



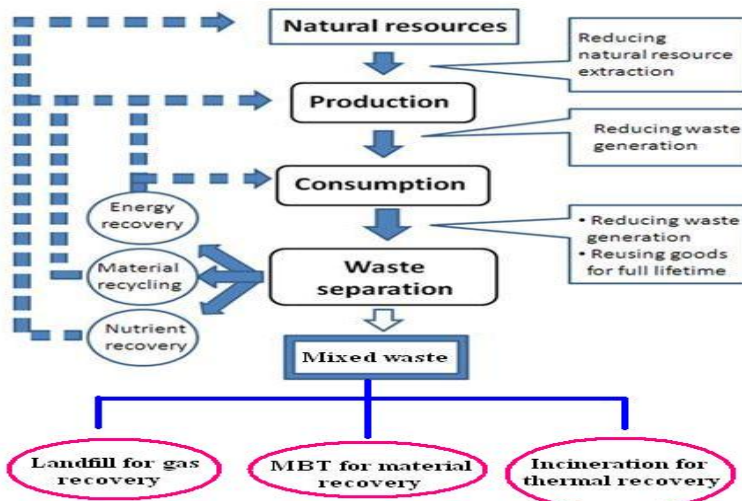
Existing efforts and lessons learned
**Japan's MSW Recycling Policy and a
 Climate Friendly Waste Management
 Practice for Developing Asian Countries**

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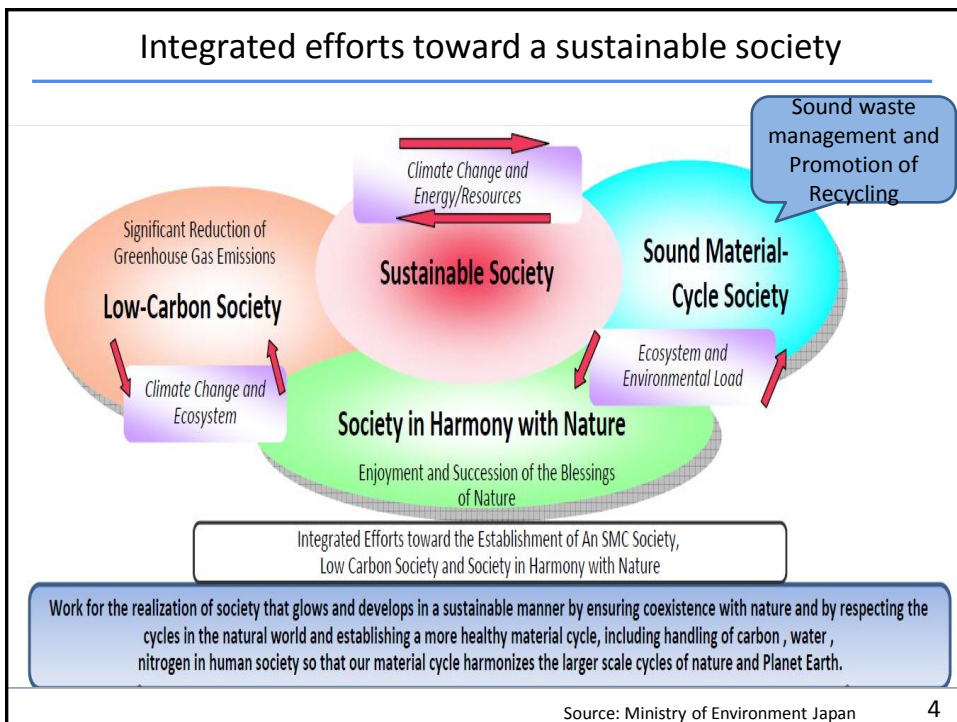
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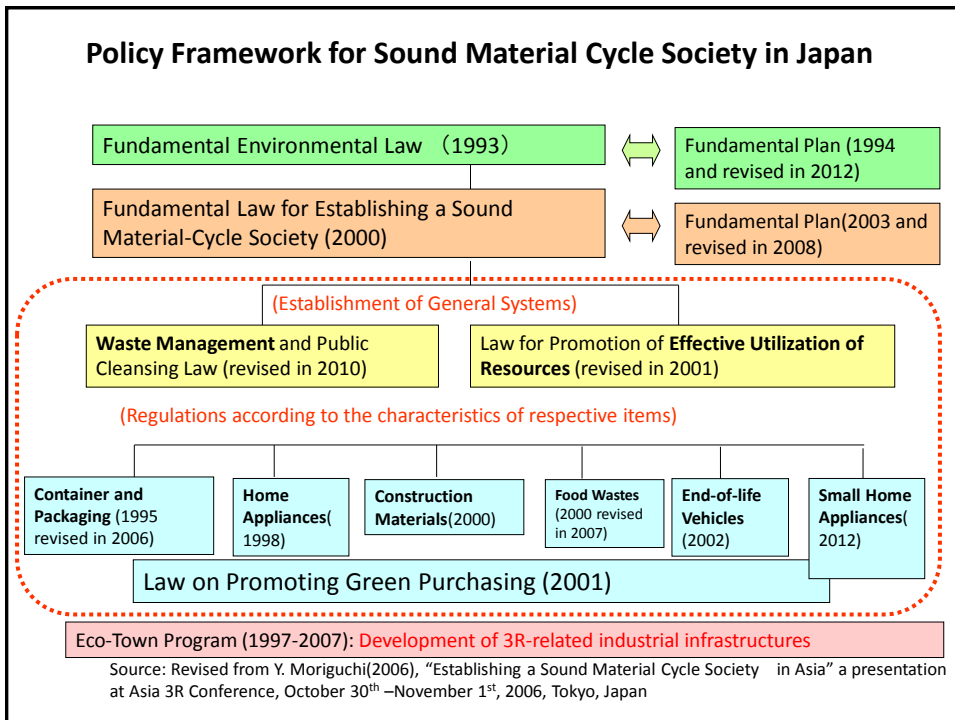


How can the 3Rs reduce GHG emissions and enhance resource efficiency?



1. Japan's MSW Management and Recycling Policy



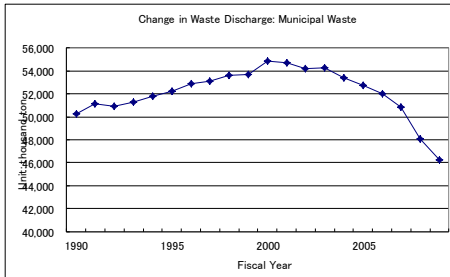


Japanese local experience to promote the 3Rs

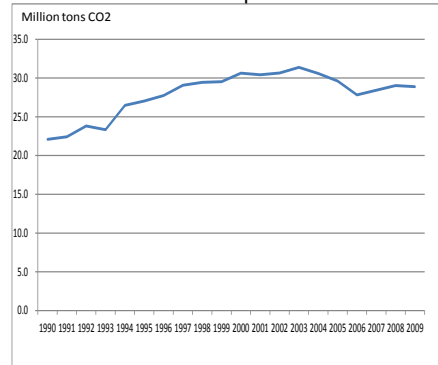
- The facilities and regulatory framework should be designed and established according to the delicate balance between the additional costs required for source separation and the benefits of waste reduction .
- A thorough explanation by city officials to residents is crucial.
- Strong leadership by the mayor or other political leaders is effective.
- Recycling methods should be selected in accordance with the composition and nature of the city's municipal waste.
- National legislation and a regulatory framework to provide the basis for municipal efforts are important.

Municipal Waste Generation and GHG Emissions from Waste Sector in Japan (1990-2009)

Municipal Waste Generation in Japan



Change in GHG Emissions from Waste Sector in Japan

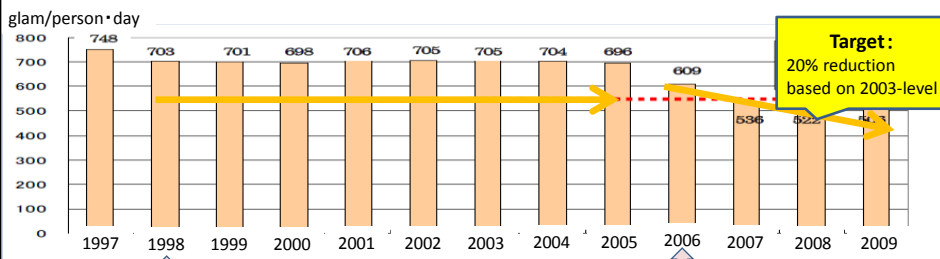


Source: Environmental Statistics of Japan 2011

Experiences in Kitakyushu city, Japan

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

Saved waste management cost by **10%**

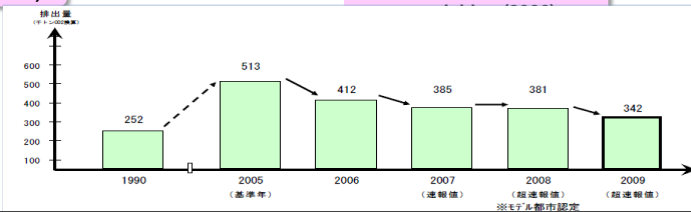


Enforcement of pricing bags (1998)

Raising the bag price & pricing bags for

Source: Kitakyushu City

GHG Emission from Waste Sector in Kitakyushu

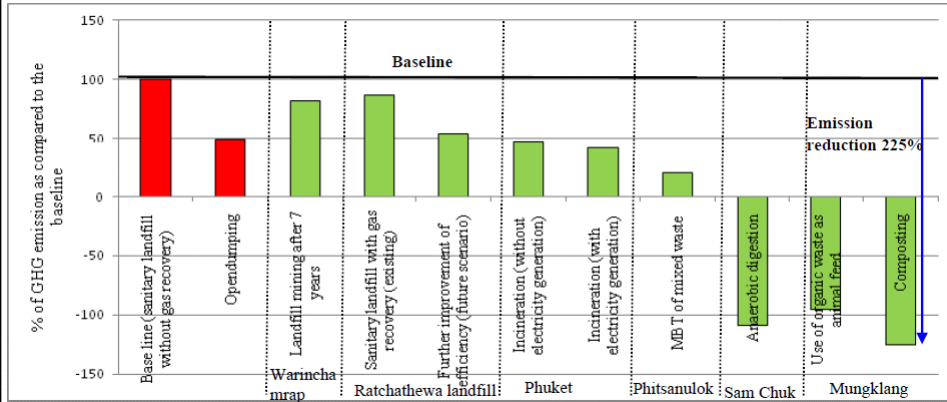


2. Climate Friendly Waste Management Practice for Developing Asian Countries

IGES's contribution to Japan's initiatives to promote 3Rs implementation for resource efficiency and climate change mitigation in developing Asia

1. Supporting the National 3R Strategy development in 6 countries: Bangladesh, Cambodia, Indonesia, Philippines, Thailand, Viet Nam.
2. Collaborating with Viet Nam and Malaysian government to develop 3R programme and organic waste management policies.
3. Organizing capacity building workshops on solid waste management and climate change mitigation in 3 countries: Cambodia, Lao PDR, Thailand
4. Conducting a comparative analysis of waste treatment technologies to identify the most climate friendly waste management for developing countries: case study of Thailand
5. Developing a GHG emission estimation model based on excel to facilitate GHG emission estimation by local authorities.
6. Implementing pilot project to promote organic waste separation at source for composting for climate change mitigation in Cambodia (with collaboration with Phitsanulok Municipality of Thailand)

GHG emissions from SWM in Thailand- LCA perspective



Baseline for mixed waste management is sanitary landfilling of mixed waste without gas recovery.
The baseline of organic waste utilisation is sanitary landfilling of organic waste without gas recovery

GHG emissions from material recycling in Thailand- LCA perspective

Type of recyclables	GHG emissions from recycling ¹ (A)	GHG emissions avoidance from virgin process ¹ (B)	GHG emissions avoidance from sanitary landfill (C)	Net emissions from recycling (D) = (A)-(B)-(C)
Unit : (tCO ₂ -eq/tonne of waste)				
Paper	1.27	0.97	2.38	-2.08
Plastic	2.15	1.90	0	0.25
Aluminium	0.39	12.47	0	-12.08
Steel	1.10	2.95	0	-1.85
Glass	0.57	1.03	0	-0.46

Source: ¹Menikpura, 2011

Potential methane emissions from anaerobic digestion system and composting

Direct emissions reduction

- 20-98% reduction by composting and 60-100% by anaerobic digestion of food waste (compared to landfill).

IPCC Default Values

Treatment	Methane emissions (gCH ₄ /kg waste treated)		Nitrous oxide emissions (gN ₂ O/kg waste treated)		Remarks
	Dry weight	Wet weight	Dry weight	Wet weight	
Composting	10 (0.08 – 20)	4 (0.03-8)	0.06 (0.2-1.6)	0.3 (0.06 – 0.6)	- 25-50% degradable organic carbon and 2% nitrogen - 60% moisture content
Anaerobic digestion	2 (0 – 20)	1 (0 – 8)	Assumed negligible	Assumed negligible	

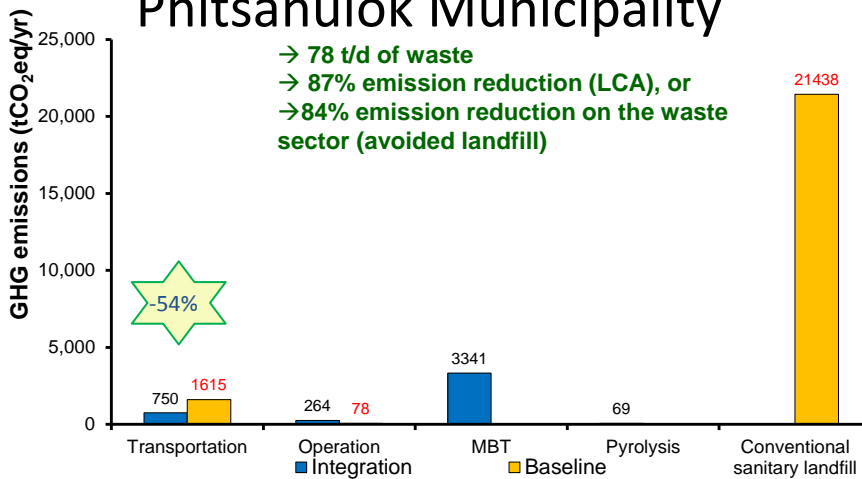
Note: Numerical value in bracket refers to ranges of potential emissions.

http://enviroscope.iges.or.jp/modules/envirolib/upload/3263/attach/Janya_Practical_Guide%28final%29_web_edition.pdf

Best practice on SWM and climate change mitigation in Thailand: Phitsanulok Municipality

- Public participation → Community based management
 - Residents separated recyclables for sale
 - Residents conduct household and community organic waste management
 - Composting, anaerobic digestion, animal feed
 - Municipality applies the Mechanical Biological Treatment (MBT) prior to landfill disposal
 - Municipality uses of NGV to minimise cost of fuel consumption
 - Municipality introduces the Polluter Pay Principle

GHG emissions from integrated waste management system in Phitsanulok Municipality



Recommendations

- **3Rs (reduce, reuse, recycle)** is a climate friendly waste management policy that should be adopted for National Solid Waste Management Plan, Nationally Appropriate Mitigation Actions (NAMAs), the 3R law, etc.
- Some municipalities practice 3Rs for minimising the waste to final disposal site, however most municipalities do not understand the linkage of the 3Rs and global warming. Therefore, **capacity building and awareness raising** are important to achieve the GHG emission reduction goal.
- In addition, **subsidies to landfill development should be minimised**. Otherwise the 3Rs would not be integrated to the project.