



Data Collection in Developing Countries



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Content

- Status of waste and waste management systems
- Status of material recovery
- Collection of data
- Type of data required
- Case study of Bangkok



+ Community Solid Waste in different areas 3

Area	Amount of Solid Waste (ton/day)		
	2003	2005	2006
Bangkok	9,356	8,291	8379 (21% - 1.5 kg/p/d)
Municipalities and City of Pattaya	12,500	12,635	12,912 (32% - 1 kg/p/d)
Central and East		5,499	5,619
North		2,148	2,195
North-East		2,906	2,970
South		2,082	2,128
Others	18,100	18,295	18,697 (47% - 0.4 kg/p/d)
Total	39,956	39,221	39,988 (0.6 kg/p/d)

14.63 million tons/year. (2006)

+ Status of Waste Management

Waste generated 100%
(14.12 Million tons)

Waste Collected 85%
(11.77 Million tons)

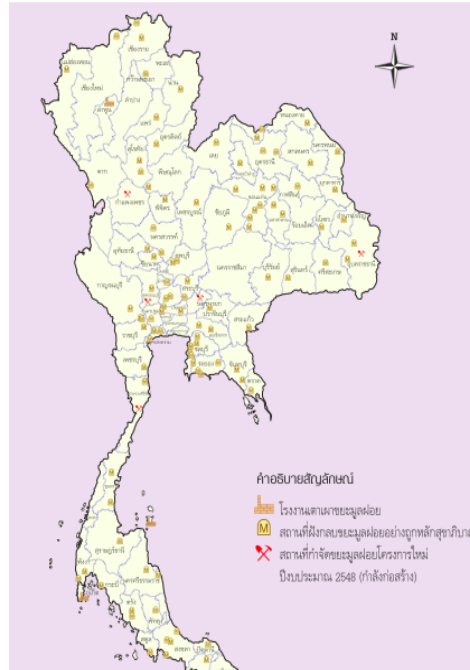
Sanitary Disposal 36% (Landfill,
incinerators and integrated solid
waste management)



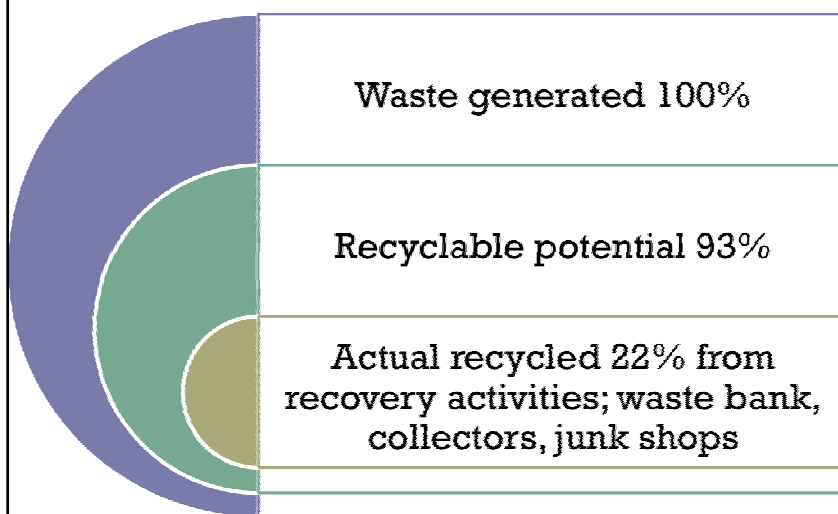
No operational procedure, no environmental control!!

+ Sanitary Disposal

- 101 landfills
- 3 incinerators
- 3 integrated waste management center
- More sites under construction



+ Material Recovery Status



+ Utilization of Waste

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■ Community solid waste 22% (3.19 Mton)

- 0.20 Mton as compost and liquid fertilizer,
- 2.99 Mton as recycle materials.
 - Paper 0.9269 Mton (38%)
 - Glass 0.7475 Mton (64%)
 - Plastic 0.3588 Mton (25%)
 - Iron 0.8671 Mton (90%)
 - Aluminum 0.0897 Mton (54%)

+ Problems of current practice

- Low levels of sanitary disposal and material recovery imply that the currently used solid waste management system is not as effective as expected.
- In order to improve the situation, more data in solid waste management are required.

+ Collection of Data

- Collection of data to quantify and qualify types of waste plastics require good understanding in;
 - Solid Waste Management System to identify pathways of waste flows.
 - Material flow accounting (MFA) in order to quantify the amount of plastic flows.

+ Problems Encountered in Developing Countries

- Data on many of aspects does not exist at all;
 - Pathways of plastics flows
 - Social factors influencing solid waste management system
 - Informal sectors in waste management system
 - Etc.

+ Collection of Data

- Within existing waste management system, following factors need to be identified.
 - Actors involved
 - Quantity of waste collected
 - Quality of waste collected
 - Organization of material recovery system

+ Type of data required

- Review of solid waste management system
 - How much waste is generated?
 - How much waste is collected?
 - What are the characteristics of waste generated?
 - How is waste collected and transported?
 - What are disposal technologies employed?
 - Who are the main actors involved in formal waste management system?
 - What are the major constraints in current solid waste management system?

+ Type of data required

- The material recovery system
 - How is the system organized?
 - How much materials are being collected?
 - Who are the actors collecting plastic materials for recovery?
 - How many actors involved in the system?
 - How the system is financed?
 - Major problems concerning the system

+ Type of data required

- Relationship between formal and informal sectors
 - Connection between formal and informal sectors
 - Problems encountered by both sectors

+ Type of Data

■ Primary data

- Interviews of key informants, questionnaire surveys of related sectors, and observation.

■ Secondary data

- Analysis of existing data and verification of data source

+ Case Study: Bangkok Metropolitan Administration



+ Actors

■ Formal sector

■ Central Government Agencies

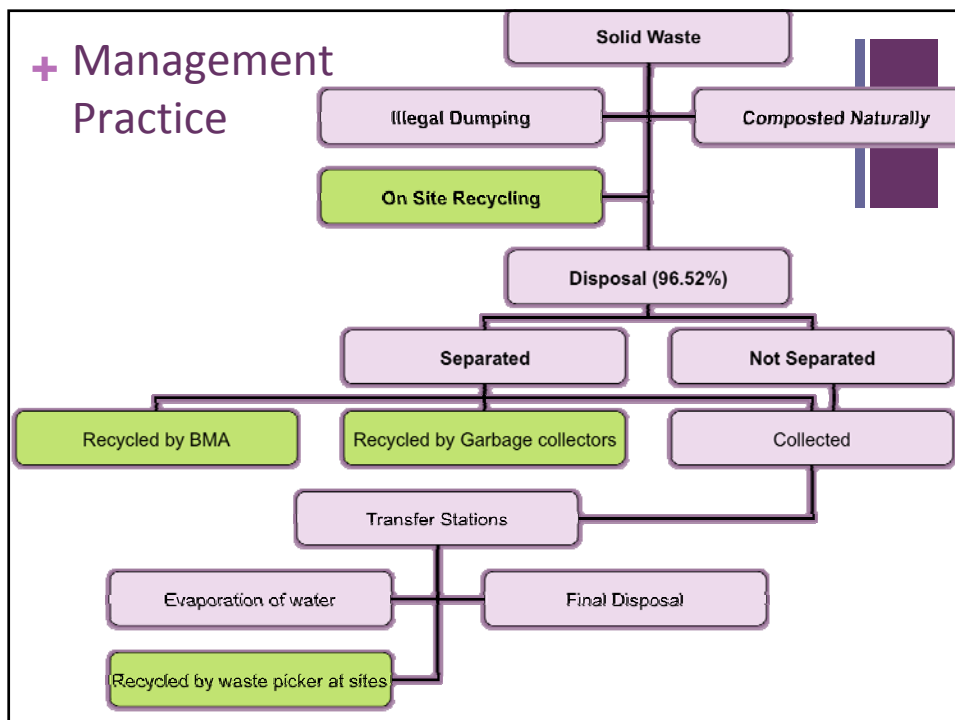
- Four Ministries; Ministry of Public Health, Ministry of Natural Resources and Environment, Ministry of Industry, and Ministry of Interior

■ Environment Dept. of BMA

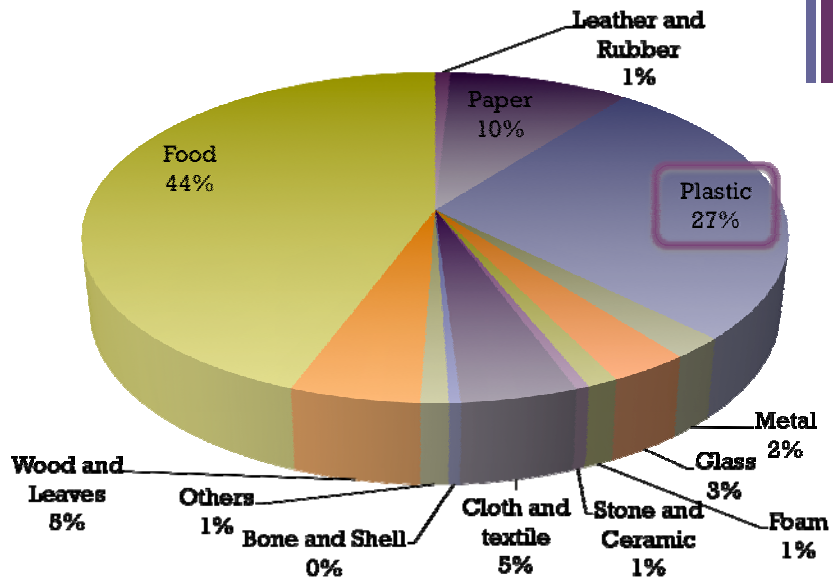
■ Informal sector

- Household
- Waste pickers
- Waste collector

+ Management Practice



+ Waste Characterization



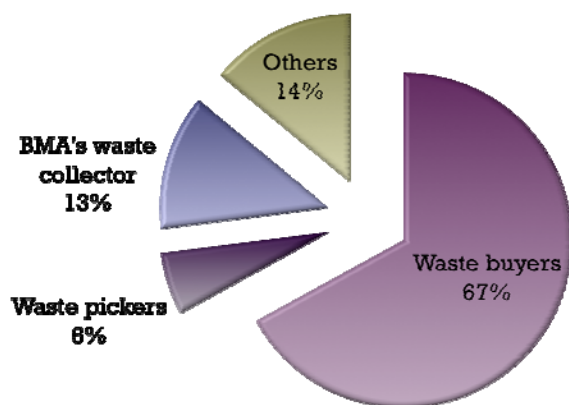
+ Waste Collection Amount

■ City of Bangkok	100%
■ Municipalities (4780 ton/d)	37%
■ Others (1120 ton/d)	6%

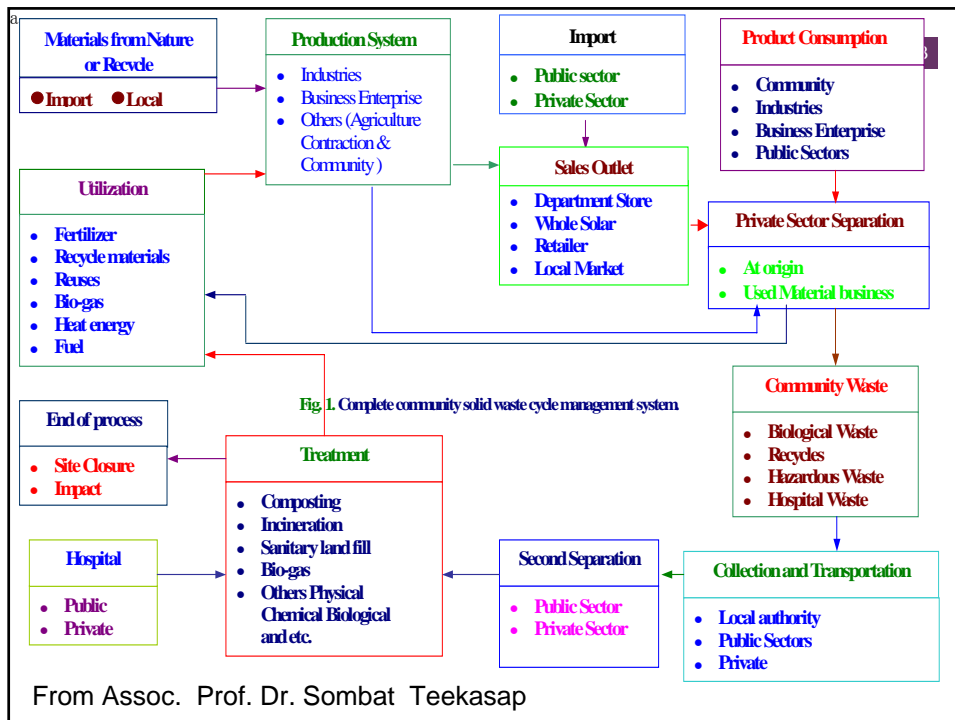
+ Waste Recycling

- Traditional waste recycling systems at generation sources.
- New waste recycling system initiated by BMA.
- Recycling by waste collectors during collection work.
- Recycling by waste pickers at transfer stations.

+ Collection of Waste for Recycling



Others include factory, stores and BMA's initiatives



+ Conclusions

- Actors involved in plastic materials recovery include both formal and informal sectors.
 - Household
 - Waste collectors
 - Scavengers

+ Conclusion

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- Improper sorting facilities in operation. Most of separation process has been done informally.
- Most of solid waste sent to landfill site. Promotion of waste separation and utilization should be implemented.
- Only two anaerobic digestion from waste plants are running but at not designed capacity.

+ Recommendations

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- Sorting plants.
- Upgrading recyclable material plant.
- Electronic waste recycling plant.
- Hazardous waste recycle plant.
- Waste exchange program.
- **Waste to energy** – Highly interested by researchers and investors (both local and foreigner) in producing electricity and fuel oil.

+ Recommendations

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- Composting plant
- Bio-liquid and compost earth wormiest system
- Individual house composting
- New recycle technique
- Bio-gas fermentation plant
- Other Waste to Energy System (Gasification, Direct Burning, and etc.)