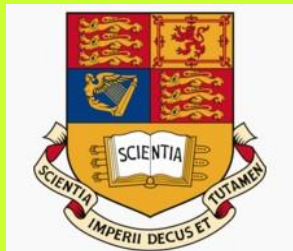


Acting Alone to Partnerships - Strategic Approach for Sustainable Municipal Waste Management

David C Wilson, Imperial College

CSD Intersessional Conference
16-18 February 2011, Tokyo, Japan



Imperial College
London

DcW

Scope of this presentation

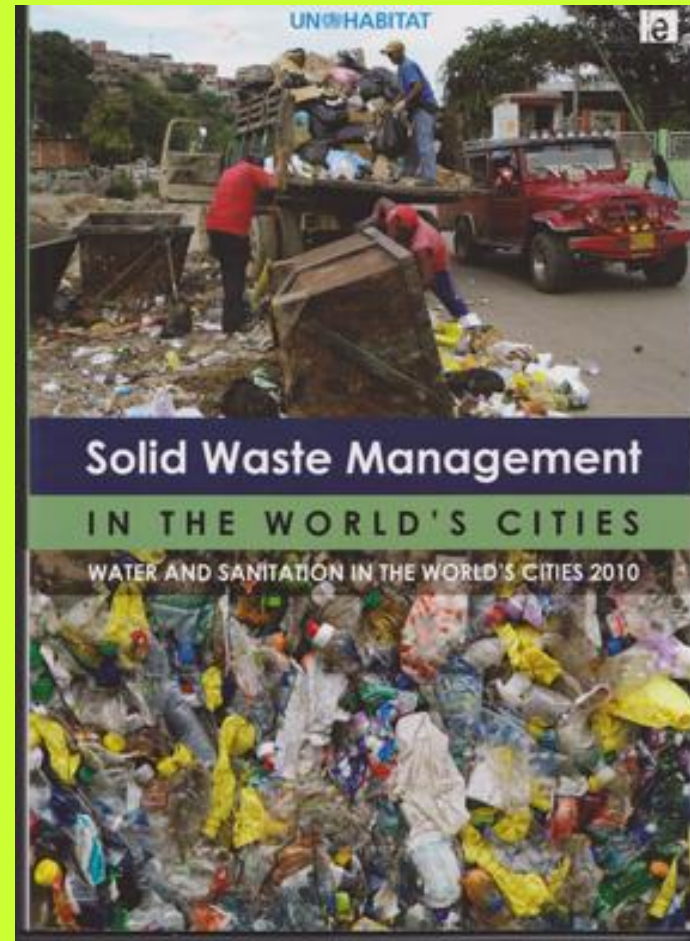
- What is sustainable waste management?
- How much progress have we made?
- Partnerships:
 - Why is partnership important?
 - Who are the key partner groups?
 - What does partnership involve?
- What are the key success factors?



The 2010 UN-Habitat Book



- 3rd Global Report on *Water & Sanitation in the World's Cities*
- Compiled by a team of 30+ professionals from North and South
- Launched at 5th World Urban Forum, Rio, March 2010
- *Objective 1*: to provide a critical review and guidelines on SWM in the World's cities

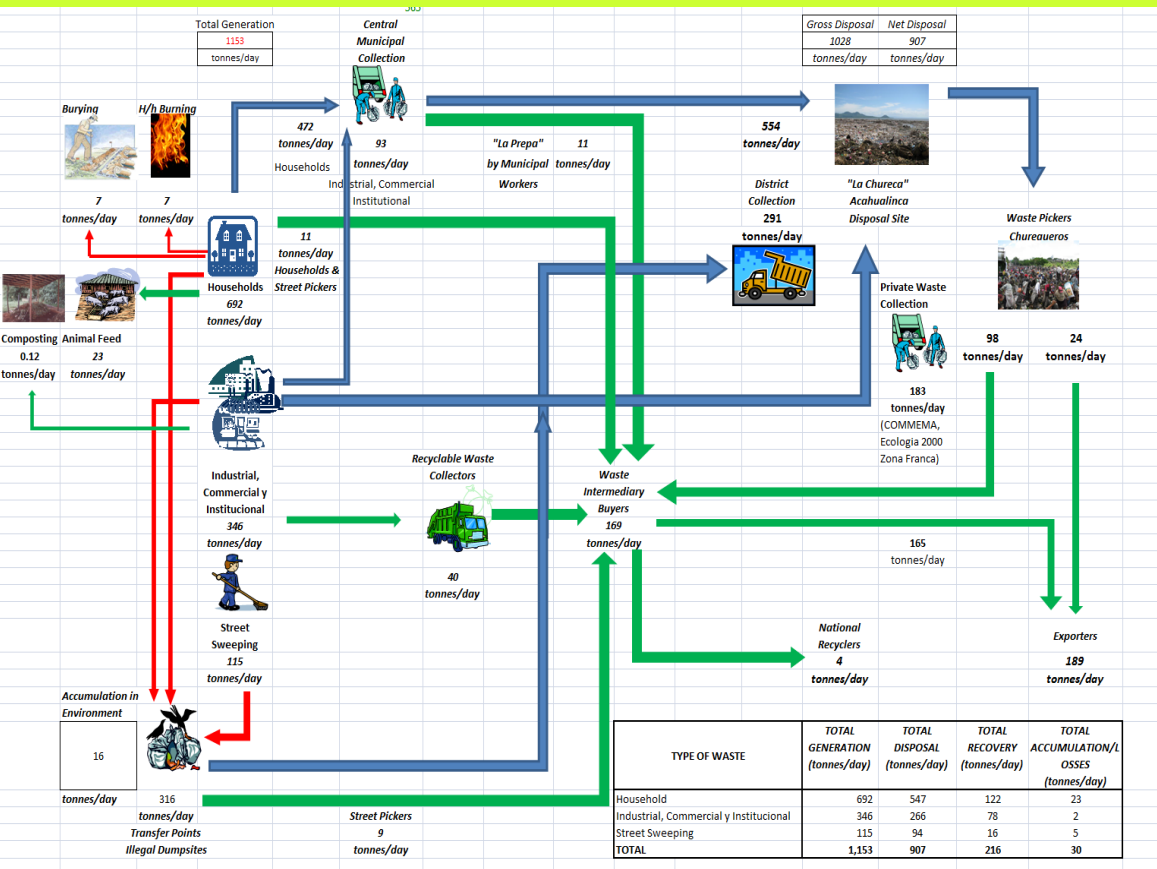


Scheinberg A, Wilson D.C. and Rodic L. (2010). *Solid Waste Management in the World's Cities*. Published for UN-Habitat by Earthscan, London

No reliable and consistent data

- Objective 2: address the critical lack of solid waste & recycling benchmarks
- Set out to collect reliable and consistent data from at least 20 cities

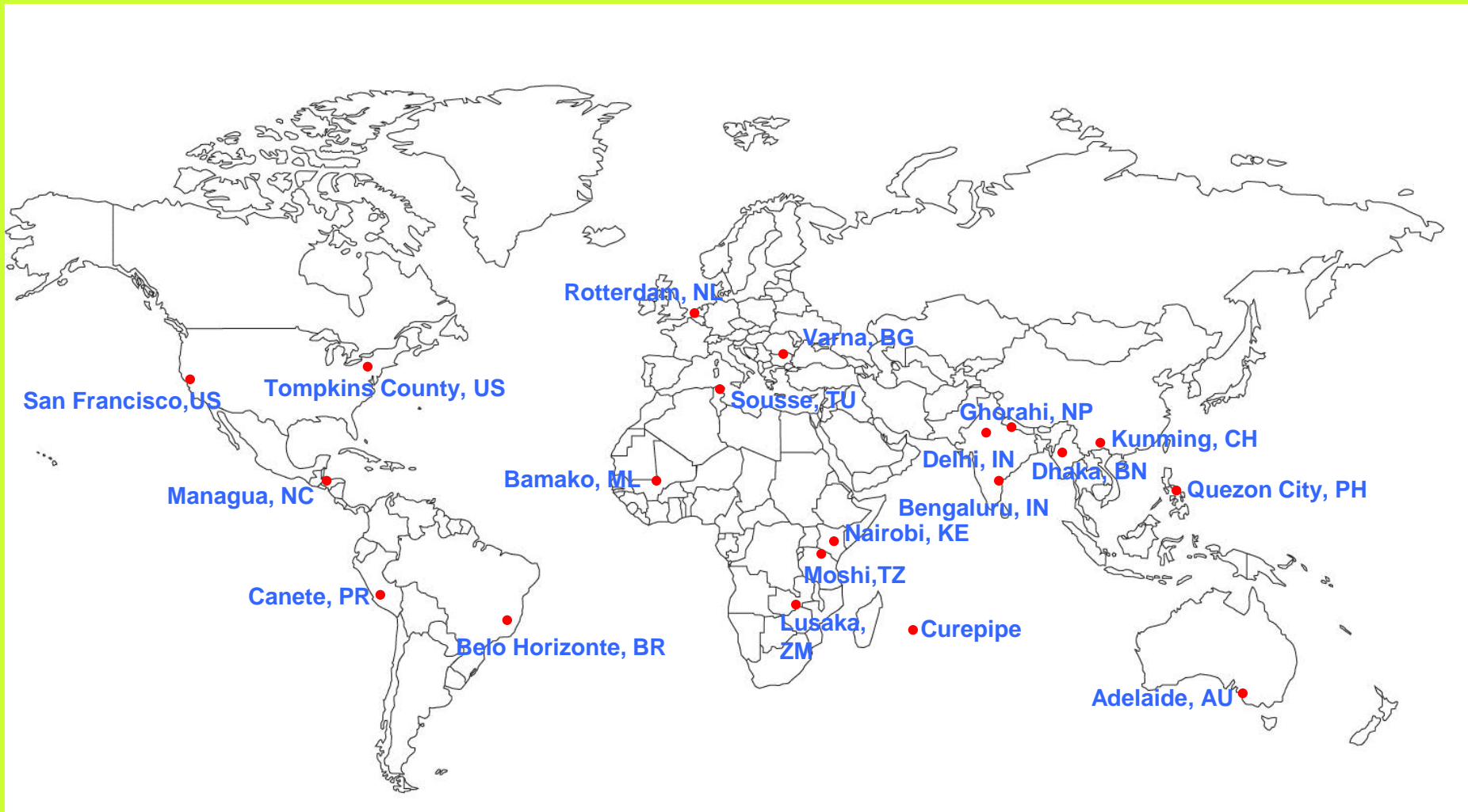
- Detailed data protocol to ensure consistency
- Uses a process flow diagram (PFD - mass balance) to understand entire system
- Including formal and informal sectors
- Developing indicators even for more qualitative criteria



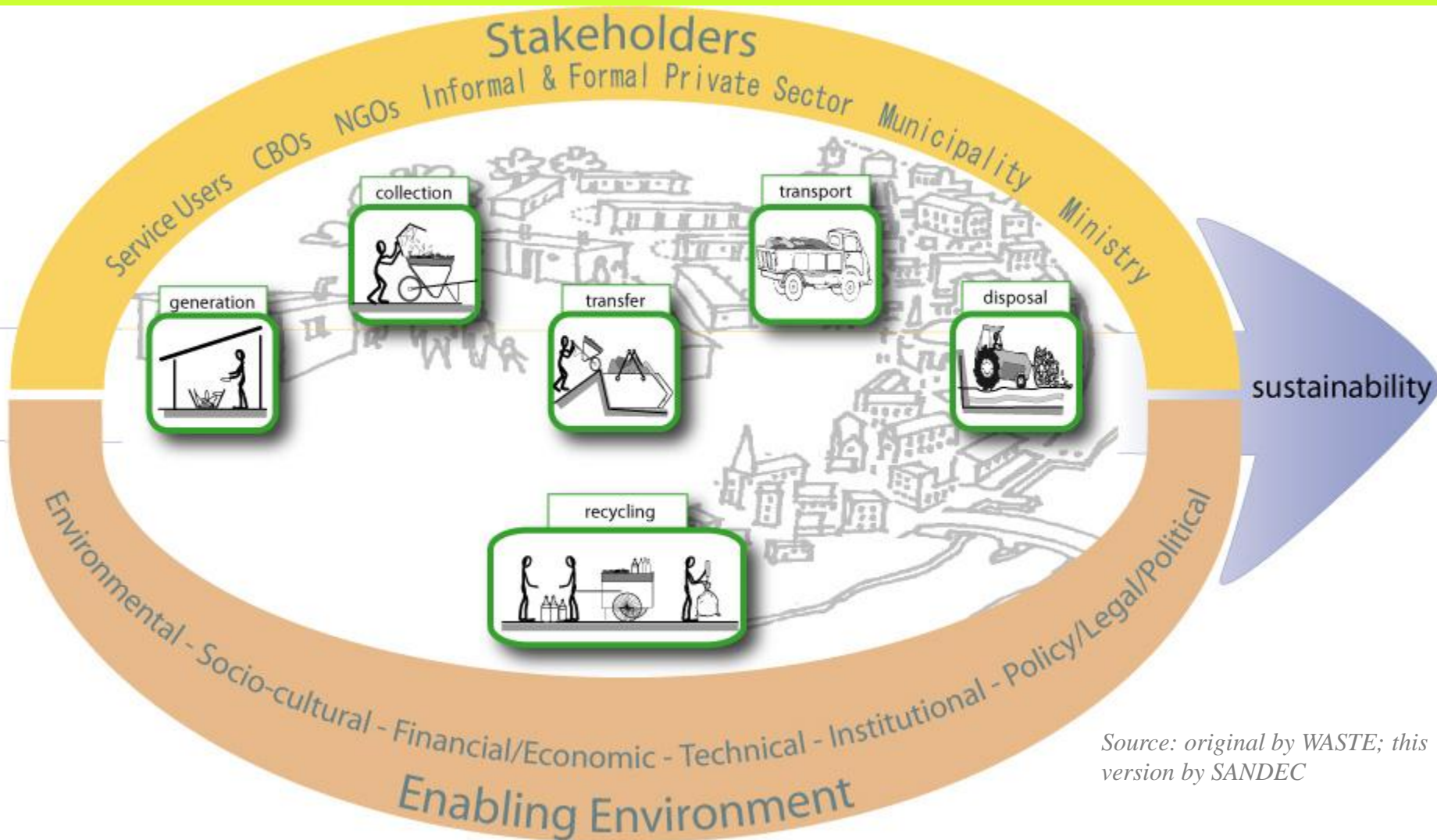
Example PFD: Managua

Source: Olley, J., IJgosse, J. and Rudin, V. (2010). Managua city profile for the UN-Habitat's Global Report "Solid Waste Management in the World's Cities"

The 20 reference cities



Integrated and sustainable waste management (ISWM)



Source: original by WASTE; this version by SANDEC

Analytical Framework (1)



**3 key physical elements
- each related to a driver**

- Public health/ collection
- Environmental protection/ disposal
- Resource management

*The old paradigm – up to
early 1990s – stopped there*

- *Focus on technical solutions*
- *Each municipality acting on its own*

New Analytical Framework



3 key physical elements

- each related to a driver

- Public health/ collection
- Environmental protection/ disposal
- Resource management

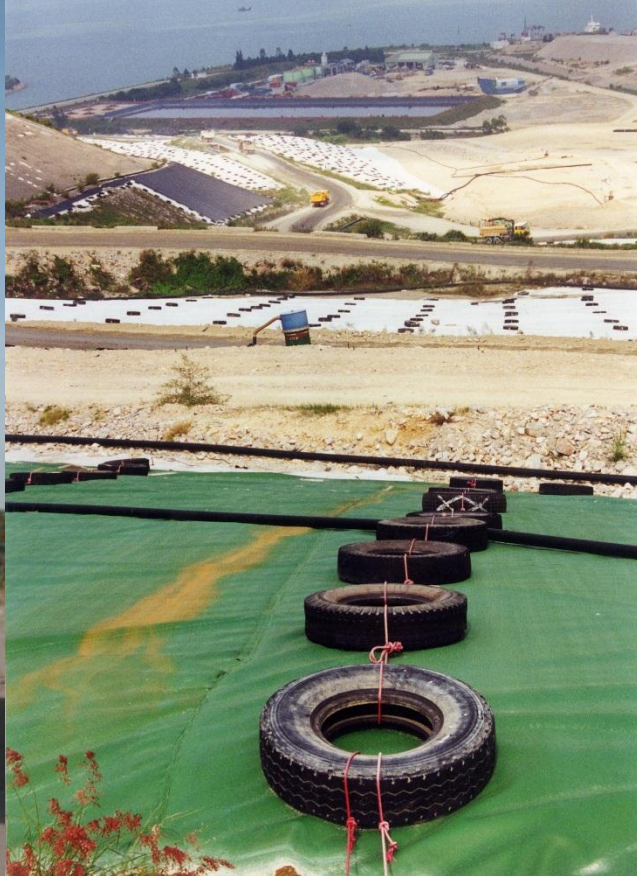
3 key governance strategies

- Inclusivity, of both users and service providers
- Financial sustainability
- Sound institutions and proactive policies

Source: Scheinberg A, Wilson D.C. and Rodic L. (2010). *Solid Waste Management in the World's Cities*. Published for UN-Habitat by Earthscan, London



CBO collection in
Ouagadougou, Burkina
Faso



Modern landfill in
Hong Kong



Selling recycled bottles,
Dhaka

CURRENT STATE OF SWM – PROGRESS UPDATE

One way of categorising the cities

- by income level of the country (GDP/capita/year)

High-income	Upper-middle	Lower-middle	Low-income
Rotterdam, Netherlands	Belo Horizonte, Brazil	Sousse, Tunisia	Lusaka, Zambia
San Francisco, USA	Curepipe, Mauritius	Kumming, China	Nairobi, Kenya
Tompkins County, USA	Varna, Bulgaria	Quezon City, Philippines	Bamako, Mali
Adelaide, Australia	Canete, Peru	Bengaluru, India	Dhaka, Bangladesh
		Delhi, India	Moshi, Tanzania
		Managua, Nicaragua	Ghorahi, Nepal
<i>Over \$11,500</i>	<i>\$3,700 - \$11,500</i>	<i>\$970 - \$ 3,700</i>	<i>Less than \$ 970</i>

Based on GDP/capita data for 2007 (taken from 2009 UNDP Human Development Report)

Categorisation follows that of the World Bank

Per capita waste generation

Income Level	Minimum Kg/year	Maximum Kg/year	Average Kg/year	Average Kg/day
High	490	609	551	1.51
Upper-middle	246	529	373	1.02
Lower-middle	184	420	302	0.83
Low	167	338	225	0.62



How do we decouple waste/capita from GDP/capita?

Data source: Scheinberg A, Wilson D.C. and Rodic L. (2010). *Solid Waste Management in the World's Cities*. Published for UN-Habitat by Earthscan, London

Average waste composition

Income Level	paper	glass	metal	plastic	organic
High	24%	6%	5%	11%	29%
Upper-middle	13%	6%	5%	13%	52%
Lower-middle	8%	2%	1%	10%	67%
Low	6%	2%	1%	7%	71%

The nature of the waste is very different in lower income countries

Data source: Scheinberg A, Wilson D.C. and Rodic L. (2010). *Solid Waste Management in the World's Cities*. Published for UN-Habitat by Earthscan, London

Uncollected waste - public health issue



Burning uncollected waste, Venezuela



Waste blocking a storm drain, Bamako, Mali



Dengue fever clean-up campaign, Quezon City



Waste dumped in a stream, Nairobi

Public health – collection coverage

Received wisdom: 30-70% in low & middle income countries

Income Level	Minimum %	Maximum %	Average %
High	100	100	100
Upper-middle	73	100	92
Lower-middle	70	100	90
Low	45	65	55

Substantial progress has been made in middle income countries

Average data hide considerable variations, between and within cities & countries

Data source: Scheinberg A, Wilson D.C. and Rodic L. (2010). *Solid Waste Management in the World's Cities*. Published for UN-Habitat by Earthscan, London

Environmental control – waste disposal

1990s baseline: open dumping still dominant in middle and low-income countries

Income Level	State of the art disposal	Disposal at simple controlled sites	Disposal at open dumps, losses, illegal dumping
High	100%	0%	0%
Upper-middle	75%	20%	5%
Lower-middle	61%	32%	7%
Low	29%	24%	47%

Substantial progress has been made, particularly in middle-income countries

Data source: Scheinberg A, Wilson D.C. and Rodic L. (2010). *Solid Waste Management in the World's Cities*. Published for UN-Habitat by Earthscan, London

Resource recovery – recycling rates

Income Level	Minimum %	Maximum %	Average %
High	30	72	54
Upper-middle	7	27	15
Lower-middle	6	39	27
Low	6	85	27

A lot of variation between countries

Rates in high-income countries have regrown since 1980s

Rates still relatively high in the lower income countries

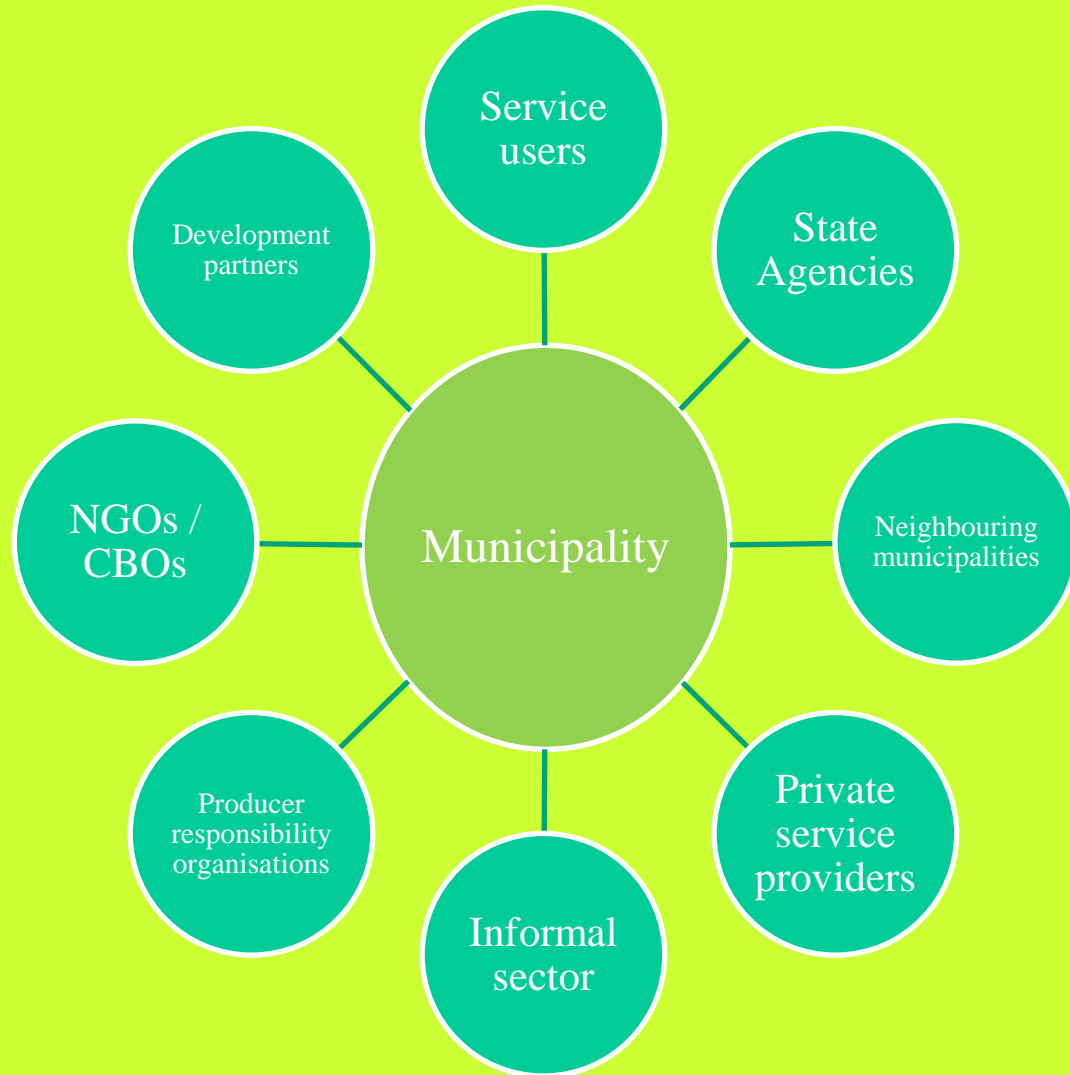


Moshi – the ‘cleanest city in Tanzania’

Waste & Citizenship Forum, Belo Horizonte

FOCUS ON PARTNERSHIPS (GOVERNANCE ASPECTS)

Good governance – partnering with ALL stakeholders in an ISWM system



User inclusivity

Why partner with users?

1. SWM is a service – the users need to be satisfied
2. People want to live in clean neighbourhoods where their children are healthy
3. Changes in the service require participation from the users and often changes in their behaviour
4. New facilities cannot be sited without the buy-in of the people

Qualitative indicators*

1. Do laws require participation of stakeholders outside the bureaucratic structures?
2. Are there any procedures in place for citizens to participate in the siting of landfills or incinerators?
3. Is customer satisfaction with the waste management service measured at the municipal level?
4. Are there any feedback mechanisms between service users and service providers?
5. Are there any citizens committees in place which address waste management issues?

**As defined and used in the Habitat book*

Achieving user inclusivity

Citizens Committee

At Barangay level in
Quezon City, Philippines



Participative planning

Catia La Mar, Venezuela



Provider inclusivity

Why partner with service providers?

1. They are waste professionals and bring knowledge and expertise which the municipalities may lack
2. They may be able to deliver the service at lower cost

Both of these reasons apply to the formal private sector AND to the community/ informal sector

3. The community / informal sector may already handle a significant % of waste at little or no cost to the city

Qualitative indicators*

1. Do laws encourage 'PSP' – i.e. public-private partnerships or community based organisations to participate in SWM?
2. Are there any platforms or organisations to represent the private waste sector?
3. Is there any formal occupational recognition of the community / informal sector already active in recycling?
4. Is there any protection of community /informal sector rights to operate in SWM?
5. Are there any legal or institutional barriers for PSP in waste management?
6. Are there any legal or institutional incentives for PSP in waste management?

**As defined and used in the Habitat book*

Collection

*Some examples
of diversity in
service
provision*



Door-to-door informal collector, India

Bicycle cart delivering to small
transfer station in Kunming



Curepipe, Mauritius



CBO collection in Bamako, Mali

Adelaide, Australia



Modernisation does not necessarily mean motorisation

Recycling rates- formal vs informal

Income Level	Average %	Formal %	Informal %
High	54	54	0
Upper-middle	15	1	15
Lower-middle	27	11	16
Low	27	1	26

Data source: Scheinberg A, Wilson D.C. and Rodic L. (2010). *Solid Waste Management in the World's Cities*. Published for UN-Habitat by Earthscan, London

Contribution of community / informal sector

- Systems entirely private sector, financed only from sale of recyclates
- Modern recycling systems have been rebuilt by municipalities as ‘sinks’ – cost them money but cheaper than landfill or waste-to-energy
- Reduce public sector costs – by millions of \$/year in a large city
- **Professional waste workers in the community/ informal sector are just one partner group, but they are often not recognised as such by the municipality**



Istanbul, 1993 (Photo: DCW)



Port Harcourt, 2006 (Photo: Kaine Chinwah, IC)

Example of financial contribution - Mumbai

Budget of SWM Department

2009/10	US\$228 million
2010/11	US\$334 million (estimate)

Source: Perinaz Bhada-Tata, *Waste Management World*, September – October 2010

- This is the budget to deal with ~ 75-80% of the waste generated
- ~20-25% of the waste is collected & recycled by informal sector
- Informal sector is saving city ~US\$100 million/year in avoided collection & disposal costs
- *Cross-subsidy - from poor to rich*

*A detailed study which documents the financial contribution of the informal sector to SWM in 6 cities is available: Scheinberg, Simpson M.H. and Gupt Y. (2010). **Economic Aspects of the Informal Sector in Solid Waste**. German Technical Cooperation (GTZ, re-named GIZ in 2011), Eschborn, Germany. www.giz.de*



Source: Ranjith Annepu,
<http://swmindia.blogspot.com/>

How many professional waste workers in the community / informal sector?

City	% of total population
Bengaluru	0.5%
Belo Horizonte	0.0%
Canete	0.4%
Delhi	1.3%
Dhaka	1.7%
Ghorahi	0.1%
Lusaka	0.0%
Managua	0.3%
Quezon City	0.5%
Sousse	0.1%
Average	0.5%
Total workers in 10 cities	350,000

Global estimate:
15 million

Source: 2010 World
Congress of Waste Pickers

Source: Scheinberg A, Wilson D.C.
and Rodic L. (2010). *Solid Waste
Management in the World's Cities*.
Published for UN-Habitat by
Earthscan, London

‘Working conditions are unacceptable’

- Yes, but why are their working conditions so dirty?
- Most sorting is in mixed waste
- Hand sorting is common in high income countries
- **Key: separate organics from dry recyclables at source**
- *At a stroke, improve working conditions for the recyclers AND provide the foundation for ‘zero waste’ to landfill*
- Separation at source already takes place – itinerant waste buyers (IWBs)



Clockwise from top: Delhi, India; Lichfield, UK; Siddhipur, Nepal; Sukkur, Pakistan

Photo credits: Enrico Fabian, Lichfield DC, Bhusan Tuladhar, Mansoor Ali

Major opportunity for win-win solutions through partnership

- Build recycling rates
- Move towards zero waste
- Improve livelihoods
- Improve working conditions
- Save the city money



Itinerant waste buyer in Brazil

Sorting recycled plastics in Delhi

Photo credits: © Jeroen Ijgosse, Enrico Fabian

Integrating the community / informal sector into sustainable WM

- Secure livelihoods
 - Find new niches, e.g. in separate collection and recycling
 - Assure access at transfer stations and/or landfill sites
 - Increase market leverage – e.g. co-operatives, diversification
- Open channels of communication with the city
- Address social and health & safety issues



Itinerant waste byer in Nepal
Recycling co-operative in Colombia

Case study 1: Quezon City, Philippines

❑ Sharp increase in recycling

Year	Total	IWBs
1997	6%	4%
2006	25%	16%
2009	37%	24%

❑ NGO-led 'Linis Ganda'

- Linkages across supply chain
- Recognition & respectability
 - uniforms, ID, access
 - politically connected
- Organise co-operatives
- Facilitate affordable credit



Photo credits: Embassy of Japan in the Philippines;
Government of the Philippines, 2006

Case Study 2: Brazil

- Waste-picking recognised as a profession (2001)
 - entitled to the minimum wage in negotiations with municipalities
- National Inter- Ministerial Committee for Social Inclusion of Waste Pickers (2003)
- Waste and Citizenship Forums
 - aim to eradicate open dumps, child labour & integrate waste pickers

Recycling facility of one of the waste picker cooperatives in Belo Horizonte © SLU



How should we refer to the ‘informal’ sector?

- Development agencies do not like the ‘informal sector’ – synonymous with the ‘black economy’ – tax revenues are necessary for good governance
- The ‘informal’ sector in WM need not be outside the formal economy – e.g. Brazil
- But they do not want to be ‘formalised’ in the sense of being ‘absorbed’ – separate stakeholder group
- I have used here : ‘community/ informal sector’
- **What term should we be using? Would another term make recognition and integration easier?**

The community sector (CBOs) in SWM in high income countries

- Surprisingly large and active
- Often focus on reuse
- .. but also recycling and community composting
- Complain that they are not recognised as equal partners by LAs and the formal private sector



Waste prevention in practice – by CBO

Unsold food from shops, which would otherwise be discarded as waste, being sorted prior to distribution to some 15 000 people registered with the social inclusion food bank in Belo Horizonte. Brazil



Comparing financial sustainability

- Cost data very poor
 - Cities often don't know their costs
 - Treat cost data as confidential
 - SWM organisation fragmented
 - Many budget lines

- Budget data better

% of a city's total budget spent on SWM	
Received wisdom	30-50%
Habitat data	3-15%

- 80-90+% of SWM budget spent on collection

Financial sustainability - affordability

Income Level	City SW budget per capita	City SW budget per capita as % of GDP per capita	
		range	average
High	\$75	0.03 - 0.40%	0.17%
Upper-middle	\$33	0.14 - 1.19%	0.59%
Lower-middle	\$10	0.40 - 1.22%	0.69%
Low*	\$1.4	0.14 – 0.52%	0.32%

* Data only available for 3 of the 6 low-income cities (for 16 out of 20 cities in total)

Affordability is a key issue in the lower income countries

- Fees < 1-2% of household income

Data source: Scheinberg A, Wilson D.C. and Rodic L. (2010). *Solid Waste Management in the World's Cities*. Published for UN-Habitat by Earthscan, London

People are willing to pay – when they can see the benefits

- which is often for primary collection,
to improve the living conditions of their children

*Raising awareness
amongst citizens to
pay for waste
collection goes
hand in hand with
collection service
improvement*

Maputo,
Mozambique

Photo: Joachim Stretz



Financial sustainability – fee collection for formal waste services to households

Direct charging via a waste bill or a utility bill (U)	Direct waste fee + property tax	No direct fee (financed via property tax)	No direct fee (finance from general sources)
Adelaide	Bamako	Belo Horizonte	Ghorahi
Canete	Bengaluru	Curepipe	Quezon City
Kunming		Delhi	
Lusaka		Dhaka	
Moshi		Managua	
Nairobi (U)		Sousse	
Rotterdam (U)			
San Francisco			
Tompkins County			

Data source: Scheinberg A, Wilson D.C. and Rodic L. (2010). *Solid Waste Management in the World's Cities*. Published for UN-Habitat by Earthscan, London

Financial sustainability – fee collection

Income Level	SW fee as % of household income	% of population that pays for collection	Reported cost recovery % via fees
High	0.44%	99%	81%
Upper-middle	1.4%	56%	36%
Lower-middle	0.26%	28%	27%
Low	0.9%	59%	22%

Data source: Scheinberg A, Wilson D.C. and Rodic L. (2010). *Solid Waste Management in the World's Cities*. Published for UN-Habitat by Earthscan, London

Funds for investment

- Municipalities will look to partners
 - National government
 - Development grants
 - International agency loans
 - Private investment
- Most partners only provide capital costs
- Municipality still needs to be able to afford the operating costs

Key questions to ask yourself when accepting investment (1)

- Grants for collection vehicles
 - Can they be maintained locally?
 - Are spare parts available/ affordable?
- Sanitary landfills to EU standards
 - Are the operating costs affordable?



Key questions to ask yourself when accepting investment (2)

- Waste-to-energy incinerators
 - Will your waste burn unsupported?
 - Does it compete with recycling for paper, plastics?
 - Can you afford the gate fee?
 - Does the environmental regulator have the powers & institutional capacity to control and monitor the gas cleaning?



Baoan incinerator in Shenzhen, China

- Novel technology
 - Is it proven?
 - *Beware the magic solution*
 - *If it seems too good to be true – then it probably is!*

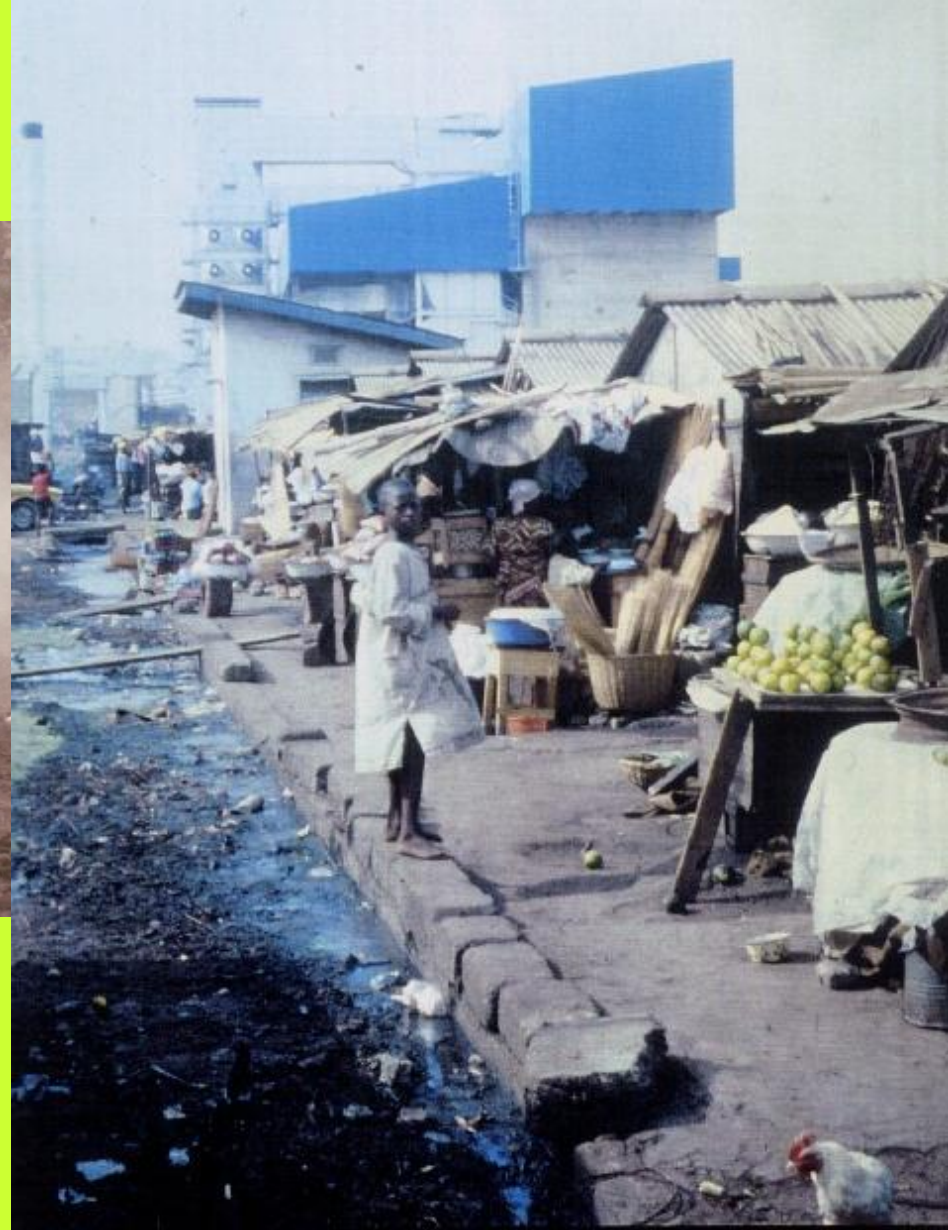
Cautionary tales



Jam Chakro Landfill, Karachi

Built as a sanitary landfill in 1996,
photo taken 2001

Photo: Jonathan R. Rouse



West African Incinerator, 1980

Photo: J.R. Holmes

Case Study- Ghorahi, Nepal 2009 Karauti Danda Landfill

including waste sorting / recycling



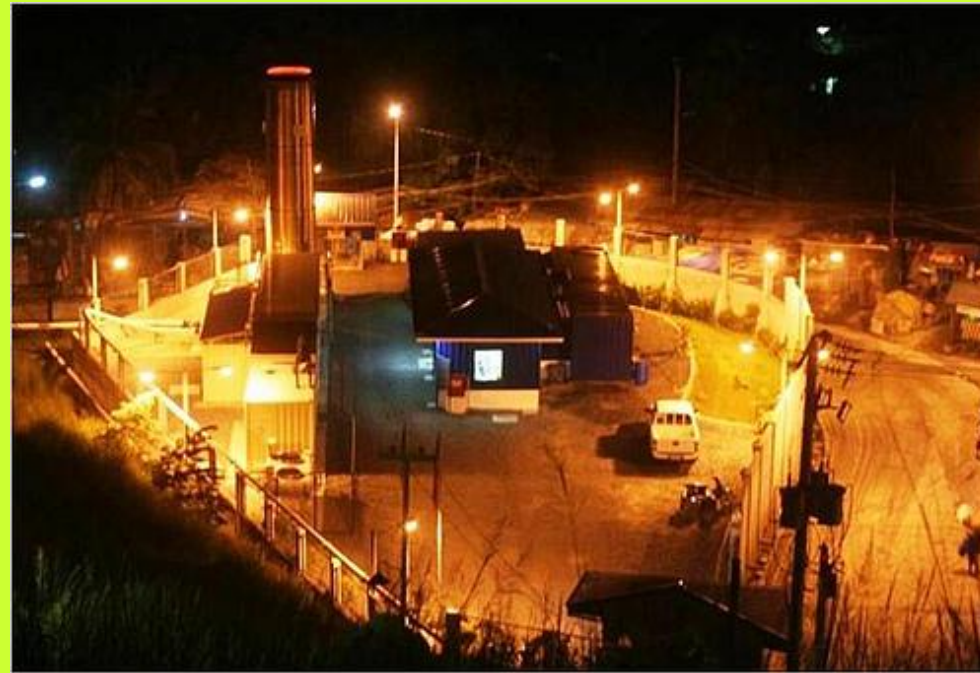
Photo credits : © Bhushan Tuladhar

Example of a local initiative, community support, no international funding

Novel funding mechanisms:

1 - CDM

- Kyoto Clean Development Mechanism
- Early focus on methane from landfill
- Very bureaucratic...
- .. but provides a steady income, and
- an incentive to maintain your (new) landfill site



Payatas landfill gas recovery
plant, Quezon City
(Photo: SWAPP)

Extending CDM

Composting

- Dhaka Bangladesh
- Bulta compost plant
- 130 tonnes per day
- Receives source separated organics
- Employs informal collectors



Next challenge is recycling

- Existing scheme very bureaucratic for community/informal sector



Photos: Waste Concern

Novel funding mechanisms: 2 - EPR

- Extended producer responsibility
- Aims to transfer financial burden of end-of-life products from municipality to the producer
- EPR has spread from the EU
- ... but few developing country examples
- Export of WEEE to developing countries sidesteps existing EPR
- **How to we extend SWM partnerships to include the producers?**



Tunisia is an example of successful EPR

Photo: Sousse Municipality

Sound Institutions, Proactive Policies

What is a sound institution for SMW?

1. Policy framework and commitments in place
2. Sound organisational structure
3. Coherent budgets – know and monitor costs
4. Institutional and professional capacity in place to manage PPP and other partnerships

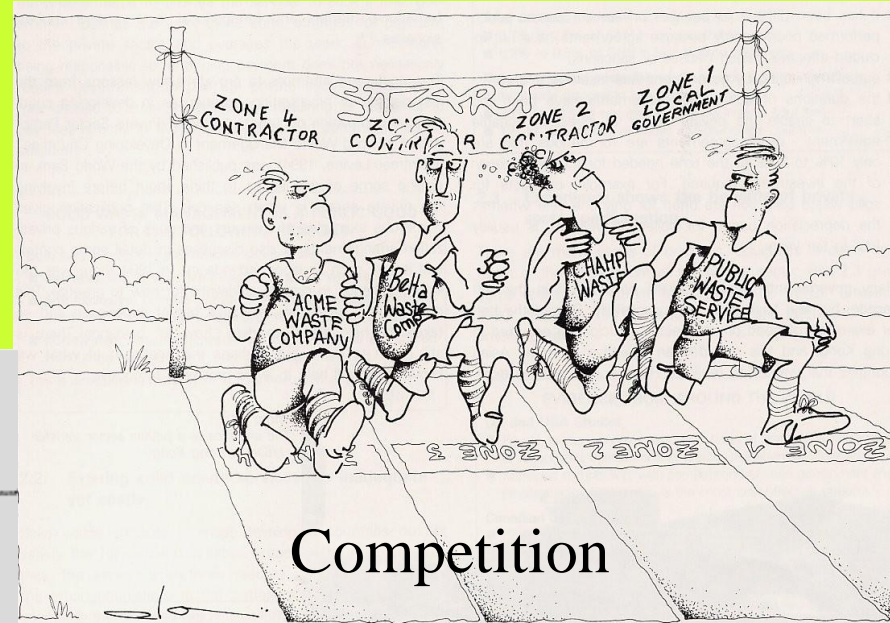
Qualitative indicators*

1. Are there any sustained policy commitments to sustainable solid waste management?
2. Is there a clear and transparent policy framework for the planning and implementation of waste management practices?
3. Are authorities allowed to retain the revenues collected from municipal fines and charges or to levy direct charges for services?
4. Are the out-sourced municipal waste collection services defined, supervised and controlled by municipalities?
5. How many budget lines are there for SWM, do they talk to each other and what percentage of budgeted costs falls under the largest budget line?
6. How coherent and autonomous is the solid waste management function within the city? How high in the organisational chart is it necessary to go to find a manager responsible for ALL solid waste and recycling functions?

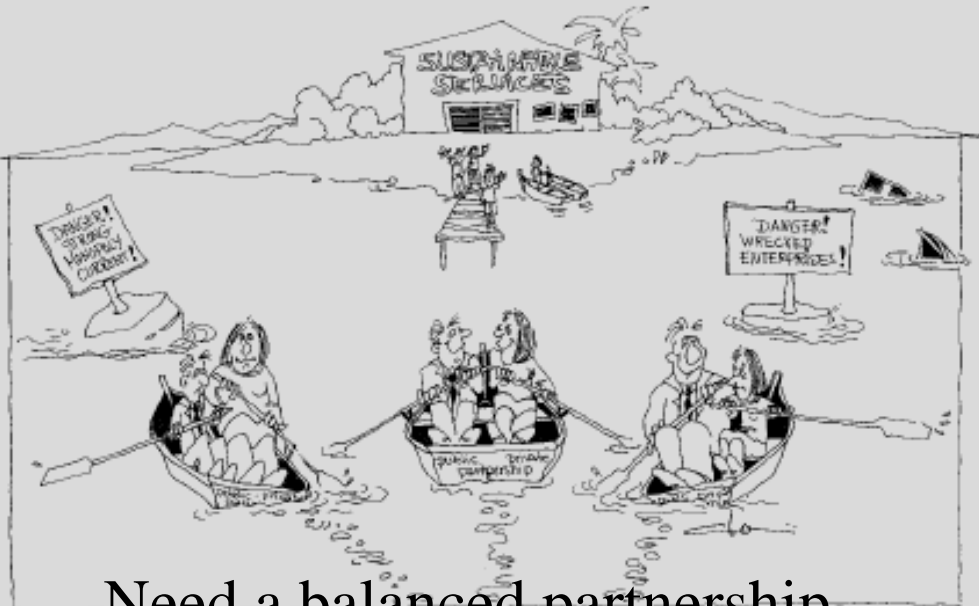
**As defined and used in the Habitat book*

Making Public-Private Participation Work

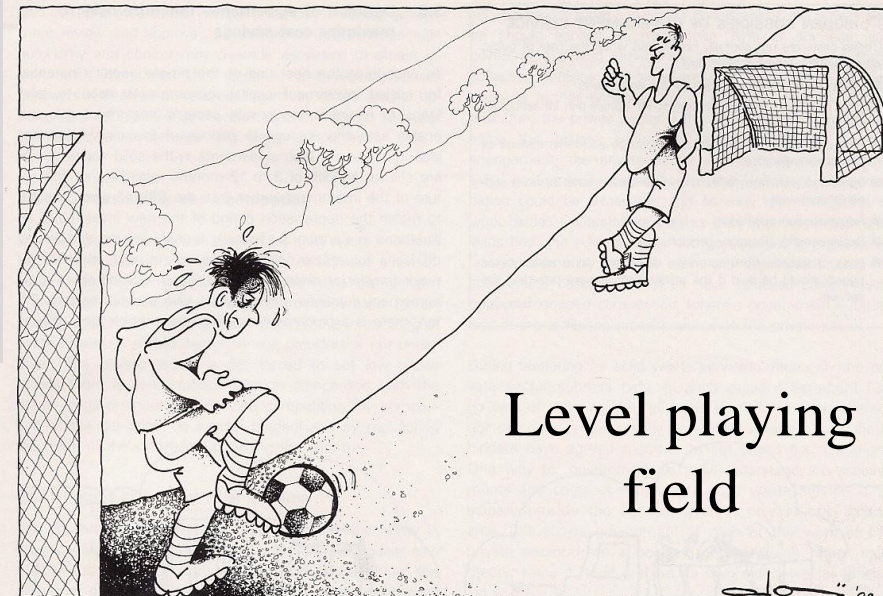
- *Municipality retains responsibility but delegates service delivery*
- Competition
- Transparency
- Accountability



Competition



Need a balanced partnership



Level playing field

Sources: Guidance Pack for Private Sector Participation in MSW, Cointreau/Coad, SKAT, 2000 ISBN 3-908001-90-0

A. Coad. Private Sector Involvement in Solid Waste Management - Avoiding Problems and Building on Successes. CWG Publications Series No 2, 2005. www.cwg.net.net

A Win-Win Partnership Strategy Between the Public & Private sectors

- Ensure a balanced partnership
 - Reasonable terms of performance
 - Adequate contract duration
 - Ensure regular and punctual payments
 - Balance commercial risk
- Build capacity of local private sector, including the ‘informal’ sector and CBOs
- Recognise existing role of informal sector

Pro-Poor Public-Private Partnerships - 5Ps

- Services by the poor for the poor
- Pioneered by ILO, e.g. in Dar-es-Salaam, Tanzania (right)
- Community based organisations (GIEs) provide collection in Bamako, Mali (below)



Photos 2009: Erica Trauba, Alodia Ishengoma



Kerbside sort in Rotterdam



Bring bins in Varna,
Bulgaria



Exchanging recyclables for
onions Siddhipur, Nepal

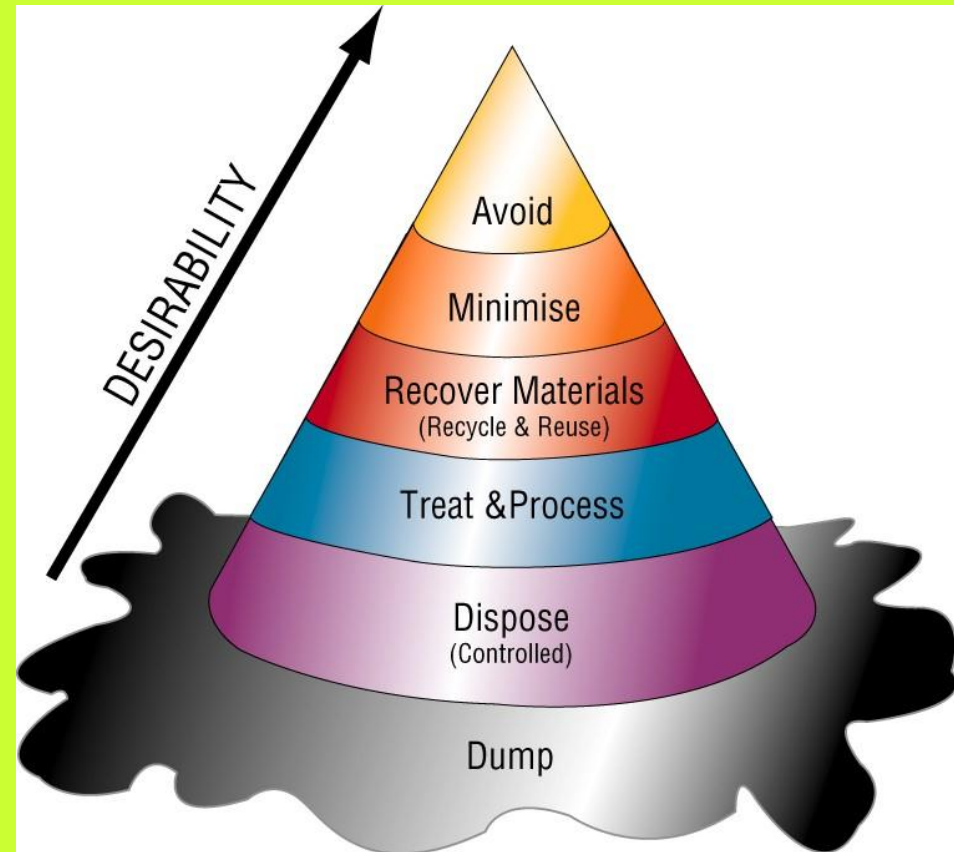
A diversity of approaches to separate collection for recycling

REFLECTIONS: *SUCCESS FACTORS*

Photo credits: © City of Rotterdam; Kossara Bozhilova-Kisheva; Bhushan Tuladhar

Priorities are defined by the physical requirements ...

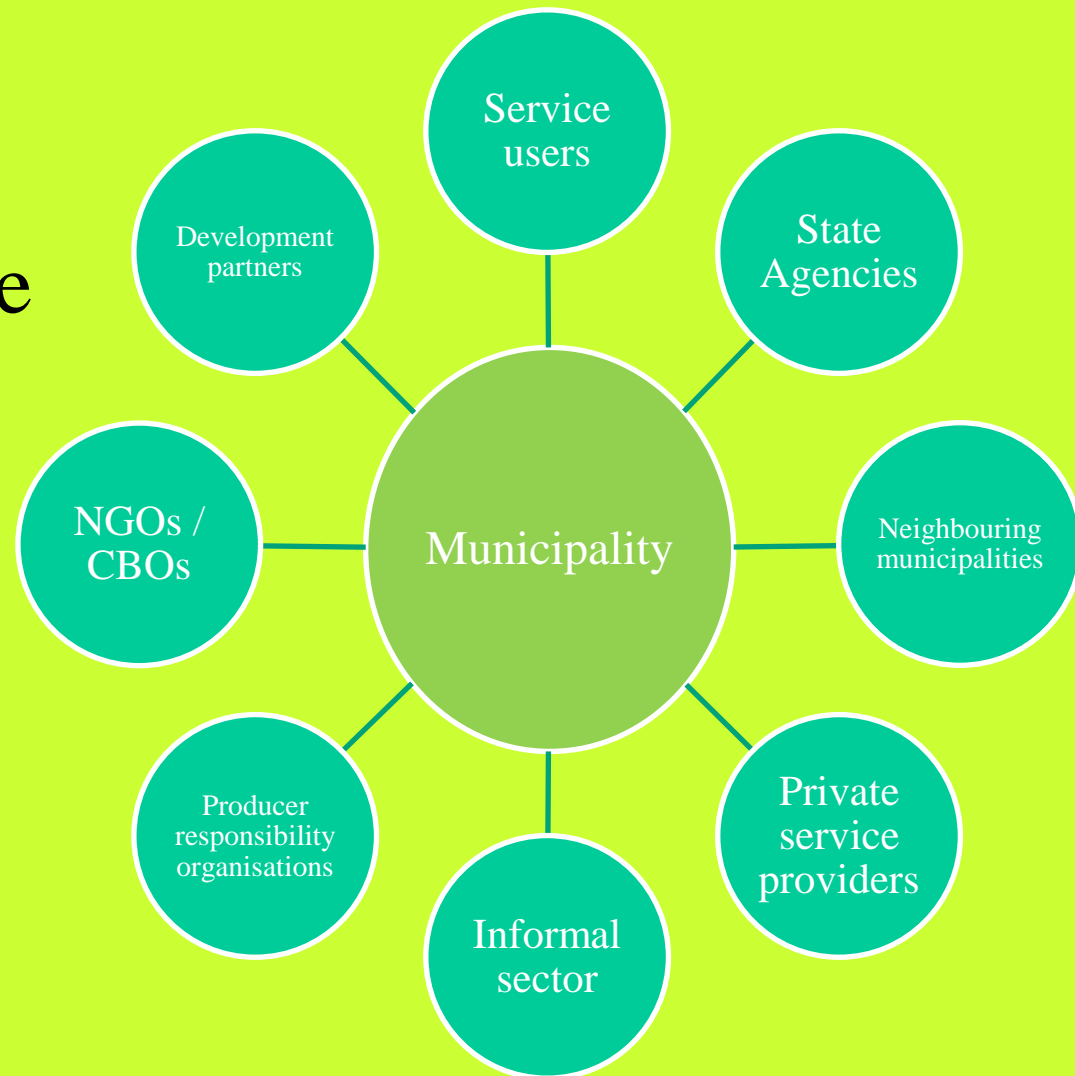
- Extend collection coverage
- Reduce waste generation
- Build recycling rates
- Eliminate open dumping
- Appropriate treatment



DCW's version of the waste hierarchy

.. but successful implementation requires good governance & partnerships

- Partnerships underpin all the Habitat governance factors
- Municipalities cannot solve the SWM problem alone



If you don't measure it, you can't manage it

e.g. always weigh waste

analyse waste composition



Kunming – weighbridge at incinerator



GIZ project in Mozambique

Need reliable and timely data

Quality and comparability of data is poor

- For too many numbers - not clear what they mean
- Definitions not consistent: for many cities, *total costs* bear no relation to *total budget*
- Recycling and recovery statistics mean different things
- The most basic statistic, *cost/ton* is impossible: neither costs nor tons clear
- ***A common methodology for data collection improves comparability – please use the Habitat template!***
- 20 cities now – aim for 50, 100, 200 ..

Conducting household waste survey, Managua
Measuring compost temperature, Dhaka



Success factors

- *No one size fits all – every city needs to develop its own local and sustainable solution*
- Commitment does more than money: several poor cities with good systems
- Building on what you have works
- *Including informal activities in formal reporting would make cities look a lot better*
- Technical ambitions need to be modified to achieve affordability: e.g. a sanitary landfill is worth nothing if it the city can't afford to use it

Thanks to ...

- *UN-Habitat for their leadership and funding*
- *the global community of practice (CWG) who did the work behind the Habitat book*
- *and most of all to ...*



One size does not fit all – large and small composting plants in Adelaide and Canete, Peru

... the millions of professional waste workers around the world



Clockwise from top left: Canete, Nepal, Delhi, Sousse, Cairo, Bengaluru, Dhaka, San Francisco, Rotterdam

Thank you for your
attention!

*The Habitat book is available at
www.earthscan.co.uk
- use discount code ISWA*

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