

# GHG mitigation potential of SWM in India

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# Overview

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# Situation in India

- India is the world's second most populous country, with over 1.2 billion people. The overall amount of waste generated is not well known (Waste quantity estimated from waste transportation vehicles)
- In **2005, urban waste generation** was estimated to be **42 million metric tons**<sup>1</sup>. Recently<sup>2</sup>, a per capita waste generation of 200 kg/cap/yr was assumed, which would result in about **240 million metric tons**
- About 10% is collected by door recyclables collection (informal sector)
- MSW collection rates in urban areas are between 50%-90%, in some cities as low as 25%; collection efficiency throughout India is assumed to be 60%
- Formally collected waste is mainly disposed of in low-lying areas without taking any precautions or operational controls (unmanaged dumps)
- The current practise is not in compliance with the MSW Rules (2000), which instructs to prohibit littering, and demands managed landfilling restricted to non-biodegradable or non-recyclable waste (due to missing land availability)

1) Improving MSW Management in India. World Bank Institute, 2008

2) India 2nd national communication to the UNFCCC, MoEF 2012

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# Waste quantities and scenarios India (current study)

## (2005) current situation

Waste amount:

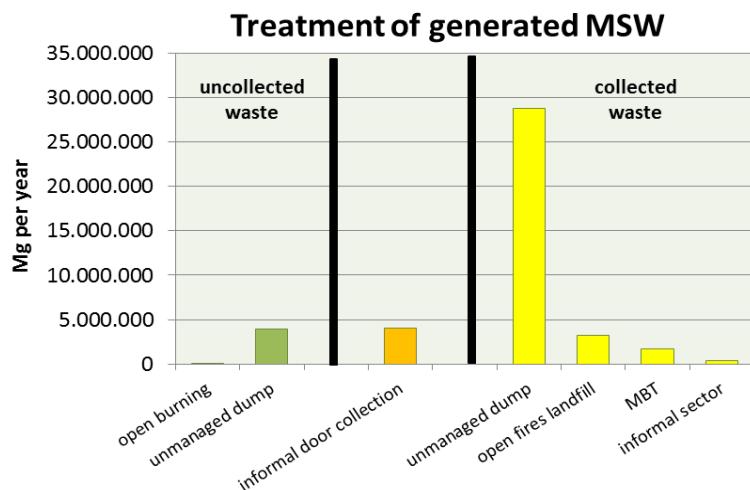
**42 million tonnes**

Waste treatment:

**86% unmanaged dump**

4% MSW composting

10% Recycling



## Scenarios 2030

**Assumptions:**



no change in informal recycling sector; no more littering

**Scenarios:**

- **„low-tech“**

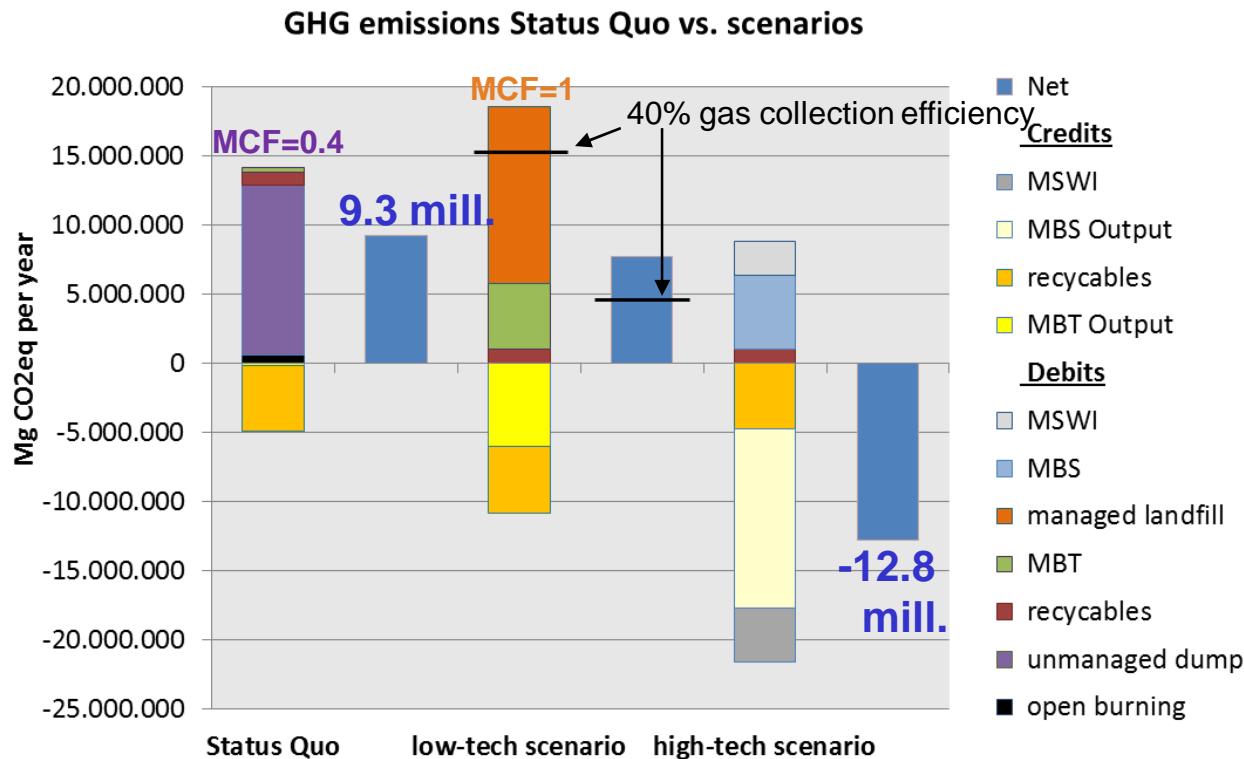
50% managed landfill with 20% gas collection efficiency; 50% MBT with 20% of input RDF to co-incineration

- **„high-tech“**

50% MBS with 42% of input RDF to co-incineration; 50% MSWI, plastics removed for recycling in advance

## GHG balance of MSW in India (current study)

- Current GHG emissions from landfill caused about **12 million tonnes CO<sub>2</sub>eq** with MCF=0.4 for unmanaged dumps



- „low-tech“ scenario achieves a 17% GHG mitigation (51% with 40% gas collection efficiency)
- „high-tech“ scenario leads to a net benefit and an overall GHG mitigation of **22 million tonnes CO<sub>2</sub>eq**

- Both scenarios present a significant co-benefit to GHG mitigation
- With high waste quantity (240 mill. t) current net emissions would be about **54 million tonnes CO<sub>2</sub>eq** and GHG savings much higher respectively

# „Waste and Climate Change“ Workshop in India



- Organised by the GIZ, supported and cooperation with UBA and IFEU
- Objective:
  - facilitate a discussion between key players in SWM, to discuss challenges and opportunities for India
  - gather feedback on data, regional differences, informal sector, political issues on municipal level, experiences
- Participants:  
Representatives from Ministry of Environment & Forests (MoEF), Ministry of Urban Development (MoUD), Ministry of New & Renewable Energy (MNRE), Municipal Officials, Waste Management Companies, NGOs
- Concerns and situation in India were subject to a panel discussion, also engaging the audience

## Concerns of different stakeholders

- Data situation is difficult; not enough quality data to enable planning; measurement/monitoring system is needed and overview of existing data
- Alternative waste treatment options often failed due to missing or not fitting data (waste quantity, heating value too low, organic waste content lower than expected), and due to technical problems, missing infrastructure or miscalculations
- Good practise low-tech and low-cost options seem to be more accepted
- Regional differences require different technologies - a „one size fits all“ approach will not work for all of India
- More capacity is needed at the municipal level, which could be financed by PPP. Most of current funding is directed to the private sector
- There is a need for targets that are set and strived for, also accepted on the federal states level, and in synergy between regulators and implementers of waste management rules (different ministeries), otherwise the situation will not progress
- But it has to be recognized that alternatives to the status quo are in direct competition with waste picker employment; need to be formerly integrated

# Summary of important aspects

- In India a National Action Plan for Climate Change (NAPCC) exists (2008) but does not recognize waste management
- In urban areas MSW is increasing at a rate of about 5% -> no action means GHG emissions will further increase
- GHG accounting shows: the possible contribution of SWM to national GHG mitigation goals is relevant
- Key aspects are diversion from landfill and implementing a recycling economy
  - > **How can this be further supported?**
  - > **What is needed that technology transfer works?**
- Key aspects are general findings, also for other emerging and developing countries, and there is potential in some OECD countries

	Landfill	Incineration	Recycling	Composting
OECD (2006+) <sup>1)</sup>	48%	19%	23%	10% (1% mixed waste)
USA (2011)	54%	12% (WtE)	26%	8%
EU27 (2007) EU28 (2012)	42% 34%	21% 24%	24% 27%	13% 15%
Germany	0%	38%	45%	17%
India <sup>2)</sup> (2005)	86%	0%	10%	(4%, mixed waste)
Egypt <sup>2)</sup> (2010)	86%	0%	4%	4% (6% Feeding)

1) 2006 or most recent year

2) Collection rate India 60%, Egypt 43%; Informal sector India 10%, Egypt 11%

**Thank you!**

## **Synergies**

**Integrated waste management** not only offers a way to **cut GHG** emissions but also contributes to **more efficient resource use** and **reduced impacts** on human health and the natural environment

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