CIRCULAR ECONOMIC UTILIZATION OF BIO-MASS WASTE INSTEAD OF OPEN BURNING – CLIMATE AND HEALTH CO-BENEFITS

Valentin Foltescu

ccacoalition.org

UN environment

CLIMATE & CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

CLIMATE & CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

- The Climate & Clean Air Coalition is a global, voluntary partnership dedicated to addressing short-lived climate pollutants
- Network of 400+ members: governments, IGOs, financial institutions & civil society organisations

A unique action global partnership

70 countries
76+ international orgs & NGOs
More than 100 cities
Some businesses
→ Hosted by UN environment programme

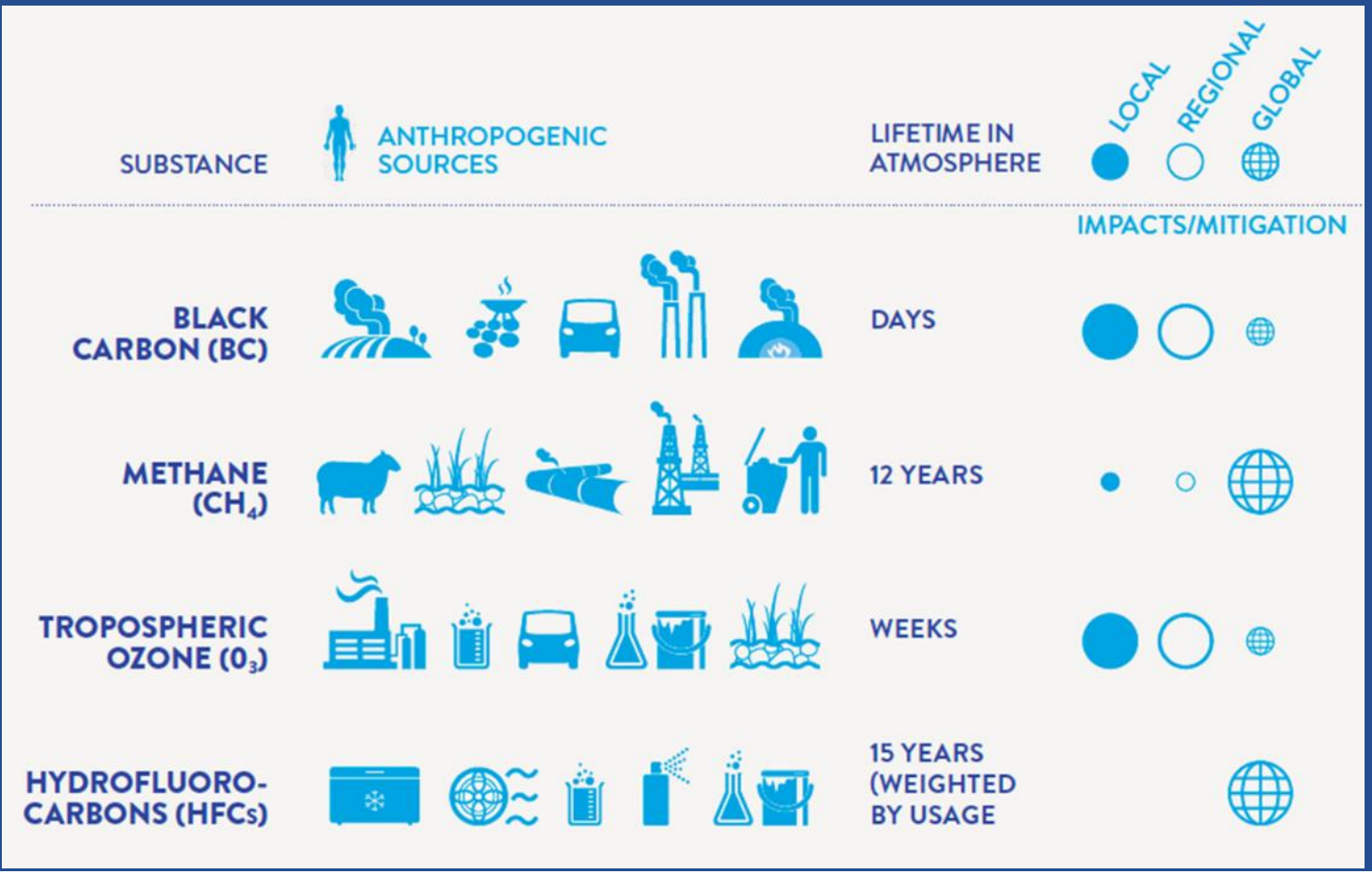
FAST ACTION
QUICK RESULTS
MULTIPLE BENEFITS

Science-based solutions

Leadership & awareness

WHAT ARE SHORT-LIVED CLIMATE POLLUTANTS?

SLCPs are substances with relatively short lifetime in the atmosphere and a warming influence on near-term climate.



They are powerful climate forcers and dangerous air pollutants, and are detrimental to human health, agriculture, and ecosystems.

CCAC MUNICIPAL SOLID WASTE (MSW) INITIATIVE

SLCP AND THE WASTE SECTOR

Solid waste sector is a substantial source of short-lived climate pollutants (SLCPs), particularly black carbon and methane

- Landfills are the third-largest source of global anthropogenic methane emissions
- Open burning of waste emits black carbon and other air pollutants
- Black carbon is also emitted by outdated and polluting vehicles used in waste collection and transport

CLIMATE & CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

MSW INITIATIVE

Mitigating SLCPs from Municipal Solid Waste

WASTE

Objective

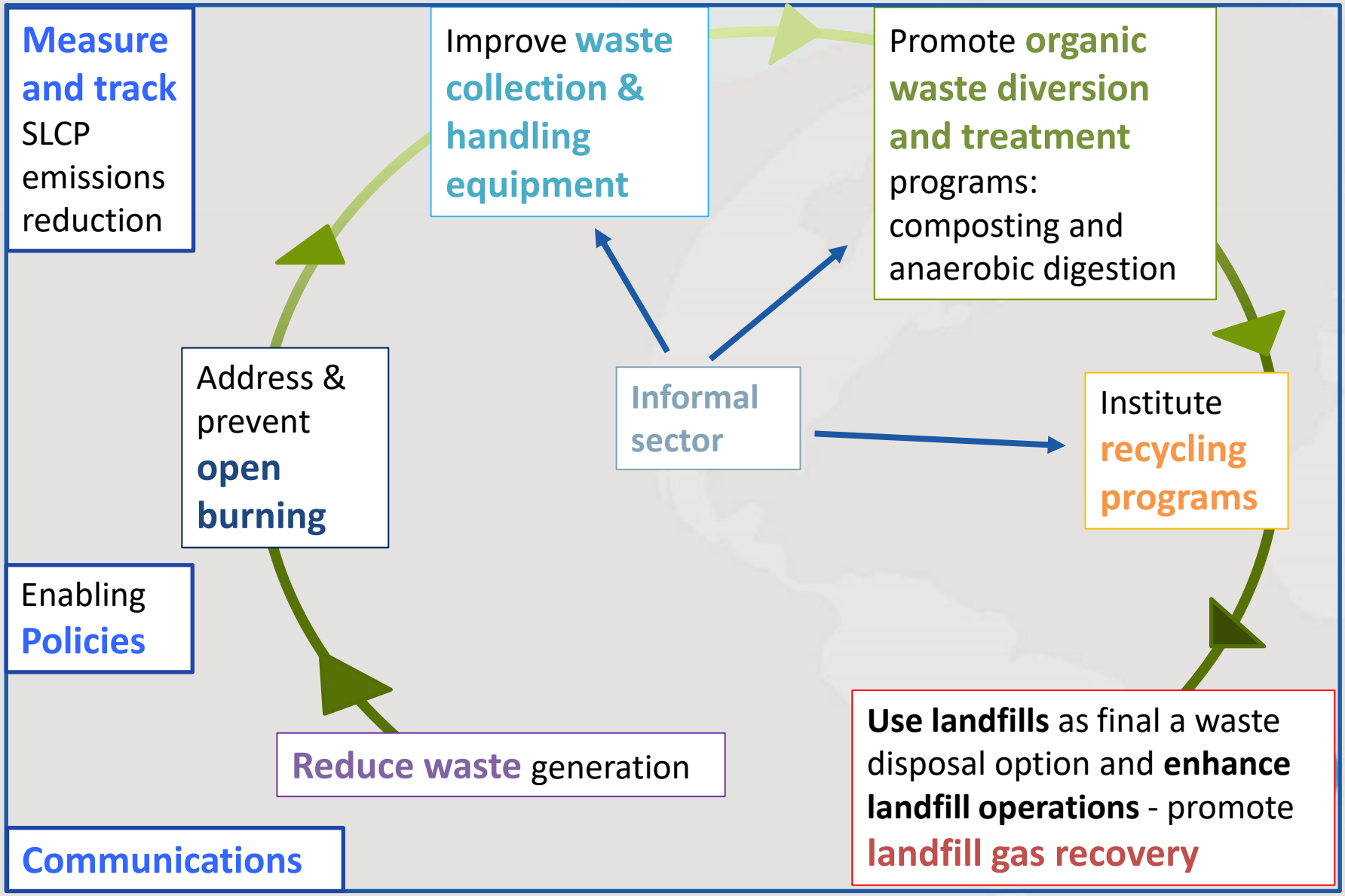
- Reduce emissions of SLCPs across the municipal solid waste sector by providing a comprehensive package of resources, technical capacity building, and a global network of cities to facilitate the design and implementation of locally appropriate actions.

Added value of the Initiative:

- Working directly with cities
- Support from the CCAC partners
- Mobilizing experts from all over the world

Working with its partners promoting the waste hierarchy & circular economy

WASTE



- Impacts of Open Burning of Waste
- Situation of Organic Waste at the Global and Asia Level
- Benefits of Organic Waste Diversion and treatment

CLIMATE & CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

ESTIMATED OPEN BURNING OF WASTE AT THE GLOBAL LEVEL

Amount of waste burned globally

- **~ 41% of all waste generated**
- **Over 620 million tons a year**

Open burning of waste releases a variety of toxic pollutants

- **Greenhouse gases:** carbon dioxide, methane and particulate matter
- **Persistent organic pollutants (POPs):** polycyclic aromatic hydrocarbons, dioxins and furans

Ref: (2016) R20 Regions of Climate Action – Open Burning of Waste: A Global Health Disaster

CLIMATE & CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

IMPACTS OPEN BURNING OF WASTE

Reasons

- **Inadequate waste collection** in low- and many middle-income countries
- **Reduce the volume of waste in open dumps**
- **Facilitate scavenging activities**
- **Inability or no desire to not pay fees for waste collection or disposal**
- **Used to dispose of healthcare waste**
- **Culture or habit**
- **Accidental:** spontaneous combustion

Impacts

When waste is burned, the resulting toxins and particulate matter, including black carbon, in the air can cause:

- **Air pollution**
- **Impact human health:** respiratory and neurological diseases, particularly in children
- **Impact animals health:** animals used as pets or for work
- **Affect crops:** deposit of PM on crops
- **Reduce visibility:** impact on traffic
- **Strain health facilities** due to the increase of health problems related to the burning of waste
- **Affect economic development** such as through diminished tourism

ORGANIC WASTE ESTIMATED PRODUCTION AT THE GLOBAL LEVEL

Organic fraction of MSW generated globally - 2016

Population data [GD1] MSW data [GD2]	Total Population 2015 (x1000)	Urban MSW Generation - 2016			
Income Level		Per Capita (kg/capita /day)	Total (m tonnes /year)	Organic waste	Total organic waste (m tonnes /year)
Lower Income	641'859	0.40	93	56%	52
Lower Middle Income	2'969'901	0.53	586	53%	311
Upper Middle Income	2'588'363	0.69	655	54%	354
High Income	1'180'061	1.58	683	32%	219
Total	7'380'184	0.75	2'017	46%	935

Organic waste comprises approx. 44% to 46% (by mass) of MSW

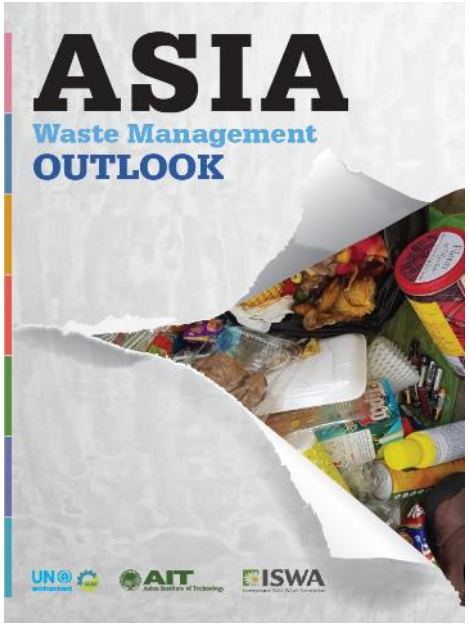
Predicted Organic fraction of MSW generated globally - 2050

Population data [GD1] MSW data [GD2]	Total Population 2050 (x1000)	Predicted urban MSW Generation - 2050			
Income Level		Per Capita (kg/capita /day)	Total (m tonnes /year)	Organic waste	Total organic waste (m tonnes /year)
Lower Income	1'413'034	0.56	283	56%	158
Lower Middle Income	4'276'584	0.79	1'233	53%	653
Upper Middle Income	2'790'496	0.99	1'004	54%	542
High Income	1'287'798	1.87	879	32%	281
Total	9'767'912	0.95	3'399	48%	1'635

Ref: (2020) ISWA- Global Assessment of Municipal Organic Waste Production and Recycling Used World Bank Data

CLIMATE & CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

NATIONAL MSW GENERATION - ASIA



Variations in waste types are found on a country-by-country basis

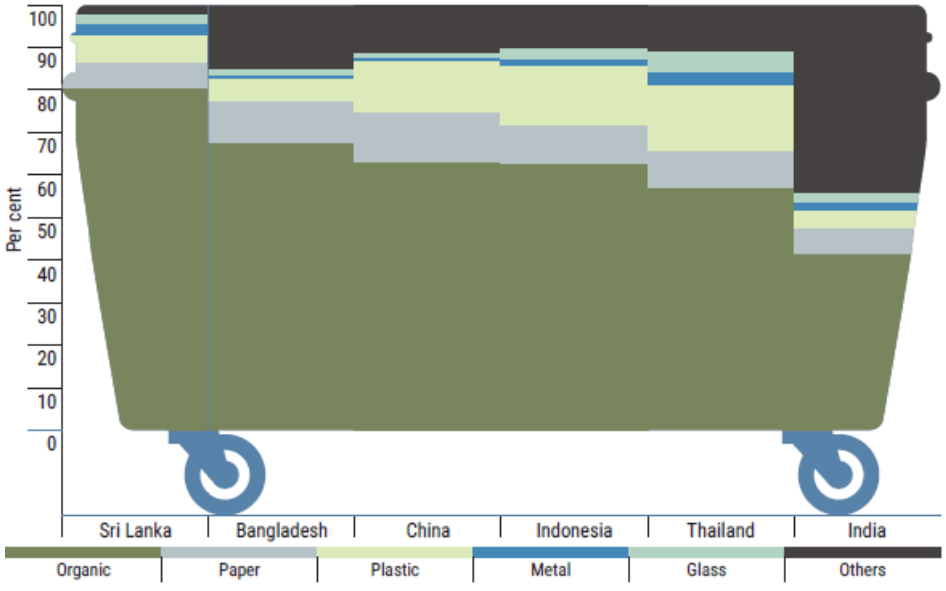


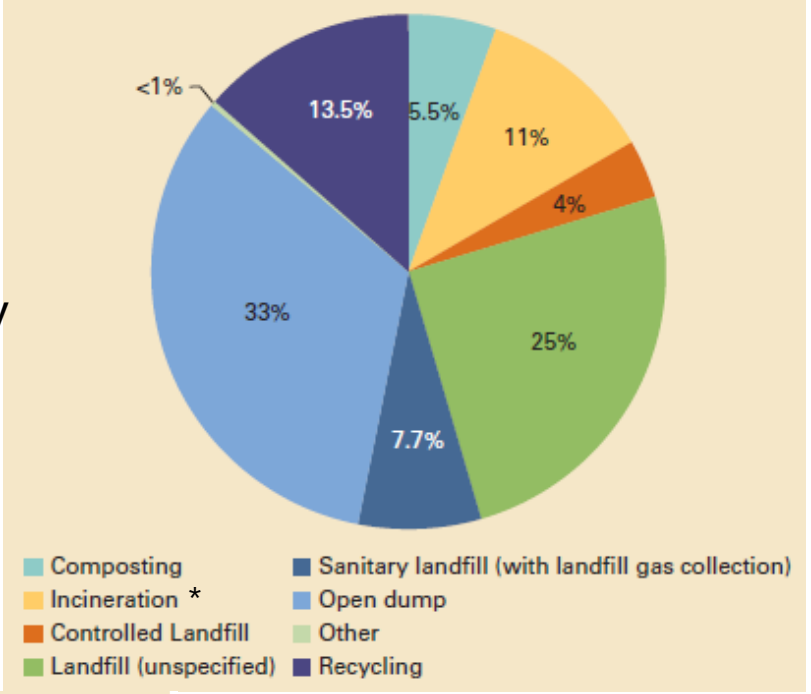
Figure 2.5 : Waste Composition in Various Countries in Asia

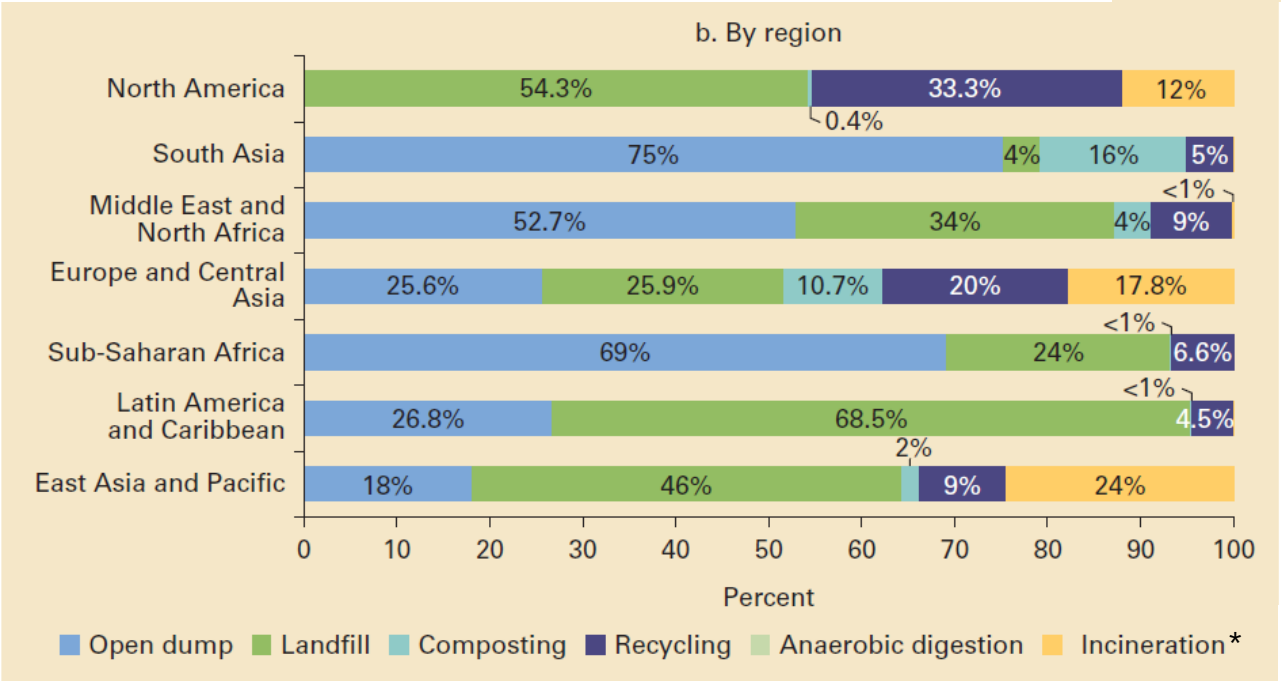
Source: Seventh Regional 3R Forum in Asia and the Pacific (Nov 2016).

CLIMATE & CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

ORGANIC WASTE TREATMENT AT THE GLOBAL LEVEL

- 5.5% of waste is composted
- Waste disposal practices vary greatly by income level and region.





*Modern incineration

NATIONAL MSW TREATMENT- ASIA

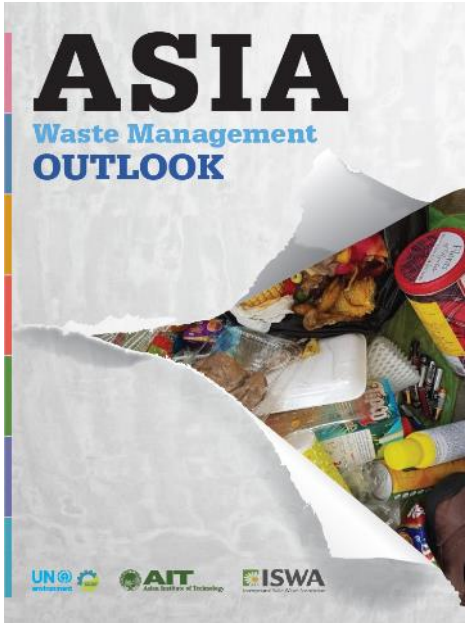


Table 4.1 Common Municipal Solid Waste Disposal Methods in Asia by Country Income Level

Country	Income level	Solid waste disposal site	Incineration	Composting	Other
Cambodia	Low	100%	0%	0%	0%
China	Upper Middle	85%	15%	0%	0%
India	Lower Middle	75%	5%	10%	10%
Indonesia	Lower Middle	70%	2%	15%	13%
Japan	High	3%	74%	0%	17%
Malaysia	Upper Middle	93%	0%	1%	6%
Philippines	Lower Middle	85%	0%	10%	5%
Republic of Korea	High	35%	28%	37%	0%
Singapore	High	6%	94%	0%	0%
Thailand	Upper Middle	70%	5%	10%	15%

Source: Chin (2011); EMC (n.d.), Hoornweg and Bhada-Tata (2012)

CLIMATE & CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

BENEFITS OF ORGANIC WASTE DIVERSION

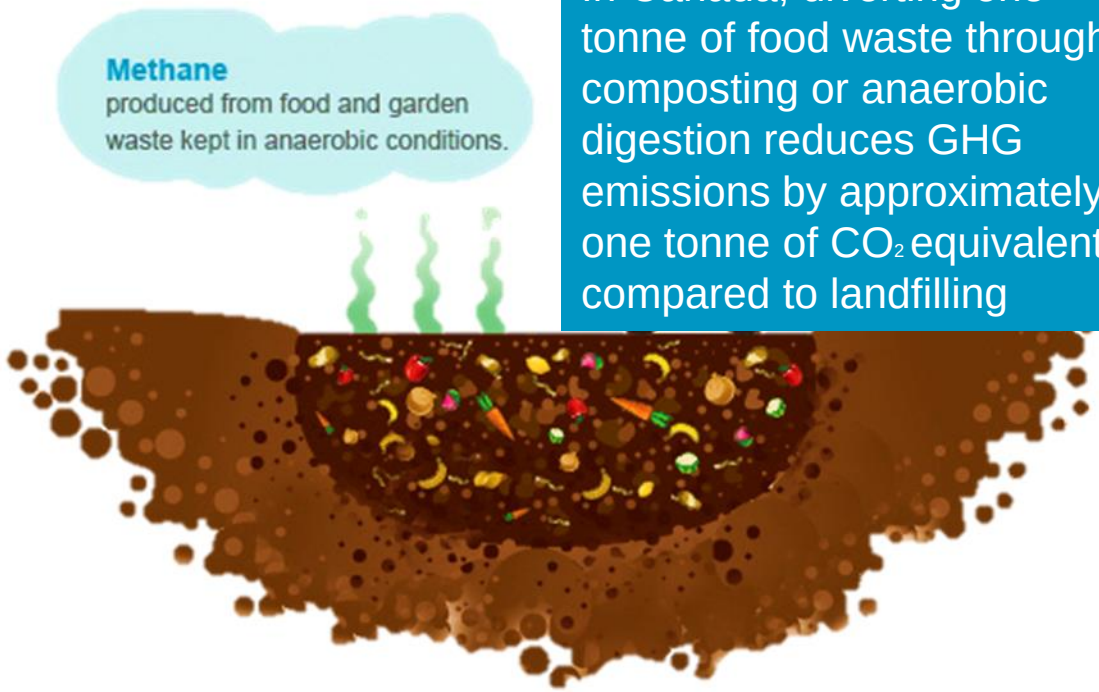
Environmental Benefits

Greenhouse gas reduction

GHG reductions can be realized when organic waste is diverted from landfills to composting and AD facilities and processed under controlled conditions

GHG Reduction Factors

- Level of landfill gas capture
- Carbon content of compost recycled to soil
- Quantity of fertilizer replaced
- Quantity and type of energy generated from biogas



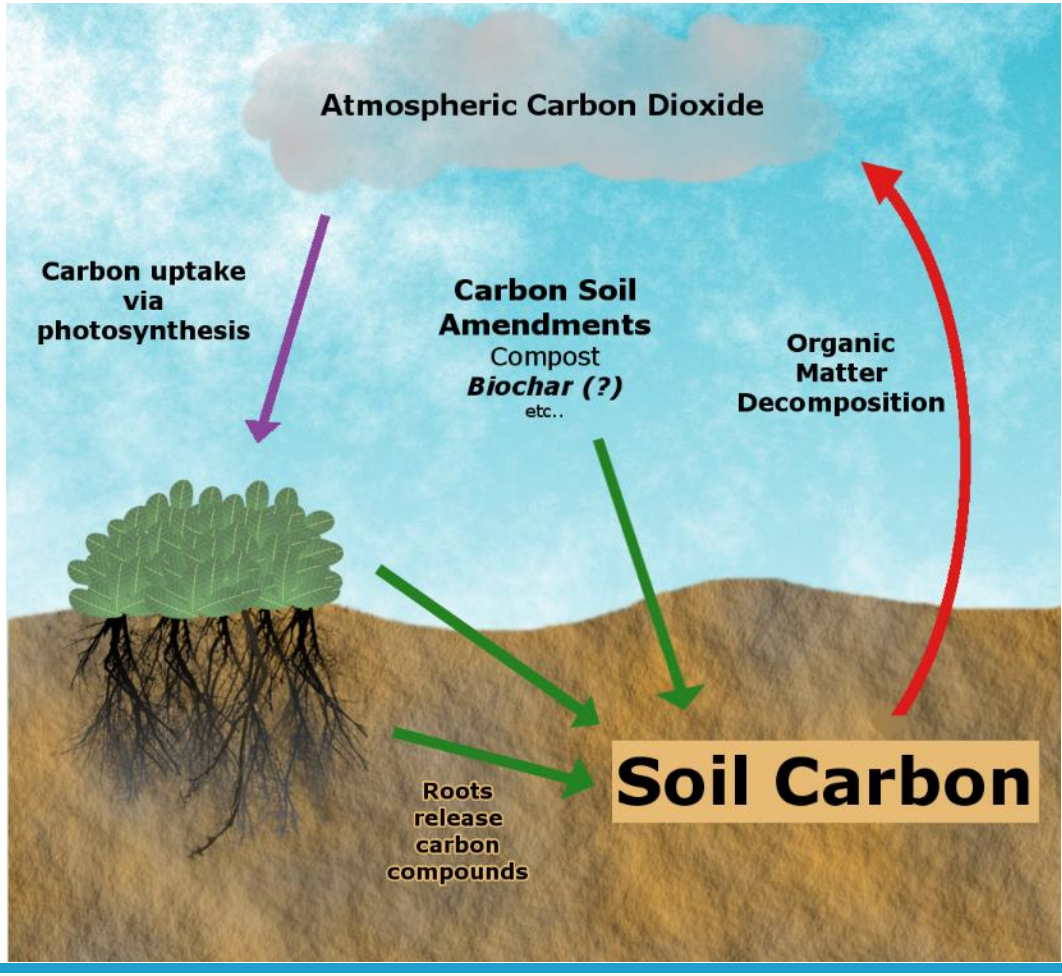
In Canada, diverting one tonne of food waste through composting or anaerobic digestion reduces GHG emissions by approximately one tonne of CO_2 equivalent compared to landfilling

Ref: 2013 Environment Canada. Technical Document on Municipal Solid Waste Organics Processing

BENEFITS OF ORGANIC WASTE TREATMENT

Compost improves soils and healthy soils can sequester carbon and mitigate climate change

- **Improved soil health**: soil carbon sequestration helps restore degraded soils, which can improve agricultural productivity. Combat desertification.
- **Increased climate resilience**: healthier soils make farms more resilient against both droughts and heavy rainfall.
- **Reduced fertilizer use**: healthier soils require less fertilizer, saving farmers money and reducing environmental impacts
- **Reduced water use**: compost improves water infiltration and retention



United Nations – Convention to Combat Desertification (www.unccd.int)

ccacoalition.org

CLIMATE & CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

Recommended documentaries: “Kiss the Ground” and “Need to Grow”

BENEFITS OF ORGANIC WASTE DIVERSION

All of **the environmental benefits** associated with landfill diversion and compost use also provide **social benefits**

Social Benefits

- Protects human and environmental health
- Reduces landfill safety risks
- **Contributes to land preservation**
- Produces compost, which can be used for reforestation, wetlands restoration, and habitat revitalization to reverse industrialization impacts
- Decreases nuisances for neighbours
- Allows creation of compost and biogas, reducing reliance on nonrenewable resources (peat and fossil fuels)
- **Provides opportunities for teaching, training, and employment**
- Contributes to healthy soils vital to sustaining the agricultural industry
- **Compost sites are easier to site and construct than landfills**

BENEFITS OF ORGANIC WASTE DIVERSION

OW programs typically provide **net benefits** when a **life-cycle accounting procedure** is used to measure the cost of capital and operations, taking into account the social and environmental benefits.

Economic Benefits

- Extends landfill life & defers costs associated with finding and constructing new landfills sites
- Lower costs for landfill gas and leachate management
- Reduces in GHG emissions and air pollutants
- Provides new, environmental based, direct and indirect employment opportunities
- Provides costs savings by reducing fertilizer use and by water use
- Generates potential revenue if GHG reductions sold as offsets
- Decentralized compost plants often closer to the sources of organic waste can reduce waste transferring costs
- OW processing facilities do not preclude future redevelopment & land use

Thank you!

LEARN MORE:

CLIMATE & CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

secretariat@ccacoalition.org
@CCACoalition
facebook.com/ccacoalition
www.ccacoalition.org