Report on WG: Waste

Chair: Dr. Sirintornthep Towprayoon
Reporter: Dr. Masato Yamada
Participants: Mr. HB. Henky Sutanto, Ms. Upik Sitti Aslia, Mr. Hiroshi Fujita, Mr. Khamphone Keodalavong, Mr. Ne Winn, Ms. Raquel Ferraz Villanueva and Mr. Kiyoto Tanabe

7 countries/ organization and 9 participants
Theme one: Wastewater treatment and discharge
Presentations

• Methodology in IPCC’s Guidelines
  by Mr. Kiyoto Tanabe

• Country Report: Philippines
  by Ms. Raquel Ferraz Villanueva

• Country Report: Lao PDR
  by Mr. Khamphone Keodalavong

• Country Report: Indonesia
  by Mr. HB. Henky Sutanto and Ms. Upik Sitti Aslia

• Country Report: Myanmar
  by Mr. Ne Winn

• Country Report: Thailand
  by Dr. Sirintornthep Towprayoon

• Country Reports: Japan
  by Mr. Hiroshi Fujita
Discussion (1): Comparision of wastewater flow in Asia

- **Domestic WW flow**
  - There are 4 types of flow in Asia
    - Untreated to river/sea
    - Septic tank to river/sea
    - Septic tank via sewer collection to river/sea
    - Septic tank through sewer collection to central treatment plant and discharging to river/sea
  - These flows are depend on type of septic tank
  - The flowchart in 2006 guideline is not enough for Asian Countries.
On site Wastewater Treatment

New household and building

- Wastewater from common usage
- Wastewater from kitchen
- Wastewater from toilet

Old household and building

- Wastewater from common usage
- Wastewater from kitchen
- Wastewater from toilet

Flowchart:
- Wastewater from common usage → Oil separator → wastewater treatment system → Sewage
- Wastewater from kitchen → Oil separator → Septic tank → Sewage
- Wastewater from toilet → Septic tank → Sewage

Thailand
WASTEWATER FLOW FOR DOMESTIC WASTEWATER

Philippines

Domestic Households
Davao City

Individual Septic Tanks

Wastewater

Local Sewerage/Canals

Davao Gulf (Open Sea)

Sludge from septic tanks

City Dumpsite
Management flow of Wastewater

Japan

Wastewater treatment facilities / Natural world

Surface-active agent

Industrial wastewater

Pulping waste liquor

Black liquor boiler (energy use)

Domestic and commercial wastewater

Vault toilet

Feces and urine

Septic tank (Tandoku-shori johkasou/Gappei-shori johkasou)

Wastewater treatment facilities for in-plants

Sewage-treatment plant

Human-waste treatment facilities

Application of Sludge to Agricultural Land

Disposal into the sea

Others

Sea, river, lake

Feces and urine

Feces and urine

Feces and urine

Feces and urine

6.B.1

CH₄, N₂O

6.B.2.a

CH₄, N₂O

6.B.2.b

CH₄, N₂O

6.B.2.c

CH₄, N₂O

6.B.2.d

CH₄, N₂O
Discussion (1): Comparison of wastewater flow in Asia

• Domestic WW flow
  - There are 4 types of flow in Asia
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Wastewater treatment system and discharge pathways

Emissions from boxes with bold frames are accounted for in Chapter 6 of Vol. 5.

See also Table 6.1 on CH₄ & N₂O emission potentials. (Page 6.8)
Discussion (2): Comparison of wastewater flow in Asia

- **Industrial WW flow**
  - should depend on type of industry
    - Uncollected & untreated: small factory
    - Organics is mainly contained in WW from Food, Pulp and paper, Chemical, Textile... industries
    - Make attention to fate of sludge.
WASTEWATER FLOW FOR INDUSTRIAL WASTEWATER

BEER MANUFACTURING PLANT

Philippines
Industrial Wastewater Flow

1. Factory
2. Screening
3. Equalization tank
4. Aeration tank
5. Sedimentation tank
6. Polishing pond
7. Belt press filter
8. Fertilizer

Lao PDR
Discussion (3): Other Issues

- **Mixing of Domestic and Industrial WW**
  - is not common in Asian Countries.

- **EF**
  - MCF: less information in Asian countries.
  - We can use 2006 guideline data if they fit to Asian countries.
Theme two: Solid waste disposal on land
Presentations

• Country Reports: Lao PDR
  by Mr. Khamphone Keodalavong
• Country Reports: Indonesia
  by Mr. HB. Henky Sutanto
• Country Reports: Philippines
  by Ms. Raquel Ferraz Villanueva
• Country Reports: Thailand
  by Dr. Sirintornthep Towprayoon
• Country Reports: Japan
  by Dr. Masato Yamada
Discussion (4): Comparison of Solid Waste Stream in Asia

- **2 Waste recycling activities**
  - Separation at Source (or House): almost every country for valuables
  - Material Recovery Facility: some countries (Philippines, Thailand)

- **Access to data on recycling is possible.**

- **Pre-treatment (or waste reduction) technologies in Asian countries are composting and incineration.**

- **Waste stream of each countries is also affected from policy of local municipality, law, society...**
Current MSW flow

Waste generated from sources

Waste stream 1

Valuable waste 1
Collected by tricycle

Waste stream 2

Valuable waste 2
Collected by collectors

Waste stream 3
To landfill

Valuable waste 3
Collected by scavengers
SOLID WASTE STREAM
FROM GENERATION TO DISPOSAL

Segregation at Source
- Recyclables
- Residuals
- Biodegradable

Materials Recovery Facility

COMPOSTING

Segregation at MRF
- Recyclables
- Residuals
- Biodegradable

Sell to Junkshop or Livelihood Products

LANDFILL

COMPOSTING

Philippines
Capital and Industrial Waste Flow

Household and Commercial

Collected

Factor

Landfill

Lao PDR
**Structures of MSW Stream**

**Western Countries**
- **Waste** → **Collection**
- **Separation after collection**
- **Mechanical Separation** + **Aerobic Treatment**
- **Landfill** → **LFG recovery**

“**Mechanical Separation**” should be applicable to waste with low water content.

**Japan**
- **Waste** → **Source Separation**
- **Collection**
- **Paper, Metals, Glass, Plastic**
- **Combustibles** → **Incineration** → **Landfill**
- **Uncombustibles** → **Landfill**

“**Incineration**” has been selected due to sanitation of waste with high water content.

**Asian Countries**
- **Waste** → **Collection** → **Landfill**

“**Resource**” includes organic materials with high water contents for composting.
Discussion (5): Comparison of Solid Waste Stream in Asia and Others

• **Database on mass and quality (or composition) of waste and its continuity is important.**
  - This can be also used for future improvement of management with incineration, RDF, Waste to Energy or so on...
  - Composition will be change due to growing recycling activities.
  - Data acquisition is important. Guideline could be helpful.

• Main co-benefit in improvement of waste management such as waste recycling and energy recovery depends on country’s situation.
<table>
<thead>
<tr>
<th>Residual (Non-Biodegradable)</th>
<th>Biodegradable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tin Foil</td>
<td>Food Leftovers</td>
</tr>
<tr>
<td>Rubber Tires</td>
<td>Leaves</td>
</tr>
<tr>
<td>Broken Ceramics</td>
<td>Vegetable Peelings</td>
</tr>
<tr>
<td>Broken Bottles</td>
<td>Flowers</td>
</tr>
<tr>
<td>Broken Glasses</td>
<td>Roots of Plants</td>
</tr>
<tr>
<td>Cigarette Filters</td>
<td>Banana Stalk</td>
</tr>
<tr>
<td>Hair</td>
<td>Egg Shells</td>
</tr>
<tr>
<td>Straws</td>
<td>Kitchen Waste</td>
</tr>
<tr>
<td>Diapers</td>
<td>Barbeque</td>
</tr>
<tr>
<td>Weight in kilograms = 2.30 kgs.</td>
<td>Animal Waste</td>
</tr>
<tr>
<td>Percentage = 12%</td>
<td>Sticks</td>
</tr>
</tbody>
</table>

Weight in kilograms = 10.40 kgs.
Percentage = 52%

Philippines
Capital and Industrial Waste

• Only 5 major town has was collection systems
• Disposal Method:
  • Disposal at the land field sites
  • Burning in open areas
  • Dumping on selected spots or water body
• Waste Production in urban areas  0.75 kg per capita per day.

Composition of Solid Waste:
• Organic Material (Compost) - 60 %
• Reuse waste (Glass, can...) - 10-15 %
• Recycle Waste (Plastic, Paper, Steel...) - 10-15 %
• Hazardous Waste - 10 %
(Urban and Commercial Waste has the same composition)
Figure 4.6 Type of Solid Waste composition 1991 and 2000
(Source: Department of Public Cleansing, BMA, 2000)
Composition of MSW (for combustible waste)

- Are plastics included in combustible waste?
  - No
  - Yes

Wet basis in around 1999:
- Japan
  - 46.3%
  - 38.1%
  - 26.6%
  - 31.3%
  - 36.2%
  - 40.6%
  - 25.8%
  - 37.3%
  - 52.5%
  - 39.6%
  - 33.3%
  - 36.9%
Discussion (5): Comparison of Solid Waste Stream in Asia and Others

• Database on mass and quality (or composition) of waste and its continuity is important.
  - This can be also used for future improvement of management with incineration, RDF, Waste to Energy or so on…
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• Main co-benefit in improvement of waste management such as waste recycling and energy recovery depends on country’s situation.
Co-benefit in Waste Stream Management

Future economic development will change the level of applicable technologies.

Stepwise Introducing of Scheme/Technology appropriate to Host Courtiers

Real and substantial merit for developing countries are;

Win-Win Situation

Disposal Mass

Disposal Hazardous Materials

Load to water and air

GHGs Emission

Source Separation

Resource Recovery Plant

Base Line

Final Disposal Technology

Investment / Cost

Sustainability of System

Resource Recovery Scheme

Generation

Mixed MSW

Unauthorized Collector

Resource

Including Organics

Landfill

Appropriate Treatment Technology

Final Disposal Technology
Thank you for your attention