Introductory Presentation; Result of the survey for waste sector inventory status of each country

WGIA8, Session III, WG 4
14 July 2010, Vientiane, Lao PDR

Takefumi Oda

Greenhouse Gas Inventory Office of Japan (GIO/CGER/NIES), Japan

Agenda for Waste Sector WG

WG 4: Waste Sector ***Plaza III***

Theme: Information Exchange on the Current Status of the Inventory Preparation for Waste Sector in each Asian Country

Chair: Tomonori Ishigaki Rapporteur: Gao Qingxian

Current status and /or problem of Waste Sector Inventory preparation of Asian countries

Takefumi Oda	Introductory presentation (GIO); result of the survey for waste sector inventory status of each country
Mya Thein	GHG emissions from waste sector of INC, Myanmar
Dorjpurev Jargal	Mongolia's GHG Inventory - Waste sector
Retno Gumilang Dewi	Indonesia’s progress in Waste inventory
Gao Qingxian	The Study Progress on Waste Sector
	Discussion

Proposal for the Waste Sector WG in future WGIA; information sharing for the mitigation actions in waste sector and the inventory improvement

Kosuke Kawai	Accuracy of municipal solid waste data in Vietnam
Wonseok Baek	Improvements in the process of estimating GHG emission for waste sector in Republic of Korea
Sirintornthep Towprayoon	Linkage of Greenhouse Gas Invenotry in Waste Sector to Mitigation Option
Hiroyuki Ueda	Continuous Improvement of Inventory for MRV Mitigation Action in Waste Sector

Agenda for Waste Sector WG of the past WGIA

- **Objective of WGIA**
  - to enhance the capacity building of GHG inventories in Asian countries
- **Themes for the past Waste Sector WGs in WGIA**
  - data collection, waste streams, waste water handling, and some others.

Past Agenda

- WGIA (Nov. 2003) & WGIA 2 (Feb. 2005):
  - No Waste WG
- WGIA 3 (Feb. 2006):
  - discussed about Activity data estimation, Waste streams, Uncertainty analysis and so on.
- WGIA 4 (Feb. 2007):
  - focused on important activity data to improve GHG inventory; wastewater flow and solid waste streams in Asian countries
- WGIA 5 (Sep. 2007):
  - No Waste WG
- WGIA 6 (Jul. 2008) :
  - mainly focused on AD related issues and how to improve the reliability of waste data
- WGIA 7 (Jul. 2009):
  - Theme 1: Improvement of the data collection scheme for the waste sector
  - Theme 2: Information exchange on waste water handling.

The survey for waste sector inventory status of each country

- How improved have been the Participating countries' inventory ?
- In WGIA8, we planned
  - to confirm the current inventory status of each country
  - to detect the problems ,
  - to discuss the improvement for future inventory.
- The secretariat conducted the survey by the questionnaire in advance for waste sector inventory status of each country.
- Respondent countries are followings;
  - Cambodia, China, Indonesia, Japan, Korea, Malaysia, Mongolia, Myanmar, Philippines, Thailand, Vietnam

Items of the Survey

1. Inventory compilation system
2. Transparency;
   - ✓ Preparation of documentation for explanations
3. Comparability;
   - ✓ Estimation for Source category in line with IPCC Guidelines
4. Completeness;
   - ✓ Estimation for all sources by gas
5. Consistency;
   - ✓ Time series, Methodology and Recalculations
6. Accuracy ;
   - ✓ Methodology, Emission Factors and Parameters
7. Key Category Analysis

Inventory Compilation System (1)

- **Specific agency** compile the inventory in waste sector in most country.
  - For continuous preparation of inventory, permanent compilation agency is necessary.
- Every country has established the **compilation system** supporting confirmation for methodology.

Table 1 Responsible agency

Countries	Responsible Agency			Compilation system
	Government or relevant agency	University or Research institute	Temporarily project team	
Cambodia	○			○
China		○		○
India	NA	NA	NA	NA
Indonesia	NA	NA	NA	NA
Japan		○		○
Korea	○			○
Lao	NA	NA	NA	NA
Malaysia	○			○
Mongolia	○		○	○
Myanmar	NA	NA	NA	NA
Philippines		○		○
Singapore	NA	NA	NA	NA
Thailand		○		○
Vietnam	○		○	○

Inventory Compilation System (2)

- Continuous preparation of annual inventory
  - Japan, Korea, Malaysia, Philippines and Thailand
- The other countries have following problems in the continuous preparation.
    - No legal obligation to compile the inventory
    - Lack of human resources
    - Lack of budget
    - Lack of inventory calculation system
    - Lack of time
- What solution do we have for the problems?

Transparency

- Disclose of detailed explanation for the inventory is important to keep its transparency.
- Many countries prepare such detailed documentations.
  - Are the prepared current documents enough transparent?
- No preparation of the document
  - Cambodia and Mongolia
  - lack of clear obligation, budget, human sources and time
  - What solution do we have for the problems?
  - Once we prepare such document, we only have to update it with partly change.

Table 2 Preparation of documentation for explanation

Countries	Documentation for explanation
Cambodia	×
China	○
India	NA
Indonesia	NA
Japan	○
Korea	○
Lao	NA
Malaysia	○
Mongolia	×
Myanmar	NA
Philippines	○
Singapore	NA
Thailand	○
Vietnam	○

Comparability

- Most countries estimate the emissions for the categories in line with IPCC Guidelines.
- Preparation of CRF tables is better solution to make comparability .
- CRF tables become
  - guiding means to comparison of inventories
  - tool to verify the completeness of estimations
- **Generation of CRF Tables**
  - Japan, Korea and Thailand
- Other countries have not generated the CRF tables.
  - No obligation of IPCC Guide lines
  - Lack of experiences

Table 4 Generation of CRF tables

Countries	CRF tables
Cambodia	×
China	×
India	NA
Indonesia	NA
Japan	○
Korea	○
Lao	NA
Malaysia	×
Mongolia	×
Myanmar	NA
Philippines	×
Singapore	NA
Thailand	○
Vietnam	×

Completeness (CO2)

Completeness

The completeness of each country's inventory in waste sector by subcategory

CO2		Cambodia	China	India	Indonesia	Japan	Korea	Lao	Malaysia	Mongolia	Myanmar	Philipines	Singapore	Thailand	Vietnam
Solid Waste Disposal															
6A1	Managed Waste Disposal on Land	E (full)	NO			NO	NA		NA	(E)	-	NA			NA
6A2	Unmanaged Waste Disposal Site	E (full)	NO			NO	NA		NA	(E)	-				NA
a	Deep (>5m)	E (full)	NO			NO	NA		NA	-	-	NA			NA
b	Shallow (<5m)	E (full)	NO			NO	NA		NA	-	-	NA			NA
6A3	Other (please specify)					NO	NA		NA	-	-				NA
Waste Water Handling															
6B1	Industrial Waste Water														
a	Waste Water											NA			
b	Sludge											NA			
6B2	Domestic and Commercial Wastewater														
a	Waste Water											NA			
b	Sludge											NA			
	N2O from human sewage											NA			
6B3	Other (please specify)											NA			
Waste incineration															
6C1	Biogenic	NA	NE			E(full)	NA		NA	-	-	NE			NA
6C2	Other (please specify)	NA	E(part)			E(full)	E(full)		NA	-	-	NA			NA
	Other (please specify)					Industrial Solid Waste	Municiple solid waste								
						E(full)	E(full)			-	-				
	Other (please specify)					Municiple Solid Waste	Industrial waste								
						E(full)	E(full)			-	-				
	Other (please specify)					Specially controlled ISW	Designated waste								
						E(full)	E(full)			-	-				
Other (please specify)															
6D	Other					Decomposition of Petroleum-Derived Surfactants	Biological Treatment of Solid Waste								
		NA				E(full)	NA		NA	-	-	NA			

E (full): Fully Estimated
E(part): Partly Estimated
IE: Included Elsewhere
NE: Not Estimated
NO: Not Occurred
NA: Not Applicable

:Not Estimated

Completeness (CH4)

Completeness

The completeness of each country's inventory in waste sector by subcategory

CH4		Cambodia	China	India	Indonesia	Japan	Korea	Lao	Malaysia	Mongolia	Myanmar	Philipines	Singapore	Thailand	Vietnam
Solid Waste Disposal															
6A1	Managed Waste Disposal on Land	E (full)	E(full)			E(full)	E(full)		E	(E)	-	E (full)		E(fulll)	E (part)
6A2	Unmanaged Waste Disposal Site	E (full)	E(full)			NA	E(full)		NE	(E)	-			E(fulll)	E (part)
a	Deep (>5m)	E (full)	E(full)			NA	E(full)		NE	-	-	E (part)		E(fulll)	
b	Shallow (<5m)	E (full)	E(full)			NA	E(full)		NE	-	-	E (part)		E(fulll)	
6A3	Other (please specify)					E(full)	-		NE	-	-	n/a			NA
	Other (please specify)					Inappropriate Disposal									
						E(full)				-	-				
Waste Water Handling															
6B1	Industrial Waste Water	E (full)	E(full)			E(full)IE	E(full), NE		E(part)	(E)	-				E (part)
a	Waste Water	E (full)	E(full)			E(full)	E(full)		E(part)	-	-	E (part)		E(fulll)	
b	Sludge	E (full)	E(full)			IE	NE		E(part)	-	-	NE		E(fulll)	
6B2	Domestic and Commercial Wastewater	E (full)	E(full)			E(full)IE	E(full), IE		E(full)	(E)	-				E (part)
a	Waste Water	E (full)	E(full)			E(full)	E(full)		E(full)	-	-	E (full)		E(fulll)	
b	Sludge	E (full)	E(full)			IE	IE		E(full)	-	-	E (part)		E(fulll)	
	N2O from human sewage											NA			
6B3	Other (please specify)					NO	-		NO	-	-				NA
Waste incineration															
6C1	Biogenic		No			E(full)	NA		NA	-	-	NA		NE	NA
6C2	Other (please specify)		No			E(full)	NE		NA	-	-	NA		E(fulll)	
	Other (please specify)					Industrial Solid Waste									
						E(full)				-	-				
	Other (please specify)					Municiple Solid Waste									
						E(full)				-	-				
	Other (please specify)					Specially controlled ISW									
						E(full)				-	-				
Other (please specify)															
6D	Other (please specify)					composting of organic waste	Biological Treatment of Solid Waste								
		NA				E(full)	E(full)		NA	-	-	NA		NE	

E (full): Fully Estimated
E(part): Partly Estimated
IE: Included Elsewhere
NE: Not Estimated
NO: Not Occurred
NA: Not Applicable

:Not Estimated

Completeness (N2O)

Completeness

The completeness of each country's inventory in waste sector by subcategory

N2O		Cambodia	China	India	Indonesia	Japan	Korea	Lao	Malaysia	Mongolia	Myanmar	Philipines	Singapore	Thailand	Vietnam
Solid Waste Disposal															
6A1	Managed Waste Disposal on Land											NA			
6A2	Unmanaged Waste Disposal Site											NA			
a	Deep (>5m)											NA			
b	Shallow (<5m)											NA			
6A3	Other (please specify)											NA			
Waste Water Handling															
6B1	Industrial Waste Water	E (full)	E(full)			E(full)IE	NE		NA	-	-				NA
a	Waste Water	E (full)	E(full)			E(full)	NE		NA	-	-	NA		NE	
b	Sludge	E (full)	E(full)			IE	NE		NA	-	-	NA		NE	
6B2	Domestic and Commercial Wastewater	E (full)	E(full)			E(full)IE	NE		NA	-	-				NA
a	Waste Water	E (full)	E(full)			E(full)	NE		NA	-	-	NA		NE	
b	Sludge	E (full)	E(full)			IE	NE		NA	-	-	NA		NE	
	N2O from human sewage	E (full)				E(full)	E(full)		NA	-	-	E (full)		E(full)	E (part)
6B3	Other (please specify)					NO	-		NA	-	-	NA		NE	NA
Waste incineration															
6C1	Biogenic					E(full)	NA		NA	-	-	NA			NA
6C2	Other (please specify)					E(full)	E(full)		NA	-	-	NA			
	Other (please specify)					Industrial Solid Waste	Municiple solid waste								
						E(full)	E(full)			-	-				
	Other (please specify)					Municiple Solid Waste	Industrial waste								
						E(full)	E(full)			-	-				
	Other (please specify)					Specially controlled ISW	Designated waste								
						E(full)	E(full)			-	-				
Other (please specify)															
6D	Other (please specify)					composting of organic waste	Biological Treatment of Solid Waste								
		NA				E(full)	E(full)		NA	-	-	NA			

E (full): Fully Estimated
E(part): Partly Estimated
IE: Included Elsewhere
NE: Not Estimated
NO: Not Occurred
NA: Not Applicable

:Not Estimated

Consistency

- **Time Series**

  not completed the time series from 1990

  – Cambodia, China and Vietnam

  partly completed the time series

  – Malaysia and Philippines.
  – specific solutions for problems are planned.

- **Methodology**
  – The estimation methods for GHG emissions are consistent in each country's inventory.

- **Recalculations**

  The recalculations after the latest inventory submission

  – Japan, Korea, Malaysia and Philippines.

  Continuous revision of the methodology are necessary for improvement of the inventory.

Accuracy

- Next presentations will show you the accuracy of each inventory.
  - Methodology
  - EFs and Parameters
- Please find your interest on your hand-out materials !

Accuracy (6A)

◆ Solid Waste Disposal on Land (6A)

- **CO2**
  - Cambodia and Mongolia : Tier 1 methods.
  - China : Tier 2 methods.
- **CH4**

  methodology
  - Cambodia, Korea, Malaysia, Mongolia and Vietnam : Tire 1
  - China, Japan, Philippines, Thailand : Tier 2 or Tier 3.

  parameters
  - **DOCs:** Most countries use country-specific.
  - **k value:** Japan and Thailand use country-specific
  - **MCFs:** China and Thailand use country specific values.

Accuracy (6B)

◆ Wastewater Handling (6B)

- **CH4**

  Methodology

  – Cambodia, China, Malaysia, Mongolia and Vietnam : Tier 1

  – Japan, Korea, Philippines and Thailand : Tier 2 or CS

  Parameters

  – China and Malaysia use many country specific parameters.

- **N2O**

  Methodology

  – Cambodia, China, Korea, Thailand and Vietnam: Tier 1.

  – Japan and Philippines : Tier 2 or CS

Accuracy (6C)

◆ Waste Incineration (6C)

- **CO2**

  Methodology

  – Mongolia : Tire1

  – Japan and Korea : Tier 2 or CS

  Parameters

  – Japan and Korea : many country specific parameters

- **CH4**

  Methodology

  – China, Mongolia and Thailand : Tier 1

  – Japan : CS

- **N2O**

  Methodology

  – Japan and Korea : Tier 2 or CS

  Parameters

  – Japan and Korea : many country specific parameters

Key Category Analysis

- For most countries
  - CH4 emission from “Solid Waste Disposal on Land (6A)”
- For several countries
  - CH4 emission from “Wastewater Handling (6B)”
  - CO2 emissions from “Waste Incineration (6C)”
- Mongolia, Myanmar and Philippines did not report key category analysis.

			Cambodia	China	India	Indonesia	Japan	Korea	Lao	Malaysia	Mongolia	Myanmar	Philipines	Singapore	Thailand	Vietnam
6A	Solid Waste Disposal	CO2	L				-	-		-	NA	NA	NA		-	
		CH4	L	√			T	T		L	NA	NA	NA		L	L,T
		N2O													-	
6B	Waste Water Handling	CO2													-	
		CH4	L	√			-	-		L	NA	NA	NA		L	T
		N2O	L				-	-		-	NA	NA	NA		-	
6C	Waste incineration	CO2	L				L	L, T		-	NA	NA	NA		-	
		CH4	L				-	-		-	NA	NA	NA		-	
		N2O	L				-	-		-	NA	NA	NA		-	
6D	Other (please specify)	CO2					-	-		-	NA	NA	NA		-	
		CH4					-	-		-	NA	NA	NA		-	
		N2O					-	-		-	NA	NA	NA		-	

L: Key category of level assessment
T: Key category of trend assessment
Q: Key category of qualitative assessment

- Based on the above results, let’s discuss the improvement for our inventory in Waste Sector!

Thank you!

Theme 2
Proposal for the Waste Sector WG in future WGIA;
information sharing for the mitigation actions in waste sector and the inventory improvement

- Topics
  - Progress of Inventory improvement and solution for its problems
  - Mitigation actions as incentive of inventory improvement
- Theme of mitigation actions is an option for agenda of future Waste Sector WG.