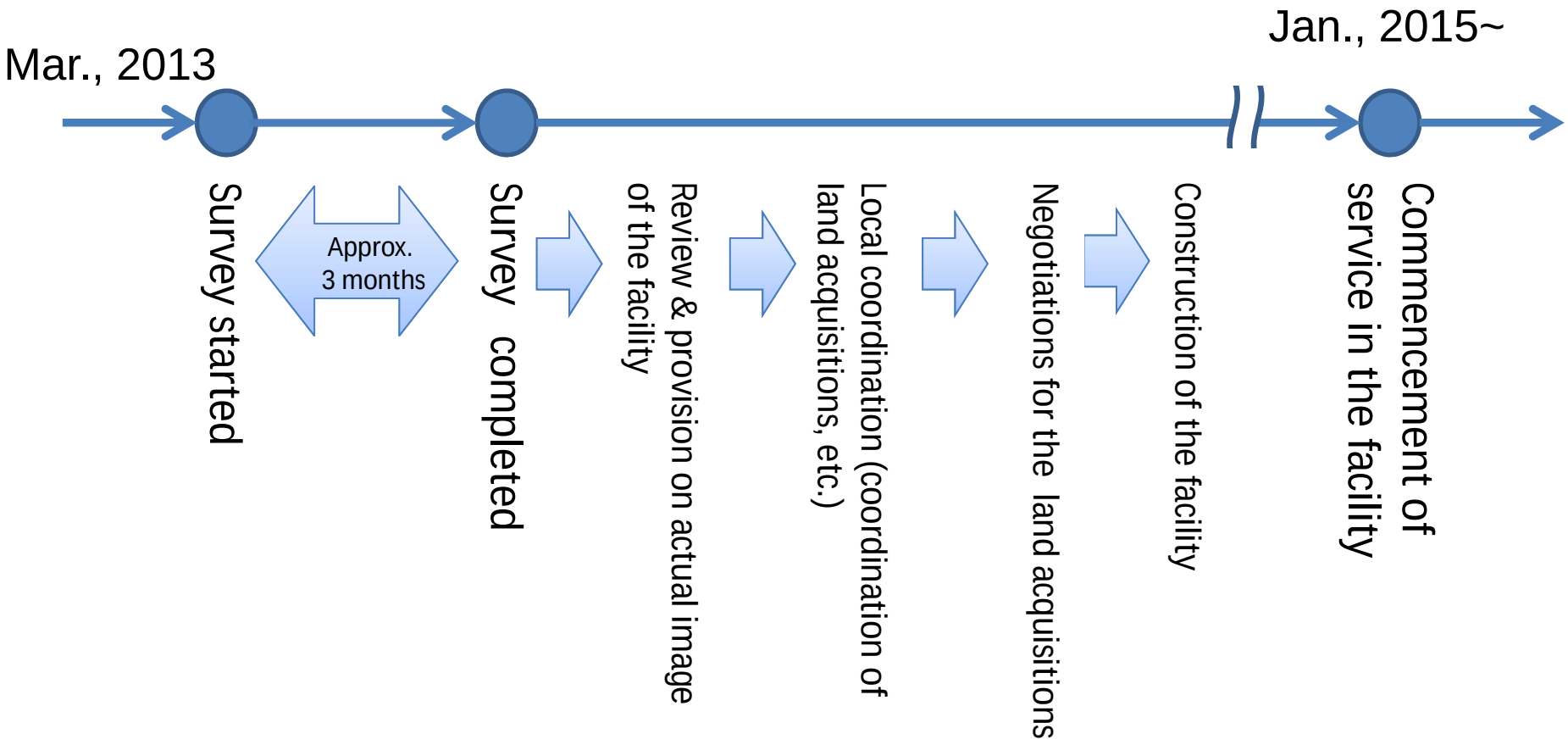
- ○Effective utilization of existing geological formation, e.g. plateaus and hills
- ○Utilization of existing facility
- ○Utilization of sites contributed to disaster prevention

Potential sites for preliminary survey

Existing controlled landfill site

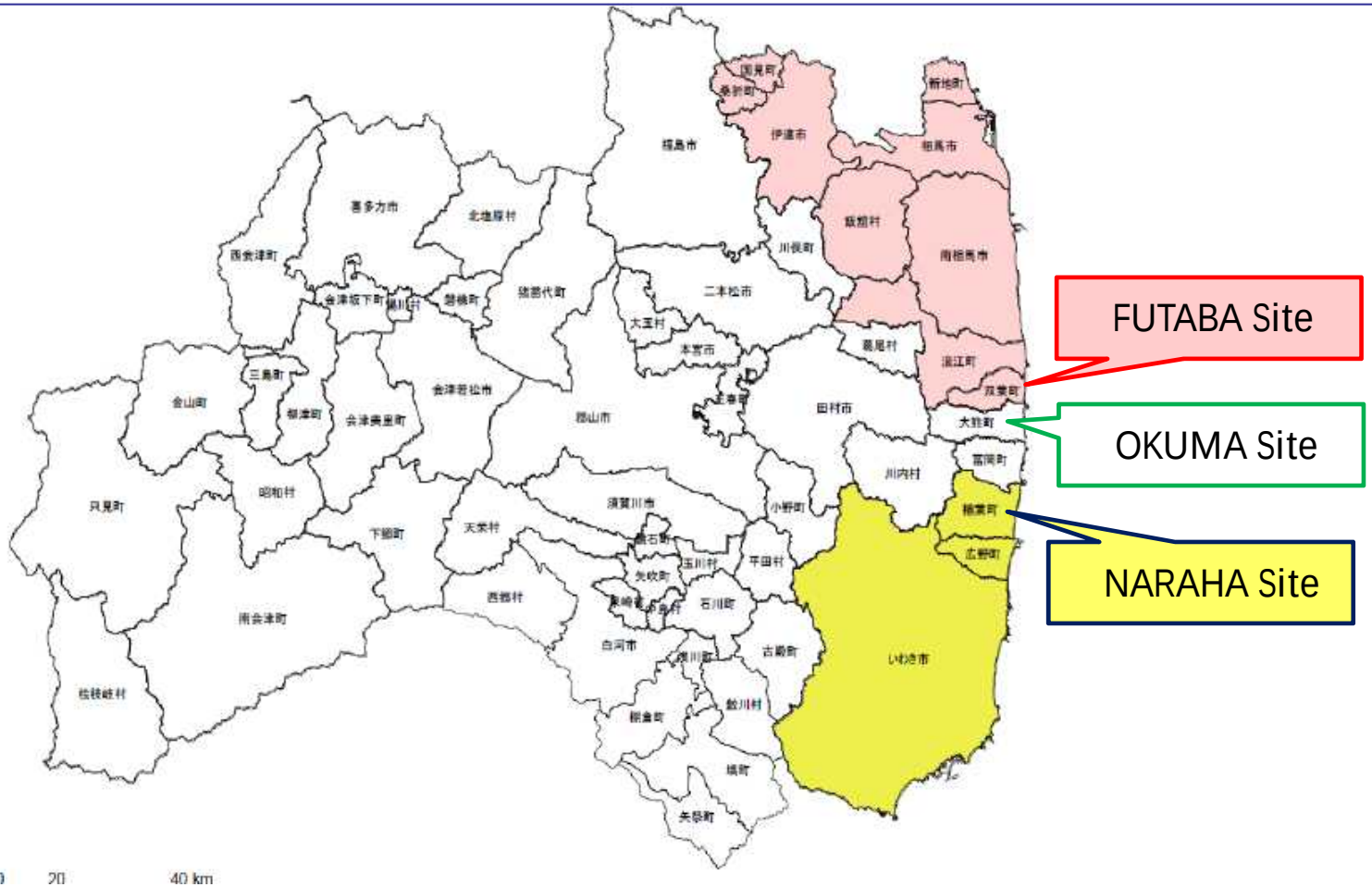
※Indicated potential survey sites are only rough outline envisaged to carry out the preliminary survey as of this moment.

Future Plan

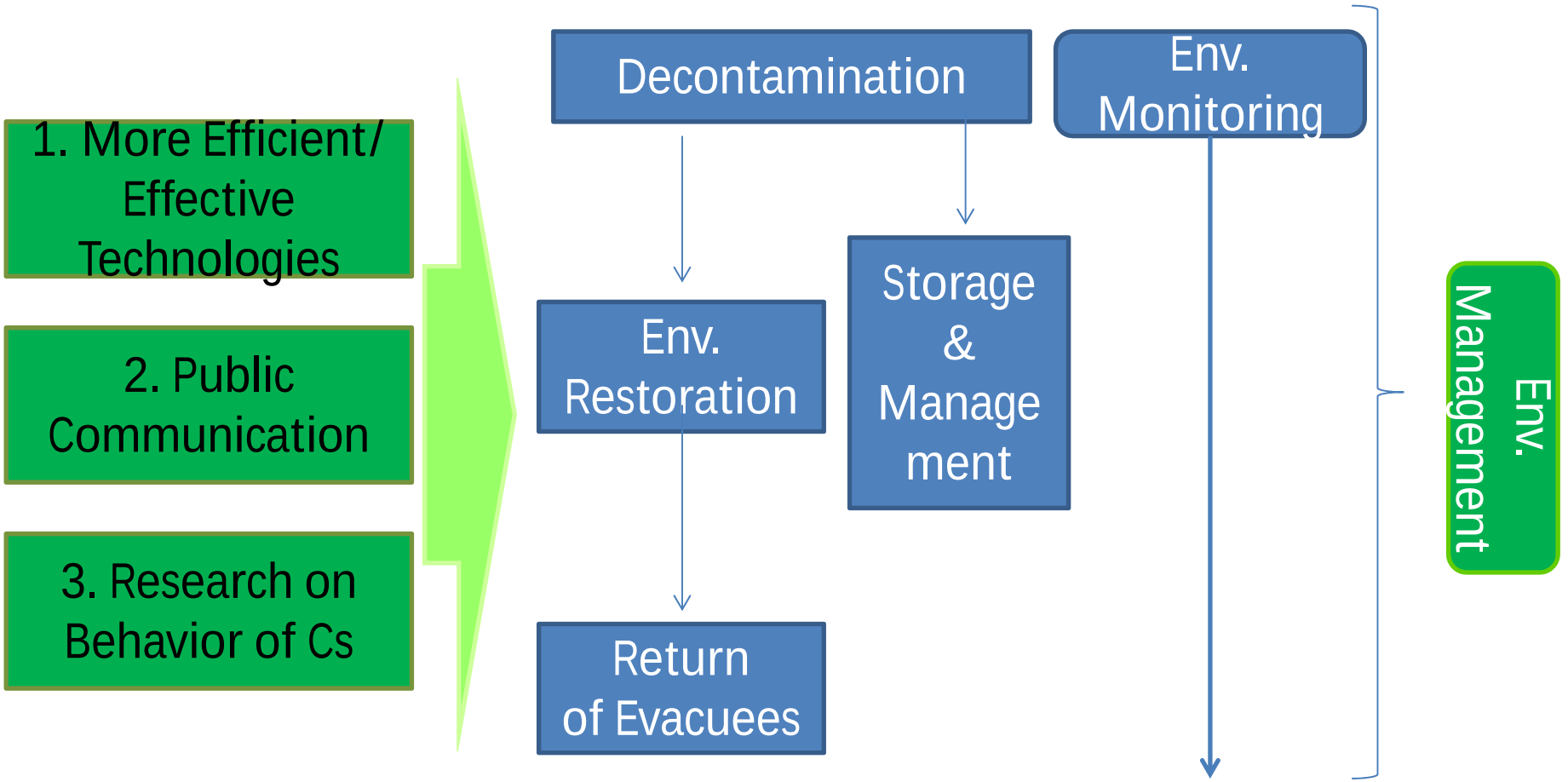

Mar., 2013
Jan., 2015~
Survey started
Approx.
3 months
Survey completed
Review & provision on actual image of the facility
Local coordination (coordination of land acquisitions, etc.)
Negotiations for the land acquisitions
Construction of the facility
Commencement of service in the facility

Transportation Plan

- Municipalities in Fukushima pref. are categorized into 3 areas according to
  - ISF locations (FUTABA, OKUMA and NARAHA)



Tackling the Challenges



Tackling the Challenges

1. Seeking for more efficient / effective technology for decontamination from the perspective of cost, time, etc. through demonstration model project and R&D (incl. soil/ waste minimization and volume reduction)

2. Promotion of Public communication for securing temporary storage sites, interim storage facilities, etc. for removed soils as well as risk communication with citizens before/after decontamination.

3. Research on the behavior and environmental fate of cesium, including the development of transport models