

**Session III:**  
**Group Discussion on Sector-Specific Issues-**  
**Group 4: Waste**

The 7<sup>th</sup> Workshop on GHG Inventories in Asia (WGIA7)  
9 July 2009,  
Seoul, Republic of Korea

**Takefumi Oda**

Greenhouse Gas Inventory Office of JAPAN (GIO)  
National Institute for Environmental Studies (NIES)

# List of participants

- Mr. Haneda Sri Mulyanto (Indonesia)
- Mr. Khamphone Keodalavong (Lao PDR)
- Ms. Azlina Othman (Malaysia)
- **Dr. Sirintornthep Towprayoon \*** (Thailand)
- Dr. Seungdo Kim (Republic of Korea)
- Mr. Byong-bok Jin (Republic of Korea)
- Mr. Wonseok Baek (Republic of Korea)
- Mr. Youngsung Kwon (Republic of Korea)
- Dr. Jeon-seong Ho (Republic of Korea)
- Dr. Chang-hwan Jung (Republic of Korea)
- Dr. Masato YAMADA (Japan)
- **Dr. Tomonori ISHIGAKI \*** (Japan)
- **Mr. Hiroyuki UEDA\*** (Japan)
- Dr. Kosuke KAWAI (Japan)
- Dr. Takefumi ODA (Japan)

15 persons.

\* : participants of WGIA6

**Thank you for your participation!**

# Recommendation from WGIA6

- There are two topics carried over from WGIA6.
- For Data collection system
  - Establishment of data collection format
  - Identification of country specific waste stream
  - Guidelines for four separate levels of data collection systems namely :
    - no data, not enough data, poor data quality and
    - good quality data .
- “WGIA7 should focus more on wastewater emission.”

# Theme of the session for waste sector

- We set up two theme for this WGIA7.
  - **Theme 1:** Improvement of data collection scheme for the Waste Sector
    - How about the state of data collection in each country?
    - How can we establish the data collection format of waste sector in Asian countries?
    - What method is available for estimation of waste generations?...etc.
  - **Theme 2:** Information exchange on wastewater handling
    - What is problem on estimation of GHG emissions from wastewater handling in each country? ...etc.

# Schedule of Working Group

- 9:30~10:50**    **Theme 1:**  
**Improvement of data collection scheme for the Waste Sector**  
**Chair: Seungdo Kim,    Rapporteur: Byong-bok Jin**
- 9:30~9:35    Takefumi Oda    Introductory presentation
- 9:35~9:45    Wonseok Baek    Change of MSW Composition by Landfill Ban of Food Waste
- 9:45~9:55    Kosuke Kawai    How to Accumulate the Waste Data in each Asian Country
- 9:55~10:50    All    Discussion
- 10:50~11:00**    *Tea Break*
- 11:00~12:20**    **Theme 2:**  
**Information exchange on wastewater handling**  
**Chair: Sirintornthep Towprayoon,    Rapporteur: TBD**
- 11:00~11:10    Hiroyuki Ueda    GHG Emissions from Wastewater Treatment and Discharge in Japan
- 11:10~11:20    Tomonori Ishigaki    Possibly Co-benefit? Advanced Wastewater Treatment Process
- 11:20~12:20    All    Discussion

# Hand-outs for Discussion

For these discussions, we have prepared some materials.

## ➤ **For theme 1.**

- To share Japan`s data collection method
  - **‘Japan’s data collection system for statistics of waste disposal’**
  - **‘How to estimate time-series data in Japan’**
- To understand status of participants data collection
  - **‘Answer for questionnaires from participants’**
    - Before we hold this session, we have received five answers to our questionnaires from Malaysia, Mongolia, Korea, Philippines and Japan.
  - **‘Country report on WM in Laos’**

## ➤ **For theme 2**

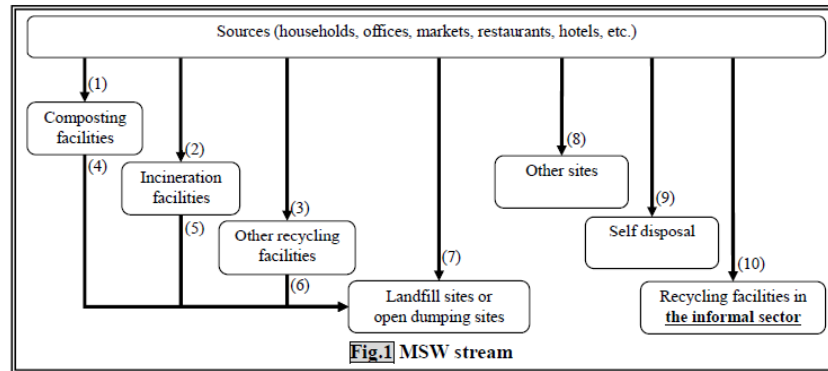
- **Slides of presentations**

Questionnaire

This form is to be completed if information and data of municipal solid waste management is available for your municipality.

Name	Batimaa, Dorjpuver and Namkhainyam	
Affiliation	researchers	
E-mail address	mcco@arigsor.mn, mecc@magicnet.mn, namkhai0311@yahoo.com	
Tel & Fax	Tel:88101866, 99166094,99138624	Fax:976-11-368643

1. If you have inventory of MSW IN YOUR MUNICIPALITY, please fill out the following information (data of the latest year) by reference to Fig.1.  
 -Please make it clear whether waste related data in your municipality are measured by weight (ton) or volume (m<sup>3</sup>).  
 -If you have the list of the facilities, please attach and send it to Dr. Oda (his contact address can be found at the last part of this questionnaire).



		Unit (ton or m <sup>3</sup> )	Amount	Number of facilities receiving MSW	
General information	Year of data	Year			
	Total Population				
	Population covered by MSW collection service				
MSW inventory	Treatment	Composting (1)			
		Incineration (2)			
		Other recycling (3)			
	Disposal	From composting (4)			
		From incineration (5)			
		From other recycling (6)			
		Direct disposal (7)	ton	117460	
	Other ( ) (8)				
	Self disposal (9)				
Recycling facilities in the informal sector (10)					

2 If your municipality has ever conducted an analysis on physical composition of MSW, please specify the items composing MSW, the description and the ratio.  
 If soft or hard copy of the site specific study is available, please attach and send it to Dr. Oda (his contact address can be found at the last part of this questionnaire).

Item	Ratio (%)
Food	23.2
Paper and cardboard	12.0
Plastic	11.5
Metal	2.5
Glass	8.0
Garden	
Wood and grass	2.6
Ceramic & Stone	4.4
Leather and Rubber	0.4
Textiles	3.4
Others (if any) (mainly ash)	32
Total	100

3. How the physical composition ratio above is measured? Please tick (x) one of the following options.  
 % by volume  
 % by weight (wet basis)  
 % by weight (dried basis)

4. Who conducted the analysis on physical composition of MSW above, when and where was it conducted?

Data collector	
Contact info	
Sampling period	
Sampling city	

Data are collected from different literature sources. Thus it is difficult to fill above table.

5. Please describe freely major issues / concerns of MSW management in your municipality.

There are two final disposal sites (as open dumping) in Ulaanbaatar, a capital city and there are fires, scattering of waste. Actually, there are no clear solutions for solid waste management.

Thank you for taking the time to complete this survey. It would be appreciated if you kindly send back the filled questionnaire to Dr. Oda of National Institute for Environmental Studies (NIES). If you would like more information, please feel free to contact Dr. Oda as well by email or phone call.

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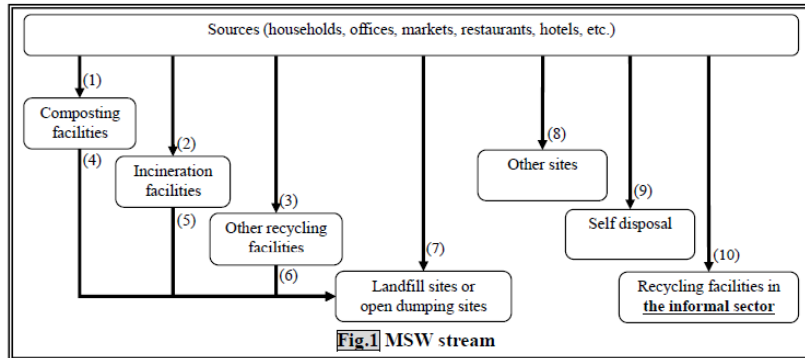
For Municipal Governments

**Questionnaire**

This form is to be completed if information and data of municipal solid waste management is available for your municipality.

Name	MUHAMMAD ZAINI HASNAN	
Affiliation	MINISTRY OF HOUSING & LOCAL GOVERNMENT, MALAYSIA	
E-mail address	zaini@kpkt.gov.my	
Tel & Fax	Tel: 603-2099 8471	Fax:

1. If you have inventory of MSW **IN YOUR MUNICIPALITY**, please fill out the following information (data of the latest year) by reference to **Fig.1**.  
 -Please make it clear whether waste related data in your municipality are measured by **weight (ton)** or volume (m<sup>3</sup>).  
 -If you have the list of the facilities, please attach and send it to Dr. Oda (his contact address can be found at the last part of this questionnaire).



		Unit (ton or m <sup>3</sup> )	Amount	Number of facilities receiving MSW	
General information	Year of data	Year			
	Total Population		26 million		
	Population covered by MSW collection service				
MSW inventory	Treatment	Composting (1)		-	
		Incineration (2)		-	
		Other recycling (3)		-	
	Disposal	From composting (4)			289 landfills
		From incineration (5)			
		From other recycling (6)			
		Direct disposal (7)			
	Other ( Refuse Derived Fuel -RDF) (8)	600 t/d			
Self disposal (9)					
Recycling facilities in the informal sector (10)					

2 If your municipality has ever conducted an analysis on physical composition of MSW, please specify the items composing MSW, the description and the ratio.  
 If soft or hard copy of the site specific study is available, please attach and send it to Dr. Oda (his contact address can be found at the last part of this questionnaire).

Item	Ratio (%)
Food	56.3
Paper and cardboard	8.2
Plastic	13.1
Metal	2.1
Glass	1.5
Garden	6.9
Wood	
Rubber } & others }	10.6
Leather }	
Textiles	1.3
Others (if any)	
Total	100

3. How the physical composition ratio above is measured? Please tick (x) one of the following options.  
 % by volume  
 % by weight (**wet basis**)  
 % by weight (**dried basis**)

4. Who conducted the analysis on physical composition of MSW above, when and where was it conducted?

Data collector	MOHD NAZERI SALLEH
Contact info	-
Sampling period	2002
Sampling city	KUALA LUMPUR

5. Please describe freely major issues / concerns of MSW management in your municipality.

1. Most landfills is dumpsite (not sanitary). Only 7 sanitary
2. Recycling rate still low (< 5%, 2008) from waste collected
3. Issues of collection for schedule waste from household and shoplots/commercial areas

Thank you for taking the time to complete this survey. It would be appreciated if you kindly send back the filled questionnaire to Dr. Oda of National Institute for Environmental Studies (NIES). If you would like more information, please feel free to contact Dr. Oda as well by email or phone call.

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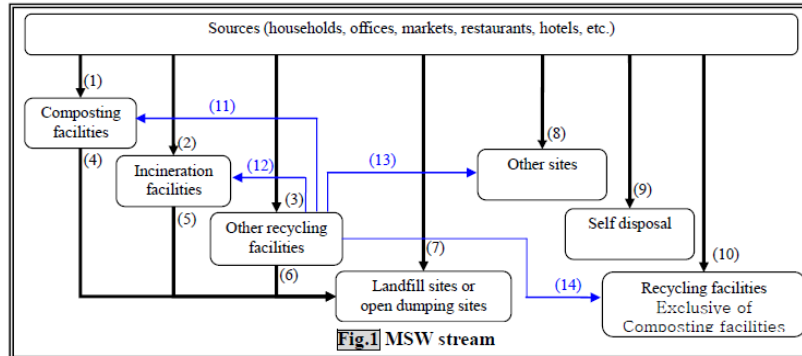


Questionnaire

This form is to be completed if information and data of municipal solid waste management is available for your country.

Name	Wonseok Baek	
Affiliation	EMC	
E-mail address	wsbaek@emc.or.kr	
Tel & Fax	Tel: +82-32-590-3756	Fax: +82-32-590-3729

1. If you have inventory of MSW IN YOUR COUNTRY, please fill out the following information (data of the latest year) by reference to Fig.1.  
 -Please make it clear whether waste related data in your country are measured by weight (ton) or volume (m<sup>3</sup>).  
 -If you have the list of the facilities, please attach and send it to Dr. Oda (his contact address can be found at the last part of this questionnaire).



		Unit (ton or m <sup>3</sup> )	Amount	Number of facilities receiving MSW**	
General information	Year of data	Year	2006		
	Total Population	persons	48,297,184		
	Population covered by MSW collection service	persons	48,297,184		
MSW inventory	Treatment	Composting (1)	ton	NA*	NA
		Incineration (2)	ton	3,037,071	171
		Other recycling (3)	ton	9,529,356	419
	Disposal	From composting (4)	ton	NA	
		From incineration (5)	ton	561,251	
		From other recycling (6)	ton	32,304	
		Direct disposal (7)	ton	4,564,054	229
		Other sites (8)	ton	109,584	NA
	Self disposal (9)	ton	NA	NA	
	Recycling facilities exclusive of composting facilities (10)	ton	NA	NA	
	Composting from other recycling (11)	ton	4,495,604	230	
	Incineration from other recycling (12)	ton	96,397		
Other sites from other recycling (13)	ton	92,243			
Recycling facilities exclusive of composting facilities (14)	ton	5,581,453			

\* NA: Not Available  
 \*\* The 3rd (2006~2007) Nationwide statistical research (National Institute of Environmental Research, KOREA, 2007.12)

2 If your country has ever conducted an analysis on physical composition of MSW, please specify the items composing MSW, the description and the ratio.  
 If soft or hard copy of the site specific study is available, please attach and send it to Dr. Oda (his contact address can be found at the last part of this questionnaire).

Item	Ratio* (%)	
Combustible	Food	8.1
	Paper and cardboard	35.1
	Wood	1.6
	Rubber	0.9
	Leather	0.8
	Plastic	21.4
Noncombustible	Others	25.1
	Metal	0.6
	Glass	1.5
	Ceramic	0.9
	Soil and sand	0.6
	Battery	0.2
	Leachate	0.3
	Ash	0.6
	Used briquette	0.1
	Others	2.4
	Total	100

\* The 3rd(2006~2007) Nationwide statistical research (National Institute of Environmental Research, KOREA, 2007.12)

3. How the physical composition ratio above is measured? Please tick (x) one of the following options.  
 % by volume  
 % by weight (wet basis)  
 % by weight (dried basis)

4. Who conducted the analysis on physical composition of MSW above, when and where was it conducted?

Data collector	ENVICO(Korea Environment & Resources Corporation), NIER(National Institute of Environmental Research)
Contact info	NIER : + 82-32-560-7902
Sampling period	The 3rd National Statistics: '06.11~'07.9
Sampling city	Intensive sampling of 4 sites(cities) : Seoul Mapo-gu, Daejeon Jung-gu, Gyeongsangbuk-do Gyeongju-si, Jeollabuk-do Buan-gun

5. Please describe freely major issues / concerns of MSW management in your country.

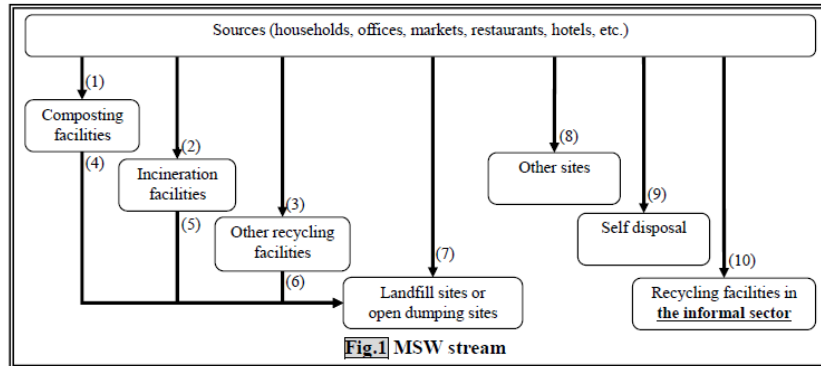
1. The operation of Total Waste Load Management from '95.1
2. The prohibition of direct disposal in landfills from '05.1

Questionnaire

This form is to be completed if information and data of municipal solid waste management is available for your country.

Name	Takefumi Oda	
Affiliation	National Institute for Environmental Science	
E-mail address	Oda.takefumi@nies.go.jp	
Tel & Fax	Tel: +81-29-850-2353	Fax: +81-850-2219

1. If you have inventory of MSW IN YOUR COUNTRY, please fill out the following information (data of the latest year) by reference to Fig.1.  
 -Please make it clear whether waste related data in your country are measured by weight (ton) or volume (m<sup>3</sup>).  
 -If you have the list of the facilities, please attach and send it to Dr. Oda (his contact address can be found at the last part of this questionnaire).



		Unit (ton or m <sup>3</sup> )	Amount	Number of facilities receiving MSW	
General information	Year of data	Year	2006		
	Total Population		127,781,000		
	Population covered by MSW collection service		127,727,000		
MSW inventory	Treatment	Composting (1)	kt	115	
		Incineration (2)	kt	38,067	
		Other recycling (3)	kt	7,064	
	Disposal	From composting (4)	kt	1	
		From incineration (5)	kt	4,363	
		From other recycling (6)	kt	1,245	
		Direct disposal (7)	kt	1,201	
	Other (Industrial waste.) (8)	kt	41,800		
	Self disposal (9)	kt	74		
	Recycling facilities in the informal sector (10)	kt	5,627		

2 If your country has ever conducted an analysis on physical composition of MSW, please specify the items composing MSW, the description and the ratio.  
 If soft or hard copy of the site specific study is available, please attach and send it to Dr. Oda (his contact address can be found at the last part of this questionnaire).

Item	Ratio (%)
Food	31.8
Paper and cardboard	32.5
Plastic	10.7
Metal	2.6
Glass	3.7
Garden	3.2
Wood	9.2
Rubber	
Leather	0.6
Textiles	3.9
Others (if any)	2.2
Total	100

3. How the physical composition ratio above is measured? Please tick (x) one of the following options.  
 % by volume  
 % by weight (wet basis)  
 % by weight (dried basis)

4. Who conducted the analysis on physical composition of MSW above, when and where was it conducted?

Data collector	Ministry of the Environment, Waste Management and Recycling Department
Contact info	
Sampling period	FY2006
Sampling city	Average of 6 sample cities

5. Please describe freely major issues / concerns of MSW management in your country.

We estimate the physical composition of household waste from the average of 6 sample cities investigated under the 'Survey on the state of discharge of waste containers and packaging'.

Thank you for taking the time to complete this survey. It would be appreciated if you kindly send back the filled questionnaire to Dr. Oda of National Institute for Environmental Studies (NIES). If you would like more information, please feel free to contact Dr. Oda as well by email or phone call.

Takefumi Oda

Data collection system is described in the 'Material 1'.

Let`s start this session!