On behalf of:

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

of the Federal Republic of Germany

Information Matters
Transparency through Reporting

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Training on data collection and management to improve GHG inventory compilation in the waste sector

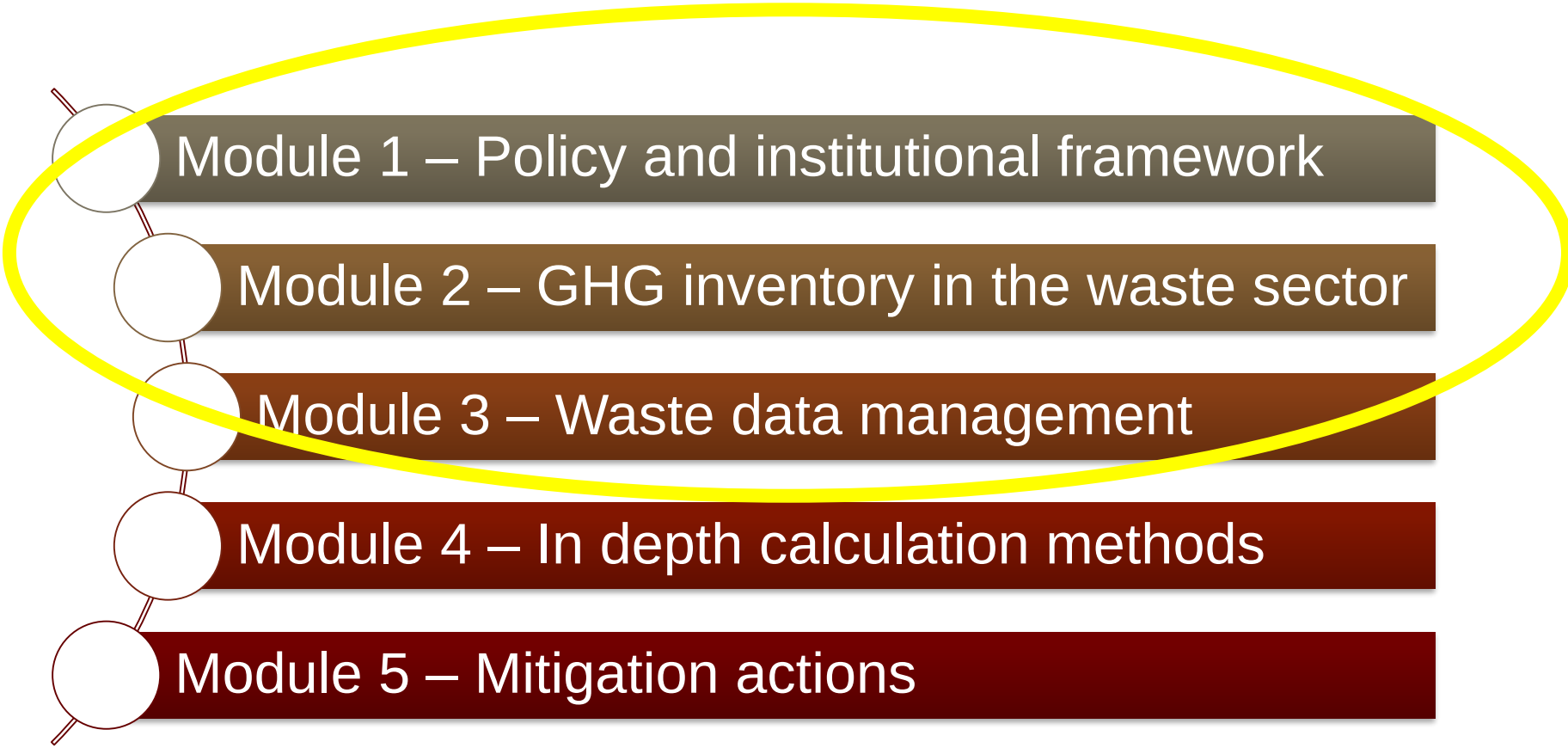
PATPA Asia-Pacific Workshop
28-30 March 2018

Oscar Zarzo, GIZ

Agenda overview

TIME	Activity	Responsible
DAY 1 3:15-3:30 pm	Introduction	Oscar Zarzo, GIZ
DAY 1 3:30-3:50 pm	UNFCCC reporting	Oscar Zarzo, GIZ
DAY 1 3:50-4:10 pm	Bangladesh's GHG inventory on waste	Mr Mokhtar Ahmed, Ministry of Environment, Bangladesh
DAY 1 4:10-5:15 pm	Overview of 2006 IPCC GL for GHG inventory waste	Oscar Zarzo, GIZ
DAY 2 9-9:15 am	Recap of day 1	Oscar Zarzo, GIZ
DAY 2 9:15 – 10:15 am	Dealing with data needs	Oscar Zarzo, GIZ
DAY 2 10:15-11:15 am	Group work: Data needs	All
DAY 2 11:30 am-12:15 pm	Inst. Arrangements	All
DAY 2 12:15-12:30 pm	(Short) Summary	All

CONTENT


Module 1 – Policy and institutional framework
Module 2 – GHG inventory in the waste sector
Module 3 – Waste data management
Module 4 – In depth calculation methods
Module 5 – Mitigation actions

Module 1 - Policy and Institutional framework

M1 : Policy and institutional framework

M1.1
- The Evolution of International Climate Policy

M1.2
- Reporting requirements arising from the UNFCCC

M1.3
- Institutional roles in GHG Inventory development in the waste sector
  - Data sources
  - Inventory compilation

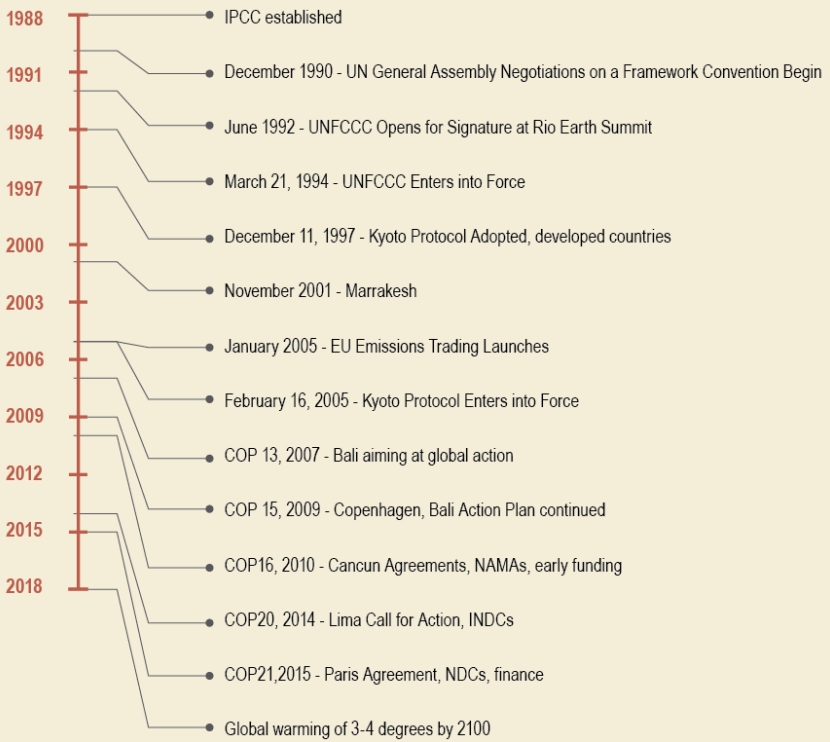
M1.4
- Policy instruments for mitigation
- GHG emissions and mitigation in the waste sector

M1.1 The evolution of International Climate Policy

Did You Know?

The first time the term "global warming" entered the public domain was in the title of a scientific paper by US scientist Wallace Broecker in 1975. The paper was entitled "Climate change: Are we on the Brink of a Pronounced Global Warming?"

M1.1 The evolution of International Climate Policy



M1.2 Reporting requirements arising from the UNFCCC

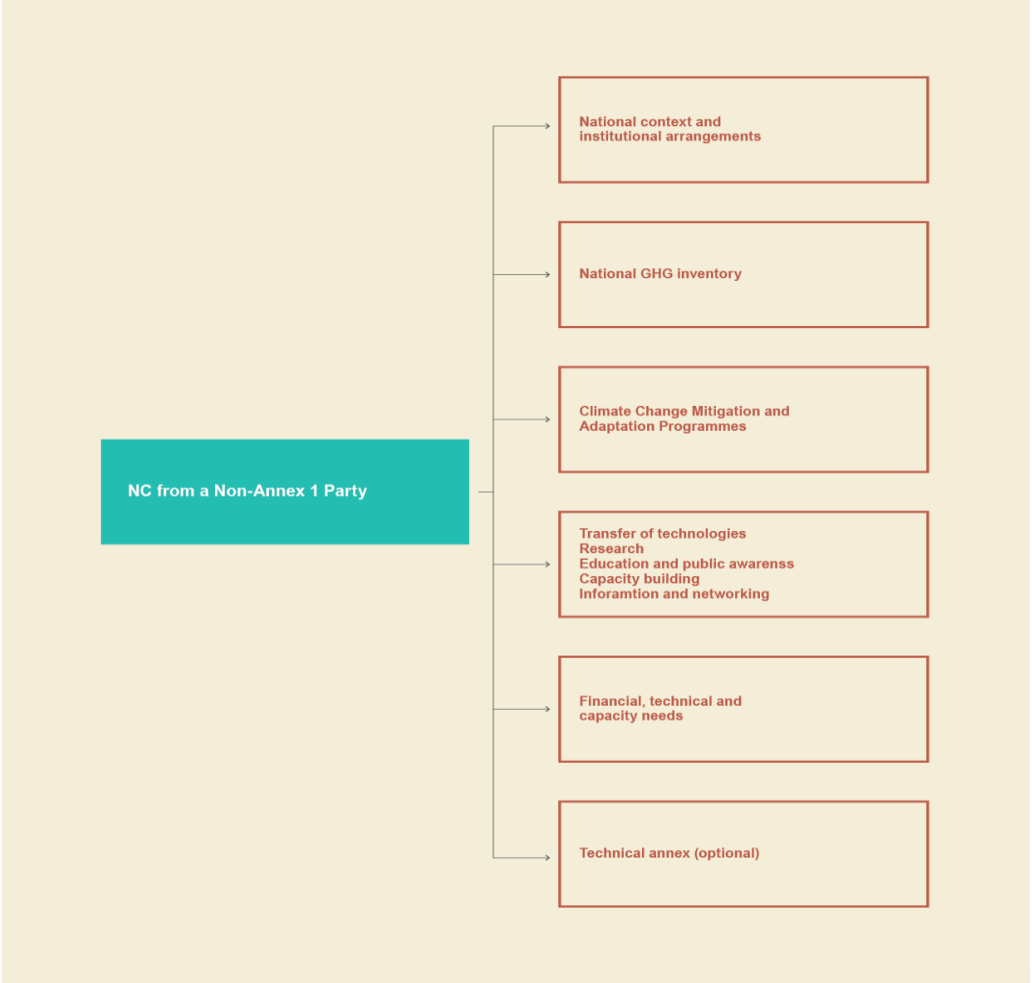
Annex 1

- CRF & NIR
- NCs
- BRs

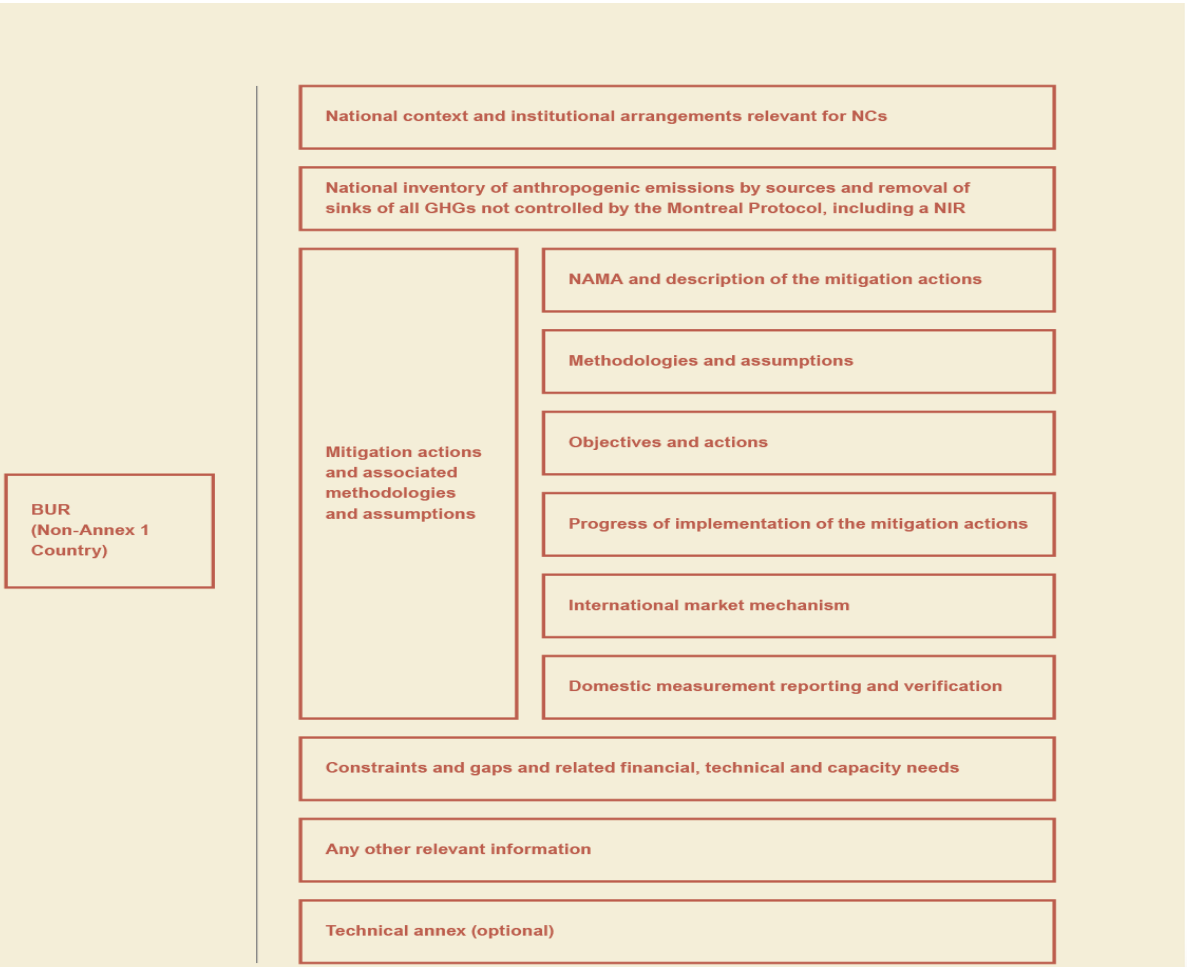
Non-Annex 1

- NCs
- BURs

M1.2 NCs and BURs



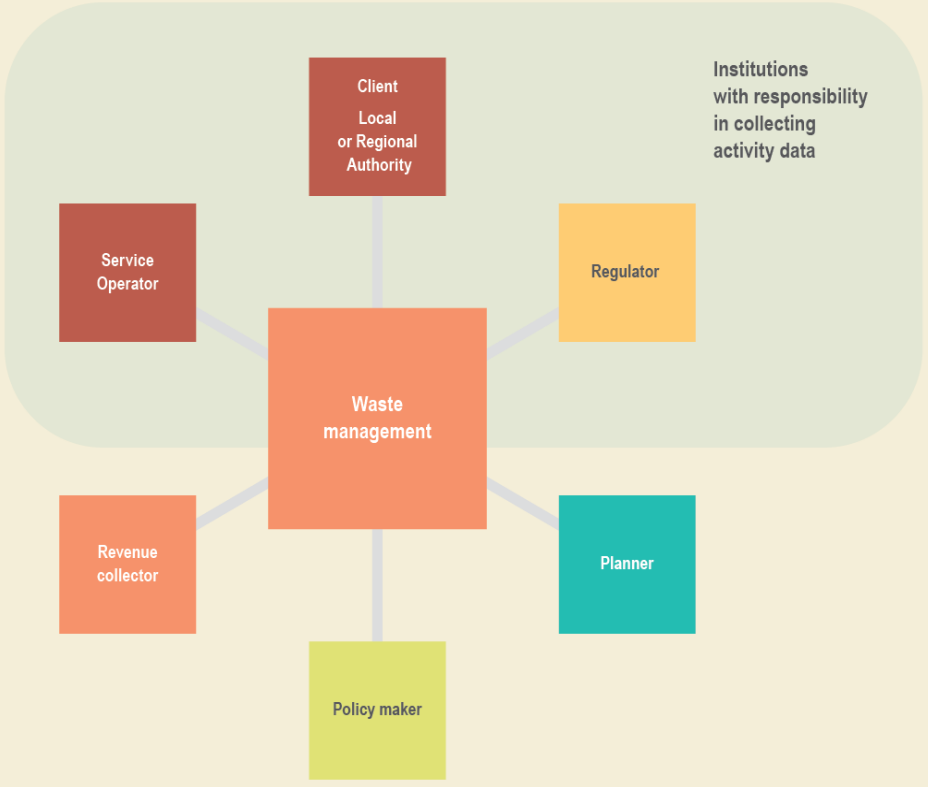
M1.2 NCs and BURs



M1.3 Institutional roles in GHG Inventory development in the waste sector

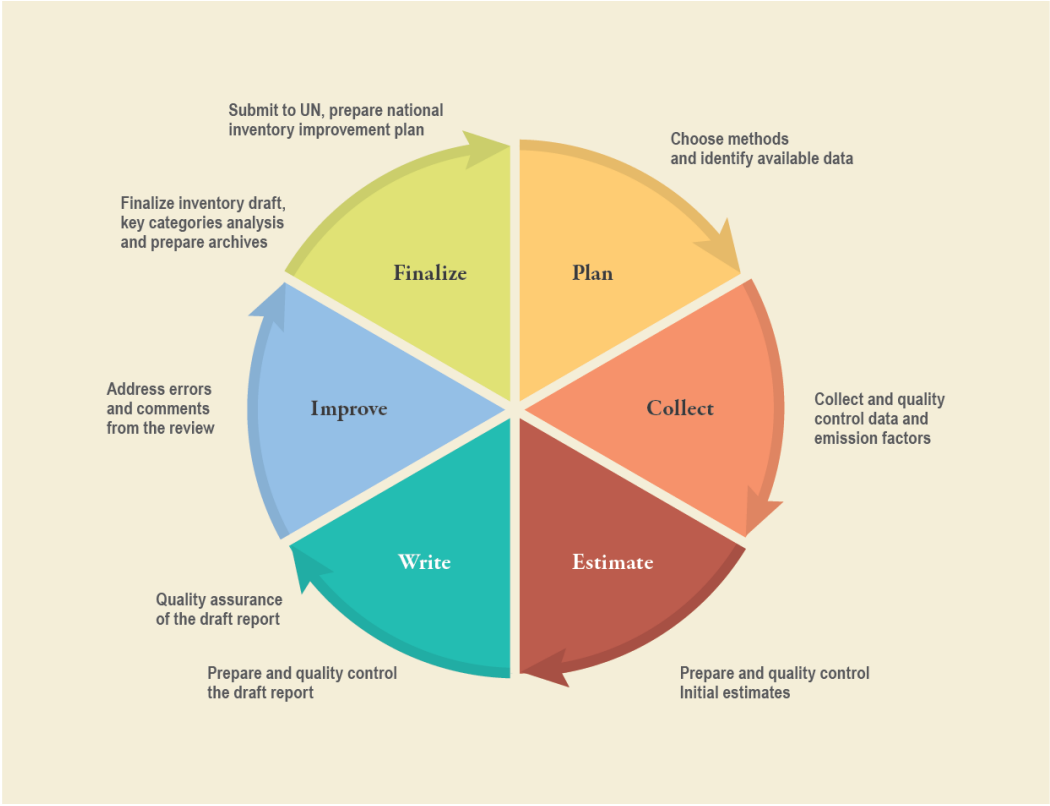
- Data collection
- Management
- Reporting

M1.3 Sources of data



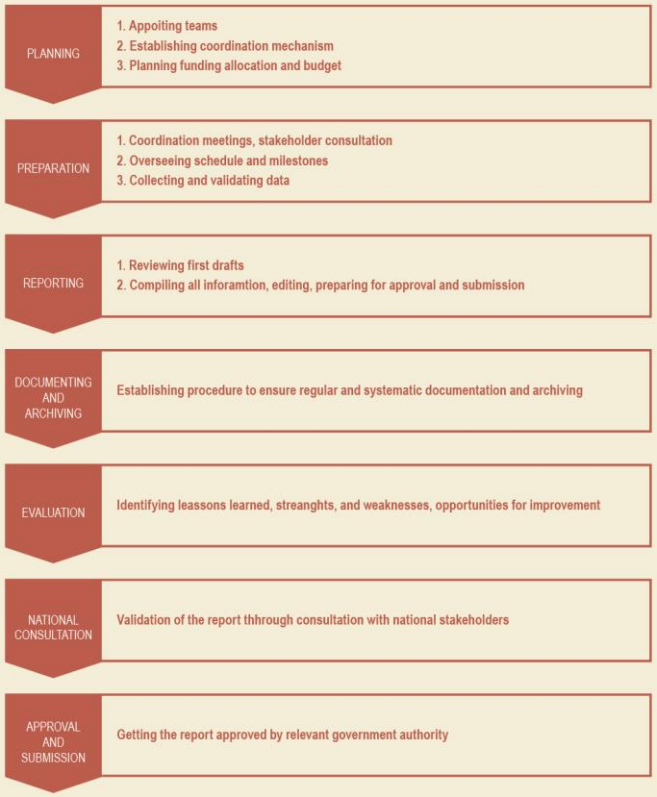
Institutional functions in waste management

M1.3 GHG Inventory compilation



National Inventory preparation and reporting processes

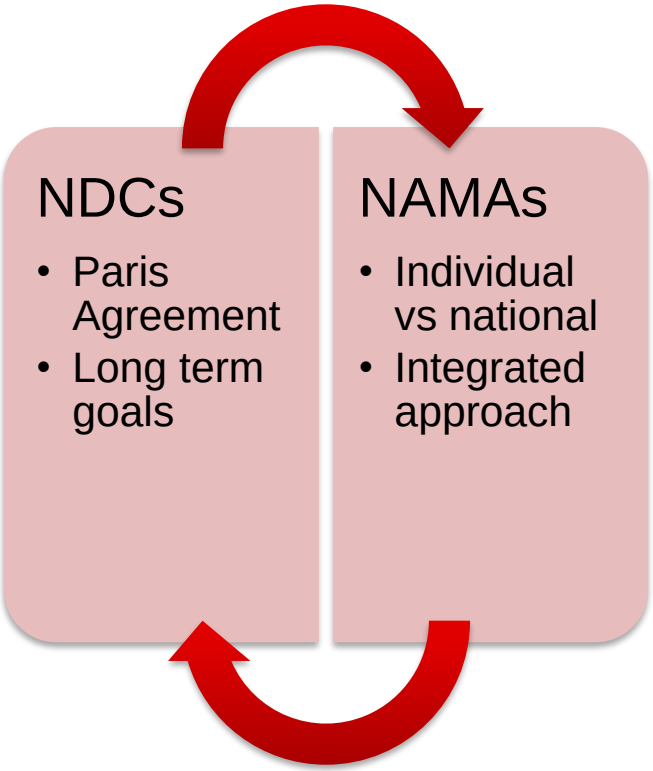
M1.3 Sustainable institutional arrangements



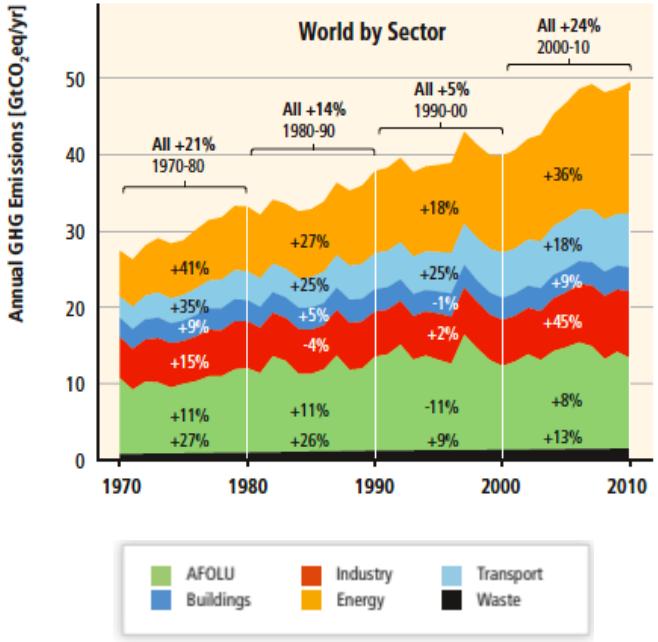
BURs and NCs

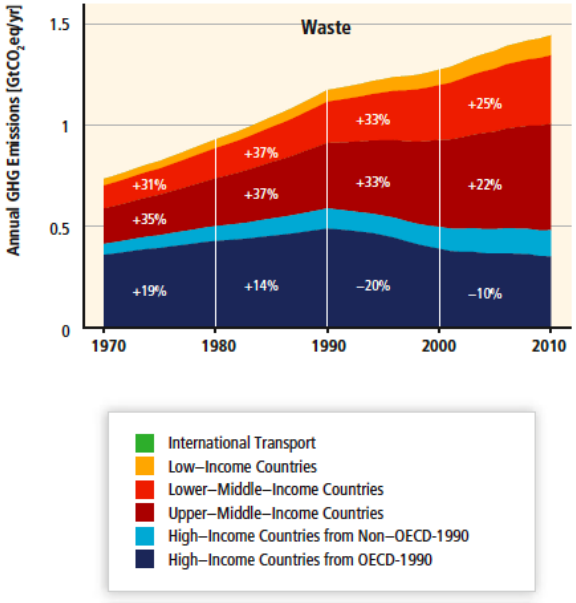
- enhance coordination and inter-sectoral dialogue
- raise awareness
- facilitate consultation

M1.4 Policy instruments for mitigation



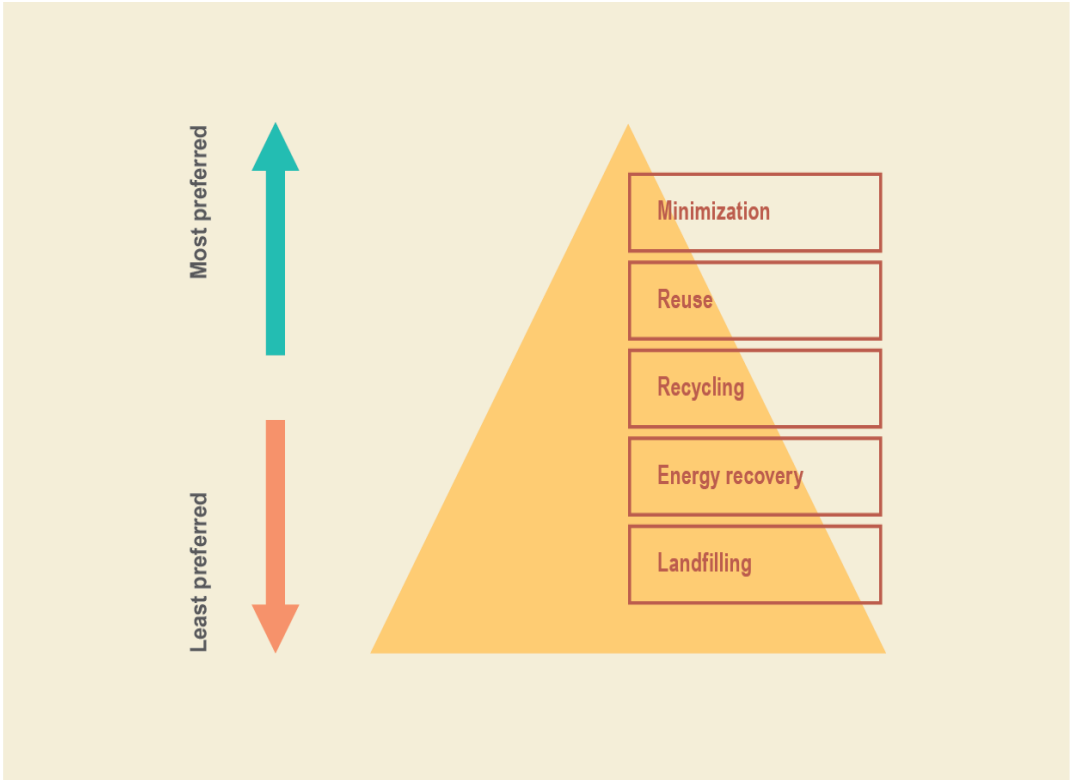
M1.4 GHG emissions and mitigation





Source: IPCC 5th Assessment Report, 2014, working group 3, mitigation, page 381

M1.4 GHG emissions and mitigation



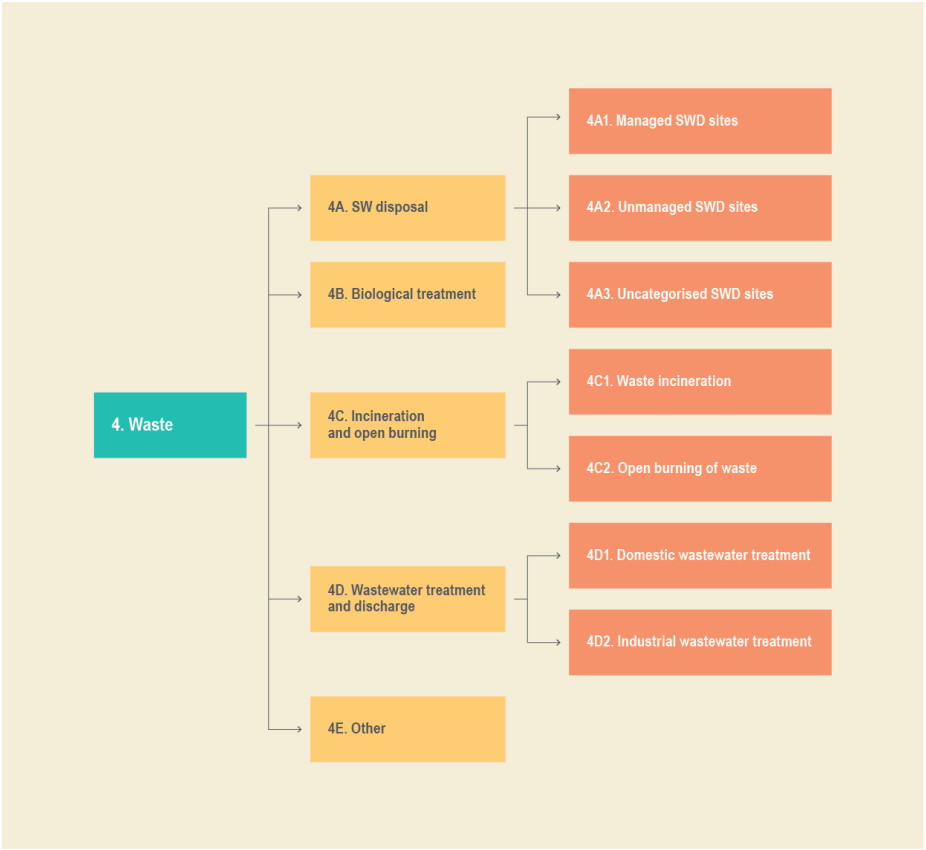
Mitigation actions should follow efforts along the waste management hierarchy

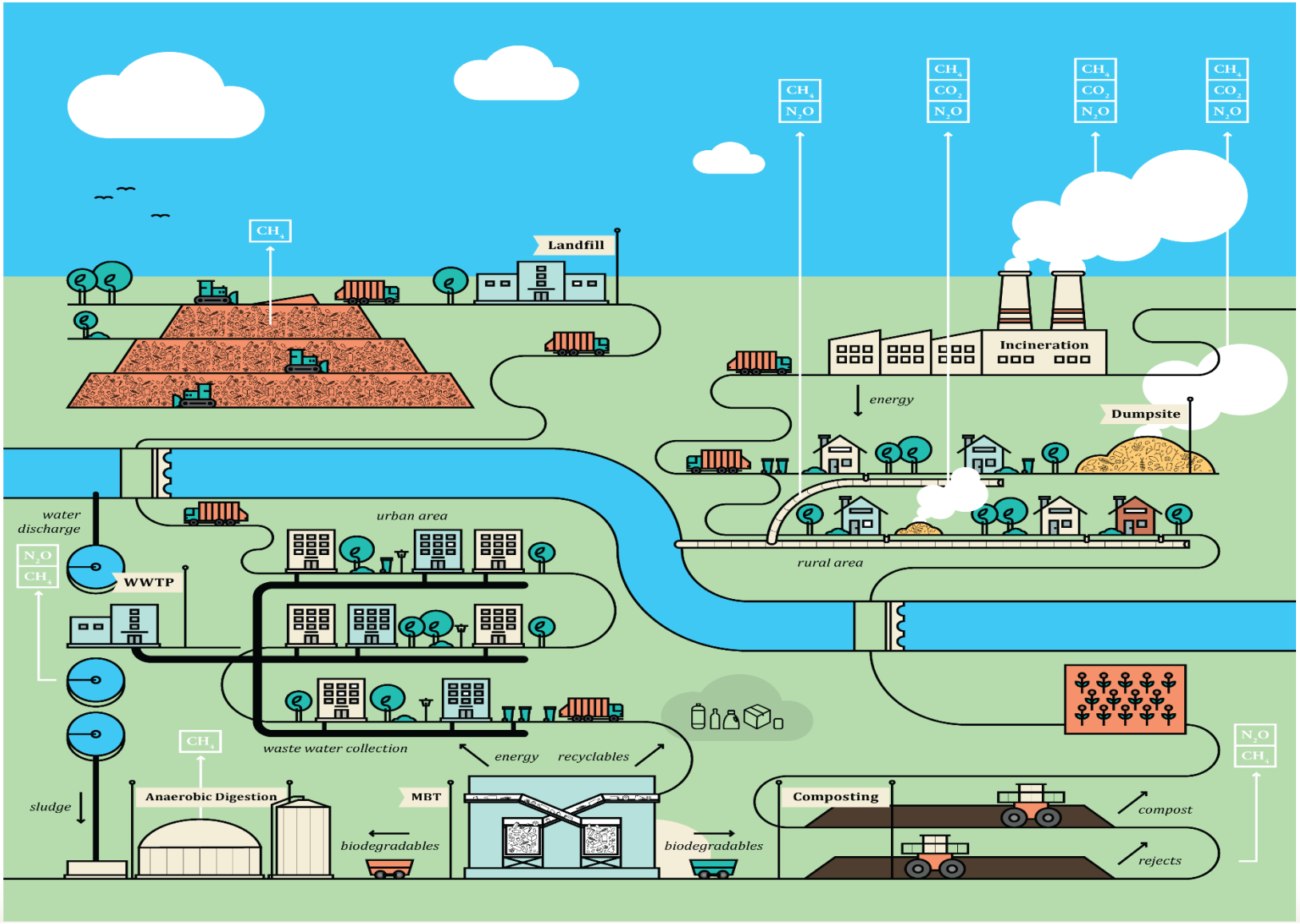
Module 2 – GHG inventory in the waste sector

M2 : GHG inventory in the waste sector

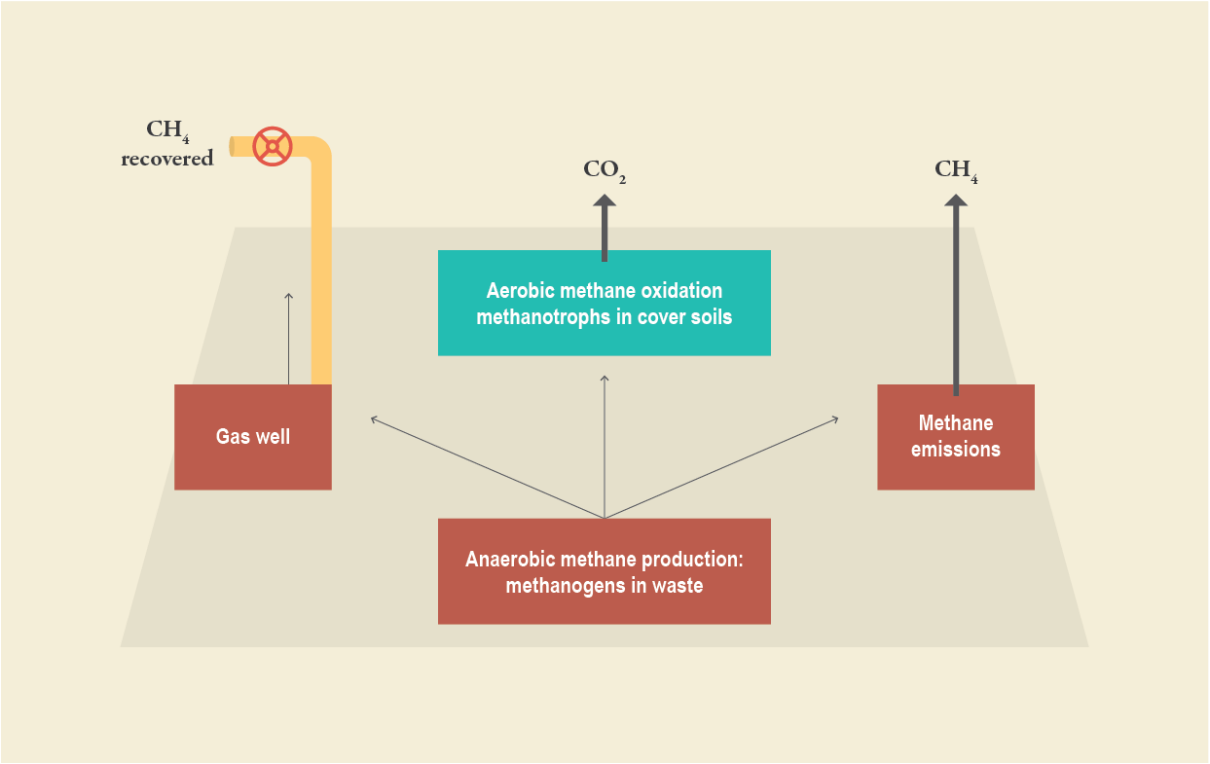
- M2.1 • Guidelines
- M2.2 • Solid waste disposal
- M2.3 • Biological treatment
- M2.4 • Incineration and open burning
- M2.5 • Wastewater treatment and discharge
- M2.6 • Key data category and double counting
- M2.7 • Exercise on key data category

M2.1 Structure of categories




CH4
N2O
CH4
CO2
N2O
CH4
CO2
N2O
CH4
CO2
N2O
CH4
Landfill
Incineration
energy
Dumpsite
urban area
water discharge
N2O
CH4
WWTP
rural area
waste water collection
energy
recyclables
CH4
Anaerobic Digestion
MBT
Composting
compost
sludge
biodegradables
biodegradables
rejects
N2O
CH4

M2.2 Solid Waste Disposal



? What is not included in the Inventory

M2.2 Solid waste disposal, First Order Decay

M2.2 Solid waste disposal, First Order Decay

Did You Know?

First Order Decay (FOD) that for a population of atoms, molecules or anything else, a constant fraction/ unit time is converted to something else. The actual fraction/ unit time is expressed as a constant rate, in units of time. The FOD method assumes that the degradable organic component in waste decays slowly throughout a few decades, during which CH_4 and CO_2 are formed. If conditions are constant, the rate of CH_4 production depends solely on the amount of carbon remaining in the waste.

M2.2 Solid waste disposal, Data needs

1. Population for 50 years
2. Waste generation rate in kg/capita
3. The share of total waste deposited in solid waste disposal sites
4. The share of different types of disposal sites
5. The waste composition of the waste disposed

- Sludge (industrial and household), industrial waste, other waste
- Landfill gas use and flaring

M2.2 Population data

Country	Disaggregation
Namibia	• Split into “high income” and “low income” urban regions for 2010. • Why?- Sustained and significant migration from rural to urban, fast-expanding low income suburbs
Tunisia	• Data is available from 1950 onwards from Tunisia’s National Statistics Institute. • A distinction is made between the rural and urban population and different generation rates are applied.

M2.2 Waste generation rate

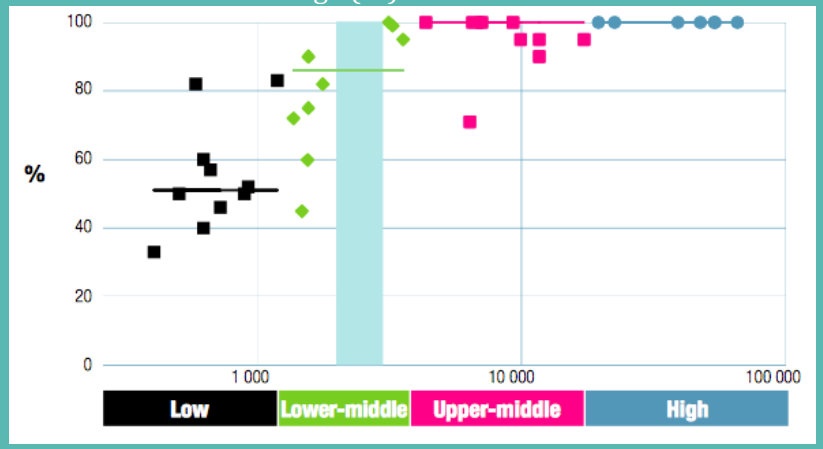
Country	Interpolation, single regression
Bulgaria	• 1950-1978 calculated based on urban population • 1979-1993 data on waste generation from operators of service • 1999-2010 statistical data on waste generation is available Missing years (1994-1999) calculated by single regression method
Brazil	• calculated based on data from two different waste management companies • data from one is used to estimate the waste landfilled in 1970 from the other for waste landfilled in 2005 • data for the intermediate years were linearly interpolated

M2.2 Data needs

Did You Know?

Collection coverage increases with income, but can be as low as 20 - 30 %; 2 billion people have no access to solid waste collection services[1]

Waste collection coverage (%) vs income level



M2.2 Share of waste disposed

Country	Using data and expert judgement
Armenia	Inventory of solid waste disposal sites/landfills operating over the period of 1990-2012. Based on urban population data: • The capital city of Yerevan - Anaerobic managed solid waste disposal sites • Secondary cities (Gyumri and Vanadzor) - Unmanaged solid waste disposal sites – deep and/or with high water table. • 45 additional cities and towns – unmanaged solid waste disposal sites.
Tunisia	• There is a number of managed disposal sites with weighbridges – anaerobic controlled disposal site • The difference between the amount of waste generated and the amount measured entering managed disposals sites is attributed to uncontrolled landfills. • The first managed landfill opened in 1999. By 2010 ten landfills opened in Tunisia, which receive more than 85% of the waste.

M2.2 Waste composition

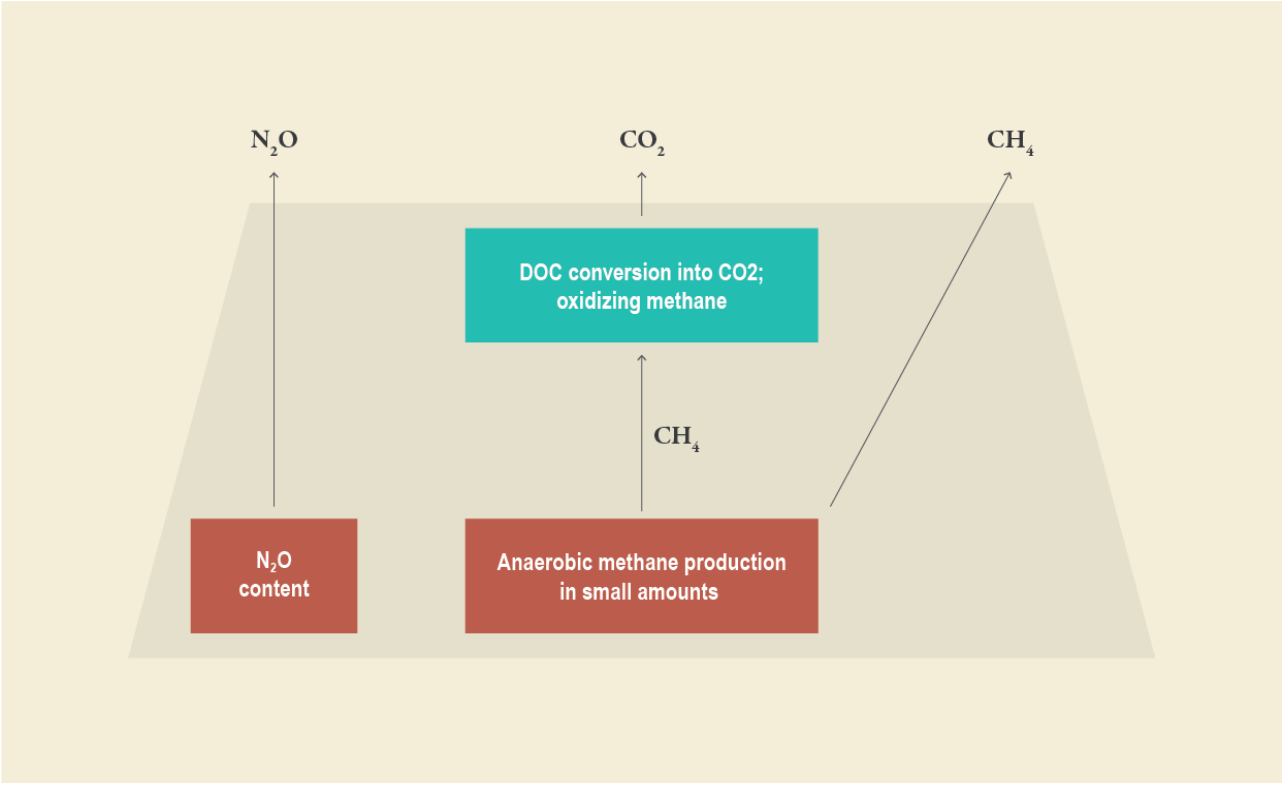
Country	Using data and expert judgment
Bulgaria	• a study conducted in 2002 that determines the shares of different waste types depending on the geographical distribution and population size of different settlements • a model has been developed, which calculates different fractions of the biodegradable organic content of waste for different population groups according to the size of settlements
Tunisia	• The composition of the waste comes from a study conducted in 2007 (feasibility study for the construction of a second landfill for the Greater Tunis, ANGed). • This composition is also verified in the context of CDM projects on landfills.

M2.2 Data needs

Did You Know?

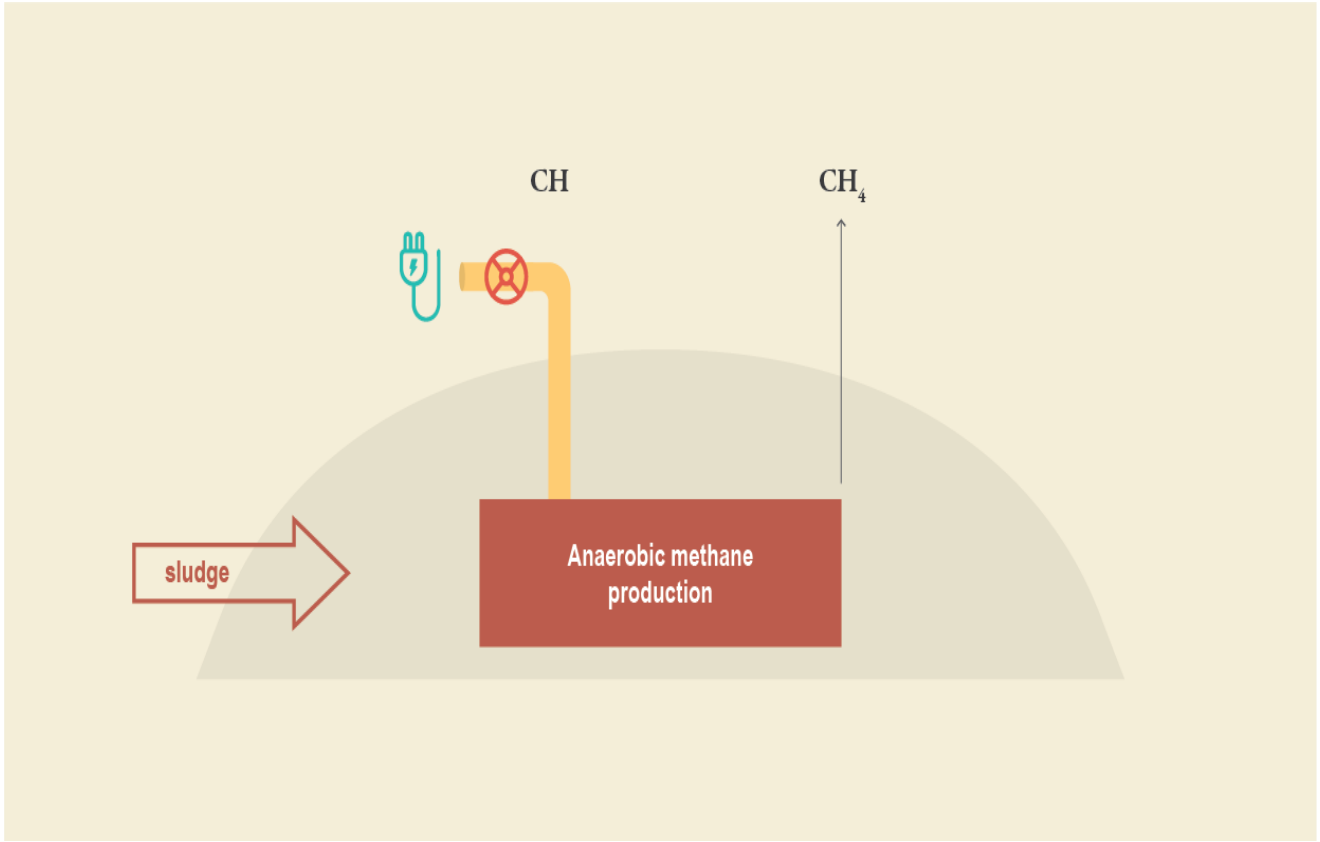
Of all credits issues for Clean Development Mechanism (CDM) projects so far, 6% come from projects in the waste sector. This is significant, taking into account that most CDM projects are landfill gas extraction projects, not touching on other mitigation strategies in the sector.

M2.3 Biological treatment, Composting



? What is not included in the Inventory

M2.3 Biological treatment, Anaerobic digestion



? What is not included in the Inventory

M2.3 Data needs

- Amount of organic waste treated
- Emission factor for treatment
  - Default emission factors are available
  - On a wet and dry weight basis

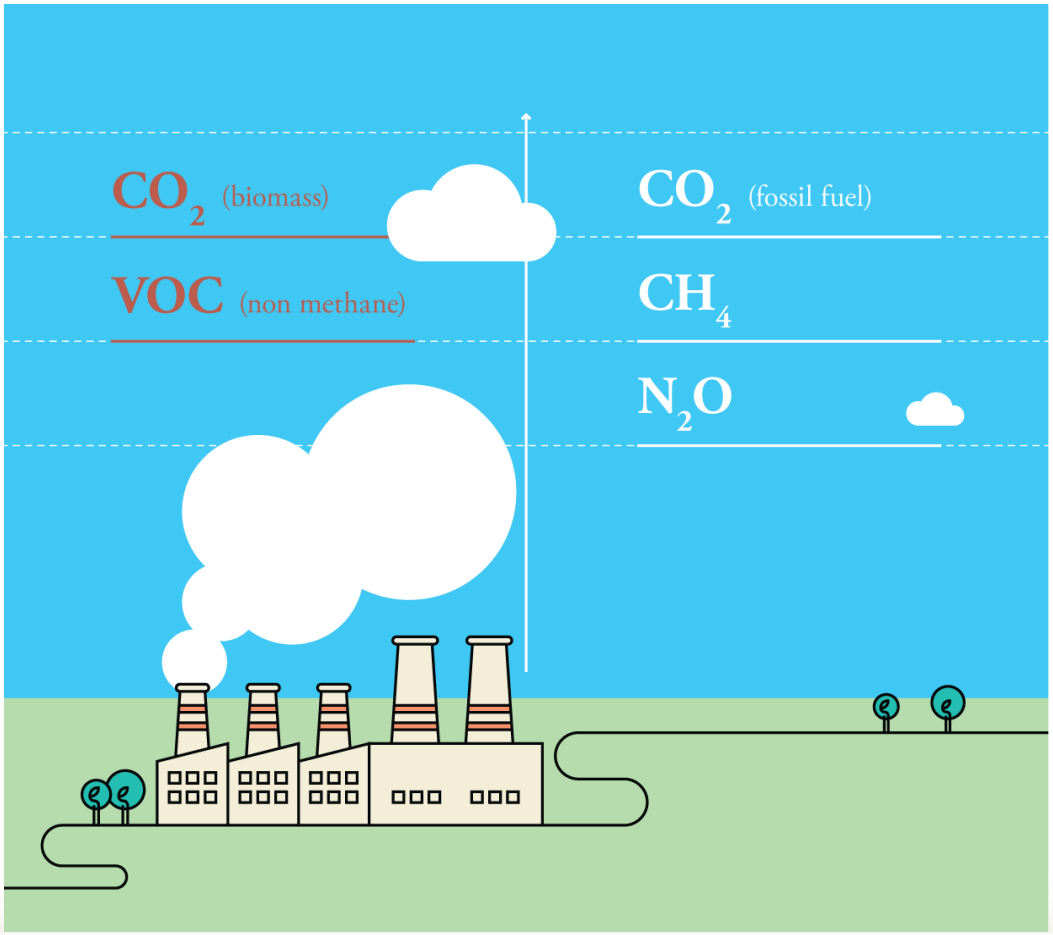
Biogas production, Seini, Romania

Source: RWA Group

M2.3 Tier 1 is used, uncertainty is high

Country	Interpolation, single regression
Chile	• No registry of facilities • Data relies on facilities that are permitted • Efforts were made to survey large facilities and large municipalities
Tunisia	• Official statistics were used, but data is unreliable, not clear if all operators report (uncertainty at 20%, doubled) • 100% uncertainty is assumed for the emission factors

M2.4 Incineration and open burning



? What is not included in the Inventory

M2.4 Incineration and open burning, Data needs

Incineration

- Amount of waste burned per type of waste (municipal, industrial, hazardous, clinical, sewage sludge)
- Amount of fossil liquid waste
- Amount of fossil carbon per waste type (for CO_2 emissions)

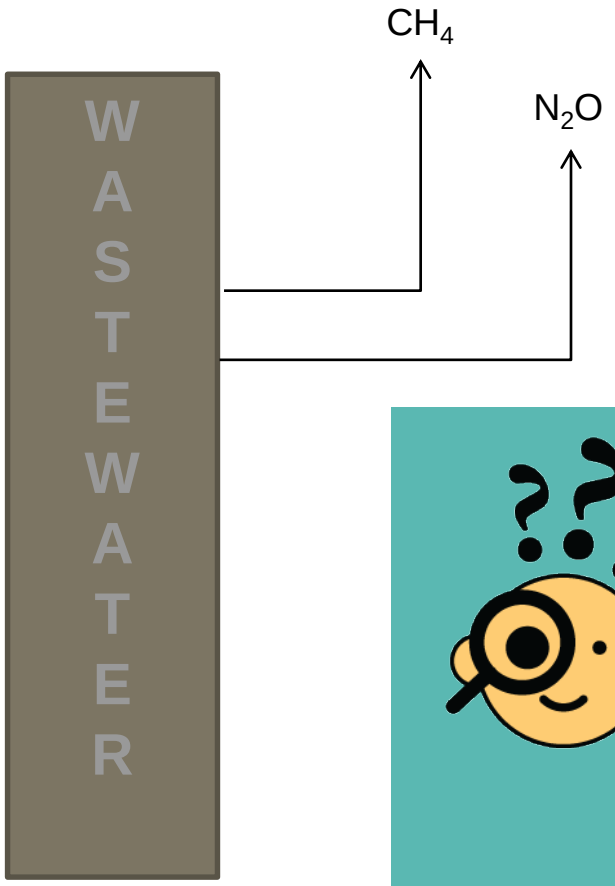
Open burning

- Population burning waste
- Per capita waste generation rate for population burning waste
- Fraction of waste burned

M2.4 Incineration and open burning, Examples

Country	Methods to collect data, estimations used
Armenia	• Assumed that 100% of rural population burns all waste openly
Mexico	• Incineration of medical waste only, the facilities report to the EPA • Assumed that 40% of waste generated in rural areas is burned
Tunisia	• Amount of medical waste estimated by # of bed and occupancy rate in hospitals • Assumed that 20% of population in rural area is burning the waste • Energy and waste sector inventory experts exchange

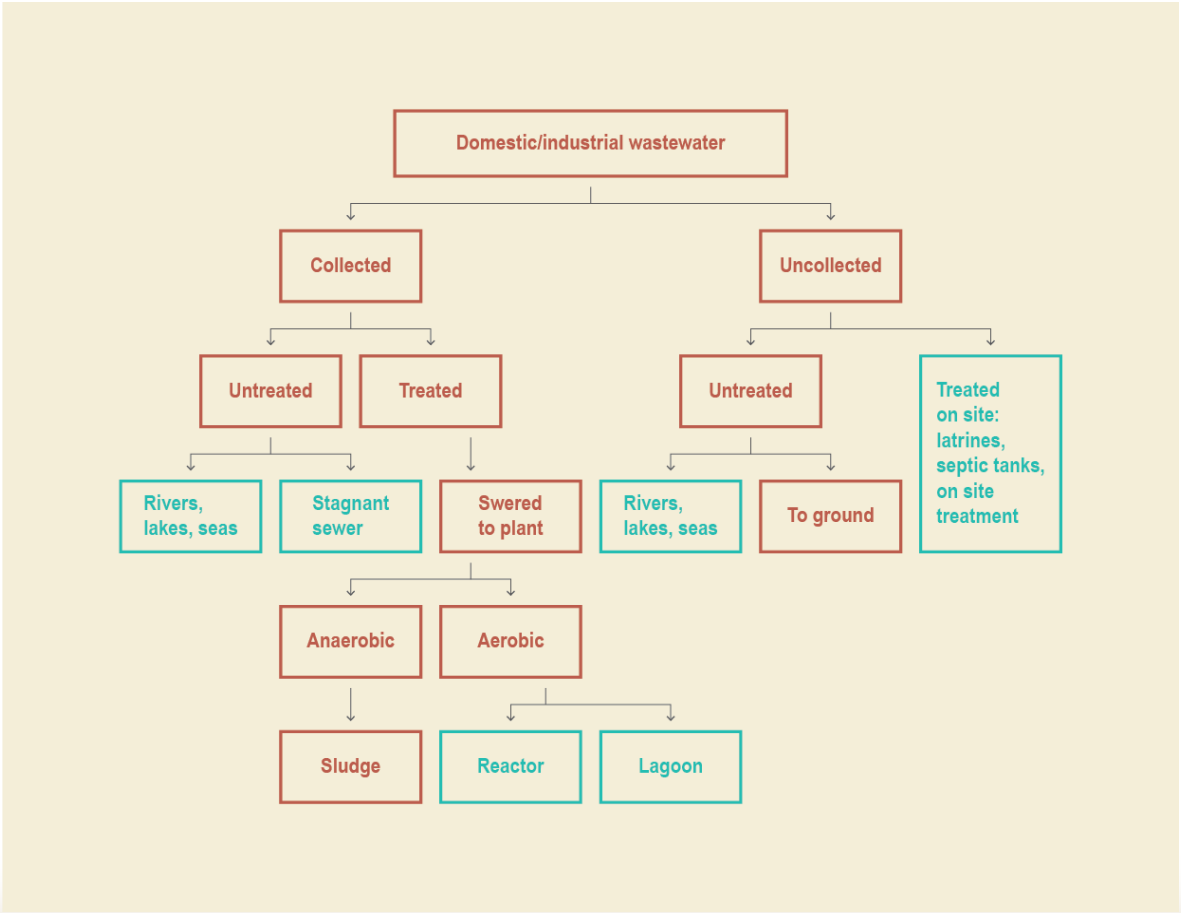
M2.5 Wastewater treatment and discharge



Did You Know?

Biological Oxygen Demand (BOD) is the amount of dissolved oxygen needed (demanded) by aerobic biological organisms to break down organic material present in water at certain temperature over a specific time period. Total organically degradable carbon is measured and expressed in BOD.

M2.5 Wastewater treatment systems and discharge pathways



M2.5 Steps

- Determine Total Organic Biodegradable Content (TOW)
- Emission factors for each pathway of the system
- Relative share of each pathway in the system
- Default values based on the carbon discharged per person and total population
- Systems may be distributed based on rural, urban high income, urban low income population
- The main industries to consider are pulp and paper, food and beverage and organic chemical industry
- For N_2O the protein intake per person

M2.5 CH_4 estimation from wastewater – estimating activity data

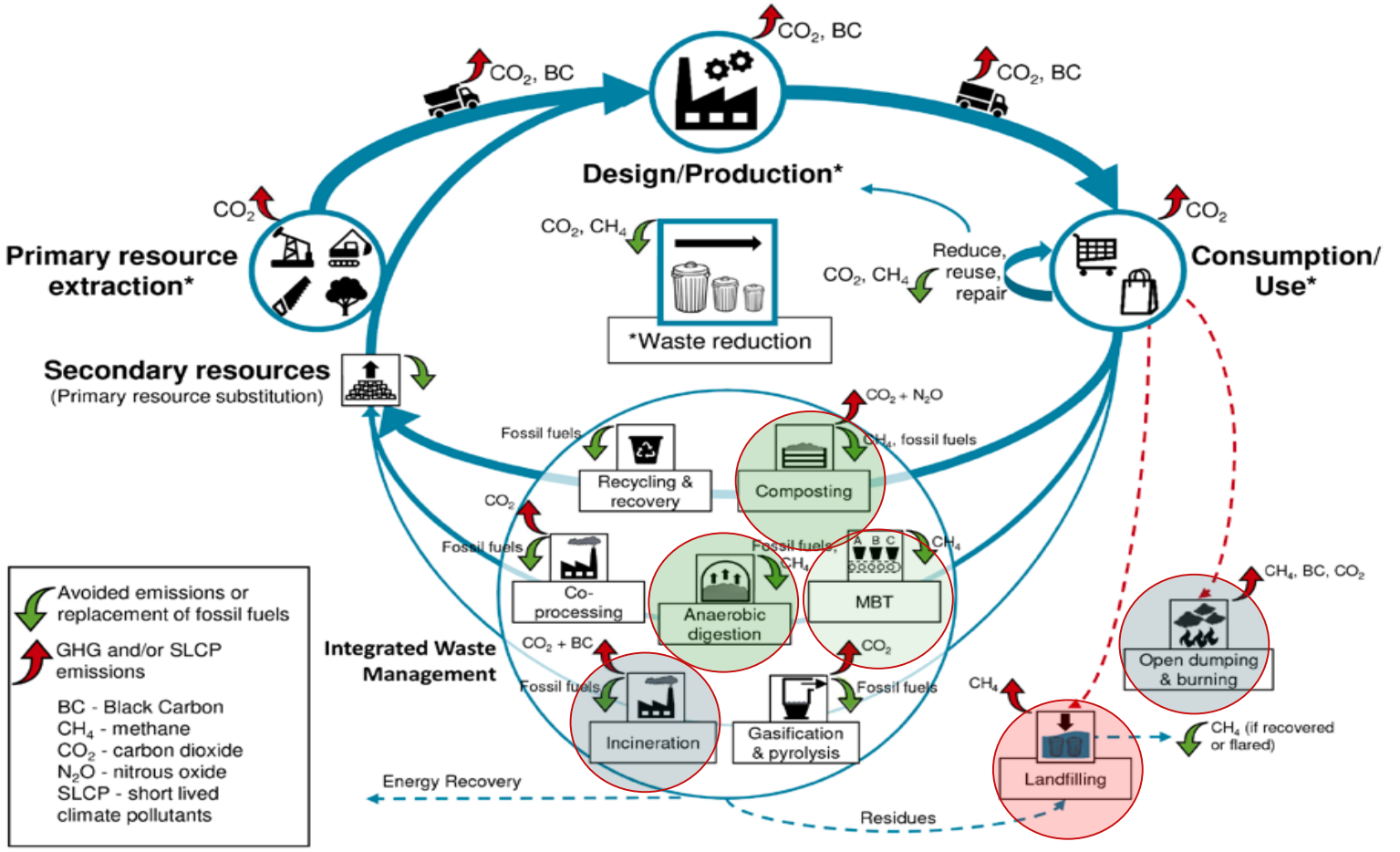
Country	Interpolation, single regression
Armenia	• Population classified into 3 groups: large cities, other towns and villages • Cities (95% sewer, 5% latrines); towns (50% sewer, 50% latrines); villages (5% sewers, 95% latrines)
South Africa	• NIR includes detailed table on treatment type or discharge pathway per income group (according to the 3 suggested categories)
Chile	• Industrial wastewater data was available for 2006-2010. Extrapolation was tempted by different methods, tying extrapolation to GDP changes proved best.

M2.5 N_2O estimation from wastewater

Country	Interpolation, single regression
Armenia	• FAO protein consumption rates used • Interpolation for interim years missing (2009-2010)
Vietnam	• Data from Vietnam's National Institute on Nutrition was used

M2.6 Key data categories and double counting

- Avoiding double counting
- Key category analysis



Graphic focuses on the most important emissions in a circular economy as well as potentials for mitigation. All treatment options result in emissions (i.e. due to electricity consumption), which are typically only a percentage of the emissions avoided by the respective treatment option.

M2.6 Avoiding double counting

- Allocation to “budget lines” or SECTORS (waste to energy, sludge used as fertilizer)

- Anthropogenic and not biogenic origin (CO_2 emissions from landfills)

M2.6 Key categories

- Qualitative assessment – which seems to be the most important source(s) of emissions?
- Based on previous emission estimates
- Trend assessments
- Future policies
- Based on uncertainties
  - Lack of completeness – if data is not complete, this may lead to a bias
  - Lack of data – if data is not available, it may be better to use default
  - Data is not representative – if data is not representative, this may lead to bias

M2.7 Quality Quiz TRUE or FALSE

1. The amount of waste collected is less than the amount of waste generated.
2. The composition of waste generated is the same as the composition of the waste disposed
3. Methane is generated in anaerobic conditions
4. Small scale biogas production generates Greenhouse Gas emissions and should be included in the Waste Sector Greenhouse Gas Inventory
5. GHG emissions from material recycling are included in the waste sector GHG inventory

Agenda overview Day 2

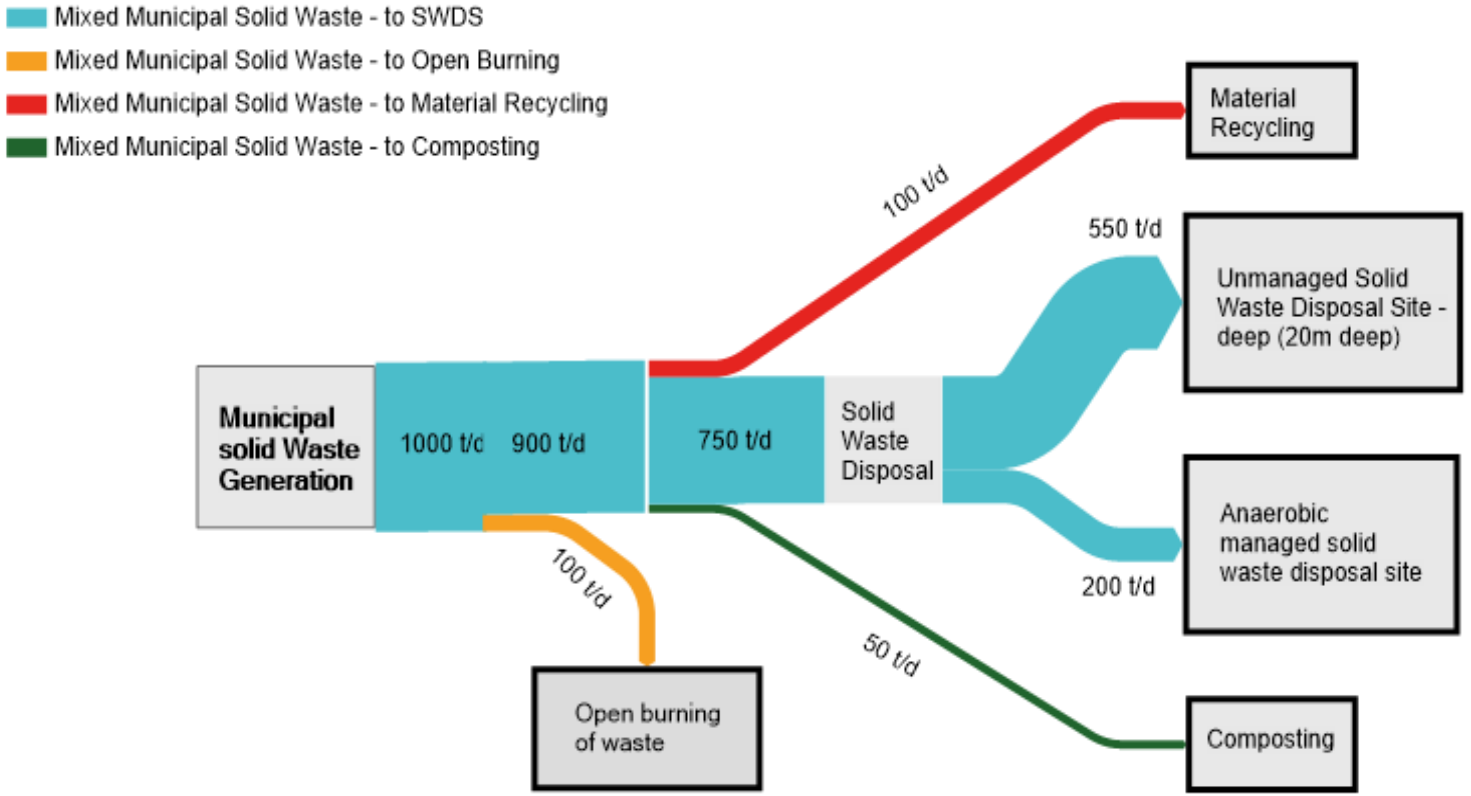
TIME	Activity	Responsible
9-9:25 am	Recap of day 1 and exercise KCA and double counting	Oscar Zarzo, GIZ
9:25 – 10:35 am	Dealing with data needs Exercise: Landfill categorisation	Oscar Zarzo, GIZ
10:35-11:15 am	Group work: Data needs	All
11:30 am-12:15 pm	Institutional Arrangements	All
12:15-12:30 pm	(Short) Summary	All

Exercise 1. Key category analysis and double counting

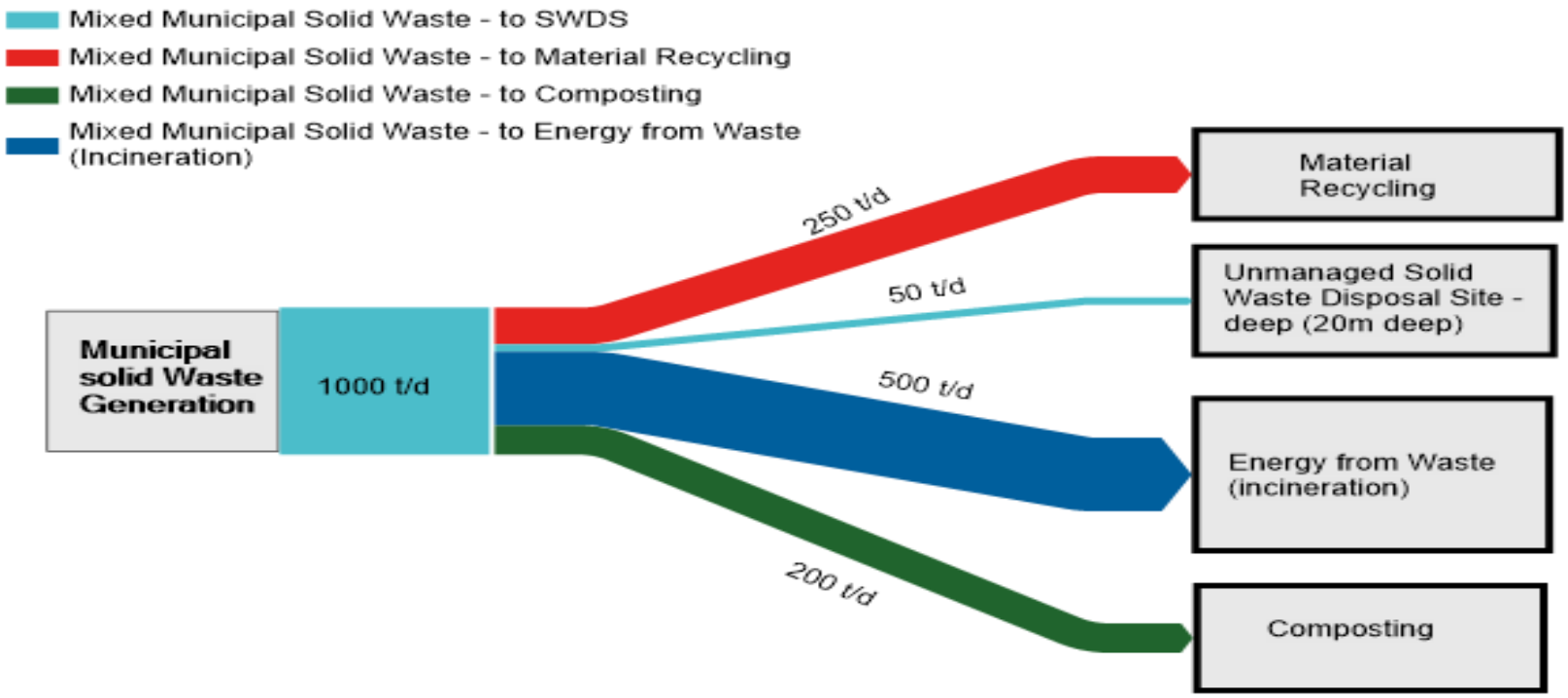
In this exercise, each source of emission must be allocated to the correct category making sure that no emissions are accounted twice.

To illustrate where these treatment options may be in your process flow diagram, we illustrate on the next slides a couple of options through a process flow diagram showing also a mass balance. Depending on the level of development of the sector, the diagram changes.

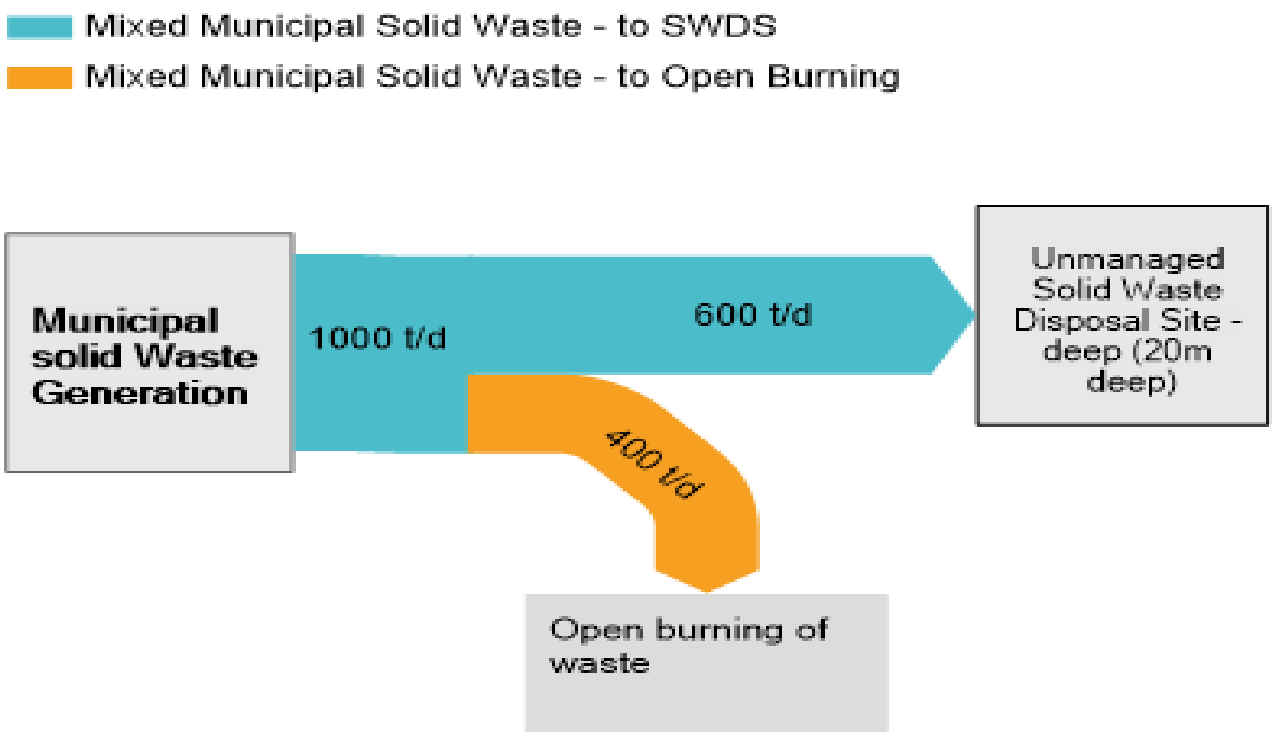
M2.7 Process flow example: Middle income



M2.7 Process flow example: High income



M2.7 Process flow example: Low income



Module 3
Waste data management

M3 : Waste data management

- M3.1 • Waste data collection
- M3.2 • Data management
- M3.3 • Waste characterization
- M3.4 • SWDS classification
- M3.5 • Exercise on SWDS classification
- M3.6 • Exercise Waste Data Management

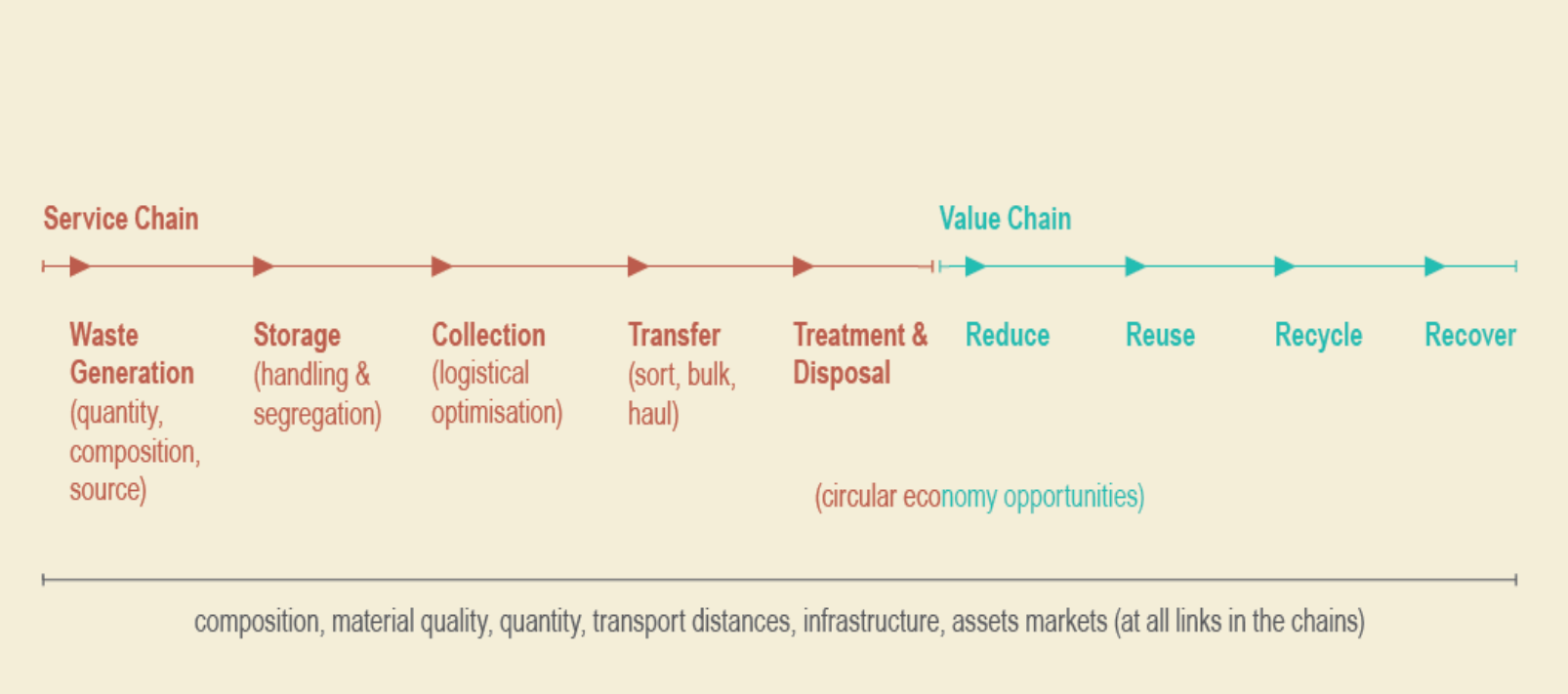
"Measurement is the first step that leads to control and eventually to improvement. If you can't measure something, you can't understand it. If you can't understand it, you can't control it. If you can't control it, you can't improve it."

Prof. H. James Harrington

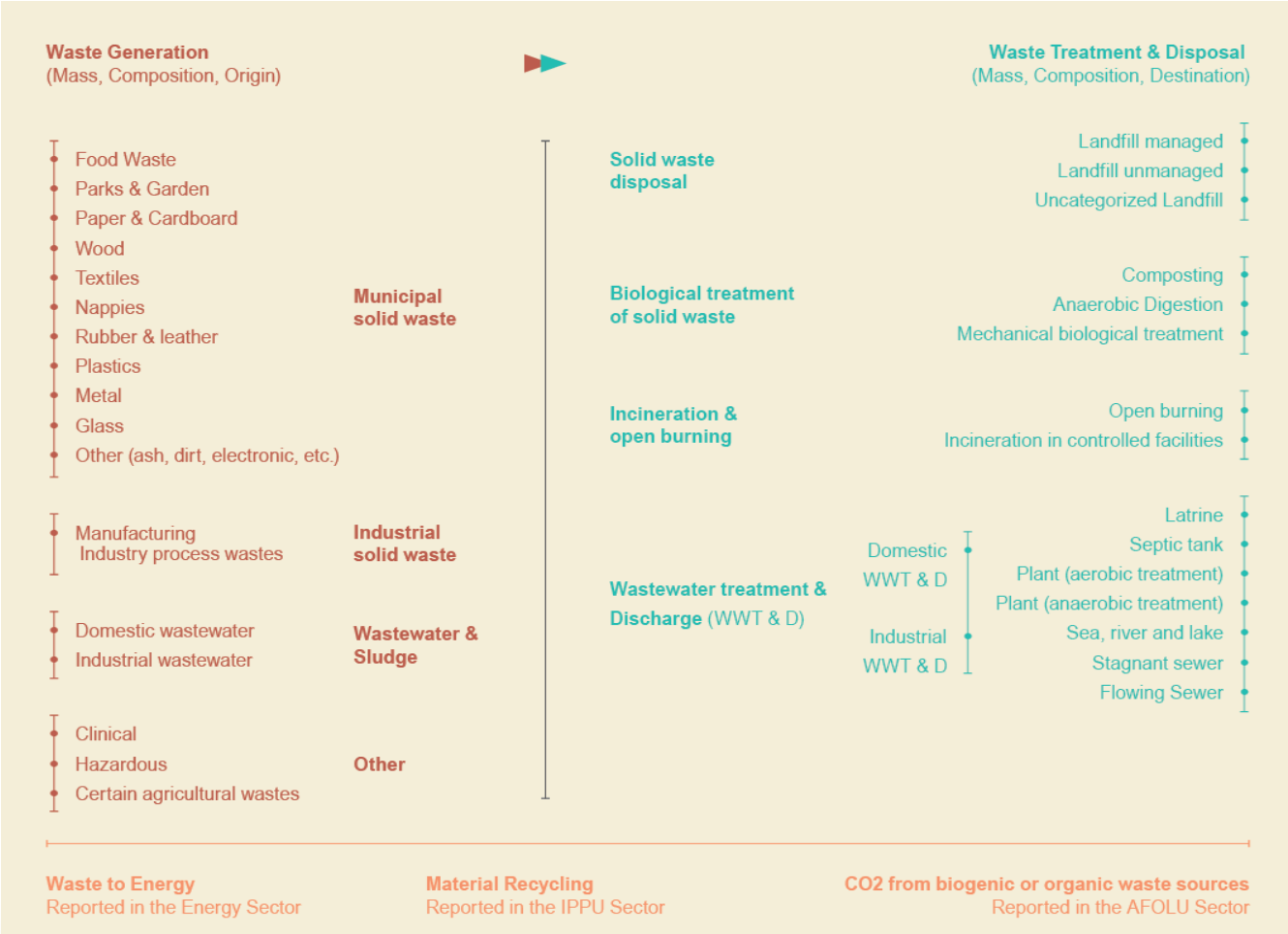
M3.1: Waste data collection

Diversity of data generation and collection	
Who (collects the data)	Landfill Manager; Collection / fleet manager; Industry operator (waste producers); Private operators; Recyclers; Contracts department; Water / Waste Water department; Consultancies; City manager / Mayor; Universities; International Organisation (i.e. Eurostat, OECD, IFIs, UNSD, Basel etc.); prospectors
What (data is collected)	Waste quantity (mass, density, volumes), population, collection rates; transport costs, exports and imports, operating cost; Waste treatment and disposal facility weigh bridge (in and out); composition; generation rates; revenues; residential type, income groups, kWh.
Where (is it collected)	Treatment / disposal facility gate; Industrial waste storage area; facility, city, municipal, national level; on collection truck; ports and borders.
When (is it collected)	Each collection; Monthly; Quarterly; Billing periods; Performance periods; Annually; Random sampling
Why (is it collected)	Contract management (performance indicators); Benchmarking; Cost / quality control; Aid decision-making by government; inform policy, investment, strategies and planning; monitoring progress towards targets; Aid enforcement and compliance monitoring; statutory reporting; identifying sector trends; research.

M3.1 The Waste Management Service and Value Chains



M3.1 Management (SWM) Practitioners' Integrated SWM Data Interests



M3.1 Main waste categories and composition sub-categories of interest

Main Category	Subcategory	Specific areas of Interest
Municipal Solid Waste **(Household waste, Garden (yard) and park waste, Commercial/ institutional waste)**	Food Waste	Specific interest within waste reporting due to high Degradable Organic Carbon (DOC) content
	Garden (yard) and park waste	
	Paper and cardboard	
	Wood	
	Textiles	
	Nappies (disposable diapers)	
	Rubber and leather	Mainly relevant where open burning or incineration is prevalent, or in IPPU sector
	Plastics	
	Metal	Mainly related to IPPU Sector,
	Glass (and pottery and china)	
	Other (e.g. ash, dirt, dust, soil, electronic waste)	Limited impact potential

M3.1 Main waste categories and composition sub-categories of interest

Main Category	Subcategory	Specific areas of Interest
Wastewater & Sludge	Sludge from domestic wastewater treatment plants	Storage, Conveyance and treatment (CH_4 release)
	Sludge from industrial wastewater treatment plants	Storage, Conveyance and treatment (CH_4 release)
Industrial Waste **(process solid wastes only, office etc. waste regarded as MSW) and industrial sludge reported as such)**	Manufacturing Industry process wastes (other than sludge)	(report by industry types, i.e.: Food, beverages & tobacco; Textile; Wood and wood products; Pulp & paper; Petroleum products, solvents, plastics; Rubber; Other)
	Construction and Demolition wastes	Mainly inert
	Clinical Waste	i.e. syringes, needles, animal tissues, bandages, clothes, etc.
	Hazardous Waste	Waste oils, solvents, ash, cinder, & others of hazardous nature (flammability, explosiveness, causticity, toxicity)
Other	Agricultural Waste	Certain manure, agricultural residues, animal carcasses, plastic film for greenhouses treated and/or disposed with other MSW and/or industrial wastes and not covered under AFOLU volume

M3.2 Waste data management

Did You Know?

The quantity and composition of waste varies between countries, but also between income groups, social groups, industrial processes, geographies, and climatic conditions within a country and even within a city. High income groups usually produce more waste with a higher percentage of plastics, electronic equipment etc., while low income groups generally produce less waste overall, with a greater percentage being food, and fines (ash, soil, sand, etc.). Knowing the waste generation and composition of different groups alongside population / size of each group is essential to producing reliable waste generation estimations, especially in locations where the formal waste collection system does not capture and report on all wastes.

M3.2 Waste generation

South African MSW Generation by income group:

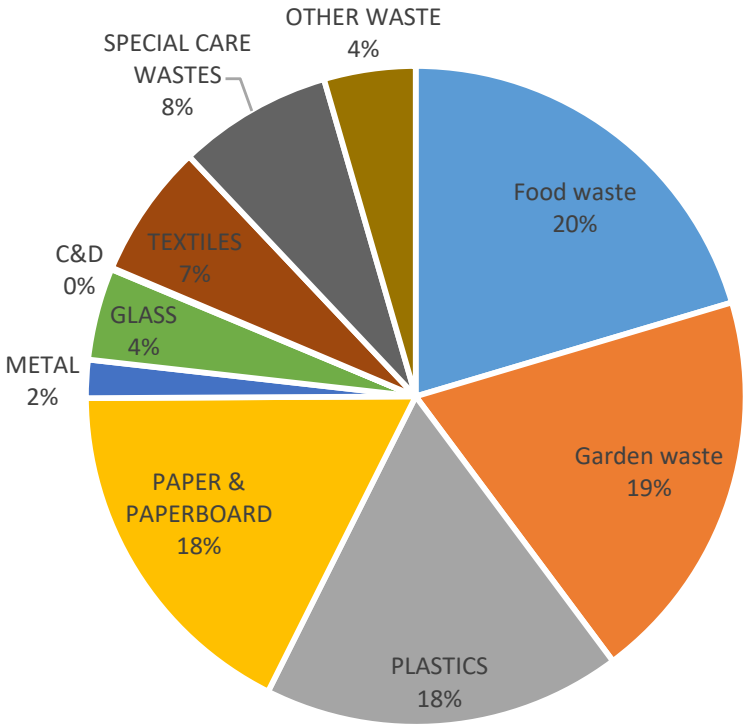
High Income:	0.55 Tonnes/cap/year
Middle Income:	0.28 Tonnes/cap/year
Low Income:	0.13 Tonnes/cap/year
National Average:	**0.22 Tonnes/cap/year**

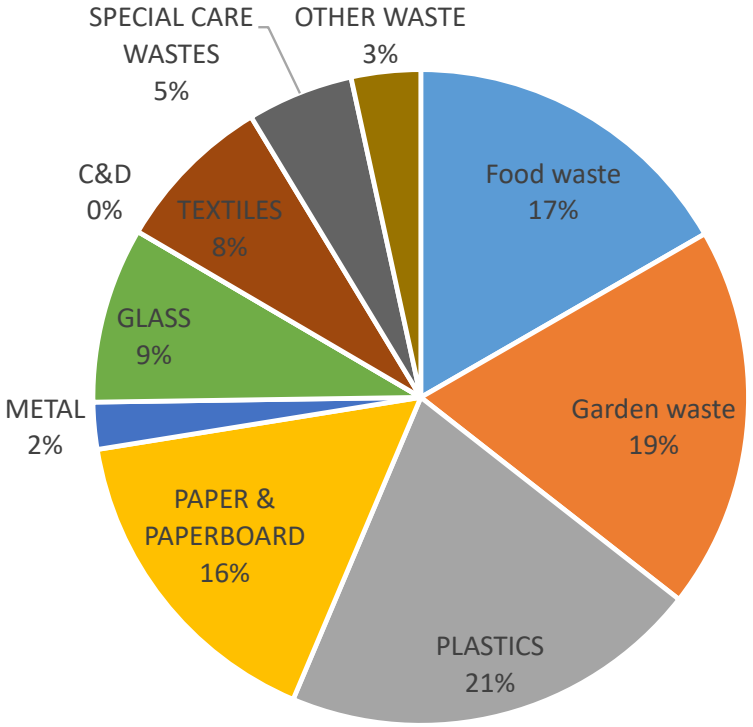
(fine for national statistics, but not site specific)

Senegal MSW Generation
National Average: **0.17 Tonnes/cap/year**

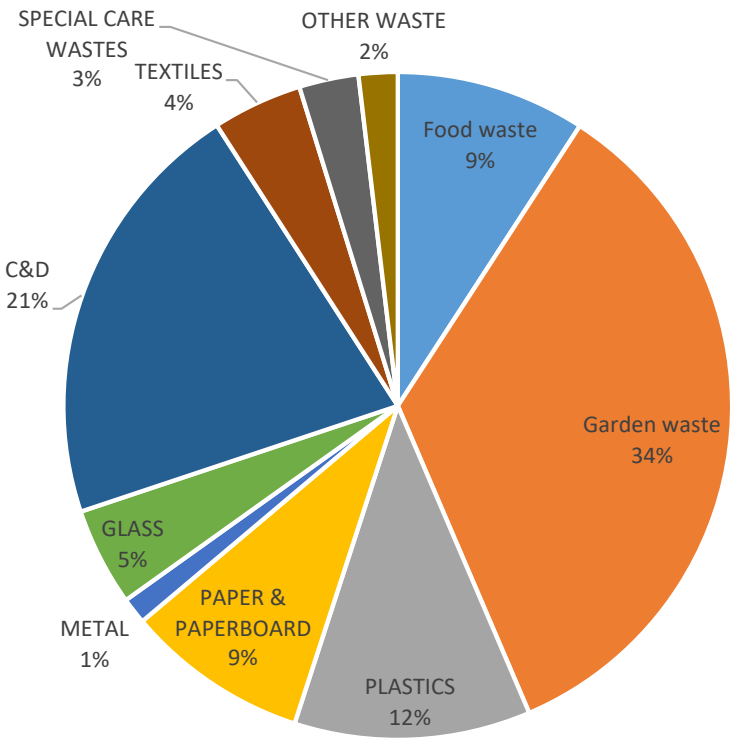
IPCC 2006 Guidelines
Default for Africa: 0.29 Tonnes/cap/year

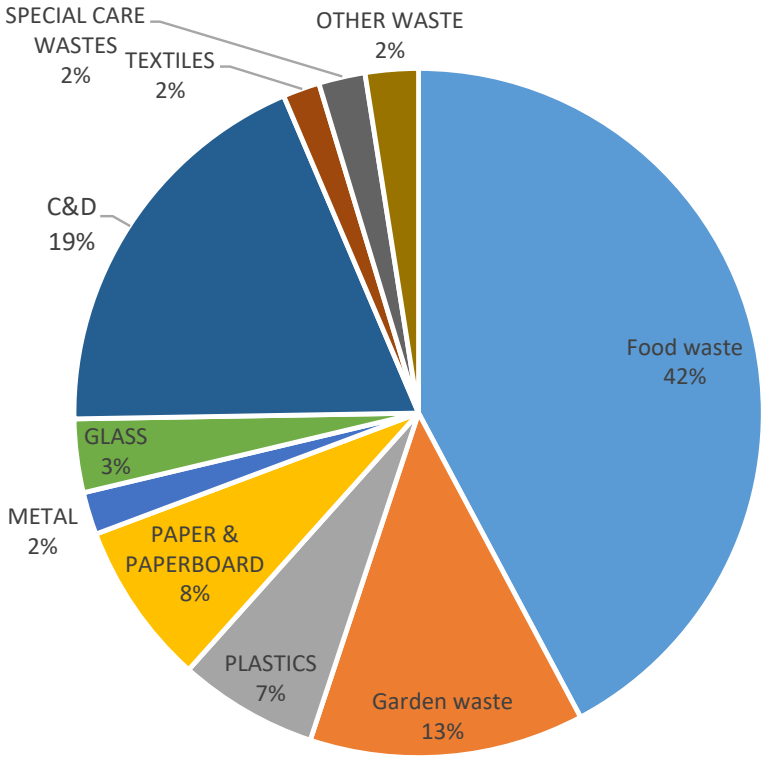
M3.2 MSW Composition for 2 different South African Municipalities



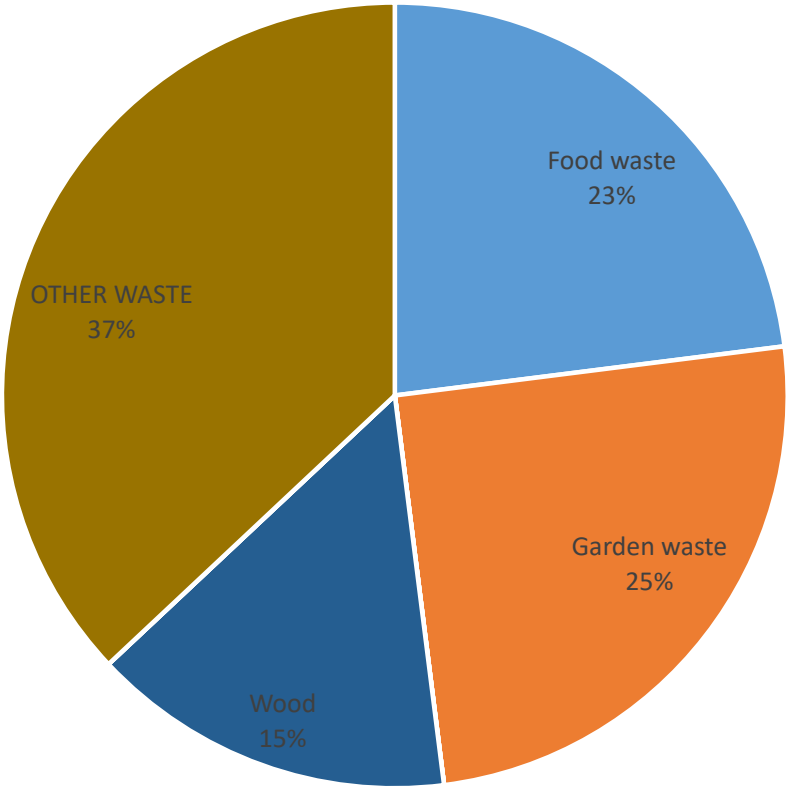


M3.2 Landfill Disposal Composition (includes Industrial and other wastes) for same 2 South African Municipalities





M3.2 IPCC 2006 Guidelines Default MSW Composition for Southern Africa



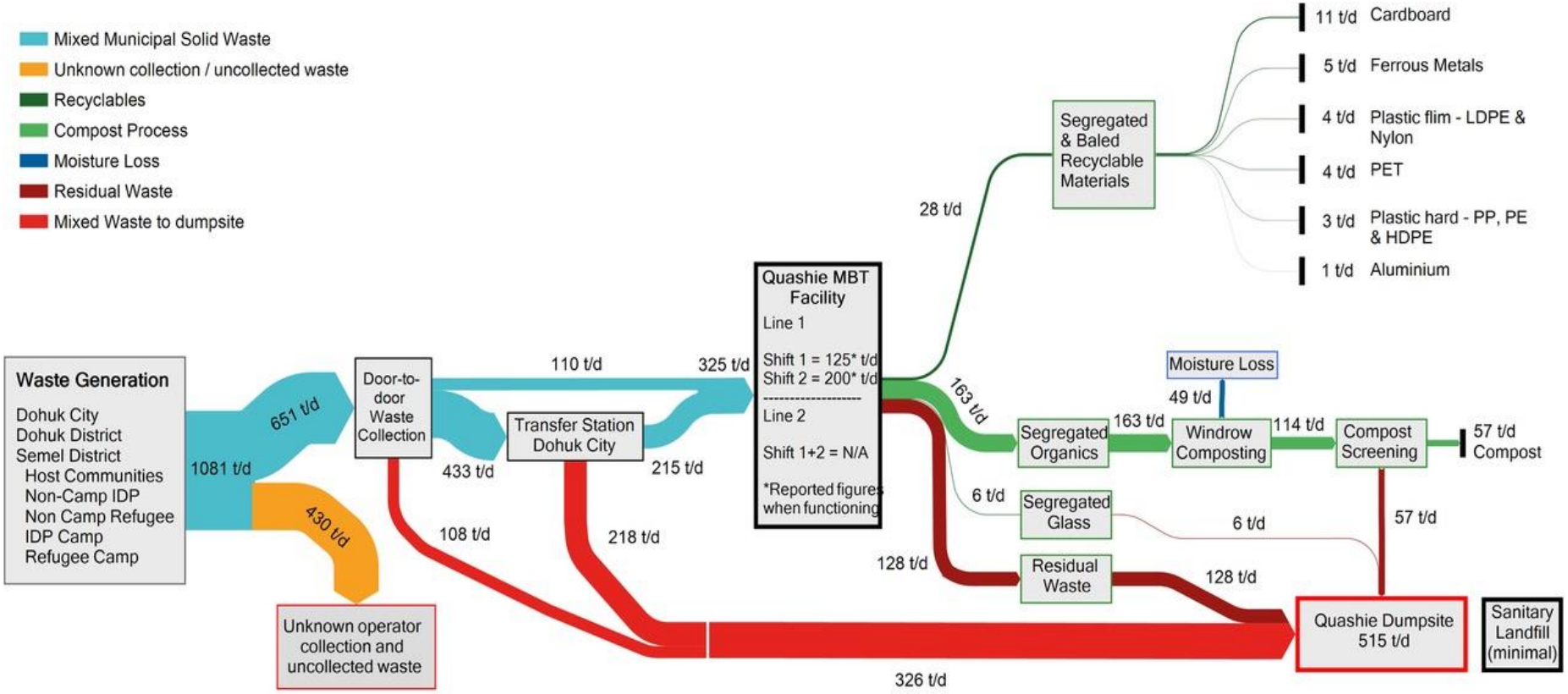
M3.2 Solid Waste Management Facility - Weigh Bridge Data

Source: RWA Group

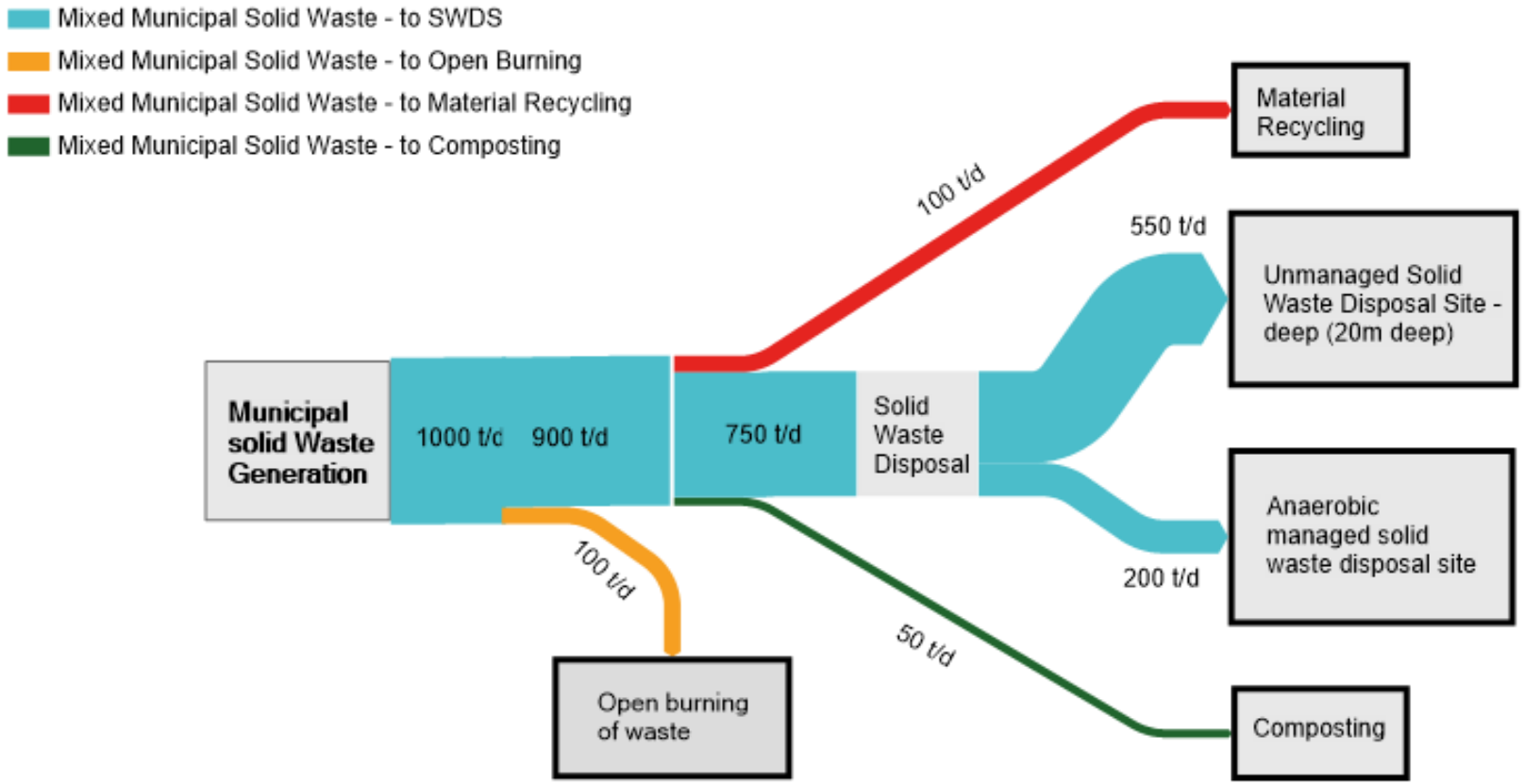
M3.2 Always difficulties knowing what enters a landfill

Source: RWA Group

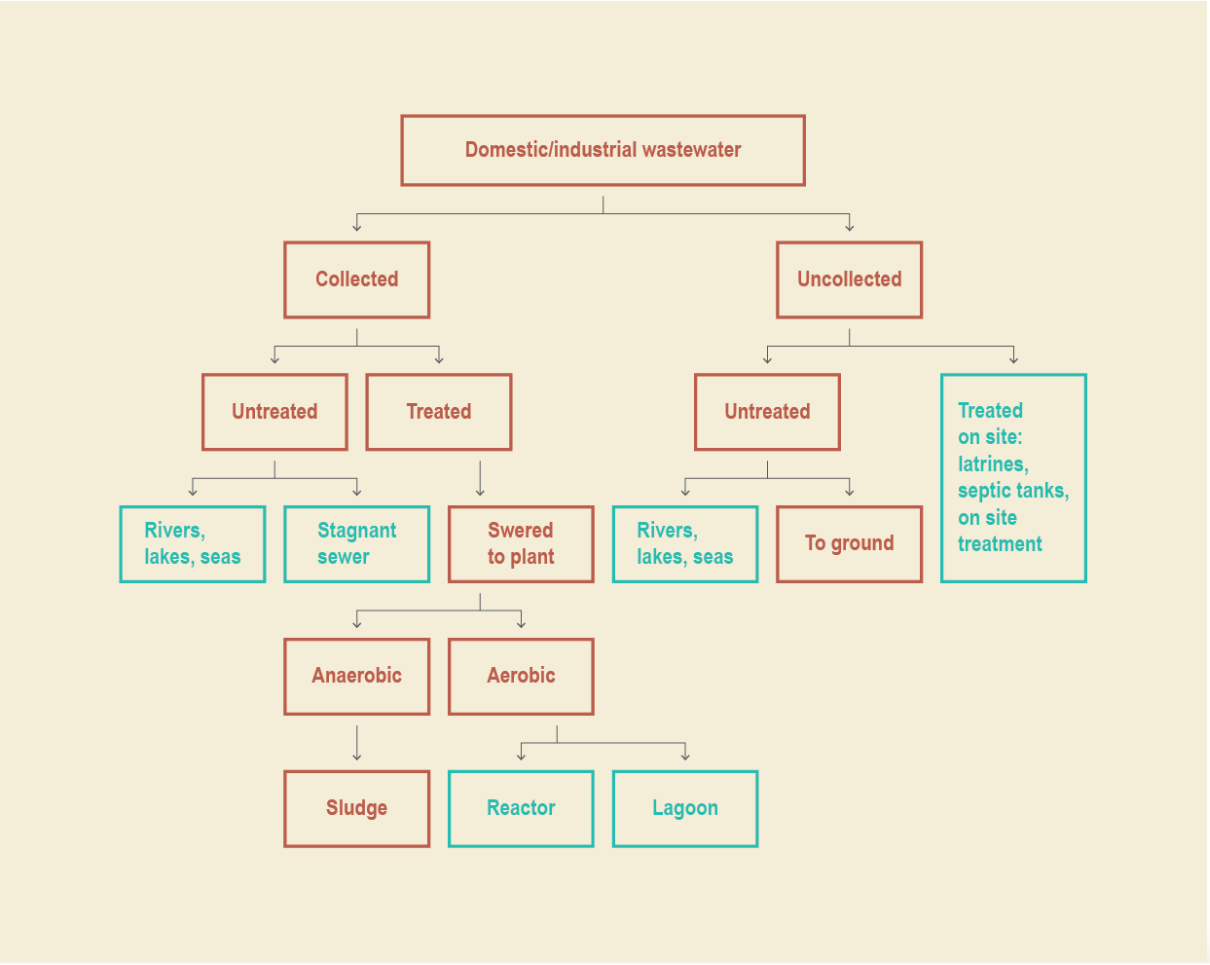
M3.2 Material Flow Mass Balance QA/QC Tool – Tier 3



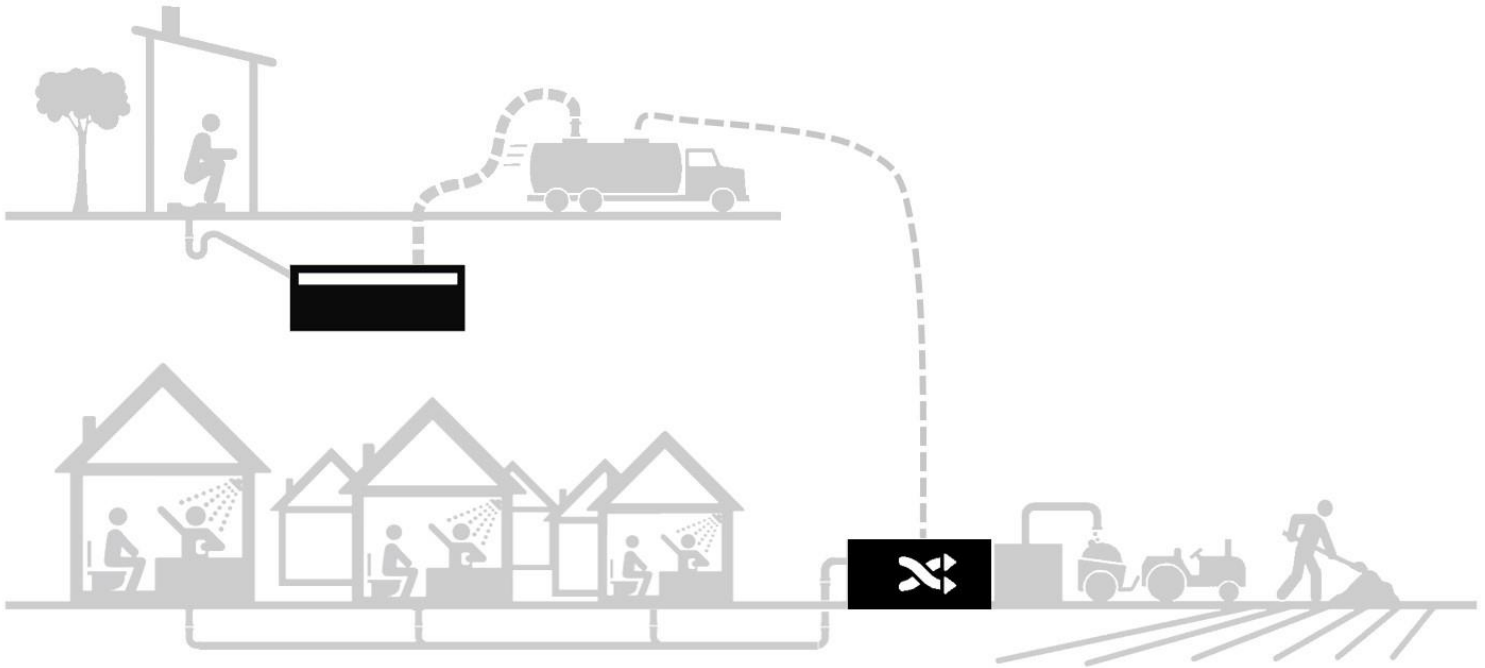
M3.2 Material Flow Mass Balance QA/QC Tool – Tier 1 / 2



M3.2 GHG Inventory Focus areas in Wastewater



M3.2 Domestic Wastewater Service Chain



M3.2 Which sanitation option is worst?

A: Open Defecation

B: Stagnant Open Sewer

B: Latrine dumping to flowing river

Example: Dakar WWTP and Faecal Sludge Facility

Source: RWA Group

Example: Tankered Wastewater Treatment Plant – Gate Records

M3.3 Waste characterisation

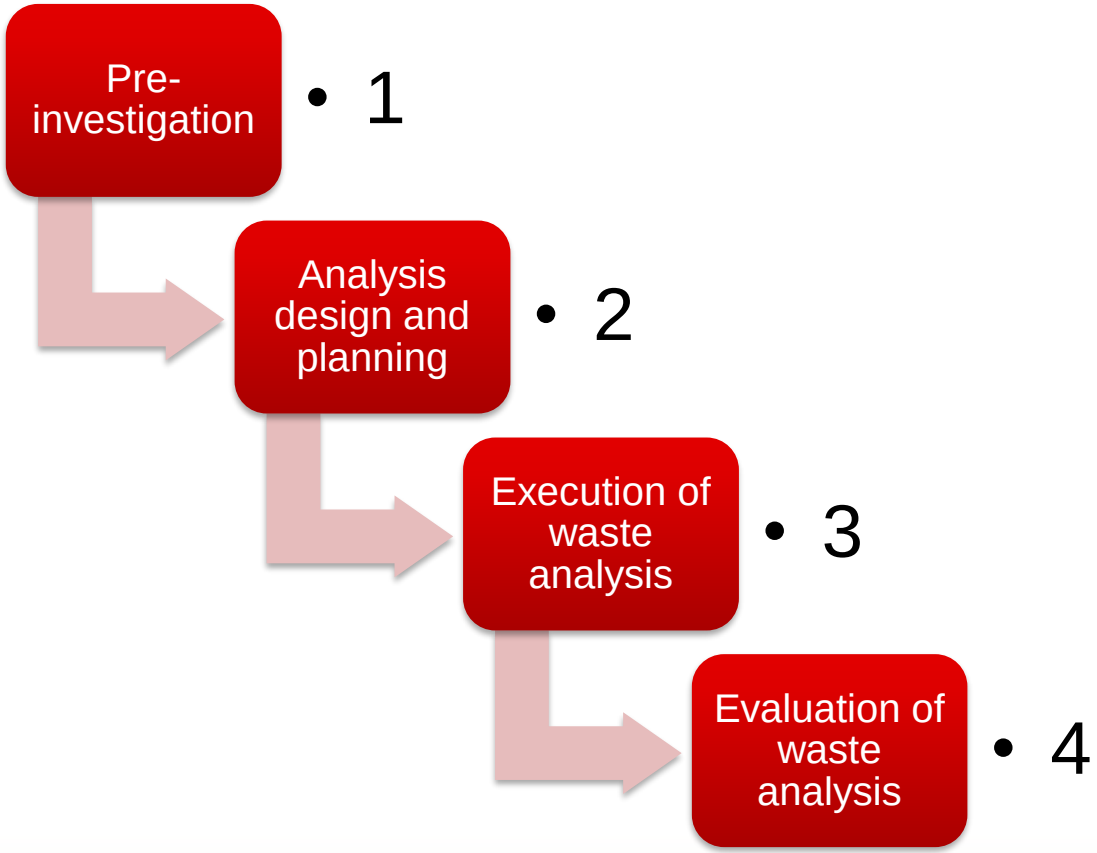
Source: RWA Group

M3.3 Selecting an appropriate methodology

Waste Characterisation Analysis should be compliant with accepted international best practice, which include:

- ASTM D5231 - 92(2016) - Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste - Available from - http://www.astm.org/cgi-bin/resolver.cgi?D5231
- UNEP/IETC - Developing Integrated Solid Waste Management Plan, Volume 1, Waste Characterisation and Quantification with Projections for Future (2009).
- Methodology for the Analysis of Solid Waste (SWA-Tool) User Version – Available from - https://www.wien.gv.at/meu/fdb/pdf/swa-tool-759-ma48.pdf

M3.3 Essential Steps



M3.3 System Design - Essential

- Seasonality – Exercise must be conducted in all major climatic seasons (usually 3 times in a year)
- 32 x 100 kg randomly selected samples from each strata – minimum required

Main difference is where in the waste service chain the analysis is conducted

- Waste direct from households / commercial properties
- Waste from bins
- Waste from collection vehicles entering landfill

M3.3 Potential Strata

1. Urban High Income
2. Urban Middle Income
3. Urban Low Income
4. Collection system
5. Bin type and size
6. Food Market
7. Dry goods market
8. CBD Offices
9. Street bins
10. Commercial districts (commercial properties only)
11. Industrial sectors
12. Parks and Gardens

M3.3 Analysis at SWDS

Landfill gate Records (Soil & Building rubble removed)	
Mixed MSW	60%
Industrial	26.6%
Organic (Garden)	5.2%
C&D	8%
Cover material	0%

Household Waste Analysis	
Organics	29.5%
Construction & Demolition Material	0.1%
Plastics	19.1%
Paper & Paperboard	22.5%
Metal	2.8%
Glass	6.5%
Textiles	6.8%
Special Care Wastes	4.2%
Other Waste	0.0%
E-waste	8.6%

Industrial Waste Analysis	
Organics	8%
Construction & Demolition Material	21%
Plastics	25%
Paper & Paperboard	32%
Metal	2%
Glass	3%
Textiles	4%
Special Care Wastes	5%
Other Waste	0%
E-waste	0%

Total Landfilled Composition	
Organics	25%
Construction & Demolition Material	13%
Plastics	18%
Paper & Paperboard	22%
Metal	2%
Glass	5%
Textiles	5%
Special Care Wastes	4%
Other Waste	5%
E-waste	25%

WASTE ANALYSIS FORM

- **DATE:**
- **TIME:**
  - **STARTED:**
  - **FINISHED:**
- **WEATHER CONDITIONS:**
- **VEHICLE I.D:**
- **WASTE ORIGINATING FROM:**
- **FORM COMPLETED BY:**
  - **NAME:**
  - **SIGNATURE:**

	MATERIAL TYPE	Gross (kg)	Tare (kg)	Net (kg)	%of Total
	PAPER & PAPERBOARD				
1	Newspaper				
2	Cardboard/boxboard				
3	Magazines/catalogues				
4	Office paper				
5	Other/miscellaneous paper				
	GLASS				
6	Clear containers				
7	Green containers				
8	Amber containers				
9	Remainder/composite glass				
	METAL				
10	Tin/steel containers				
11	Aluminium containers				
12	Other ferrous metal				
13	Other non-ferrous metal				
14	Major appliances				

	MATERIAL TYPE	Gross (kg)	Tare (kg)	Net (kg)	%of Total
	PLASTICS				
15	Clear PET Bottles/containers				
16	Green PET Bottles/Containers				
17	Amber PET Bottles/containers				
18	HDPE containers				
19	Film plastics				
20	Other plastics				
	TEXTILE				
21	Textiles				
	ORGANICS				
22	Food waste				
23	Garden waste				
24	Agricultural waste				
25	Abattoir Waste				
26	Remainder/composite organics				
	CONSTRUCTION & DEMOLITION MATERIAL				
27	Concrete				
28	Lumber				
29	Remainder/composite C& D				
	SPECIAL CARE WASTES				
30	Paint				
31	Hazardous materials				
32	Biomedical				
33	Batteries				
34	Oil Filters				
35	Remainder/composite S.C. Waste				
	OTHER WASTE				
36	Waste Electrical Equipment (WEEE)				
37	Tyre				

M3.5 SWDS classification & Methane Correction Factors (MCF)

Type of Site	Methane Correction Factor (MCF) Default Values
Managed – anaerobic	1.0
Managed – semi-aerobic	0.5
Unmanaged– deep (>5 m waste) and /or high water table	0.8
Unmanaged– shallow (<5 m waste)	0.4
Uncategorised SWDS	0.6

Solid Waste Disposal Site classification from 2006 IPCC Guidelines Volume 5, Chapter 3, Table 3.1

M3.5 Anaerobic managed SWDS

These must have controlled placement of waste. i.e.:

a) waste directed to specific deposition areas;
b) a degree of control of scavenging; and
c) a degree of control of fires

and will include at least one of the following:

i. cover material; and / or
ii. mechanical compacting; and / or
iii. levelling of the waste.

Example: Anaerobic managed SWDS

Source: RWA Group

M3.5 Semi-aerobic managed SWDS

These must have controlled placement of waste and will include all of the following structures for introducing air to waste layer:

i. permeable cover material; and

ii. leachate drainage system; and

iii. Regulating pondage; and

iv. gas ventilation system.

Example: Semi-aerobic managed SWDS

 Source: RWA Group

M3.5 Unmanaged SWDS – Deep (>5m waste) and/or high water table

All SWDS not meeting the criteria of managed SWDS and which have depths of greater than or equal to 5 metres and/or high water table at near ground level.

Latter situation corresponds to filling inland water, such as pond, river or wetland, by waste.

Example: Unmanaged SWDS – Deep (>5m waste) and/or high water table

M3.5 Unmanaged – Shallow (<5m waste)

All SWDS not meeting the criteria of managed SWDS and which have depths of less than 5 metres.

Source: RWA Group

M3.5 Uncategorised solid waste disposal sites

Only if countries cannot categorise their SWDS into first four categories of managed and unmanaged SWDS, can the MCF for this category can be used.

Generally used for countries that cannot define what kind of landfills they have or had in the past.

M3.5 Oxidation factor (OX) for SWDS

Type of site	Methane Correction Factor (MCF) default values
Managed, unmanaged and uncategorised	0
Managed, covered with CH_4 oxidising material	0.1

IPCC 2006 Guidelines, Volume 5, Chapter 3, Table 3.2

M3.6 Exercise Classification of Solid Waste Disposal Sites

Observe the following Solid Waste Disposal Sites (SWDS) Examples and in your groups:

- Identify the classification of each example Solid Waste Disposal Sites using the 2006 IPCC Guidelines Volume 5 Chapter 3

Example 1 - Bahir Dar city dumpsite, Bahir Dar - Ethiopia

Source: RWA Group

Example 2 - Dakar city dumpsite, Dakar - Senegal

Source: RWA Group

Example 3 - Reppie SWDS - Addis Ababa - Ethiopia

Source: RWA Group

Example 4: Potchefstroom SWDS – South Africa

Source: RWA Group

Example 5: Colombia, basurero Doña Juana

Source: https://static.iris.net.co/sostenibilidad/upload/images/2017/3/16/37342_1.jpg

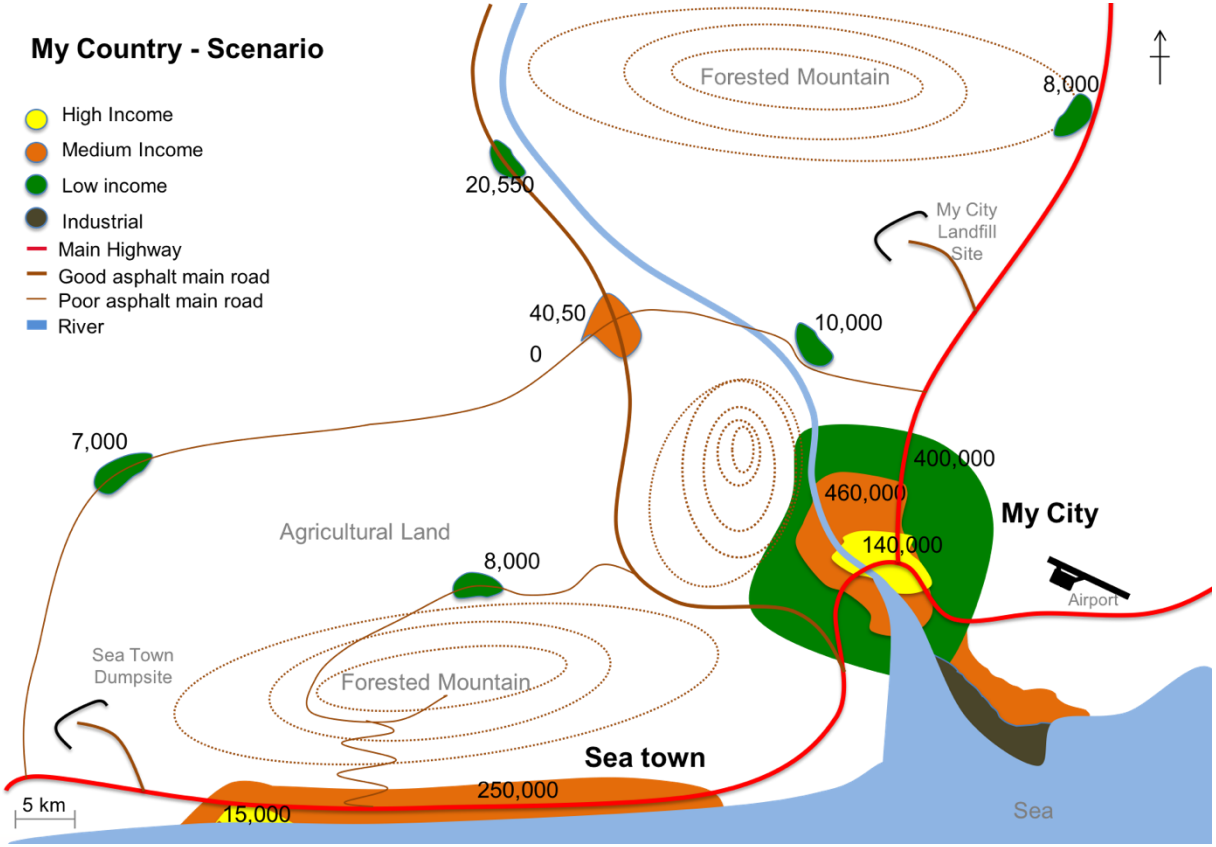
Example 6: Amman, Jordan

Source: RWA Group

M3.7 Exercise 3. Waste Data Management

An interactive group exercise based on a scenario country (”My Country”) with two separate main waste management areas, the capital city “My City” and the rural area and secondary town areas of “My Country” (see map). Using two mass balance diagrams presenting example waste management data from the two subnational groups, analyse the data, aggregate it, validate it for the entire “country” waste management sector.

M3.7 Exercise 3. Waste Data Management

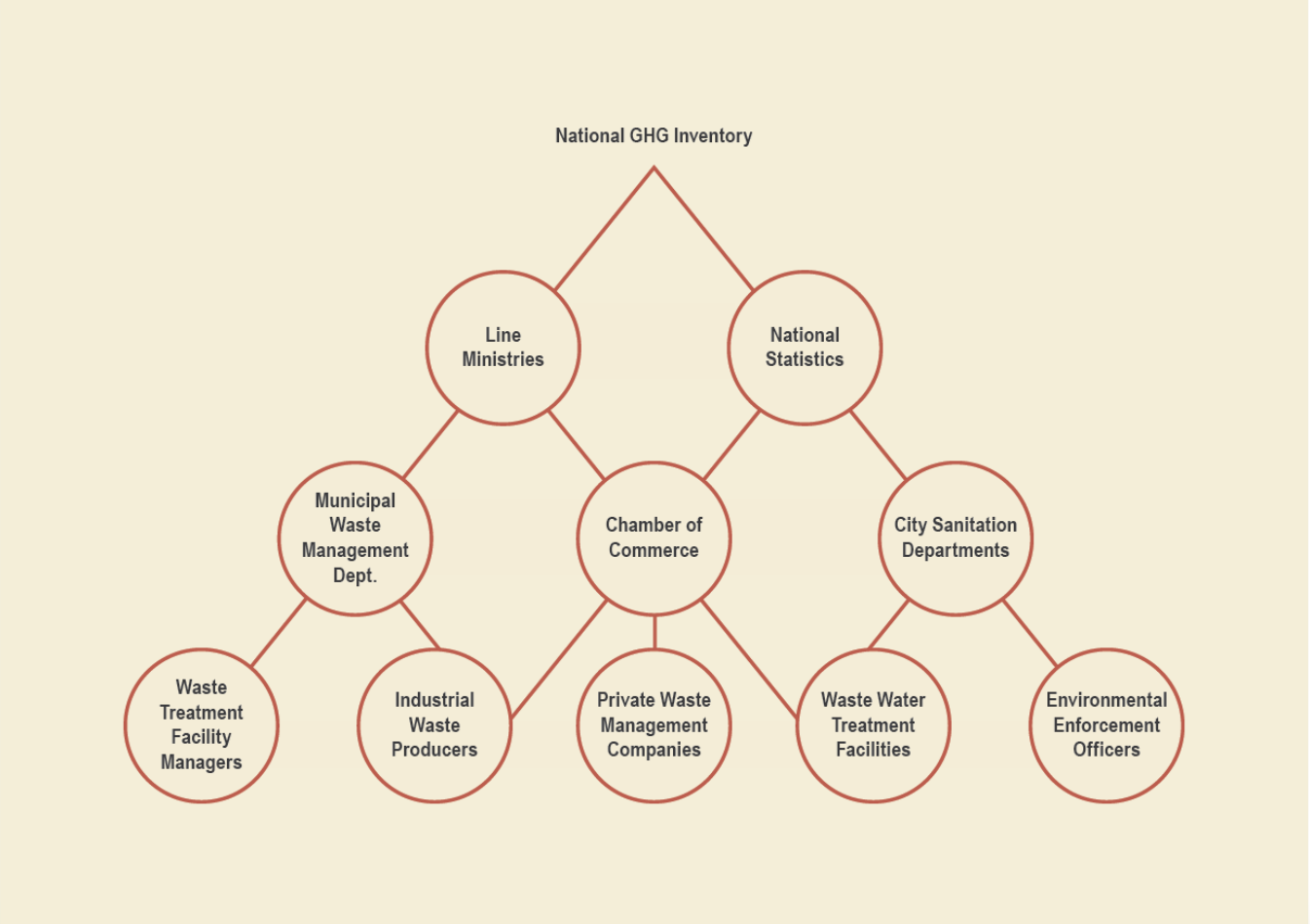


Source: RWA Group

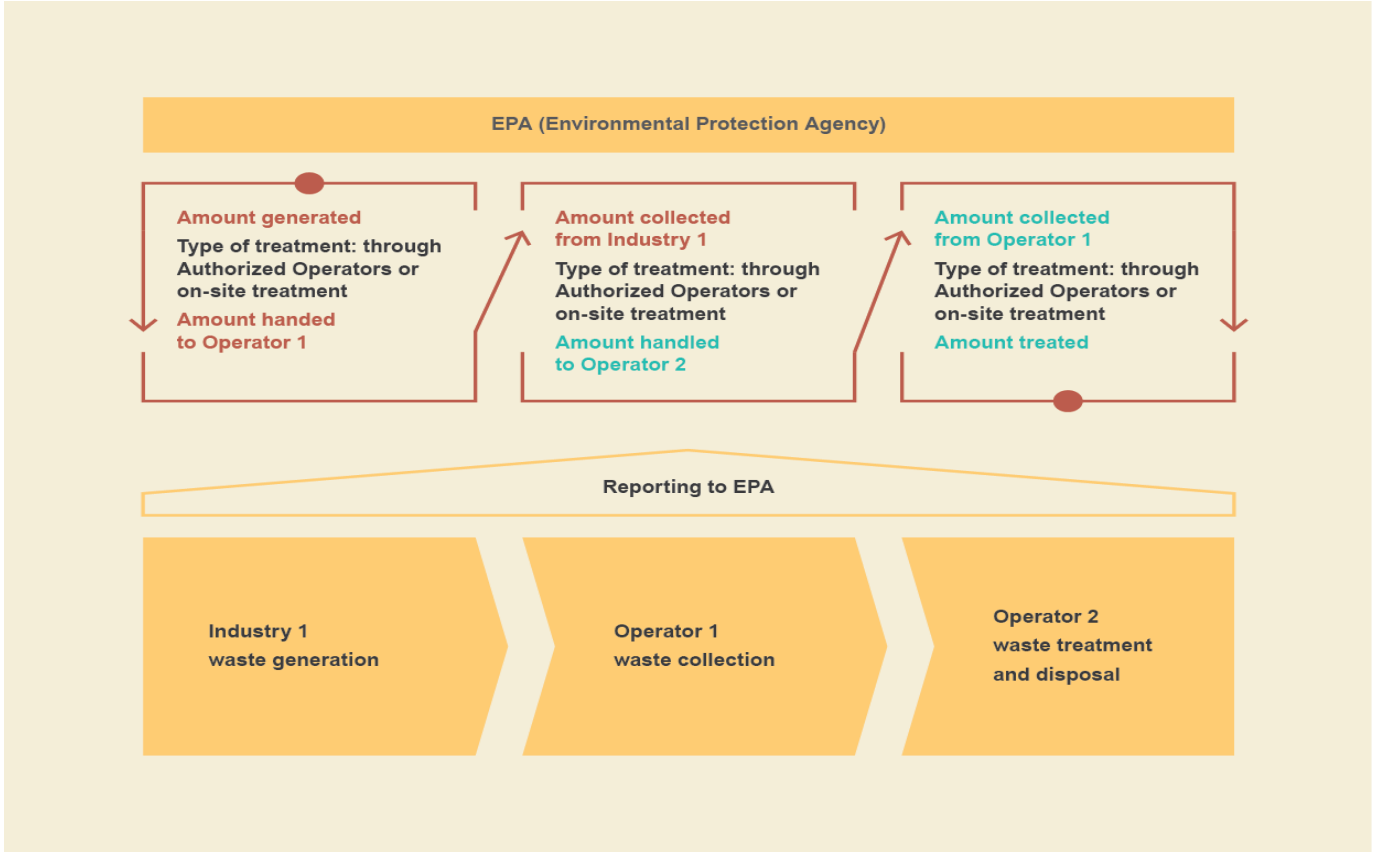
M5.8 Institutional arrangements and data flow

Exercise 9: Institutional arrangements and data flow

M5.8 Institutional arrangements and data flow



M5.8 Institutional arrangements and data flow



Thank you very much for your time and attention!

In all matters of the project please contact:

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(MRV and GHG Inventory advisor at the German Environment Agency)

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