

Waste management toward restoration

Building Safer & Resilient Society against Mega Disaster

-Report form Japan on 3.11-

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Classification of disaster waste

1. Unwanted articles from damaged houses
2. Waste from damaged houses and dismantling
3. Everyday waste from refugee life
4. Damaged infrastructures
etc. roads, bridges
5. Waste from damaged natural objects
etc. trees

Special features of disaster waste of GEJET

1. Contamination by radio activities
2. Tsunami waste; sea sediment
3. Swept away waste in sea
4. Contamination by sea water

Amount of disaster waste of GEJET

Prefecture	Estimated waste generation from coastal area (Mt)	Estimated sediment deposited ² (Mt)
Aomori	0.22	0.70-1.49
Iwate	4.42 ¹	3.21-6.83
Miyagi	12.88 ¹	5.68-12.05
Fukushima	2.28 ¹	1.73-3.68
Ibaragi	0.50	1.21-2.57
Chiba	0.12	0.66-1.40
total	20.42	13.19-28.02
Grand total	33.6-48.4	

These figures do not include cars, ships, infrastructure waste in inland area.

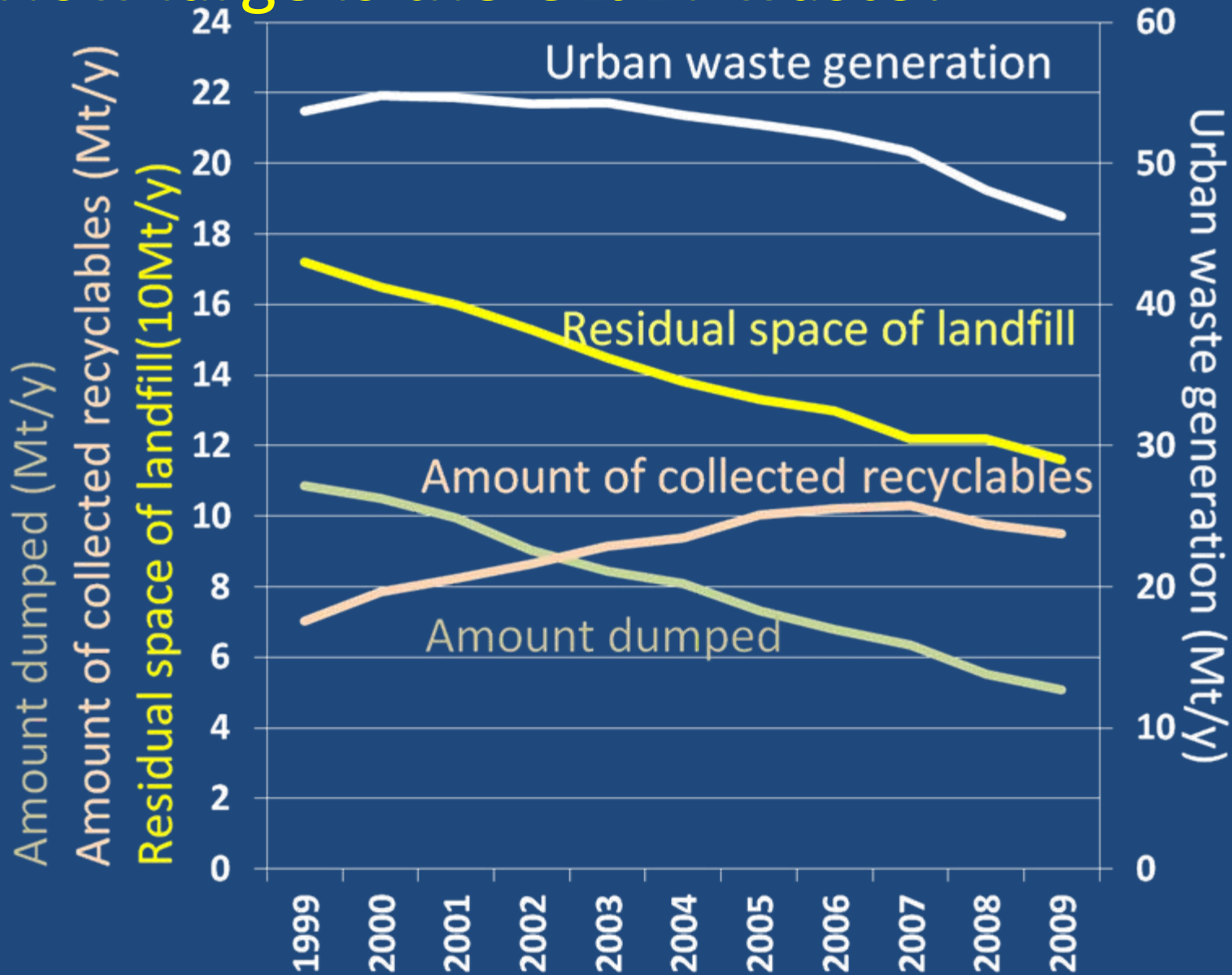
Some part of waste is swept to sea, there is no estimation how much.

Amount of waste contaminated by radioactive materials are not reported yet

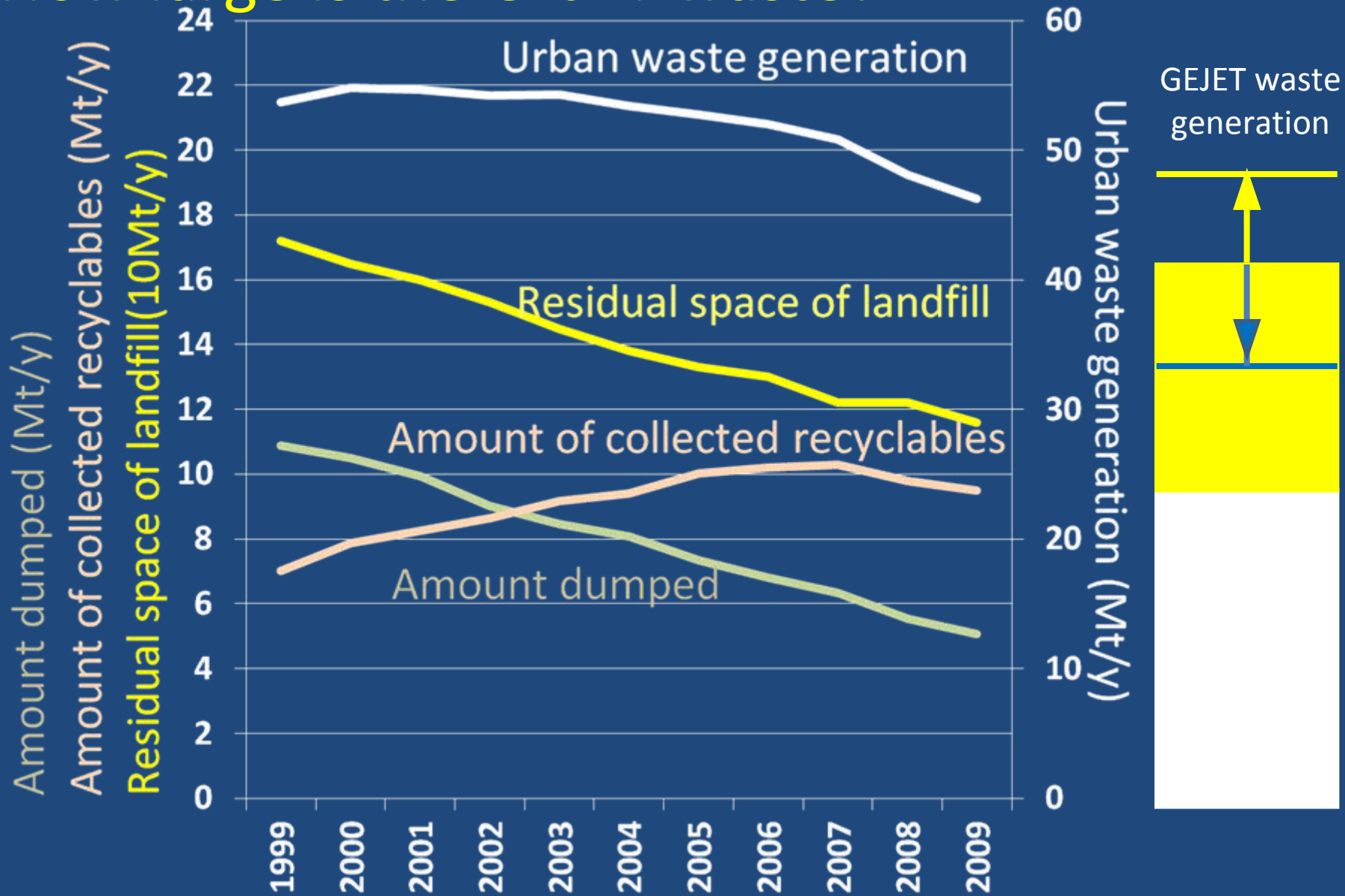
1: MOE <http://www.env.go.jp/jishin/taiou1106211700.pdf>

2: SMCWM, *Tsunami Taisekibutsu Shori Shishin (Ann)*, 2011 July

How large is the GEJET waste?



How large is the GEJET waste?



How large is the GEJET waste?

GEJET Waste comes near
annual urban waste generation
in Japan

Comparison of GEJET with Hanshin-Awaji earthquake

GEJET: 41.0Mt vs. Hanshin-Awaji: 14.3Mt
+ contamination of radioactive materials
+ much less regional landfill capacity

Waste management master plan of GEJET

Role of actors

State: Development of **master plan**

Prefecture: General **coordination**
tentative stock yard,
waste processing,
Development of **action plan**
Operation if necessary

Municipality: **Operation** of action plan

Fundamental policy of waste processing in GEJET waste

1. On-site primary sorting
2. Secondary sorting at temporary stock yard
3. Recycle
4. Use rubbles as construction materials
5. Recycle cars and electric home appliances
by formal route of recycling
6. Attention not to cause traffic jam









Necessity of regional waste processing of GEJET waste

1. Some municipalities got serious damage on waste treatment plant
2. Cost efficient
3. Consider joint incineration plant with neighboring municipalities

Waste processing

1. Burnable waste:

prevention of fire at stock yard,
utilize in cement kiln, power generation

2. Wood waste:

utilize as fuel, chip board
ex-ante coordination with users to make
sure the products is useful
leaching of salt

Waste processing

3. Non burnable waste:

separation of metals and burnable waste
and **put the rest into landfill**

4. Metals:

separate **steel and other metals**

5. Rubbles:

utilize as **construction materials**

separate **asphalt, concrete and stone**

ex-ante coordination with users to make
sure the products are useful

Waste processing

6. Electric home appliances and cars:
recycle according to recycling laws
7. Ships:
dismantle, shred after removal of
fuels and batteries sort metals,
plastics and woods to utilize
special attention on asbestos
8. Dangerous articles, PCBs or asbestos
containing waste:
separate from other waste and treat
appropriately



Waste processing

9. Sediments:

cement kiln or incineration if it contains oil, heavy metals or is corruptive otherwise, utilize as construction materials or marine disposal

10. Waste from burned sites:

separate ash, metals, and rubbles and treat appropriately

Schedule – Master plan

1. Transfer of waste to tentative stock yards
waste in the everyday life space:
end of August 2011
other waste:
end of March 2012

Schedule – Master plan

2. Intermediate processing and final disposal:
 - corruptive waste
 - as fast as possible
 - utilizable waste ;wood chips and rubbles
 - appropriate period
 - others
 - end of March 2014

Current picture (30th August 2011):

Transfer of waste to tentative stock yards

Prefecture	Include future dismantling waste	Exclude future dismantling waste
Iwate	71%	87%
Miyagi	48%	94%
Fukushima	39%	43%
Total	52%	85%

Ministry of the Environment

New approach

Matching of prefectures and cities for support

- Kansai Extended Association of Prefectures and Cities initiative
- Assign member prefectures and cities to suffered prefectures and cities
- Lesson from Chinese policy in Sichuan Great Earthquake

Problems

1. Extremely large quantity
2. Radio activities
 - 2-1. Contaminated waste
 - 2-2. Concentration by incineration
 - 2-3. Decontamination of soil
 - 2-4. Site location of temporal/final stock yard
3. Urgent needs of restoration

Problems by time frame

1. Short term

- 1-1. Transfer of waste to temporal stock yard
- 1-2. Establishment of incineration plants
- 1-3. Survey of radio activities to identify hot spots

2. Mid term

- 2-1. Establish management plan for contaminated waste and soil

3. Long term

- 3-1. Site location of final stock yard for contaminated waste and soil

Lessons from GEJET waste management

1. We should anticipate “unanticipated damage”

What should be anticipated depends on stakeholders

2. Importance of risk communication

Opinions divert on the risk of radio activities

3. Importance of ex-ante partnership

Matching system between cities for support worked, but would be much more efficient if the matching had been done beforehand and prepared

Proposals

1. Organize a **stakeholder dialog and civic panel** for management of radio active waste
 - Government is not trusted, expert opinions divert, but we clearly need facilities for processing and final disposal of contaminated waste and soils
2. Develop a **triangle partnerships** between cities for mutual support in emergency
 - Ex-ante partnerships with preparation such as regular exchange of people

My research activities

1. Participatory process

- Stakeholder dialog/civic panel
- Real application to Waste Management Plan of Nagoya City
- 3year JST project on “Dialog on Development of Low Carbon Society”

TEPCO, Toyota, Panasonic, WWF, representative scientists on energy and climate change

My research activities

2. Public Marketing Approach

- An approach to solve a social problem in which a group who has a solution model initiates a movement of **political consumerism** and get the de-facto standard to get to the objective avoiding the difficult political consensus making.
- **“Herasou Shopping”** : put simple packaging label on the shelf of supermarket to recommend people to choose.

My research activities

2. Public Marketing Approach (Herasou Shopping)

- Big companies supporting us; P&G, Kao, Kirin etc.
- Three big retailer chains collaborate with us.
- Starting from one shop for one month, now three shops for 12 months and still on going.
- Verified ca. 10% impact on sales.
- Found empowering effect on ordinary consumers.

Promotion at shop front



Promotion at shelves POP



へらしました		プラスチックフィルム	
		プラスチック容器	
なくしました		外箱	
		トレイ	
		個別包装	
その他 変えました			

Seasons promotion; Father's day



Regular patrol

Students check POPs, new products and customers' reaction three times a week



Thank you