Municipal Solid Waste Management in Sri Lanka
: Present status and future perspectives

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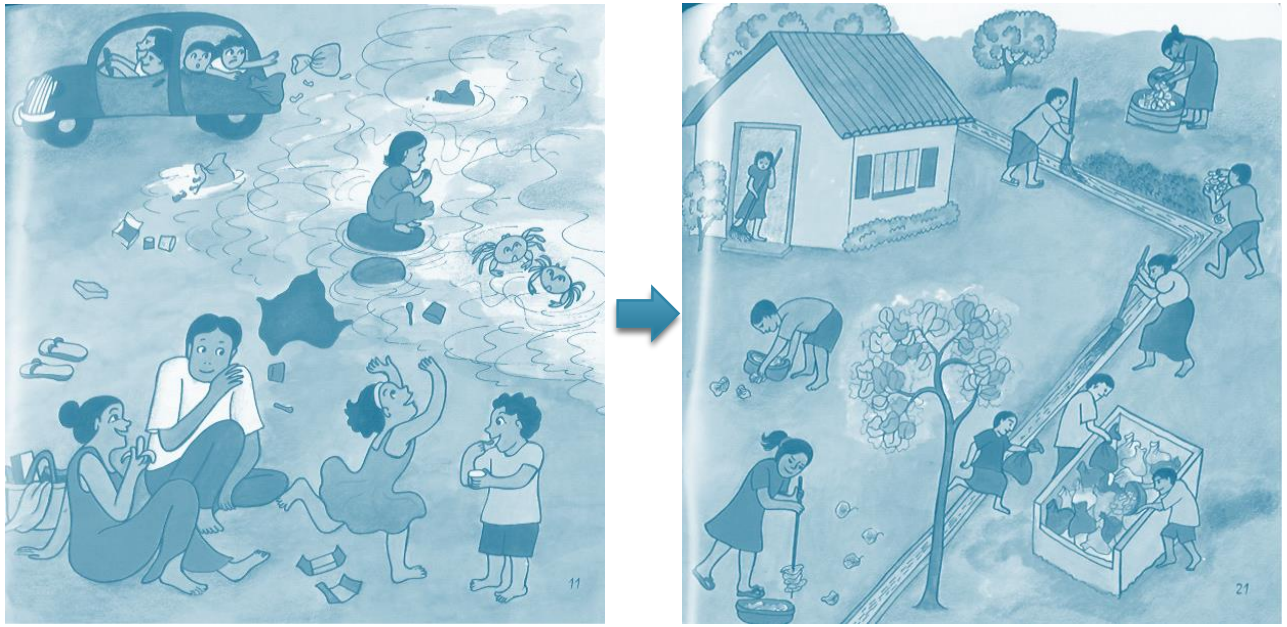
PRESENTATION OUTLINE

1) Legal and institutional setup
2) Historical developments (up to end of 90's)
3) Recent development activities (International donor projects, NGOs, Government initiatives etc.)
4) Academic research and developments
5) Issues and challenges, and future perspectives



SRI LANKA: STATE-ADMINISTRATION AND POLITICAL STRUCTURE

Civil Service (Public Administration)

-Public Administration, Civil Registration etc.

Minister (Secretary)

Ministry of Public Administration and Home Affairs

District Secretary

District secretariat/ Government agent (25)

Divisional Secretary

Divisional secretariat/ Divisional secretary

Grama Niladari

Village/ Village officer + Development officer

Political structure

- Public services, rural-development, SMW etc.

Minister (Secretary)

Ministry of Provincial Councils and Local Governments

Governor; Chief-minister; Ministers; Members (Secretary)

Provincial Councils (9)

LOCAL AUTHORITIES

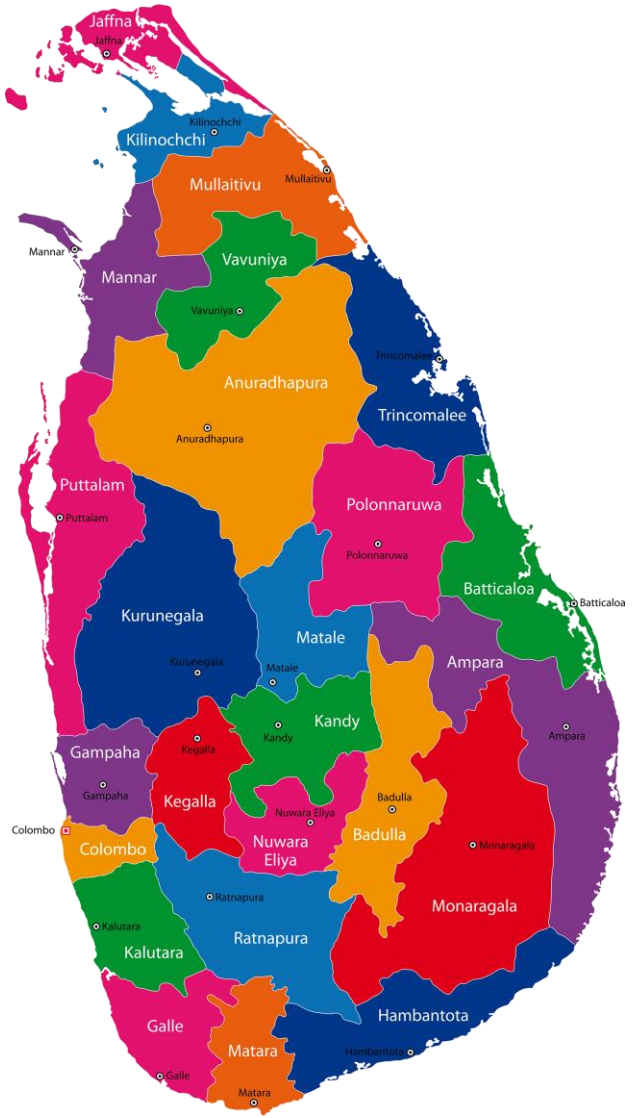
(Mayor, Chairman, Commissioner, Secretary)

Municipal/ Urban Council

Pradeshiya Saba

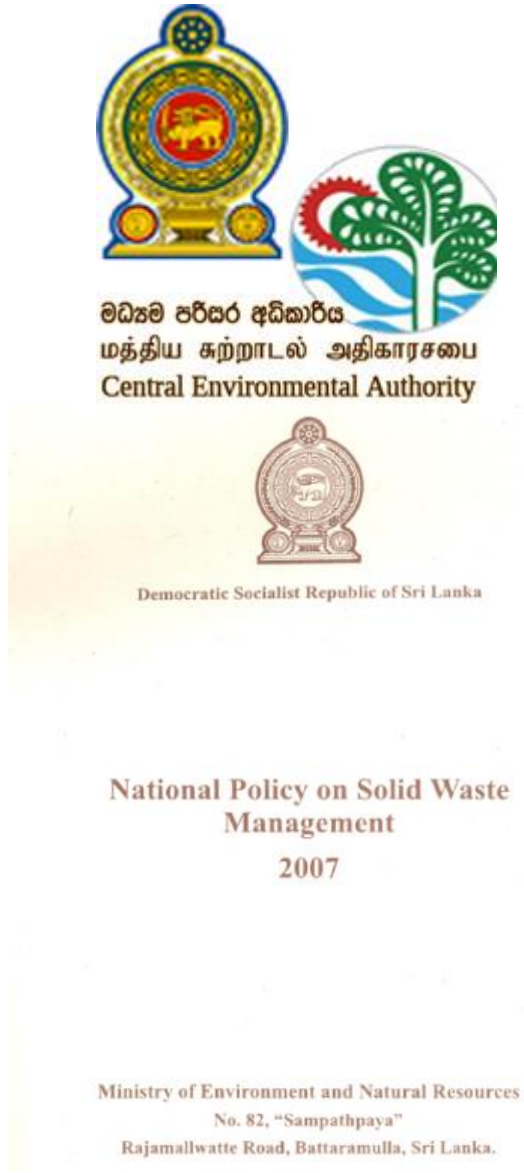
SRI LANKA: LEGAL FRAMEWORK FOR MSWM

- **Municipal Council Ordinance (29 of 1947 ~ 57 of 1979)**
  - Cleaning and sweeping of streets & paths
  - Refuse/ garbage >>>>>> property of MC
  - Provide place convenient for disposal of refuse
- **Urban Council Ordinance/Act (61 of 1939 ~ 22 of 1955)**
  - Promote public health and sanitation
  - Maintain and cleanse all public thoroughfares and open spaces
  - Refuse/ garbage >>>>>> property of UC
- **Pradeshiya Sabha Act. (15 of 1988- 14 of 1999)**
  - Cleaning and sweeping of streets & paths
  - Refuse/ garbage >>>>>> property of PS
  - Proper disposal of refuse & night soil



SRI LANKA: FRAMEWORK FOR ENVIRONMENTAL MONITORING

- National Environmental Act (No. 47 of 1980)
  - Establishment of Central Environmental Authority
  - Monitoring & regulation
  - Project approval (EIA, IEE, Environmental license etc.)
- Central Environmental Authority (CEA)
  - Assessment of environmental impacts
  - Environmental monitoring
  - Approvals and licensing
- National Policy on Solid Waste Management
  - Environmental accountability & social responsibility
  - Active involvement of stakeholders
  - Maximize resources recovery & minimize final disposal
  - Minimize adverse impacts on human & environment



HISTORY OF WASTE DISPOSAL INFRASTRUCTURE DEVELOPMENT

- In year 1994: Proposal to build a Sanitary landfill at Welisara, Colombo MC (Western Province) – under Colombo Environmental Improvement Project (World Bank)
  - ➢ USD 49 mn allocated, EIA approval (1994) granted, given up due to public objections
- In 999: Proposed to build a Sanitory Landfill at Alupotha Division, Salawa Estate (Western Province)- under Colombo Environmental Improvement Project (World Bank)
  - ➢ USD 12mn, for Greater Colombo Area, EIA approval (1998), Project withdrawn (World Bank)

FRAGMENTED APPROACHES BEFORE 90'S

MSW composting facility at Chilaw, North Western Province. Funded by Ministry of Environment; operated by an NGO. No sufficient funds for operation and maintenance, and poor compost sales. [90-00's]

A community based MSW composting facility at Madapatha, Ratmalana (Western Province). Windrow composting of ~1T/d of market waste. No sufficient funds for operation and maintenance, and poor compost sales. [90-20's]

Centralized composting system managed by Badulla Municipal Council (Uva Province). Windrow composting of ~2 T/d of market waste. No sufficient funds for operation and maintenance, and poor compost sales. [90-20's]

- Small scale composting and organic waste recycling facilities in several small townships

FRAGMENTED APPROACHES IN 90'S

Action Plan for Change

The government invited the private sector to submit expressions of interest to safely dispose the wastes, since disposal is the bottleneck. The submissions vary from very sophisticated systems to more realistic solutions backed by scientifically and technologically sound systems. As at present, a large composting project, a private sector initiative convert some of the wastes collected from the Colombo Municipal Council.

INITIATIVES BY JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

- THE STUDY ON IMPROVEMENT OF SOLID WASTE MANAGEMENT IN SECONDARY CITIES IN SRI LANKA, JICA Study Team (Kokusai Kogyo Co., Ltd.): 2002-2003
- Comprehensive studies on waste management system at seven secondary cities in Sri Lanka (Gampaha, Negombo, Chilaw, Kandy, Matale, Nuwara Eliya, Badulla)
- Pilot projects in few cities (Disposal infrastructure, collection improvement, recycling promotion, public awareness raising, human resource development)
- Span into second phase 2006-2011 through establishment of National Solid Waste management Support Center (2007)
  - Institute affiliated to Ministry of Local Government and Provincial Council
  - Theme " More Comfortable Environment for All "
  - Priorities 1st : Waste minimization; 2nd : Maximum resource recovery; 3rd : Sanitary landfilling of waste (lowest priority)
  - Assist LA in planning, designing, securing financial resources and overall coordination in the country
- Assist Local authorities for technical, management and operational aspects through JICA Experts (Kokusai Kogyo Co., Ltd.)

STATUS IN 2002-2003: STUDY BY SWM IMPROVEMENT IN SECONDARY CITIES (JICA)

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PILOT PROJECTS – JICA FUNDED SWM IMPROVEMENT IN SECONDARY CITIES

Improvement of **Moonplains** dumpsite at **Nuwara Eliya** to a Semi-Engineered landfill Facility






PILOT PROJECTS – JICA FUNDED SWM IMPROVEMENT IN SECONDARY CITIES

First dumpsite rehabilitation and landfill development project in Sri Lanka

Completed in end of 2003






PILOT PROJECTS – JICA FUNDED SWM IMPROVEMENT IN SECONDARY CITIES

Improvement of **Gohagoda** dumpsite at **Kandy** by stabilizing slopes and improving facilities






NATIONAL SOLID WASTE MANAGEMENT SUPPORT CENTER (2007- DATE)

Support for composting facility establishment, collection facility improvement, recycling centers, public awareness, training etc.

DELEGATION OF MSW AUTHORITY TO PROVINCIAL GOVERNMENTS

- Western Provincial Council established the Waste Management Authority in 2004, in order to act upon their commitment on waste management under the statute No 09 of 1999. To further strengthen of the legal status on Waste Management the Statute was amended as No. 01 of 2007.
- Solid Waste Management Rules No 01 of 2008 were introduced via the Extraordinary Gazatte No 1560/6 on 30th July 2008 to get the legal support to implement the seven management steps

National Policy → **3R Concept**

Provincial Strategies/Rules
- ❑ "Zonal Concept" of Waste Management
- ❑ "Seven Steps" of Municipal Solid Waste Management
- ❑ Municipal Solid Waste Management Rules No 01 of 2008

Implementation
- ❑ Master Plan
- ❑ Provincial Targets
- ❑ Programs

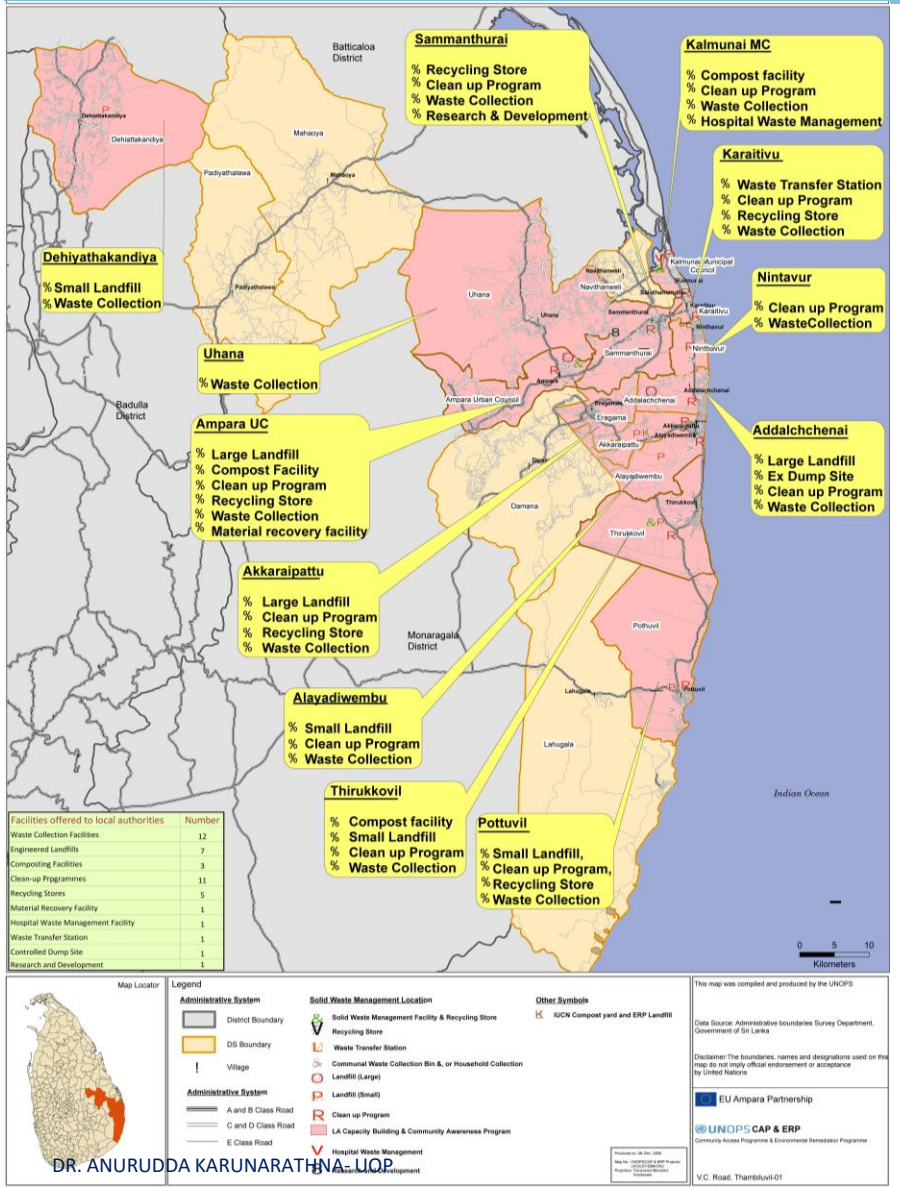
FIRST SANITARY LANDFILL AT DOMPE, GAMPAHA

- KOICA granted LKR 600 million as an aid for the program and it is implemented through “Export Development Cooperation Fund” (EDCF) for sanitary landfills and small scale composting plants. The second landfill is constructed at Dompe at a cost of US $ 4.5 million as a grant with a counter part funding of US $ 1.5 million.
- Started operation in 2014 (5-10 T/d, and recently increased to 50 t/d)





EU FUNDED ENVIRONMENTAL REMEDIATION PROGRAMME (ERP)- AMPARA



The environmental remediation programme (ERP) phases i & ii for the Ampara district (eastern province) improving solid waste management and surface water drainage in Sri Lanka [Eur 9.71 million (ERP i) | 2.13 million (ERP ii). Technical support from United Nations Office for Project Services (UNOPS)

WMA-WP IMPLEMENT FIRST WASTE TO ENERGY FACILITY

- Fairway Waste Management is developing a solid waste processing facility to address the roughly 500+ Tons Per Day (TPD) of waste received at the site.
- The design consists of a biological treatment plant that will process the fast degradable, high moisture content organic waste in a wet fermentation anaerobic digestion system. This system will treat a maximum of 140 TPD of degradable organic waste per day. The remaining waste will be diverted to an incinerator facility having a capacity of 500 TPD.

A 22- year Concession Agreement for a Public-Private Partnership

ARUWAKKALU SANITARY LANDFILL DEVELOPMENT PROJECT

- ✓ Ministry of Megapolis and Western Development- Metro Colombo Solid Waste Management Project
- ✓ A municipal solid waste disposal system including sanitary landfill, transfer station, rail transportation improvement

SUSTAINABLE SOLID WASTE LANDFILL MANAGEMENT IN ASIA [UOP]

Landfill Bioreactor test cell (52t)- UoP 2007

Inclined Step Grate Composting System - 1997

Forced aerated Composting System - 2001

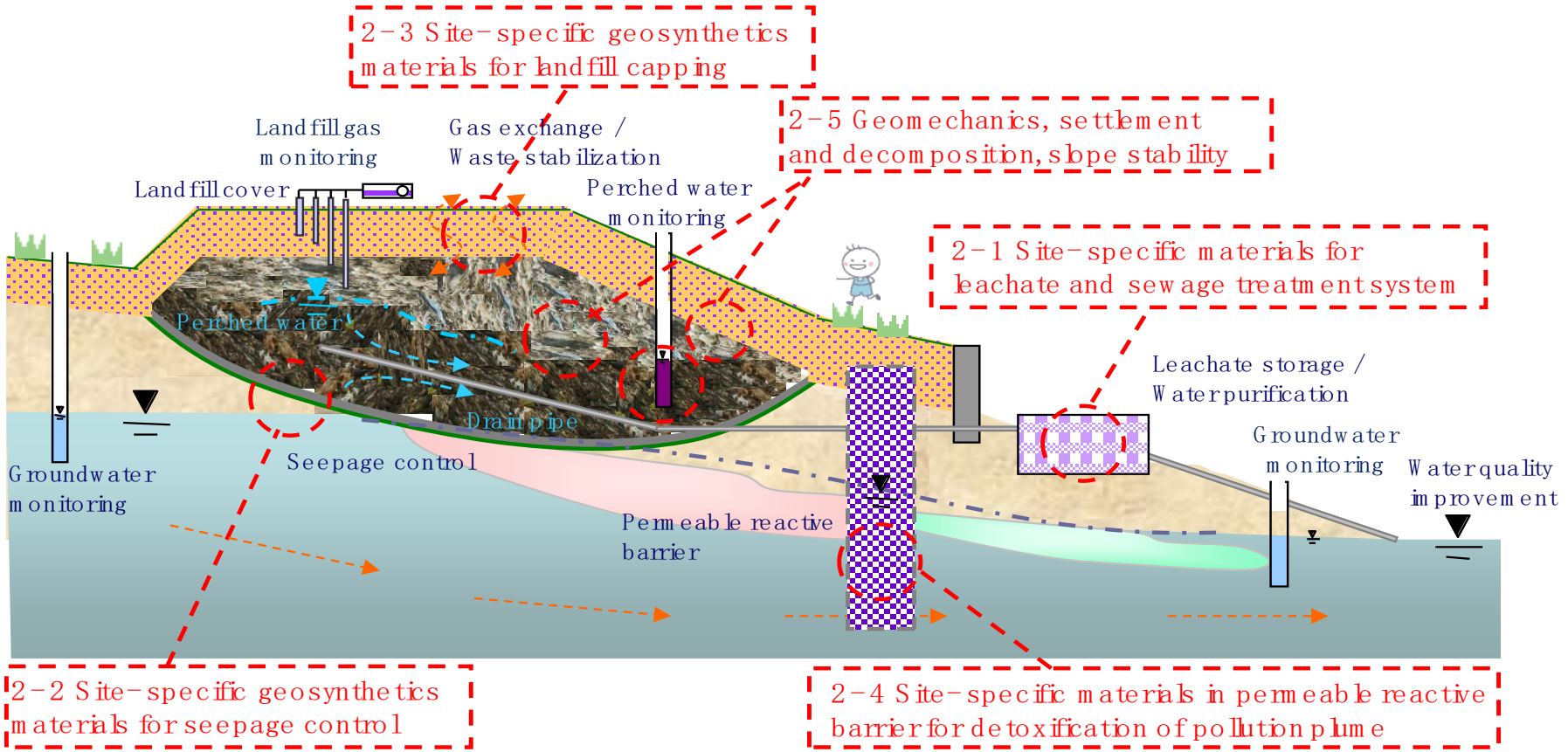
MSW organic waste Pyrolysis- BIOCHAR - 2012

Education & training programs for practitioners

Collaborative research on MSW bio-drying

SATREPS PROJECT (SRI LANKA – JAPAN)

- ✓ SATREPS Project: Site-Specific Pollution Control and Remediation Techniques for Waste Dumping Sites in Sri Lanka
- ✓ Overall goal: Develop site-specific pollution control and remediation techniques for waste dumping sites and propose a guideline for sustainable design and construction of waste dumping sites in Sri Lanka



- ➢ Activity 1: Identify policy framework of solid waste management in Sri Lanka and recognize and assess components of social capacity
- ➢ Activity 2: Define methodology of appropriate site selection for new landfills
- ➢ Activity 3: Monitor existing landfills and its surroundings
- ➢ Activity 4: Develop pollution control and environmental restoration techniques for waste landfill sites
- ➢ Activity 5: Finalize the guide for sustainable and applicable planning, maintenances and operations for waste landfills

SATREPS PROJECT IMPLEMENTATIONS (2017-2018)- JICA FUNDS

Pollution Control and Reduction of Environmental Burden in Solid Waste Management (ReEB Waste)

Consultants:
EX Research Institute Ltd.
Kokusai Kogyo Co., Ltd.

Construction of Model landfill with a newly developed liner system with locally available clay at Kataragama

Construction of Permeable Reactive Barrier (PRB) at Sundarapola Dumpsite, Kurunegala

ISSUES AND CHALLENGES – NATIONAL LEVEL

- Main Constrains
  - Lack of 'in house' capacity to run the service in an efficient and effective manner
  - Lack of knowledge to move the service from an 'end of pipe' scenario to a waste minimization approach (resource circulating society)
- Involvement/ support from Provincial Council in MSW management is not adequate ! (except WP)
- No proper program to train officers involve in MSW management (PHI's, DAs, EO, SWs, Supervisors, labors)
- Compost making is not the most important operation, it is only a small segment of a MSW management program

Sustainable Sri Lanka Vision 2030 and Strategic Path

Implement circular economy principles in all resource consuming enterprises to eliminate wastes and encourage recovery of resources

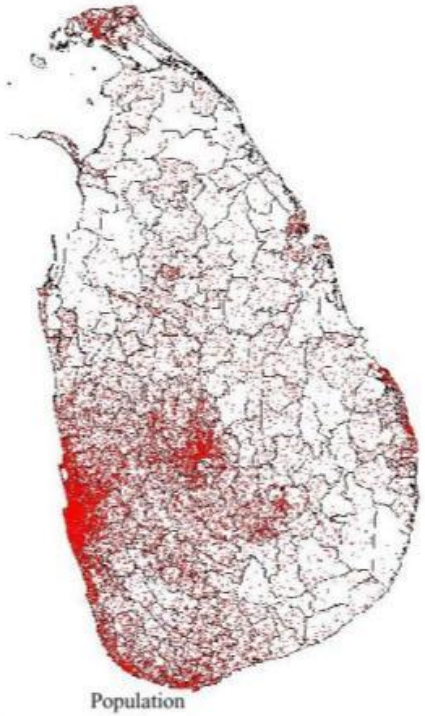
National Waste Management Policy [DRAFT]
Ministry of Mahaweli Development and Environment
2018

Rest in peace till someone one day comes and picked it up !

DUMPSITES AND LANDFILLS

Class C (50-200t/d)	t/d
Kandy	~150
Kotte	~90
Maharagama	~80
Kaduwela	~55
Kalmunei	~70
Katththankudi	~60
Kurunegala	~50
Anuradhapura	**~50**
Negambo	**~90**
Panadura	**~50**
Galle	**~70**
~ 10	

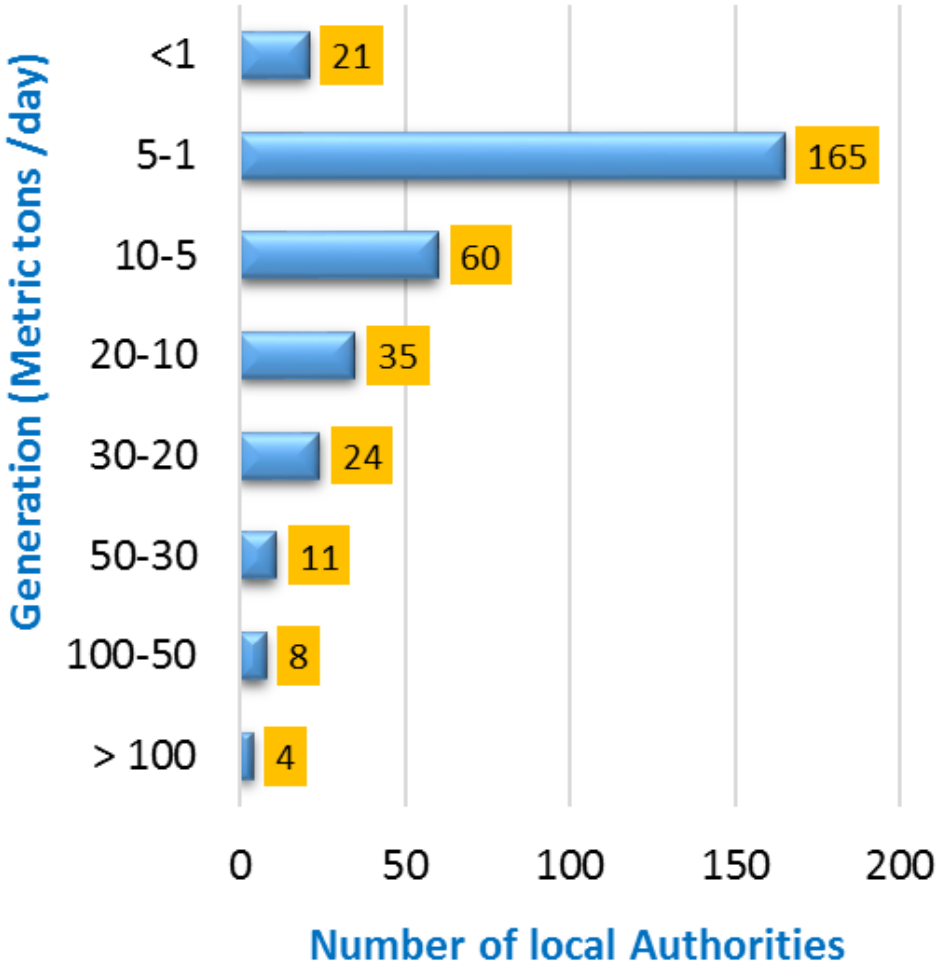
Class D (>200t/d)	t/d
Kollonnawa	~1000
Karadiyana	~500

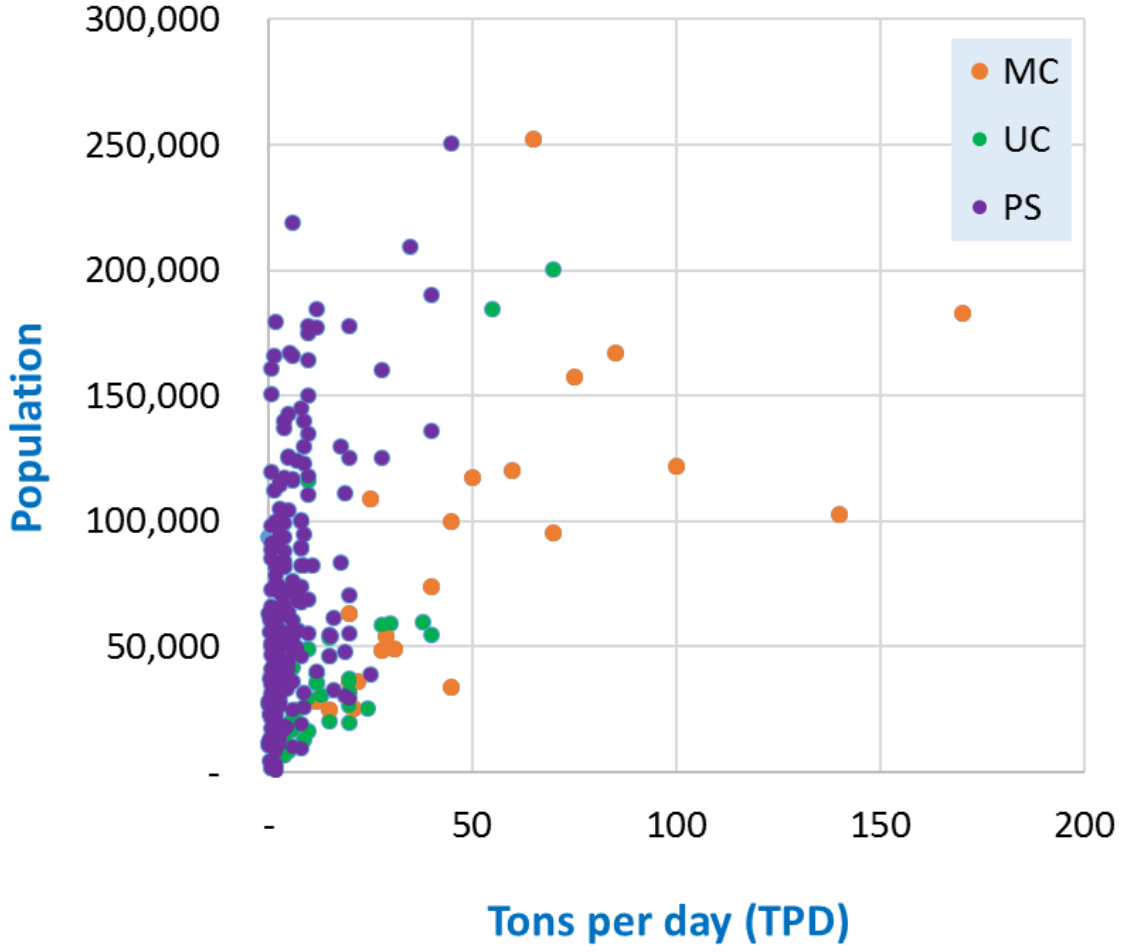


Class A (<10t/d)	#
Pradeshiya saba	200
Urban councils	5
~205	

Class B (10-50t/d)	#
Pradeshiya saba	30
Urban councils	35
Municipal councils	5 (3)
~70	

WASTE GENERATION AND DISTRIBUTION





SRI LANKA: HISTORICAL DUMPSITES

Colombo MC	Sedawatte (-1970)	Madanpitiya (~1980)	Sedawatte (~ 2002)	Kolonnawa (2008 to 2017)	
~ 1000 Tons Per Day (tpd)	 Open dump	 Open dump	 Composting & dumpsite	 Open dump	?
Kandy MC	Nittawela (Until 1980s)	Gohagoda (~1980 to 2003)	Gohagoda (2003-2005)	Gohagoda (2005 to date)	
~ 100 Tons Per Day (tpd)	 Playground	 Open dump	 Rehabilitation	 Open dump !	?

FROM OPEN DUMPS TO SANITARY LANDFILL- FEASIBILITY OF REHABILITATION

- Difficulties;
  - Most of existing dumpsites are in riverbanks/ wetlands/ forest reserves/ steep hill slopes
  - Most of the dumpsites are government land but ownership is not with LA (Illegal or mutual agreements)
  - Limited capacity for expansion and encroaching of settlements
- Municipal waste is not segregated at the source of generation and collected separately
  - Waste collection left with the 'non-marketable' perishables and street cleaning waste with a trace amount of readily marketable 'waste'
- Opportunities
  - Public acceptance & support for a rehabilitation/upgrading
  - Institutional/ government support to overcome land ownership problems
- Unlike other pollution cause industry regulations (e.g. Water, Air hazardous waste), very flexible legal procedures/ regulatory enforcement for small solid waste dumpsite rehabilitation
  - worst >>> acceptable >>> better >>> excellent
- Majority of materials with a commercial value (metal, cardboard, paper, plastic, wood, glass, etc.), is collected prior to discharge at dumpsite (At household level, Collection crew, door-to-door collectors)

PERSPECTIVES

- In the absence of an integrated solution; landfillng and rehabilitation and upgrading of open dumpsites to engineered landfills can be introduced as the total solution at the beginning, and gradually launch on techniques that can reduce the quantity/ hazardousness for landfill.
- It is imperative then that some of the LAs should consider establishing conventional landfills, where other popular alternatives may not feasible.
- This will permit others to follow with new methods such as composting, anaerobic digestion and Waste-to-Energy along with landfills.

THANK YOU !