Promotion of Sound Material-Cycle Society (SMC) and 3R Initiative in Japan and Asia

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Outline of the Presentation

- Issue of Solid Waste Management in Asia
- Development of legal and policy framework for establishing a Sound Material-Cycle Society in Japan
- Best practices in achieving Sound Material-Cycle Society at local level.
  - Yokohama
  - Nagoya
  - Kitakyushu
  - Minamata
  - Okitown
- Application of Japanese Experiences in Other Cities in Asia: A Case Study of Kitakyushu’s Involvement in Surabaya City, Indonesia
- Discussion/Lessons Learned
ISSUE OF SOLID WASTE MANAGEMENT IN ASIA
Increase of Waste in Asia

The growing economy associated with the rapid population growth in Asia has resulted in a remarkable increase in waste volume. Economic advancements have influenced lifestyles and consumer behaviour, thereby diversifying the types of waste that are produced in massive volume.

From 24% (2000), 28% (2025) to 32% (2050)
Environmental Degradation Due to Rapid Growth in Resource Use

It is critical to create sustainable patterns of production and consumption.

Source: MOE, Japan, 2005
Why Municipal Solid Waste (MSW) Management is a matter in Asia?

Conventional approach for MSW Management in Asian Cities

Generation of MSW

MSW is collected by municipalities

MSW is disposed in unmanaged dumpsite

Over 50% of MSW is organic matters

Use 20%-50% of annual budget for waste management, however, 30%-60% of waste remain uncollected

Results for serious local, regional and global public and environmental health nuisances
Promotion of SMC Society and 3R

1. **Priority 1**: *Generation reduction* (Reduce)
2. **Priority 2**: *Repeated use* (Reuse)
3. **Priority 3**: *Utilization by regeneration* (Recycling)
4. **Priority 4**: *Thermal recovery*
5. **Priority 5**: *Appropriate disposal*

Flowchart:
- **Natural resources input**
  - Austere consumption of natural resources
- **Production** (Manufacturing, distribution, etc.)
- **Consumption**
- **Discarding**
- **Treatment** (Recycling, incineration, etc.)
- **Final disposal** (landfill)

A society in which appropriate 3Rs and disposal reduce natural resource consumption, resulting in a lower environmental load.

DEVELOPMENT OF LEGAL AND POLICY FRAMEWORK FOR SMC AND 3R SOCIETY IN JAPAN
Development of Laws and Policies related to SWM in Japan

A system of recycling society was existed in the Edo Period (1603-1868). Policies designed to maintain and improve public hygiene began in the 1950s. In the 1960s, damage to human health by severe industrial pollution became social issues. In response, efforts began in the 1970s for environmental conservation. Since 2000, full-scale efforts are taken to establish a sound material-cycle society.
<table>
<thead>
<tr>
<th>Post WWII 1950s</th>
<th>History of Japan’s Legislative Framework for Sound Material-Cycle society</th>
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<td>Post WWII 1950s</td>
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<tr>
<td>1960s ~1970s</td>
<td>· Clear increase of industrial waste etc., and &quot;Environmental Pollution&quot; with the high Economic Growth</td>
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<td>Basic Law for Environmental Pollution Control (1967)</td>
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<td>Waste Management Law (1970)</td>
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<td>Amended Waste Management Law (1976)</td>
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<td>1980s</td>
<td>· Promotion of the development of facilities for waste management</td>
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<td>· Environmental Protection on Waste Management</td>
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<td>Law for Bay Area Marine and Environment Consolidation Centers (1981)</td>
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<td>Septic Tank Law (1983)</td>
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<tr>
<td>1990s</td>
<td>· Reduce/Recycle of Waste</td>
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<td></td>
<td>· Establishment of Recycling Laws</td>
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<td></td>
<td>· Measures against hazardous materials (inc. Dioxins)</td>
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<td>· Appropriate waste management depends on the diversity of the types/properties of wastes</td>
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<td>Amended Waste Management Law (1991)</td>
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<td>Law to Promote the Development of Specified Facilities for the Disposal of Industrial Waste (1992)</td>
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<td>Fundamental Environmental Law (1993)</td>
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<td>Amended Waste Management Law (1997)</td>
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<td>Law Concerning Special Measures against Dioxins (1999)</td>
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<tr>
<td>2000 ~</td>
<td>· Promotion of 3R towards the establishment of a Sound Material-Cycle Society</td>
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<td></td>
<td>· strengthen the measures for industrial waste management</td>
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<td></td>
<td>· Strengthen measures against illegal dumping</td>
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<td></td>
<td>Amended Waste Management Law (2000)</td>
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<td></td>
<td>Law Concerning Special Measures Against PCB Waste (2001)</td>
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Source: Yatsu, R, 2010
Dwindling Landfill Capacity and Increasing Waste Management Costs in Japan

The increased amount of municipal waste caused a shortage of landfill sites while the cost of municipal waste collection, transportation, treatment and disposal sharply increased.

Source: MOE, Japan, 2005
The Fundamental Law for Establishing a Sound Material-Cycle Society was enacted in 2000. Within this basic framework, the Law for Promotion of Effective Utilization of Resources has been introduced to cover the production stage along with various laws regulating the collection and recycling stage in correspondence with the specific characteristics of individual products or goods. The Law on Promoting Green Purchasing has been enforced to facilitate the purchasing environmentally friendly products.

### The Basic Environment Law
- Thorough enforcement in August 1994

### Basic Environment Plan
- Thorough amendments and announcement in April 2006
  - Securing of material circulation in society
  - Reducing of natural resource consumption
  - Reducing of environmental loads

### Basic Law for Establishing the Recycling-Based Society (the Basic Framework Law)
- Thorough enforcement in January 2001

### Fundamental Plan for Establishing a Sound Material-Cycle Society:
- Bases for central government’s other plans
  - Announcement in March 2003
  - Amendment in March 2008

### Waste Disposal and Public Cleaning Law
- Partial amendment in February 2006
  - 1) Reduction of waste generation
  - 2) Proper treatment of wastes (including recycling)
  - 3) Regulation on installation of waste treatment facilities
  - 4) Regulation on waste service companies
  - 5) Establishment, etc. of waste treatment standards, etc.

### Law for Promotion of Effective Utilization of Resources
- Thorough amendment and enforcement in April 2001
  1) Recycling of recyclable resources
  2) Application of structures and materials, etc. that facilitate recycling
  3) Indication for sorted recovery
  4) Promotion of effective use of byproducts
  - Reduce
  - Reuse
  - Recycle

### Regulation suited to character of individual product

| Law for Promotion of Sorted Collection and Recycling of Containers and Packaging |
| Law for Recycling of Specified Kinds of Home Appliances |
| Law on Recycling Food Wastes |
| Law Concerning Recycling of Materials for Construction Works |
| End-of-Life Vehicles Recycling Law

- Bottles, PET bottles, paper and plastic packages, etc.
- Air conditioners, refrigerators, freezer, TV, washing machines, and closing dryers
- Food waste
- Wood, concrete, asphalt
- Automobiles

### Law Concerning the Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities (the central government taking initiatives in procurement of recycled products)
- Thorough enforcement in April 2001

Source: MOE, Japan, 2005

Source: Yatsu, R, 2010
Planned Actions for a Sound Material-Cycle Society


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**Macro indicators to monitor the progress**

- Institution for coordination and monitoring

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**Council on Promotion of Establishing a Sound Material-Cycle Society**

(Collaboration among the central and local governments beginning with the conceptual stage)

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**Local Plans on Promotion of Establishing a Sound Material-Cycle Society**

- Implementing bodies: Municipalities with a certain population or greater
- Targets: Reduction (generation of waste per capita), recycling rate, amount of final disposal
- Policy packages: Development of facilities for material and thermal recycling and final disposal etc.

(With the central government providing grants for part of the project costs)

Source: MOE, Japan, 2005
Target Achieved for the Material Flow Index

*Inlet*: Resource Productivity
- 361,000 yen/ton (2007)
- 420,000 yen/ton (Goal)
- 263,000 yen/ton (2000)

*Cycle*: Recycling Rate
- 13.5% (2007)
- 14 to 15% (Goal)
- 10.0% (2000)

*Outlet*: Final Disposal Volume
- 27 million tons (2007)
- 23 million tons (Goal)
- 57 million tons (2000)

*Source*: MOE, Japan, 2010

*Resource Productivity*: GDP divided by input of natural resources, etc.

*Recycling Rate*: Recycling amount divided by recycling amount + input of natural resources, etc.
Changes to total waste generation and daily waste per person

Note: Total volume of waste generated = Designed collection volume + Volume of waste directly brought in + Volume of group collection of recyclable waste

Source: Ministry of the Environment
Changes of the Operating Expenses for Waste Processing in Japan

Source: MOE, Japan, 2010
BEST PRACTICES IN ESTABLISHING SOUND MATERIAL-CYCLE SOCIETY AT LOCAL LEVEL IN JAPAN
Waste Reduction and Recycling in Yokohama City - 1

The largest city in Japan after Tokyo with the total population of 3.65 million (2009) launched the “G30” Action Plan aiming to achieve the 30% waste reduction by 2010 compared to 2001, because increase in waste generation, diminishing availability of final disposal site and high cost for incineration.

Introduced the new waste separation and collection system (from 7 items in 5 categories to 15 items in 10 categories)

Public Awareness campaign (11,000 seminars covering 80% population, 470 campaigns in railway stations, and 2,200 campaigns in waste collection stations)

Model recycling projects in 57 elementary schools

Source: Yokohama City
Photo: Yokohama City
Waste Reduction and Recycling in Yokohama City - 2

Achieved waste reduction by 42% in 2009

Achieved economic benefits
- US$1.1 billion in capital costs saved because of two incinerator closures
- US$6 million in operating costs saved because of two incinerator closures
- Life of landfill sites was extended

Established a strong partnership among key stakeholders

Source: Yokohama City

Photo: Yokohama City

<table>
<thead>
<tr>
<th>Citizens</th>
<th>Businesses</th>
<th>Government</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing to an environmentally friendly lifestyle, rigorous sorting of garbage, etc.</td>
<td>Design and production of products which reduce the emission of waste, collection and recycling of used products, etc.</td>
<td>Creation of systems for 3Rs, raising the awareness of people, provision and exchange of information, etc.</td>
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</tbody>
</table>
Waste Revolution in Nagoya City - 1

Nagoya City, a major industrial city located in Central Japan with population of 2.2 million declared the waste management state of emergency in 1999, because of citizen protection to proposed new landfill site and requested citizen support for 20% waste reduction by 2 years

Introduction of a new waste separation and collection system

More than 2,300 public meetings and seminars were held throughout the city for introducing the new waste management system to its citizen

Community-based organizations played a key role in organizing waste sorting centers

Promoted eco-coupon campaign with shops

Source: Nagoya City

Photo: Nagoya City
Waste Revolution in Nagoya City - 2

Achieved 30% waste reduction within 6 years and increased recyclable waste collection by 2.6 times.

Established a social system for promoting environmentally friendly lifestyles.

An area selected for new landfill site turned into internationally recognized wetland in Japan.

Source: Nagoya City

Photo: Aichi, Nagoya
Solid Waste Management in Kitakyushu City - 1

The largest city in Kyushu after Fukuoka City with a population about 1 million (2010) drafted its master plan for establishing the material-cycle society in 2001, because of policy requirement.

- Started the segregation and collection of cans and glass
- Introduced a waste collection fee system through designated rubbish bag system
- Introduced composting at household
- Established an eco-town center for generating new business opportunity from waste recycling
- 3,000 community awareness meetings were organized for introducing the new waste management system

Source: Kitakyushu City
Photo: Kitakyushu City
Solid Waste Management in Kitakyushu City - 2

Achieved 27% waste reduction and extended lifetime of the landfill site

Saved waste management cost by 10%

Established new recycling business ventures

Source: Kitakyushu City
Photo: Kitakyushu City
Establishing a Zero-Waste Society in Minamata City - 1

A small city located in the southern part of Kumamoto Prefecture has a population of 27,000 people (2010) faced some challenges in managing the municipal solid waste after the explosion at the bulk-waste crushing plant in 1992 due to the mixing of propane gas cylinders with other garbage.

Established a vision of becoming an environmental model city in Japan and introduced new waste separation and collection system (from 2 categories to 23)

More than 300 public meetings were organized along with public campaigns in TV, Radio and Newspapers to share information on new waste separation and collection system to the residents

There are 300 stations managed by community members for collection of recyclable materials

Eco-Town center was established in 2001 for promoting recycling business enterprises

The Women’s Network for Waste Reduction was established to raise awareness on environmentally friendly lifestyles and promotion of self-monitored ISO

Source: Minamata City

Photo: Minamata City
Establishing a Zero-Waste Society in Minamata City - 2

Achieved waste reduction by nearly 50% to be incinerated and material recycling by 35%

The total cost for waste management has increased simultaneously with the city’s efforts to increase the recycling ratio and the construction of new incineration facility.

Created space for community learning and social capital building.

Community earned over 100 million yen from recycling materials and used for improving their environment.

Created new lifestyles towards living at one with environment.

Source: Minamata City
Creating a Recycling-based Society in Oki Town - 1

A small agricultural town located in Fukuoka Prefecture has a population of 14,500 people (2010) identified solid waste management as an environmental issue in 1995, due to insufficient capacity in treatment plants, high operational cost, and negative environmental impacts.

Making a vision (Okimachi Mottainai Declaration) with active citizen participation

Organized community awareness programme to educate people about new waste separation and collection system

Established biogas system for kitchen waste, human waste and septic tank sludge

Introduced new waste separation and collection system (21 categories at source)

Started to collect kitchen waste separately
Creating a Recycling-based Society in Oki Town - 2

Achieved total waste to be incinerated by 44% within 4 years

Reduced waste management cost by 20% within 4 years

Established a new social system and lifestyles

New market for local farmers

Generated renewable energy, 700kw/h

Source: Oki Town

Photo: Oki Town
APPLICATION OF JAPANESE EXPERIENCES IN OTHER CITIES IN ASIA: A CASE OF SURABAYA CITY
The city of 3 million people (2010) is the second largest city in Indonesia and serves as an important commercial and industrial capital of East Java.

Source: Ema, 2011
SWM became a serious environmental issue in Surabaya

- The total waste generation was 1,800 tons per day in 2004 (residential 68%, markets 16%. Commercial/industrial 11%, streets and open spaces 5%)
- The city’s waste collection coverage only 70% rest left in the streets, ditches and open spaces
- Keputih final disposal site was closed in 2001 due to public opposition and only final site at Benowa is over capacity and finding a new site is difficult due to a scarcity of public lands
- Disposal site was not well developed and open dumping and burning were common practices
Model Community in Kampong Rungkut Lor developed under the technical cooperation of Kitakyushu City, Japan

Educated residents to separate waste at source and use of compost bin

Collected H/H waste separately

Organic waste treated at composting center

Educated residents to start organic farming at H/H and community

Educated women to start H/H business from recycling materials

Model community for community based SWM (200 H/H)

Rest sell in Market
Development of SWM Strategy based on the success of model community under the strong political support of the Mayor

Organic waste shares more than half of total amount of waste generation

Prioratise reduction of organic waste 10% within 3 years (baseline to 2005)

Promote separated waste collection and recycling at neighbourhood level

- Waste sorting at source
- Composting at H/H
- Composting centers
- Promote recycled products integrating informal sector

Recruitment of Facilitators and training of Environmental Leaders (Cadres) for community mobilisation

Number of Community Facilitators

- **2005**: 10
- **2006**: 50
- **2007**: 100
- **2008**: 300
- **2009**: 500
- **2010**: 600

Number of Environmental Leaders (Cadres)

- **2005**: 1
- **2006**: 5
- **2007**: 10
- **2008**: 25
- **2009**: 50
- **2010**: 100

**Source:**
- Ema, 2011
- Rismaharini, 2011

**Developed materials for awareness raising:***

- Waste segregation training
- Organic-inorganic waste sorting
- Recycling trainings
- Manufacturing bags from waste
- Compost basket use
- Turn waste into blessing
- Environmental Event

**Program:** Waste Segregation & Treatment = Reduce 96%
- Organic: 70%
- Inorganic: 26%
- 10-20 rumah
- Penghijauan
- Tanaman obat keluarga
- Inorganic waste collection
- Transported to TDS and processed with communal composter
Introduced a public awareness campaign covering all sectors in the city

Counseling activities
- Counseling to student
- Counseling to Businessman
- Counseling to community
- Counseling to officer

Environmental campaign

Socialization in school

Source: Ema, 2011
Established a supportive system for promoting composting programmes

Distribution of compost bins to attended to training and willing to do residents (Over 20,000 H/H)

Provide necessary support for starting community composting centres: cleansing tools, composting tools, lands and capital cost for building, and buying composting products for city greening

Source: Rismaharini, 2011
Established Composting facilities in the City
(16 composting centers operate to treat 110 tonnes of organic waste in the city)

Source: Ema, 2011
Promotion of Recycled Product Village integrating informal businesses with private sector

Source: Rismaharini, 2011
Established both rewarding and law enforcements for motivating community to participate

- Rewards are given to the communities willing to participate through Surabaya Green and Clean Programme
- Rewards are given to Outstanding Environmental Leaders at the National Day Awarding Ceremony

Number of communities willing to contest to Surabaya Green and Clean Award has been increased

Source: Ema, 2011

Strict in law enforcement to the communities not properly handle the SWM
Capacity building for the Staff and Local Politicians

Capacity building (locally and internationally) for staff and local politicians

Recognition of its efforts at national and international level

Source: ema, 2011
Achievement: Reduction of waste to be final dumped

30% waste reduction to be land filled by 5 years

Enhanced recycling by removing organic matters from the waste stream (78% of waste reduction from recycling materials)

Source: Ema, 2011
30% waste reduction using limited municipal budget

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<tr>
<th>NO</th>
<th>BUDGET</th>
<th>BUDGET</th>
<th>NOTES</th>
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<tr>
<td></td>
<td>2009</td>
<td>%</td>
<td>2010</td>
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<tr>
<td>1.</td>
<td>Total budget</td>
<td>4,364,366.780</td>
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<td>2.</td>
<td>Environmental budget</td>
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<td>Sea, Fishery and Farming Development Program</td>
<td>35,334,13</td>
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<td>Environmen t Control and Conservation Program</td>
<td>11,430.786</td>
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<td></td>
<td>Green Open Space and City Park Program</td>
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<td>City Cleanliness Management Program</td>
<td>118,486.9</td>
<td>2.7</td>
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Only 1-2% of Cleaning and Landscape Department Budget is used for composting

Source: Maeda, 2010; Ema, 2011
Developed partnership and collaboration with different stakeholders

Expansion of Surabaya’s experiences in other cities by IGES in collaboration with other partners (Kitakyushu city, KITA and JICA, Kyushu) through the KitaQ System Composting Network.
DISCUSSION AND CONCLUSION
Moving towards establishing a SMC and 3R society

Conventional practice of SWM in cities

New initiatives for creating SMC society

How to achieve this shift in your city?
Key Lessons can be Learned from case studies

- Changes are happened either as a result of a certain demand for improved MSW management services or as a national/local policy requirement.
- A strong leadership and commitment of the local government (both political and administration) is helpful in initiating changes.
- A joint vision and strategic action plan with simple, easy to measure indicators, which are generated through active involvement of key stakeholders, including local authority, civil society, business sector (formal and informal) and academics are essential, not only to facilitate the process, but also to measure and manage the progress.
No one size fits, single strategy to manage the solid waste in the cities. Only by integrating different strategies which are meet to the local condition, cities can overcome the SWM issues.

A strategies which can be found commonly:

- Establish a separated waste collection system and extend the collection coverage
- Promotion of composting at household, community or city-scale for recycling organic waste
- Establish a material recovery facility/ waste bank to convert recyclable materials into resources, integrating informal sector
- Improve the final dumpsite from open dumping to sanitary landfill
- Raise citizens awareness on new SWM system.
- Establish an incentive systems (awards, point-card, pay for service etc) for motivating community participation for waste reduction and recycling
- Promote partnership among different stakeholders in the city, while facilitating their own innovative activities.
Key Lessons can be Learned from case studies - 3

- Establish new institutions (citizen committee etc) and planning tools (community planning/ participatory planning etc.) to facilitate continuous communication and enabling environment among stakeholders is important.

- Local resources should be promoted and made available through public and private partnership, while part of capital financing is received from national and international assistance programmes.

- International institutions can provide capacity building opportunities, information sharing, building networks, and providing technical know-how and development assistance.
Thank you for your kind listening.
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