



Mercury containing Waste Capacity Building & Institutionalization



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United Nations Environment Programme
Division of Technology, Industry and Economics
International Environmental Technology Centre



Mandate



- UNEP Government Council decision (GC 25/8) on Waste Management GC25/8 implementation of an Integrated Waste Management (IWM) approach.
- The Bali Declaration, by Conference of Parties under Basel Convention, on Waste Management for Human Health and Livelihood re-confirms this decision.
- UN Commission on Sustainable Development (CSD) has also agreed to undertake waste as one of the focus areas for CSD 18



UNEP Activities on Waste



- ISWM Plan for Wuxi New District, China – Mar 08
- ISWM Plan for Pune City, India – Aug 08
- ISWM Plan for Maseru City, Lesotho – June 09
- ISWM Plan for Matale City, Sri Lanka – Oct 08
- ISWM Plan for Novo Hamburgo, Brazil – Aug 09
- ISWM Plan for Nairobi, Kenya – In progress
- ISWM Plan for Bahir Dar, Ethiopia - In progress
- ISWM Training Package on ISWM - online
- Regional Training for Africa in Mauritius – Mar 09
- Regional Training for Asia-Pacific in Osaka – Oct 09
- South-South Cooperation on ISWM – Bali 2008



UNEP Activities on Waste



- **E-waste management:**
 - Manuals on E-waste Inventory - [online](#)
 - Manual on E-waste Management - [online](#)
 - E-waste management Plan for Pnom Penh City, Cambodia
- **Converting agricultural waste biomass into a resource:**
 - Compendium of Technologies - [online](#)
 - Piloting in Nepal, Pakistan, Philippines and Sri Lanka – [In progress](#)
 - Recycling of waste palm trees in Malaysia – [under development](#)
- **Converting waste plastic into a resource:**
 - Compendium of technologies -
 - Baseline/Piloting in India, the Philippines and Thailand
- **Waste management in the context of climate change**
- **Destruction Technologies for Hazardous Waste – 2010-11**



Publications on Waste



- Resource Augmentation in Viet Nam
- E-waste Inventory Manual
- E-waste Management Manual
- Waste Characterization & Quantification
- Assessment of Waste Management System
- Target Setting and Issues of Concern for ISWM
- How to develop ISWM Plan
- Compendium of Technologies for Converting Waste Agricultural Biomass into Resource
- Compendium of Technologies for Converting Waste Plastics into Resource
- Assessment Methodology for Waste Plastics
- Sustainability Assessment of Technologies (SAT) Framework (Draft)
- Waste and Climate Change



Proposed functions of UNEP-led strategy



1. Strengthening national institutions
2. Strengthening national networks
3. Supporting preparation of country programmes
4. Building awareness and capacity
5. Supporting development of appropriate regulations and policies
6. Technology identification and selection
7. Funding incremental costs of hardware and operations
8. Supporting international networking and cooperation
9. Enabling stakeholder involvement



Key Areas for Capacity Building



1. Data collection – technical capacity, cost and time
2. Development and implementation of ISWM or WEEE/E-waste management plan based on 3R approach covering:
 - Identification of appropriate policies (regulatory and fiscal) and development of a policy framework
 - Identification and implementation of environmentally sound technologies (EST)
 - Risk management, especially for informal sector



Key Areas for Institutionalization



1. Inventory Cell – Due to dynamic nature of data

2. Implementation of WEEE/E:
 - Coordination among various departments managing different waste streams

 - Stakeholders' participation (waste generators, service providers, regulators/government, recyclers and community)



Capacity Building Process



E-WASTE VOLUME I

http://www.unep.or.jp/Ietc/Publications/spc/EWasteManual_Vol1.pdf

http://www.unep.or.jp/Ietc/Publications/spc/EWasteManual_Vol2.pdf

Inventory Assessment Manual E-waste Management Manual

E-WASTE VOLUME II

**Capacity building of local partners on
E-waste Inventory and Management:**

**Training and application of manuals
through pilot projects**



Awareness Raising



1. Government (National & Local) – All relevant departments
2. Stakeholders (waste generators, service providers, informal and formal businesses)
3. Civil society and academia
4. Project Team



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Capacity Building



Project team consists of:

- National government (Environment, Industries, Customs, etc.)
- Local government (provincial and local government)
- Local experts from academia and non-profit organizations





Data/Information Collection



1. WEEE / E-waste Inventory
2. Current management system for WEEE / E-waste
(Policies/Regulations, Institutions, Financing Mechanisms, Technology and Stakeholders' role)





Major EEE Markets in PP

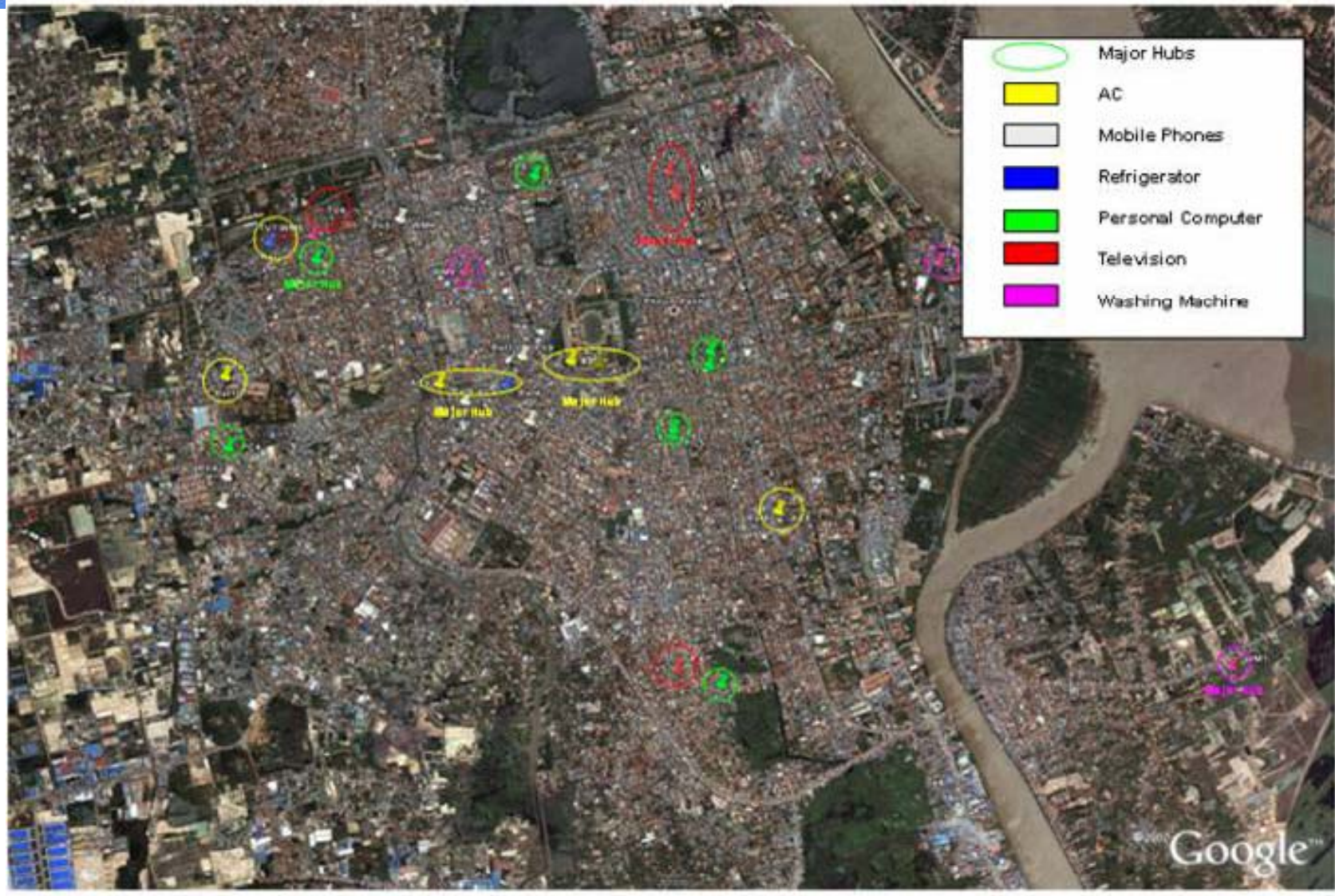




Formal & Informal Sectors



EP



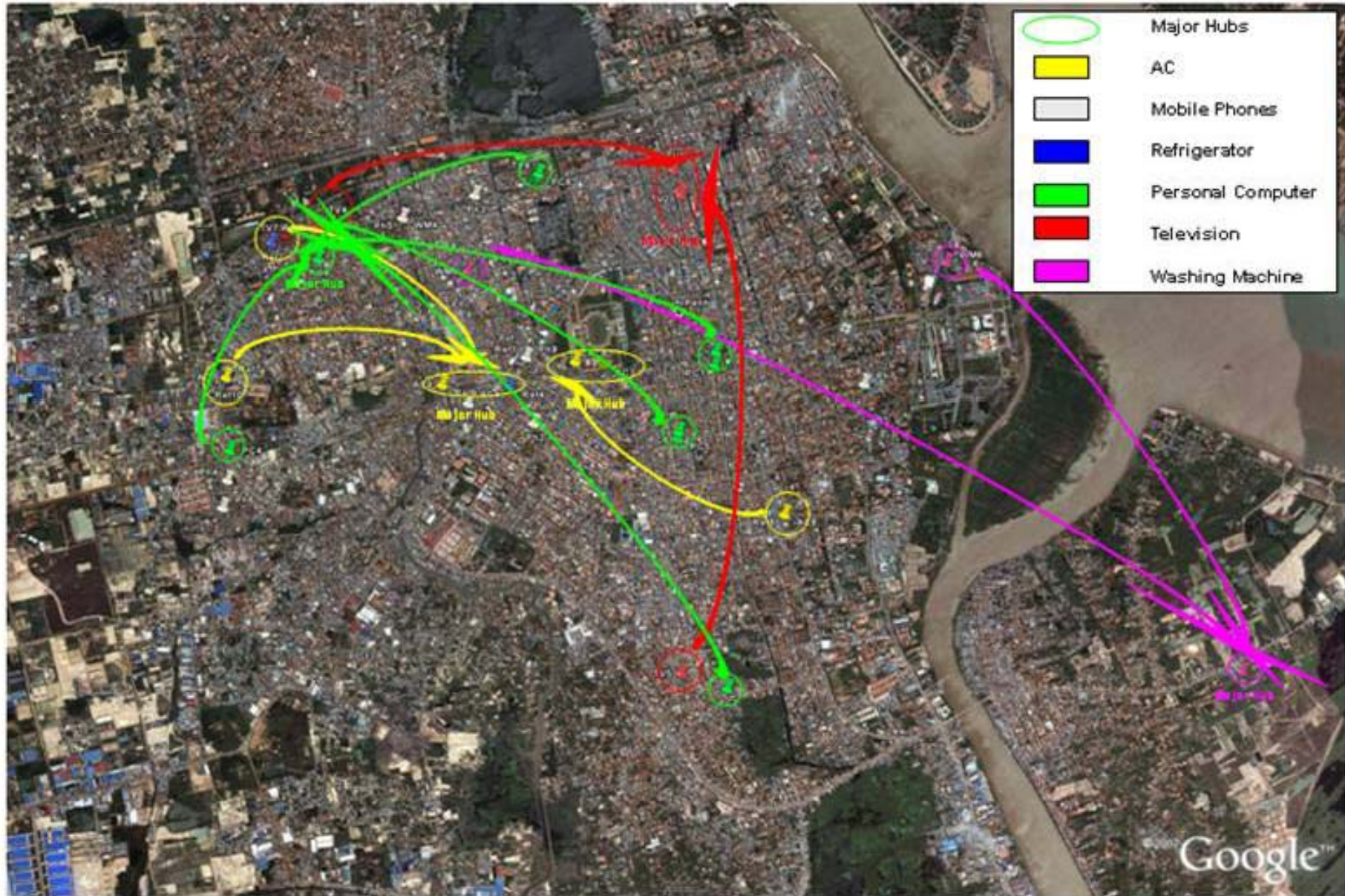
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Mapping of Trade Value Chain





E-waste Inventory



Year	TV	PC	MP	Fridge	Air Con.	Washing Machine	Total
2008	41746.44	106781.85	189756.39	19851.35	18736.18	20881.99	397754.20
2009	54398.75	109228.35	269227.20	20821.86	19741.84	21891.25	495309.25
2010	69142.10	111858.79	330980.65	21609.34	20699.28	22949.29	577239.44
2011	85977.85	110495.94	380627.75	26471.10	23524.00	24058.47	651155.11
2012	104907.47	120616.08	412976.40	25950.54	23968.12	25221.26	713639.87
2013	109310.61	122996.01	474922.86	27263.19	25276.98	26440.24	786209.90
2014	144272.21	125514.78	546161.29	28494.58	26592.70	27718.14	898753.71
2015	179260.95	128093.01	628085.49	30575.25	28336.24	29057.81	1023408.74
2016	215480.22	130672.39	722298.31	32580.81	30095.06	30462.22	1161589.01
2017	251974.02	135884.57	775737.80	33905.56	31600.06	31934.51	1261036.52
2018	277661.25	139911.21	851637.30	46184.10	54556.21	33477.96	1403428.03
2019	306104.71	143862.16	929820.20	65124.09	76763.43	35096.00	1556770.59



E-waste components



Year	Iron	Non Iron Metals	Glass	Plastic	Electronic Component	Others
2008	3079.60	607.16	1344.61	1190.69	618.63	536.39
2009	3215.72	654.27	1631.38	1321.58	670.42	575.46
2010	3352.26	704.19	1963.86	1466.61	729.53	616.22
2011	3612.69	781.28	2329.34	1638.02	780.48	694.86
2012	3805.79	844.78	2779.48	1845.46	884.48	732.19
2013	3948.59	880.25	2887.15	1914.54	910.41	767.17
2014	4149.11	974.00	3658.63	2220.17	1033.21	839.82
2015	4388.93	1075.45	4431.73	2534.83	1156.93	920.82
2016	4630.82	1179.69	5231.77	2859.79	1284.55	1003.68
2017	4882.07	1284.10	6046.56	3192.85	1424.08	1082.34
2018	5968.98	1629.66	6630.21	3612.52	1553.40	1295.49
2019	7249.20	1991.58	7277.99	4091.08	1690.06	1558.87



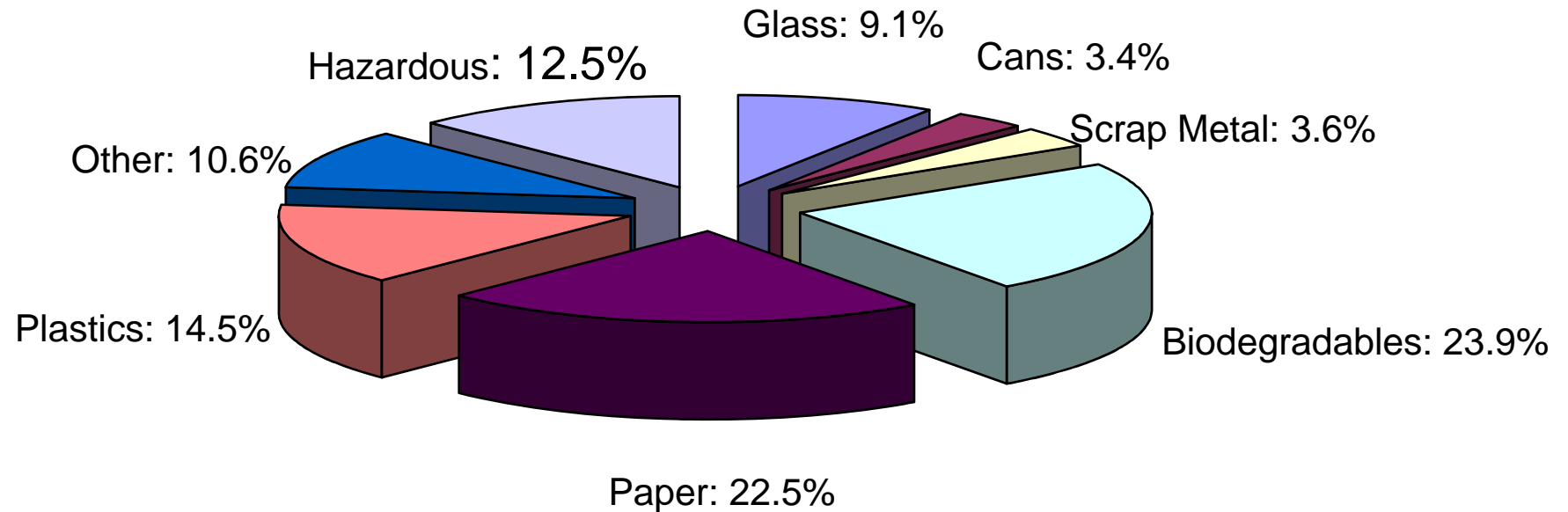
Waste Inventory for WND, China



Types of Waste according to the source generation	Waste generation (tons/day)		
	Baseline Study (2006)	2010	2020
Municipal waste from residential and commercial sources	333	390	560
Municipal waste from industries	82	100	140
Municipal waste from all sources	415	490	700
Industrial non-hazardous waste	586	692	988
Industrial hazardous waste	82	97	138
Hospital waste – total	0.3	0.4	0.5
Hospital waste – hazardous	0.2	0.3	0.4
Sludge	8	10	19
Construction & demolition debris	32,805	38,733	55,333



Waste Inventory for Maseru, Lesotho





Waste Inventory for Pune, India

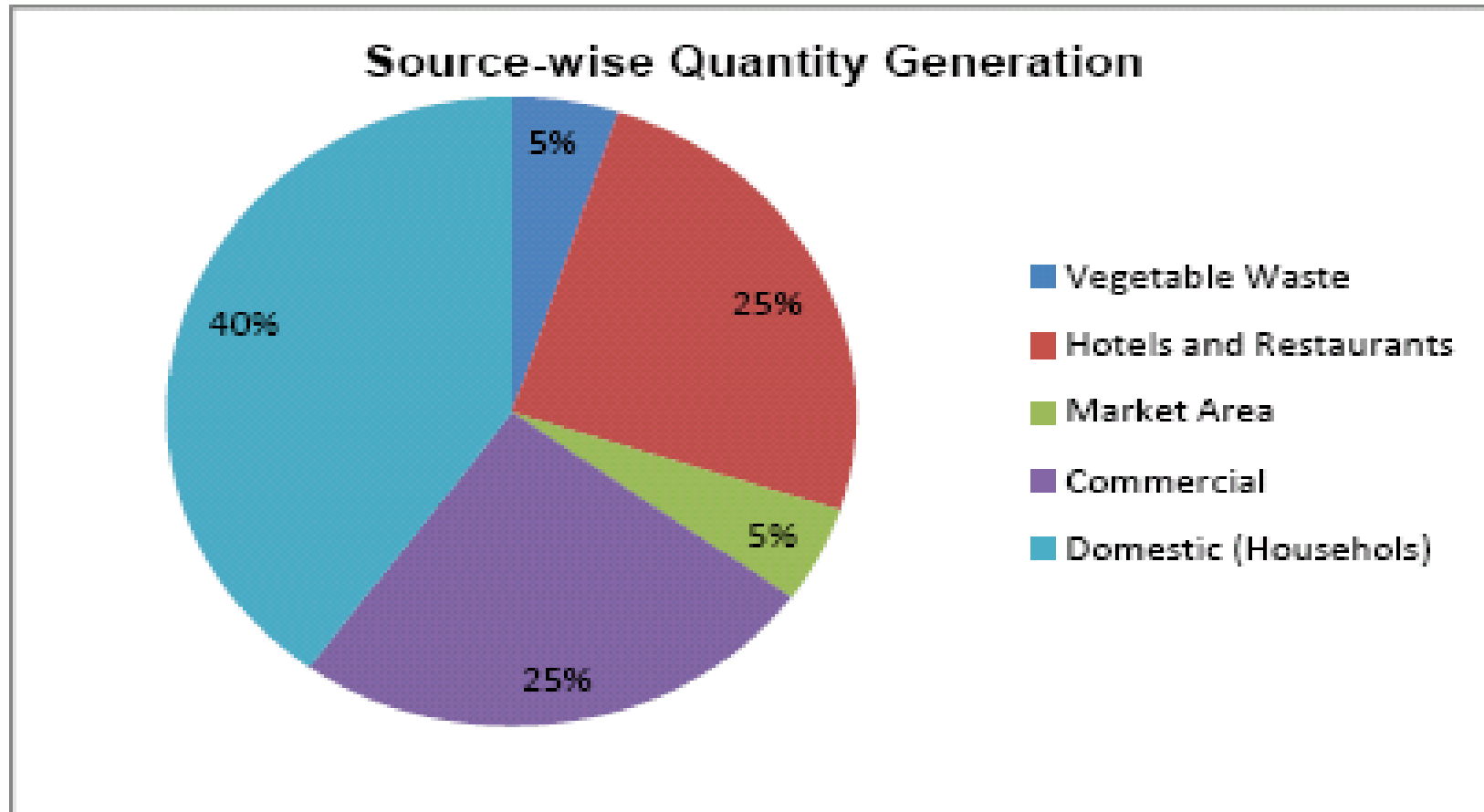


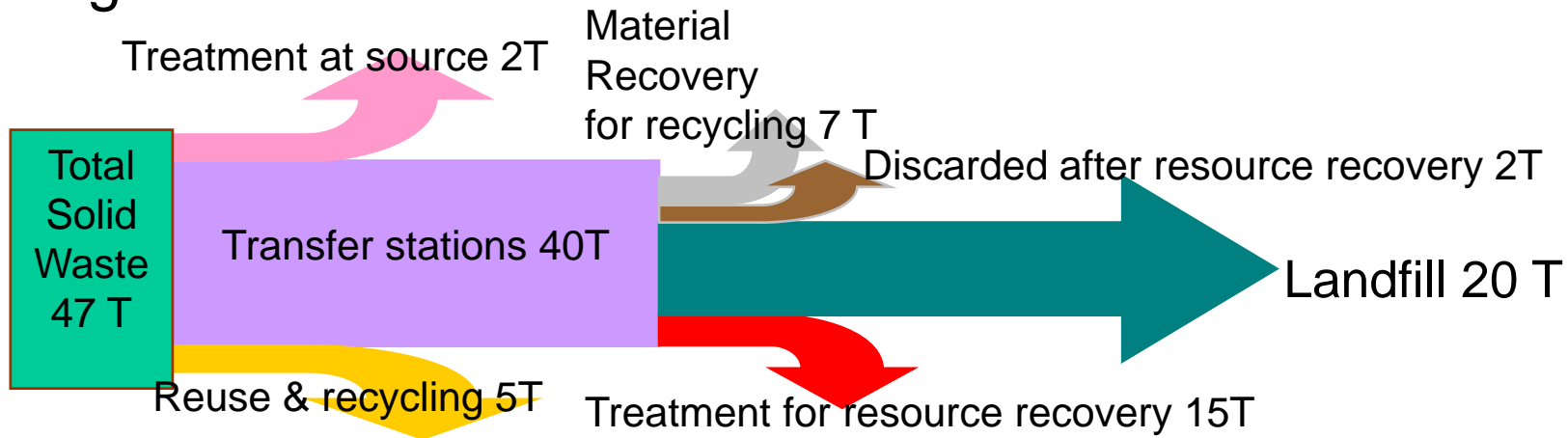
Figure 4.4: Source wise Quantity of Waste Generation in Pune⁴⁰



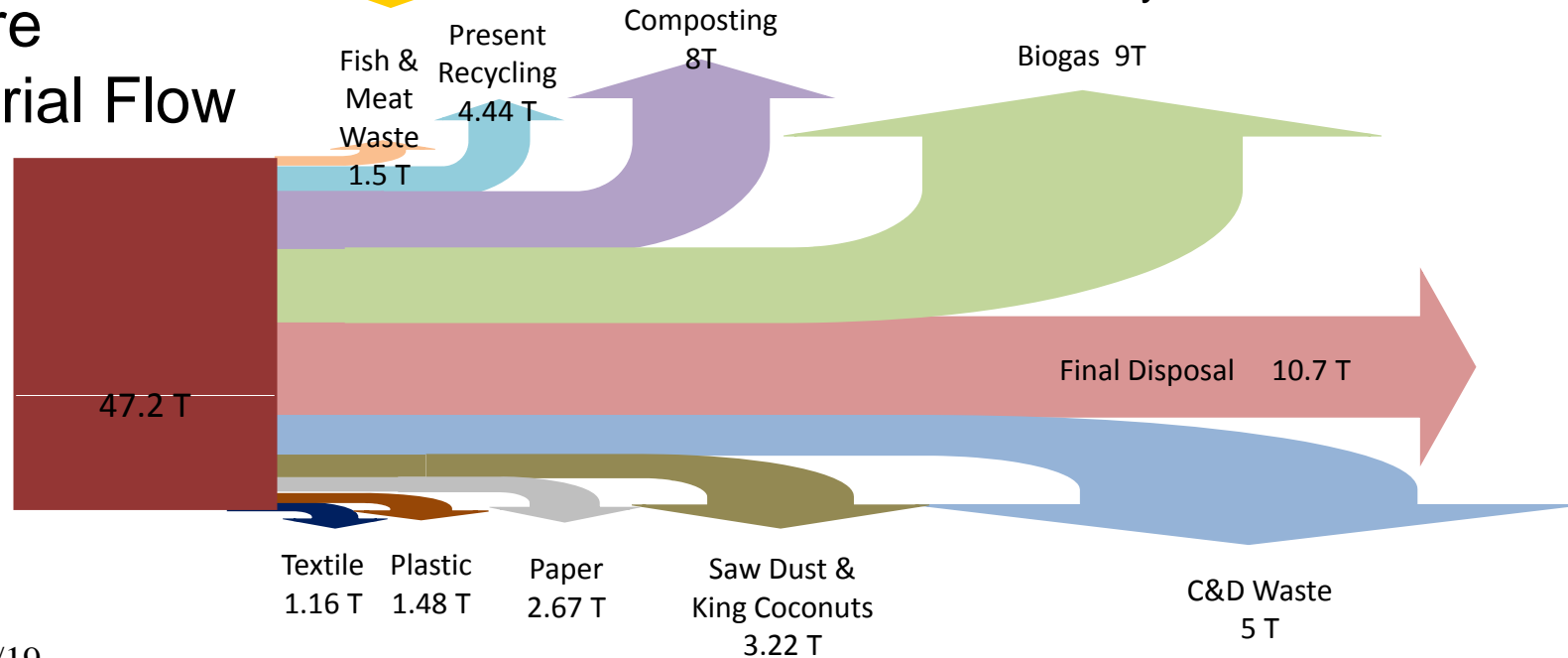
Matale- Sri Lanka



Existing Material Flow



Future Material Flow





Nairobi, Kenya



<i>Zone</i>	<i>Area km2</i>	<i>zonal total (tonnes/ day)</i>
<i>Embakasi</i>	182.7826587	1257.370058
<i>Dagoreti</i>	37.13374206	225.0527098
<i>Westlands</i>	98.59296449	601.7034426
<i>Kasarani</i>	86.15649606	488.8728118
<i>Makadara</i>	19.60399945	136.9982422
<i>Kamukunji</i>	6.524124738	44.03501624
<i>Starehe</i>	8.126581373	681.4728564
<i>CBD</i>	2.613841564	5.228682047
<i>Lang'ata</i>	93.09927529	482.9907384
<i>Nairobi</i>	696.1	3923.724558

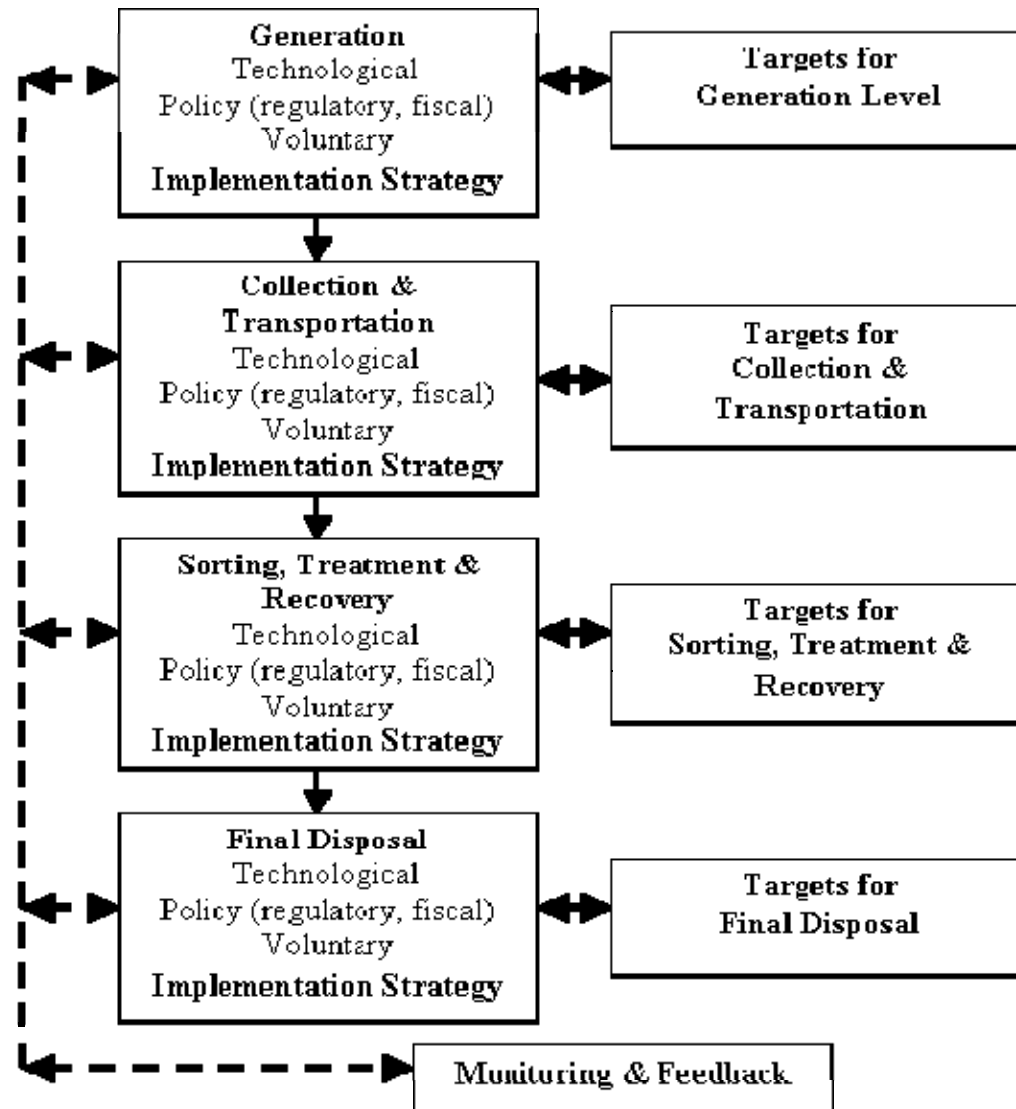
	Starehe			Makadara			Westlands		
AVG Hsize	5.6			5.2			5.0		
Category	5 Day Total	Daily	%	5 Day Total	Daily	%	5 Day Total	Daily	%
Organic	7.31	1.46	59.0	6.66	1.33	57.6	9.75	1.95	63.0
Paper	1.90	0.38	15.3	1.20	0.24	10.4	1.09	0.22	7.0
Plastic	1.87	0.37	15.1	1.80	0.36	15.6	1.72	0.34	11.1
Glass	0.26	0.05	2.1	0.25	0.05	2.2	0.51	0.10	3.3
Metal	0.17	0.03	1.4	0.26	0.05	2.2	0.66	0.13	4.3
Others	0.88	0.18	7.1	1.39	0.28	12.0	1.76	0.35	11.3
Total	12.39	2.48	100.0	11.56	2.31	100.0	15.48	3.10	100.0
Per Cap/ kg/daily		0.45			0.45			0.62	



Management Plan

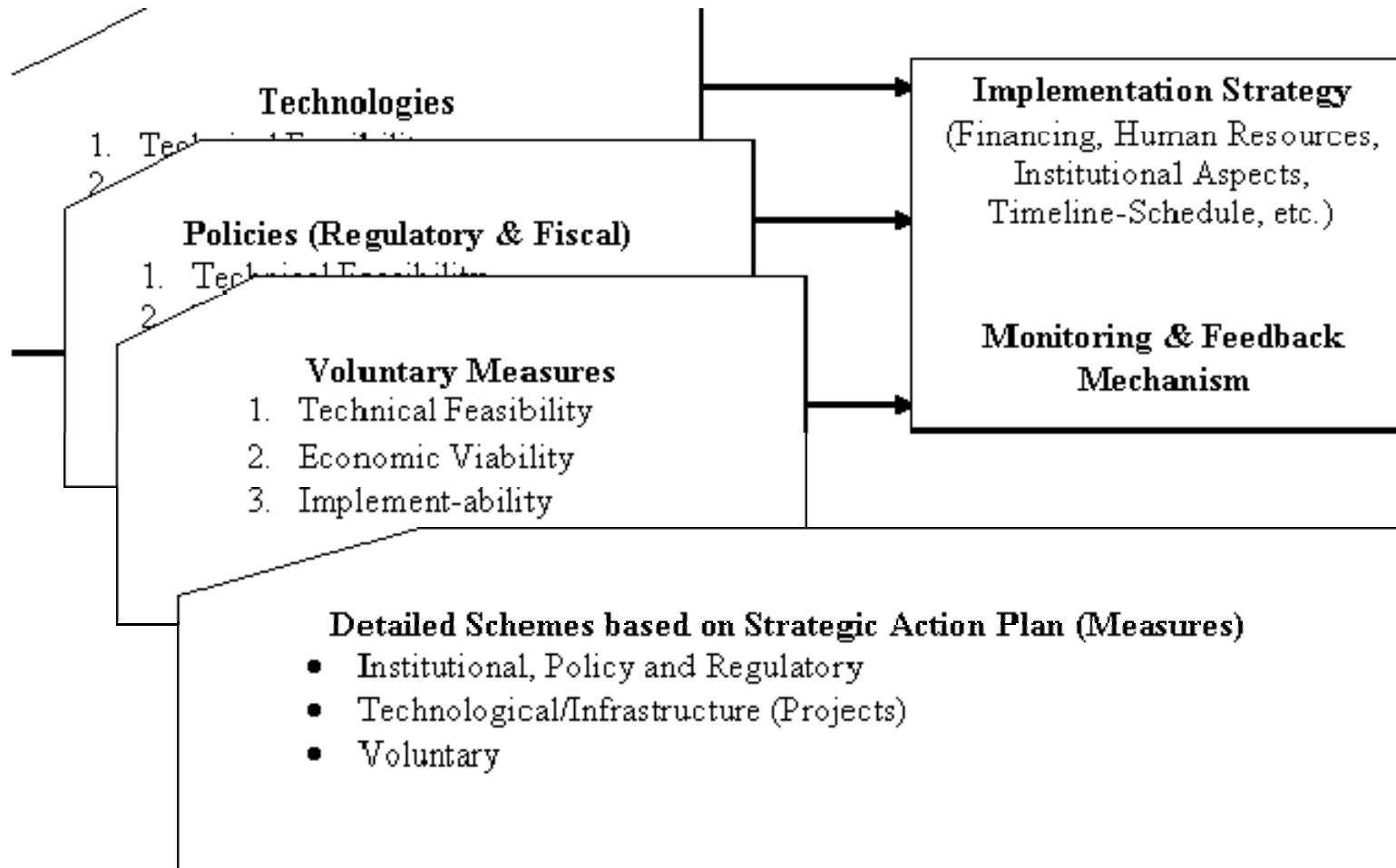


Management System





Implementation of the Plan



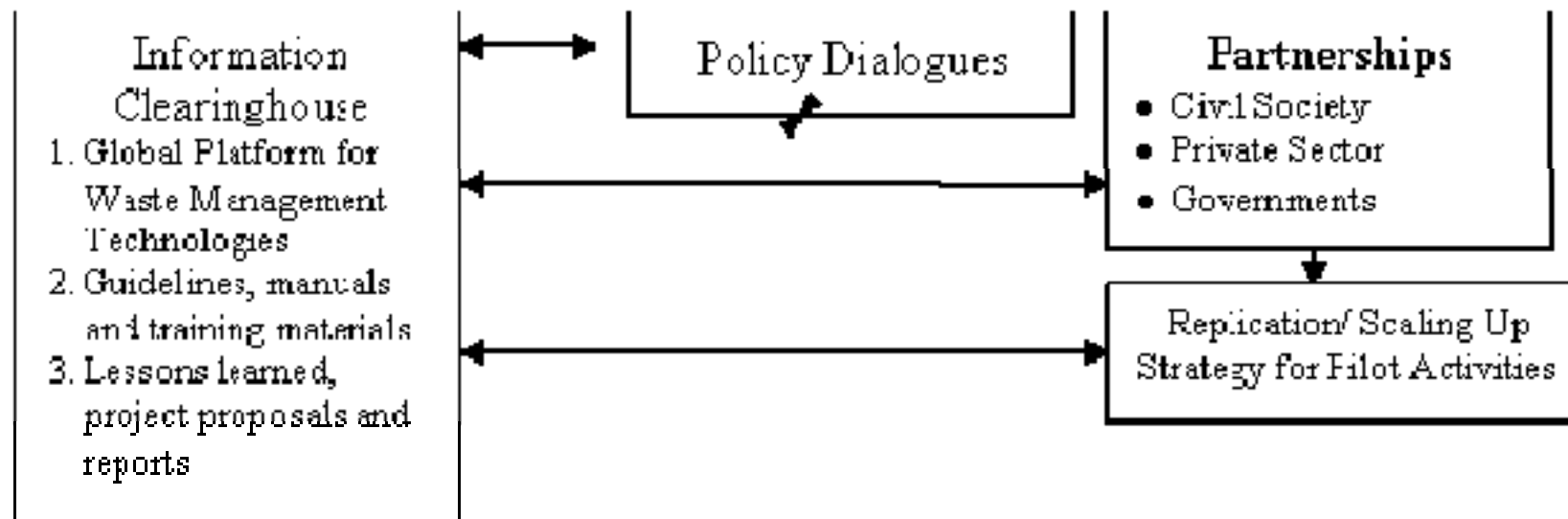


Framework for Facilitation



Global Platform on Waste Management (GPWM)

Supported by: International Agencies, Governments, Forums,
MEAs, GC, COPs, CSD





Future Activities



1. Regional training workshop for Asia-Pacific on WEEE/E-waste— tentatively August 2009 in Osaka, Japan
2. Pilot projects on E-waste management
3. ISWM plans for cities
4. Destruction technologies for hazardous waste, e.g. mercury containing wastes
5. Global Platform on Waste Management



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Thank You...

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