



Decontamination at parks (1/2)



Before decontamination
Ambient dose rate: 1.5 $\mu\text{Sv/h}$
Dose rate on soil surface: 2.4 $\mu\text{Sv/h}$



After decontamination
Ambient dose rate: 0.8 $\mu\text{Sv/h}$
Dose rate on soil surface: 0.4 $\mu\text{Sv/h}$
(Concrete: 0.2 $\mu\text{Sv/h}$)
(GM 218 cpm avg., BG 200 cpm)



Combustible waste (approx. 30 bags)
Content: plants, trees, leaves
(to be disposed of as combustible waste
on 9 September)



Decontamination at parks (2/2) – Decontamination of play equipment –

Wiping with damp cloths, neutral detergent, and orange-oil detergent were tested.


Wiping with damp cloths verified to be sufficiently effective for decontamination.

*Decontamination effect depends on place and/or material.

Horizontal bars

Effectiveness of four types of decontamination methods verified

Measurement Point	Water washing (1)	Neutral detergent (2)	Sandpaper (3)	Orange-oil detergent (4)
	Before decontamination			
Sample counting rate (cpm)	200	180	230	270
Net counting rate (cpm)	100	80	130	170
Surface density (Bq/cm ²)	0.056	0.044	0.072	0.094
After decontamination				
Sample counting rate (cpm)	100	100	100	100
Net counting rate (cpm)	0	0	0	0
Surface density (Bq/cm ²)	Below the lower detection limit			
Reduction rate (%)	100	100	100	100




Wiping with damp cloths showed sufficient effectiveness.


Slides

Decontaminated by wiping with damp cloths.

Measurement Point	Slides			
	(1)	(2)	(3)	(4)
Before decontamination				
Sample counting rate (cpm)	180	200	190	200
Net counting rate (cpm)	80	100	90	100
Surface density (Bq/cm ²)	0.044	0.056	0.05	0.056
After decontamination				
Sample counting rate (cpm)	100	100	100	100
Net counting rate (cpm)	0	0	0	0
Surface density (Bq/cm ²)	Below the lower detection limit			
Reduction rate (%)	100	100	100	100




Smear method



Surface contamination was checked by wiping a surface with a smear filter paper, and surface concentration of contamination was measured within the lead-shield.

Swings



Decontaminated by wiping with damp cloths.

Measurement Point	Swings							
	(5)	(6)	(7)	(8)	(9)	(10)	(11)	
Before decontamination								
Sample counting rate (cpm)	180	200	250	300	280	200	250	
Net counting rate (cpm)	80	100	150	200	180	100	150	
Surface density (Bq/cm ²)	0.044	0.056	0.083	0.11	0.1	0.056	0.083	
After decontamination								
Sample counting rate (cpm)	100	100	100	100	100	100	100	
Net counting rate (cpm)	0	0	0	0	0	0	0	
Surface density (Bq/cm ²)	Below the lower detection limit							
Reduction rate (%)	100	100	100	100	100	100	100	

Sandboxes

Topsoil in sandboxes was removed deeper than that for the soil decontamination, in light of the way children play.

Measurement height	1 cm		50 cm		100 cm		
	Dose rate		Dose rate		Dose rate		
	(μSv/h)	Reduction rate (%)	(μSv/h)	Reduction rate (%)	(μSv/h)	Reduction rate (%)	
Decontamination condition (1) Before decontamination works	2.4	-	1,142	-	2.0	-	1.9
(2) Waste and weeding	2.3	5	1,525	-34	2.0	0	1.7
(3) Decontaminating 1 cm in depth	2.1	11	1,200	-5	1.9	5	1.6
(4) Decontaminating 3 cm depth	1.3	45	1,300	-14	1.2	40	1.3
(5) Decontaminating 5 cm depth	0.6	74	410	64	1.5	24	1.4
(6) Decontaminating 10 cm depth	0.4	83	330	71	0.6	70	0.6



Decontamination demonstration test in community areas (1/7)

Demonstration of decontamination technologies

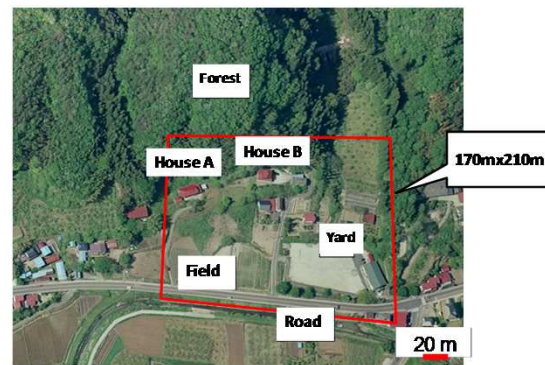
- Review the past experiences.
- Application of technologies to demonstration sites.
- Evaluation of effectiveness, cost, amount of generated waste, and safety etc.
- Development of a “catalog of decontamination technologies”.

Demonstration of decontamination methods

- Develop general approaches and a draft of guidelines.
- Identify issues to be considered for demonstration at demonstration sites.
- Update guidelines.

Demonstration at demonstration sites

- Demonstration area 1: Decontaminate areas that include many objects to be decontaminated and where dose rates are relatively high.
- Demonstration area 2: Decontaminate wide area and/or area with high dose rates in restricted/deliberate evacuation areas.



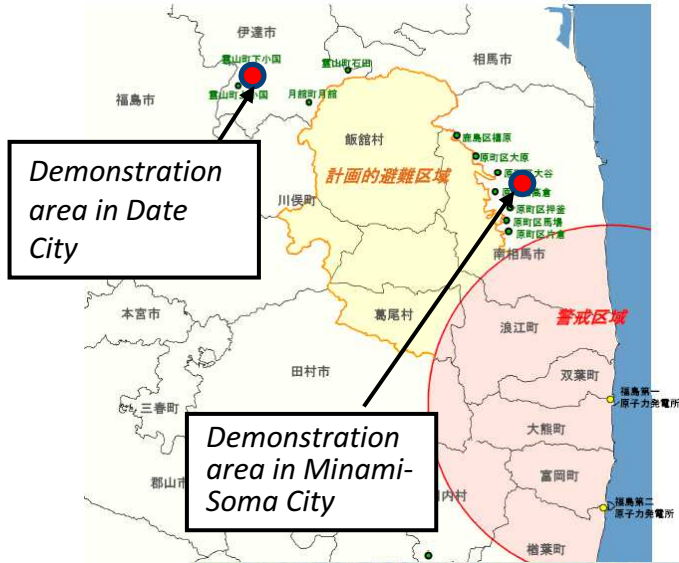
Demonstration Area 1



Demonstration Area 2

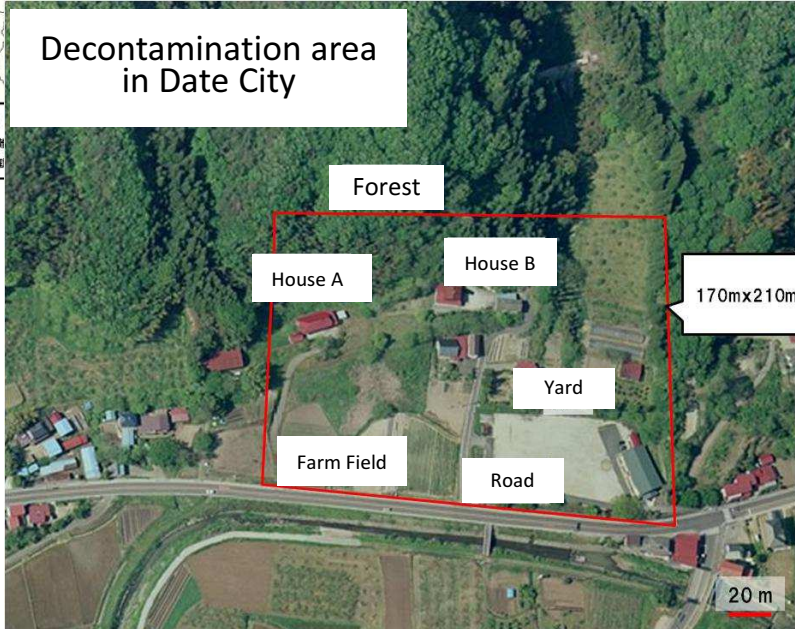


Decontamination demonstration test in community areas (2/7)



Demonstration area in Date City

Demonstration area in Minami-Soma City



Decontamination area in Date City

警戒区域
計画的避難区域
特定避難区域

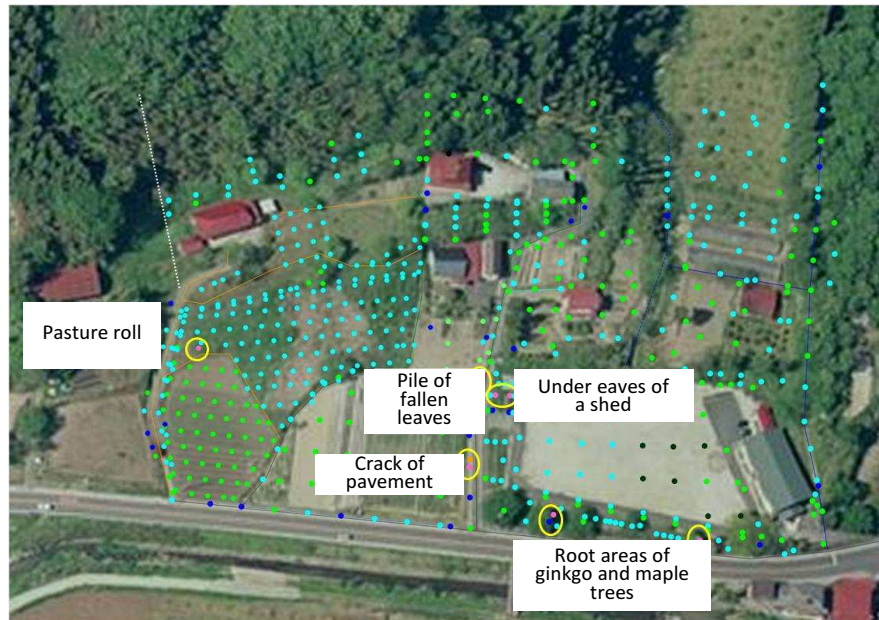


Decontamination area in Minami-Soma City



Decontamination demonstration test in community areas (3/7)

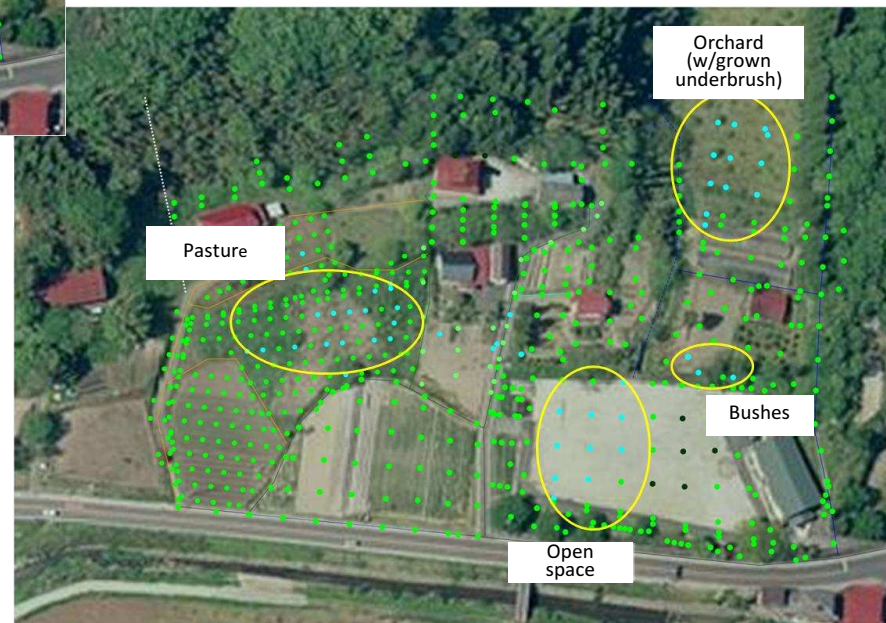
–Results of dose rate measurement –



Results of surface dose rate measurement

Demonstration area in Date-city

Results of ambient dose rate measurement [1 m]

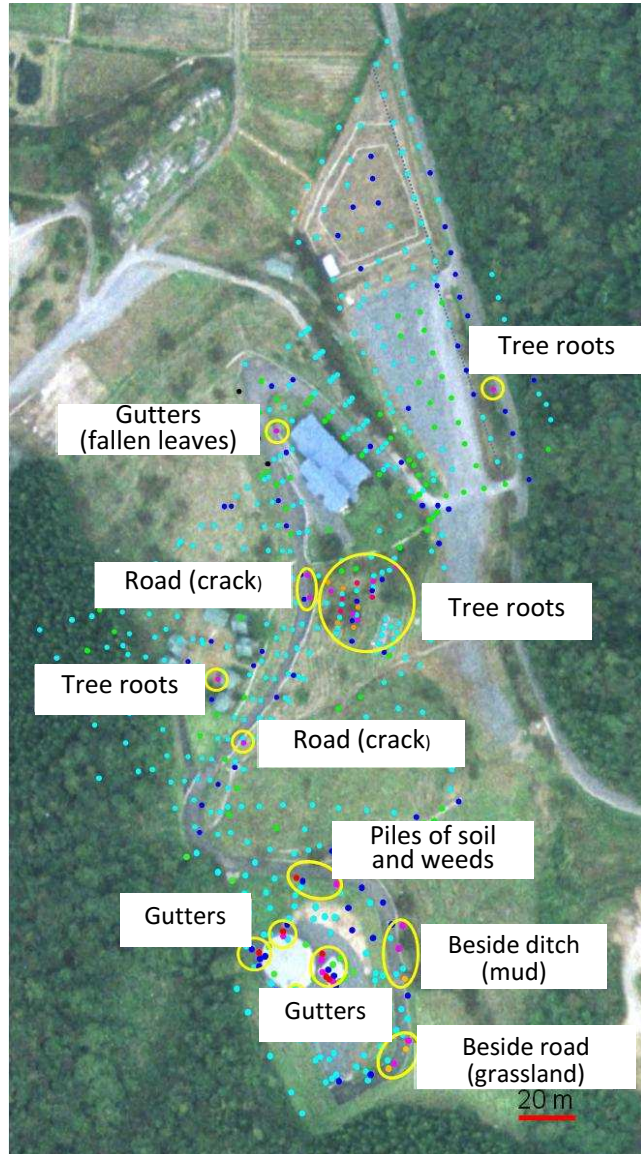




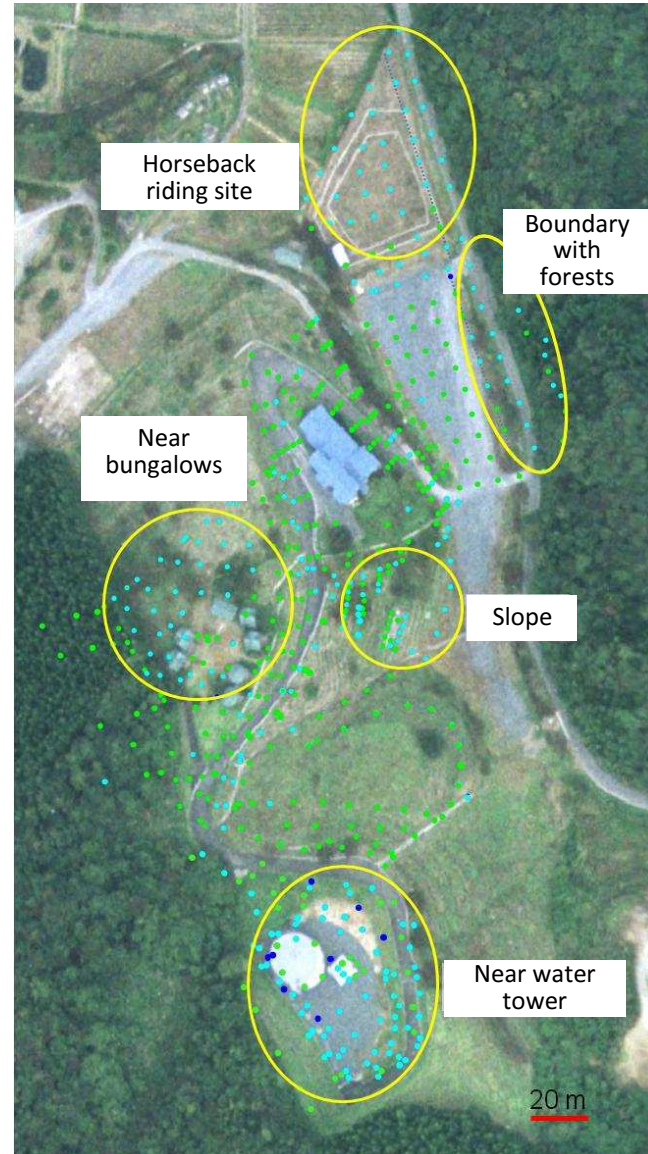
Decontamination demonstration test in community areas (4/7)

- Results of dose rate measurement -

Results of surface dose rate measurement



Results of ambient dose rate measurement [1 m]



Legend of dose rates ($\mu\text{Sv/h}$)

● 1 or less
● 1~3
● 3~5
● 5~10
● 10~20
● 20~30
● 30 or more

Demonstration area in Minami-Soma City



Decontamination demonstration test in community areas (6/7) - Basic concept for selecting decontamination method –

- Decontamination method should:
 - Be easy and practical to perform.
 - Generate minimal waste.
 - Use minimal water to avoid secondary contamination.
 - Adopt a method to reduce environmental effects caused by the decontamination, if required.

- Decontamination procedures
 - Decontamination work were conducted using JAEA's decontamination effect evaluation system ("Calculation system for Decontamination Effect") to estimate/evaluate dose rate reduction effect.
 - Decontamination should be conducted, in principle, in the order of "residential area" to "surrounding environment", and "higher area" to "lower area".
 - Forest decontamination should be conducted at the end in order to verify decontamination effect, starting from an entrance to the forest and at every several meters in a step-by-step manner.
 - Dose rate monitoring during work should be conducted for all of the cases in order to evaluate decontamination effect and the amount of removed objects.



Decontamination demonstration test in community areas (7/7)- Decontamination plan -

- Step 1** Typical method to decontaminate water tower etc.
 - Rooftop and gutters: removing waste (man-powered), wiping and washing (man-powered)
 - Soil yard: collecting fallen leaves and weeding (man-powered), scraping topsoil, soil dressing and compaction (man-powered, machine)
- Step 2** Typical method to decontaminate forests and plants etc.
 - Fallen leaves: collecting fallen leaves (man-powered)
 - Underbrush: weeding (man-powered, machine)
 - High trees: trimming (high trees)
 - Soil surface: scraping topsoil (man-powered, machine), soil dressing and compaction (machine)
- Step 3** Typical method to decontaminate bungalows etc.
 - Rooftop and gutters: removing waste (man-powered), wiping (man-powered)
 - Soil yard: collecting fallen leaves and weeding (man-powered), scraping topsoil and soil dressing (man-powered)
- Step 4** Typical method to decontaminate grasslands etc.
 - Fallen leaves: collecting fallen leaves
 - Underbrush: weeding (man-powered, machine)
 - High trees: trimming (high trees)
 - Soil surface: scraping topsoil (man-powered, machine), soil dressing and compaction (ma
- Step 5** Typical method to decontaminate the facility for agricultural experience and learning
 - Rooftop and gutters: removing waste (man-powered), wiping (man-powered)
 - Soil yard: collecting fallen leaves and weeding (man-powered), scraping topsoil and soil dressing (man-powered)
- Step 6** Typical method to decontaminate the horse-back riding site and parking lot
 - Fallen leaves: collecting fallen leaves
 - Underbrush: weeding (man-powered, machine)
 - High trees: trimming (high trees)
 - Soil surface: scraping topsoil (machine), soil dressing and compaction (machine)
- Step 7** Typical method to decontaminate roads
 - Paved surfaces: power washing (machine)

