Towards Holistic Waste Management in Asia Pacific: Multi-stakeholder Impact

Agamuthu P.
Institute of Biological Sciences,
Faculty of Science, University of Malaya, 50603 Kuala Lumpur, Malaysia
agamuthu@um.edu.my

Contents

- Introduction
- Implementation of Holistic Waste Management in Asia Pacific countries
- Role of stakeholders in Holistic Waste Management
- Case studies of Efficient waste management
- Impacts and Challenges in Holistic Waste Management
- Conclusions

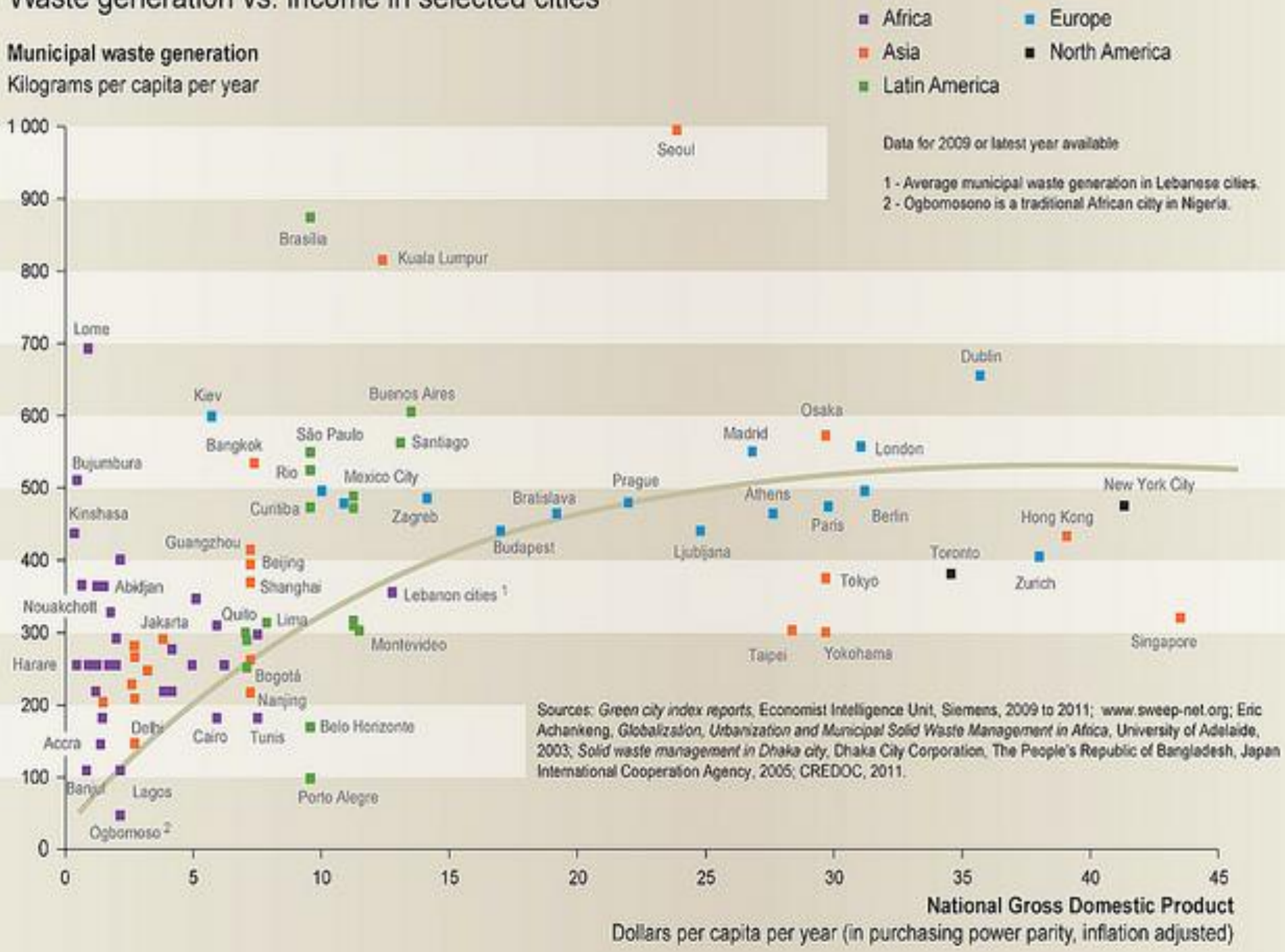
Introduction

- Holistic Waste Management (HWM) is a comprehensive waste management system that integrates all aspects and activities (generation, collections, disposal etc.), to ensure the sustainability of the management program.
- The success of HWM in a country depends heavily on the cooperation of multi-stakeholders which play their roles effectively and significantly.
- Local authorities (LAs) of the first level, the municipalities and communities, have a key role to play in supporting changes towards sustainable development
- private sector in MSW will allow LAs to benefit from economies of scale and contemporary available tools
- In many developing nations, informal sector too play a very significant role in promoting sustainable waste management system.

Implementation of Holistic Waste Management in Asia Pacific countries

- Asia Pacific countries contribute ~21% of the global waste generation.
- Per capita generation is dependent on the income level of the population.
- Many Asia Pacific (e.g. developing and under-developed) countries lack specific legislations on integrated waste management system where economic drivers dictate the flow of waste management system.
- HWM are efficiently practiced by developed nations including Japan, Korea, Singapore, Australia etc.

Waste generation vs. income in selected cities



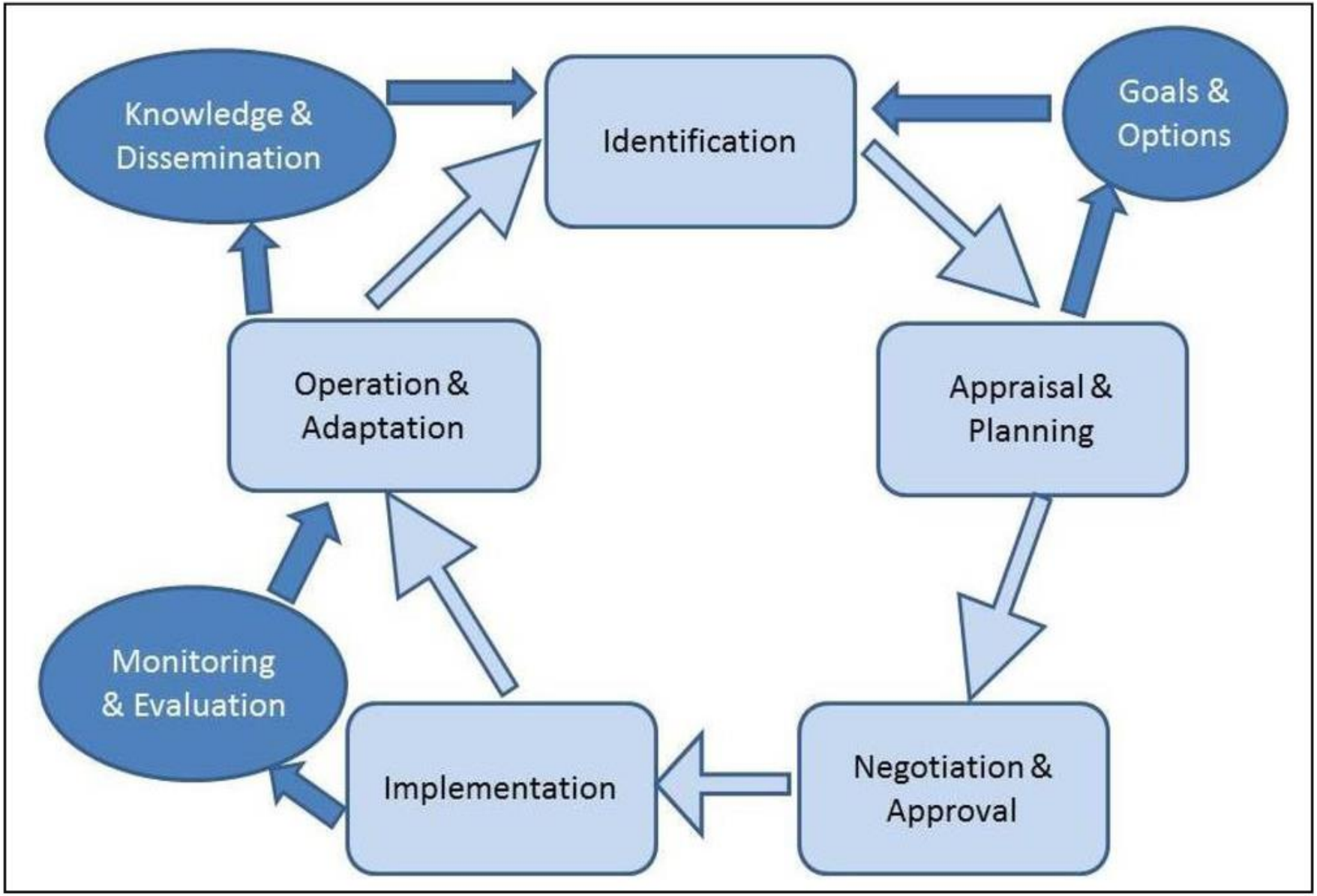
Sources: *Green city index reports*, Economist Intelligence Unit, Siemens, 2009 to 2011; www.sweep-net.org; Eric Achankeng, *Globalization, Urbanization and Municipal Solid Waste Management in Africa*, University of Adelaide, 2003; *Solid waste management in Dhaka city*, Dhaka City Corporation, The People's Republic of Bangladesh, Japan International Cooperation Agency, 2005; CREDOC, 2011.

Composting plants in Bangladesh depends on the economic incentives

Waste projection for 2025 in selected Asian countries

Country	Projected Waste Generation in 2025 (Kg/cap/day)
Brunei Darussalam	0.95
Cambodia	1.10
Indonesia	1.00
Laos	0.90
Malaysia	1.40
Myanmar	0.85
Philippines	0.80
Singapore	1.10
Thailand	1.50
Vietnam	1.00
Nepal	0.60
Bangladesh	0.60
Mongolia	0.60
China	0.90
Sri Lanka	1.00
Republic of Korea	1.40
Japan	1.30

Without HWM many of these countries will face huge problems in waste disposal !



Components in Holistic Waste Management

Indicators for HWM

- It is the central focus of an integration of the sustainability aspects into the system
  - environmental impacts,
  - economic considerations and
  - the social situation in the target region,
  - Implementation of low-cost and efficient technologies
  - community-based management and their relevant governance,
  - institutional frameworks
  - socio-economic constraints, (waste treatment with poverty reduction)
  - improvement of welfare of the population.

Case studies of Efficient waste management

- Effective HWM can be implemented with the appropriate legislation and participation of multi-stakeholders as evident in Korea, Singapore and Japan.
- Korea introduced a volume-based fee system for the treatment or disposal of wastes in 1995, which encourage reduction of waste generation (22% reduction in 2003).
- The government and restaurant operators agreed upon a voluntary MOU in 2002 that encourages the utilization of reusable containers (PPP)
- Singapore impose strict direct legislations enforcing recycling and the use of discarded materials in the country, and introduce agreement on packaging with private companies – 60% recycling in 2014
- Zero-Waste-SG has been established as a NPO to promote recycling, reduce waste generation (4.3% decrease from 2013), and to reduce waste to landfills (2% in 2014).
- Japan which has among the most impressive HWM in the world with low landfilling load and high recycling rate where 9.78 million tonnes of MSW had been recycled in 2014.

Positive Impacts of Holistic Waste Management

- Improved human attentiveness towards the HWM practices for human wellbeing
- Increased human awareness due to the concern and need to ensure clean and comfortable environment.
- Minimum pollution rate due to high environmental consciousness, as observed in Singapore, Japan, Australia and Korea
- Dissemination of information on any changes in the existing HWM can be passed through various media effectively (due to the existing level of awareness)
- Improvement in specific legislation to promote HMW can be done effectively
- Economic drivers may not be the main player in waste market, but environmental drivers plays more significant role.

Challenges in Holistic Waste Management

Aspect	Challenges	
	Developed Nations	*Developing Nations*
Population growth	▪ Increase in waste generation. ▪ Improvement in waste management technology	▪ Increase in waste generation ▪ Higher waste complexity ▪ Premature closure of disposal sites ▪ Larger number of waste pickers
Policy implementation	▪ Stringent regulations ▪ Effective	▪ Implementation of adapted policy ▪ Lack of enforcement ▪ Ineffective ▪ Illegal activities
Changes in waste composition	▪ Introduction of suitable approaches such as, incineration, composting, pyrolysis etc.	▪ Failure in existing waste management system. ▪ Disturb the waste management facilities.
Public participation	▪ High due to high awareness ▪ Active participation- daily habits	▪ Low due to low awareness ▪ Indifferent habits and refusal to change current habits. ▪ Retaliate with illegal waste disposal

Challenges in Holistic Waste Management (cont'd)

Aspects	Challenges	
	Developed Nations	*Developing Nations*
Informal recycling such as scavenger etc.	▪ Absent due to safety and hygiene factors.	▪ An importance aspect that promote recycling ▪ Unavoidable due to economic drivers. ▪ Number will increase with non-improved nations' GDP ▪ Health concern
Recycling strategies	▪ Practical , inline with governmental policy	▪ Mainly white papers and not applicable for the implementation to the current waste management system.
Existing waste management system	▪ Promote 3R	▪ Mainly serve to dispose waste.

Children scavenging at a dumpsite in Bangladesh

UNIVERSITY OF MALAYA
The Leader in Research & Innovation

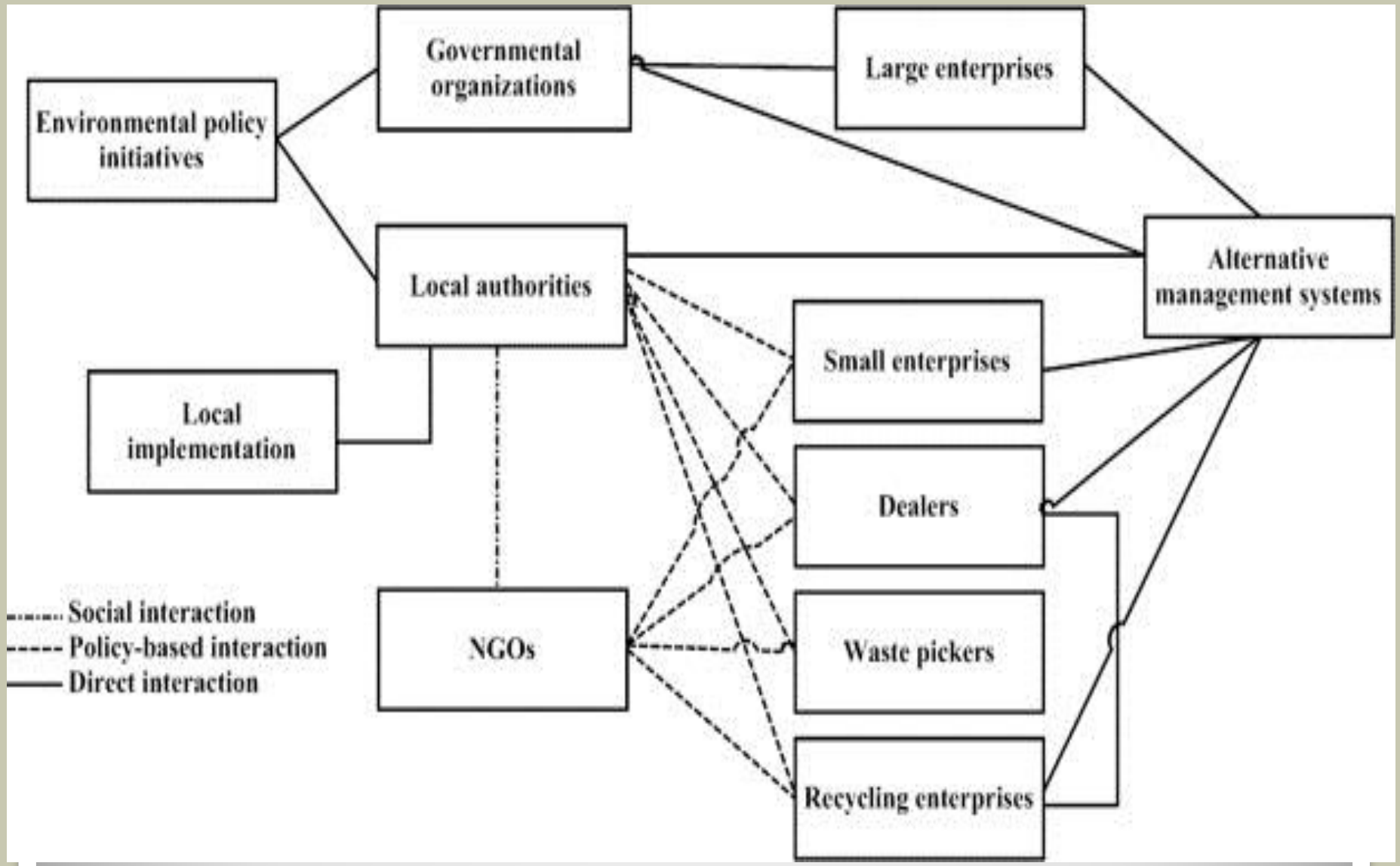
Landfill gases are hazardous to human

Thus, HWM is the best option!

Extreme case of fly infestation in a dump site in Cambodia

Role of stakeholders in Holistic Waste Management

- Government
  - Policy-makers, enforcement, subsidies/ incentives
  - Institutional set-ups, research and development, etc.
- Private entities
  - Partnership with public institutions, investors/ funder of waste management facilities, drawing up a waste management strategy for consultation and implementation wastes-market controller, etc.
- Public institutions
  - Awareness, knowledge dissemination, waste generators,, comply with stipulated regulations, etc.
- Informal sector
  - Diverter of waste from disposal options, increase recycling capability, etc.



HWM and Multi Stakeholder Interactions/ Partnerships

Conclusions

- Successful HWM implementation are evident in economically developed nations such as Korea, Japan and Singapore, while it is almost insignificant in other developing nations.
- Appropriate human attitude and economic drivers can strengthen an existing HWM, with suitable directives and legislations.
- Challenges are human attitude, discouraging economic scenario and absence of appropriate regulations pertaining to HWM.
- Thus, improvements to amend these negative factors is very crucial in order to ensure that implementation of HWM in Asia and Pacific Island can be sustainable.


We ARe ALL A PRODUCT OF OUR eNViRoNMeNT
PRODUCT DESIGN
THe GoAL IS NoT To MAKe AN eNViRoNMeNT OUT OF OUR PRoDUCTS
LANDFILL

THANK YOU