Institute for Global Environmental Strategies
Sustainable Consumption and Production Group

Introduction of solid waste management and climate change

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Sustainable Consumption and Production Group
Institute for Global Environmental Strategies (IGES)

IGES SCP Group
Waste and climate change

About Institute for Global Environmental Strategies

- Established in 1998 as an international environmental think-tank in Japan.
- HQ in Hayama, Japan. Satellite offices in Tokyo, Kitakyushu, Kobe, Bangkok, and Beijing
- Conducts policy research in response to global environmental challenges.
- Three thematic group: Climate Change (including Market Mechanism), Natural Resource Management, and Sustainable Consumption and Production.
- Four cross-cutting issue group: Environment and Economics, Governance and Capacity Development, Business and Environment, Local Governmental Initiative
- Inter-governmental programme (IPCC/TSU, APN.)

Presentation outline

- GHG Emissions from waste management
- Climate benefits from 3R approach
- CDM
- Conclusion

Solid waste management in Laos

- Open dumping and burning are common practices in Laos.
- Most of the disposal sites are not well developed.
- These practices can lead to environmental and health impacts on local residents, release GHGs to atmosphere and discourage efficient use of resources

Source of GHG emissions from solid waste management

1) Methane gas emissions from landfills of organic waste

2) Emissions of carbon dioxide from burning of plastic waste and other wastes (If incineration is used for energy purpose then the emissions of CO_2 of fossil origin are included in Energy sector. However, CO_2 emissions (fossil origin) from incineration of waste without energy recovery are included in Waste sector.)

3) Energy used for collection, recycling and others are also source of GHG. And agricultural waste is categorized in emissions from agricultural, forestry and other land use

Waste composition in GMS countries

Country	Food	Paper	Plastic	Metals	Glass	Others
Cambodia	66	3	14	1	1	15
China	50	15	10	3	3	19
Lao PDR	60		15		15	10
Thailand	64	8	17	2	3	6
Viet Nam	49	2	16	6	7	20

GHG emissions from landfills of organic waste in GMS countries

Country	GHG emissions in Million ton CO2 equivalent/year		
	1994	2000	Present*
China	42.6		45.4 – 113.4
Viet Nam	1.39	5.60	3.0 - 7.4
Thailand	0.41	4.89	5.3 - 13.5
Lao PDR	0.24**		No data
Cambodia	0.124		0.12 – 0.34
Myanmar	No data		No data

Note: * Present estimation is based on waste generation and composition that we could obtained through secondary source of data. Lower value represents potential emissions from landfills of food and paper in shallow-unmanaged landfill and the higher value represents its emissions from deep-well managed landfills.

** 1990

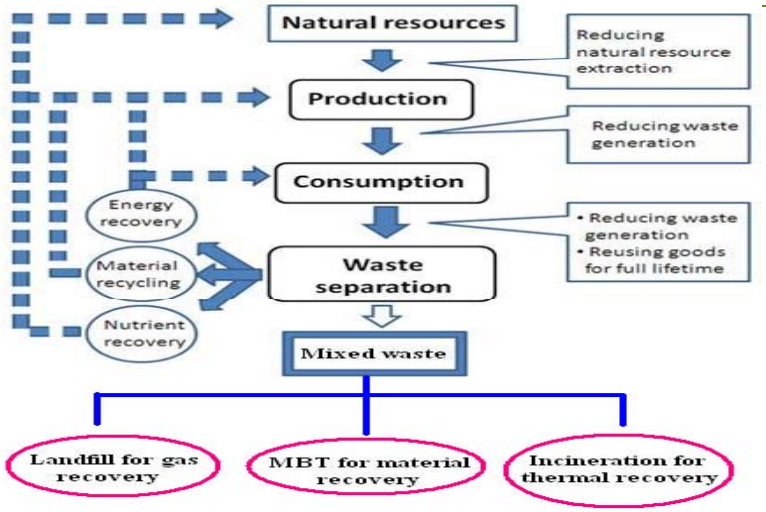
How to improve solid waste management in Laos with co-benefits on climate change and resource efficiency?

- Reducing waste generation by promoting waste minimization, reuse and recycle
- Enhancing organic waste separation for utilization (e.g. animal feed, composting, anaerobic digestion)
- Avoiding burning of plastic waste by establishing waste recycling business

Reduce waste flow to disposal site

Reduce cost for waste collection and disposal, reduce environmental impact, avoid GHG emissions, etc

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



Climate benefits of 3Rs in various sectors

Sectors	Climate co-benefits
Waste	- Reduced methane emissions from landfill - Reduced carbon dioxide emissions from burning of plastics
Energy and transport	- Reduced emissions from energy use in the process of resource extraction, agriculture, good production and distribution, and waste transportation and treatment - Reduced emissions from fossil fuels by using energy recovered from waste
Industry	- Reduced emissions from industrial processes by reducing product demand - Reduced emissions from chemical fertilizer production
Agriculture	- Avoided nitrous oxide emissions from farmland by reducing use of chemical fertilizer - Increased soil carbon sequestration
Land use change and forestry	- Reduced emissions from mining and deforestation

How much can 3Rs reduce GHG emissions?

- **Direct emissions from SWM**
  - 20-98% reduction by composting and 60-100% by anaerobic digestion of food waste (compared to landfill).
- **Indirect GHG reductions**
  - 94% by recycling of plastic.
  - 80% by recycling of steel.
  - 56-64% by using 50% recycled aluminum.
  - 22% by increasing use of recycled glass from 25% to 59%.

National climate change action plan and 3Rs

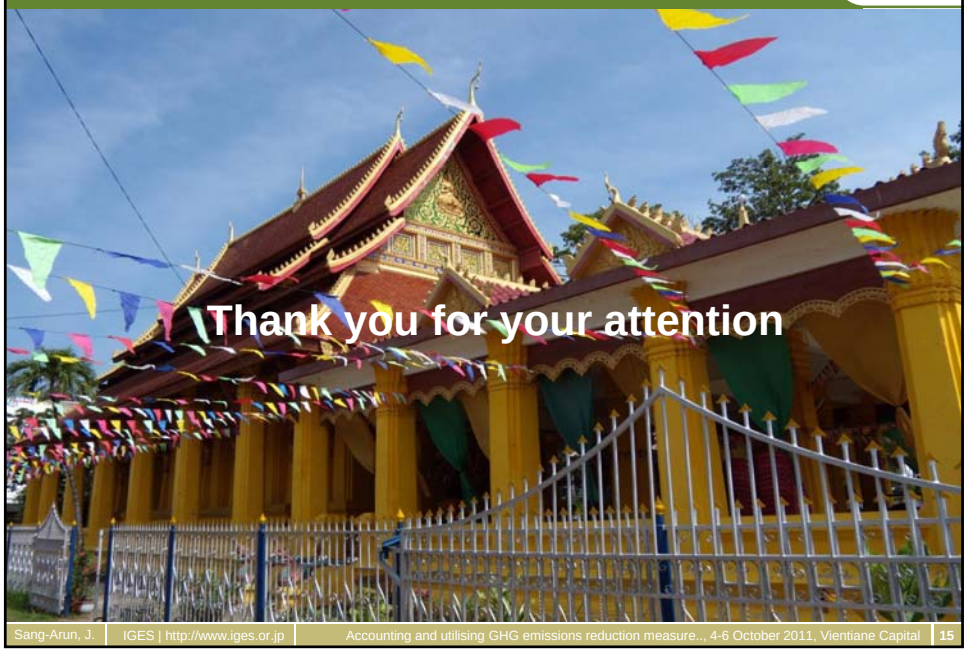
Country	Mention of the waste sector	Mention of 3Rs	Source
China	Yes	Yes	NCCCC, 2007
Thailand	Yes	Yes	ONEP, 2008
Cambodia	No	No	MOE, 2002
Lao PDR	No	No	STEA, 2000
Viet Nam	No	No	MNRE, 1999

Clean Development Mechanism and urban waste management

- CDM is an alternative financial source, but its procedure is time consuming and requires many specific data input. Also, it is one-time/project-specific.
- Projects that have been registered to CDM
  - Composting
  - Anaerobic digestion
  - Landfill gas recovery
  - Landfill gas flaring
  - Controlled combustion
  - Refuse derived fuel (RDF)
- Market mechanism for Post 2012 is not fixed yet.

Conclusions

- GHG emissions from the waste sector in Laos is increasing.
- 3Rs is an approach to achieve sustainable solid waste management because it could enhance resource efficiency and also avoid greenhouse gas emissions.
- National government should emphasize the 3Rs as a climate change mitigation measure, as it could contribute to GHG emission reduction from various sectors.
- There is possibility that waste utilization projects can receive additional financial revenue through carbon markets (e.g., the CDM, NAMA). However, the priority for solid waste management should be given to proper waste management and utilization of resources.


Thank you for your attention