

Roadmap for Transformative Action on the Open Burning of Waste in Africa

*Prepared as a guide for the implementation of AMCEN
Resolution 18/1(b) on eliminating open waste burning from
Africa*

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Acronyms

AADFI	African Association of Development Financing Institutions
AAP	ambient air pollution
AFC	African Finance Corporation
AfDB	African Development Bank

AMCEN	African Ministerial Conference on Environment
BAU	business as usual
BC	black carbon
CCAC	Climate & Clean Air Coalition
CEO	Chief Executive Officer
DBSA	Development Bank of South Africa
DFIs	development financing institutions
DRC	Democratic Republic of Congo
FDI	foreign direct investment
EPR	extended producer responsibility
EU	European Union
GDP	gross domestic product
GHG	greenhouse gases
GWMO	Global Waste Management Outlook
HAP	household air pollution
H&E	health and the environment
IGES	Institute for Global Environmental Strategies
IQ	intelligence quotient
ISWA	International Solid Waste Association
MRF	material recovery facilities
MSW	municipal solid waste
NDCs	Nationally Determined Contributions
NGO	non-governmental organisation
NIMBY	Not In My Back Yard
ODF	Overseas Development Finance
OECD	Organisation for Economic Co-operation and Development
OWB	open waste burning
PET	polyethylene terephthalate
PM	particulate matter
POPs	persistent organic pollutants
SAWPRS	South African Waste Picker Registration System
SDGs	Sustainable Development Goals
SLCPs	short-lived climate pollutants
SMEs	small- and medium-sized enterprises
SSA	Sub-Saharan Africa
SWM	solid waste management

ToC	Theory of Change
UCLG	United Cities and Local Governments of Africa
UNCLG	United Cities and Local Governments
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNHLC	United Nations High-Level Champions
UN-Habitat	United Nations Human Settlement Programme
US	United States
WBG	World Bank Group

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1 Introduction

The unchecked open burning of waste in Africa is harming health, causing premature deaths and accelerating climate change. In 2022, the African Ministerial Conference on the Environment (AMCEN) passed a landmark resolution to end the open burning of waste in Africa by 2040 and reduce it by 60% by 2030. To turn this resolution into action, the Africa Roadmap outlines key steps for stakeholders to eliminate the open burning of waste.

In October 2021, Engineering X¹ and the United Nations High-Level Champions (UNHLC) launched the Open Waste Burning in Africa project followed by the report *Open Burning of Waste in Africa: Challenges and Opportunities* (Mebratu and Mbandi 2022) which included the following key findings:

- Approximately 180 million tonnes of waste (about 9% of global waste) was generated per day by sub-Saharan African (SSA) countries in 2016. Only about 11% of this waste was disposed of in properly designed and managed sanitary landfills, while more than 60% of the waste was disposed of in uncontrolled landfills and open dump sites.
- The uncontrolled open dumping and burning of waste are the main methods available to most African cities, due to the significant lack of basic waste management infrastructure. It is estimated that up to 90% of waste is openly dumped and often burnt.
- Open waste burning at dumpsites is the main contributor of noxious pollutants to the natural environment.
- Emissions from the open burning of waste which have a direct or indirect health impact include short-lived climate pollutants (SLCPS) such as black carbon (BC) and methane, particulate matter (PM), persistent organic pollutants (POPs) such as dioxins and furans, and polychlorinated aromatic hydrocarbons. Open burning of waste can produce emissions of a variety of heavy metals including but not limited to cadmium, chromium, manganese, antimony, arsenic, lead and mercury.
- Health impacts range from upper respiratory tract infections and dermatological illnesses to immunological, reproductive and developmental abnormalities. It is estimated that over 1.1 million premature deaths occur every year in Africa due to exposure to air pollution (UNEP, 2021). The waste sector is a significant source of this pollution.

The report findings was a catalyst for UNEP's African Ministerial Conference on Environment to pass the resolution to eliminate open burning by 2040 and reduce it by 60% by 2030 in the eighteenth regular session (2022). The resolution:

- urged member states to eliminate the open burning of waste by implementing integrated solid waste management systems, policies and legislation, including the promotion of incentives for the reuse of waste as a secondary resource.
- encouraged member states, local authorities, civil society actors, community groups, the private sector and development partners to join a Multi-Stakeholder Partnership to eliminate the open burning of waste.

¹ [Engineering X](#) is a growing collaboration founded by the UK Royal Academy of Engineering and Lloyd's Register Foundation.

- and requested development partners to support African countries to reduce methane and BC emissions associated with waste with a focus on reducing the open burning of waste.

The Multi-Stakeholder Partnership² for the elimination of the open burning of waste was established under the co-chairmanship of the AMCEN Secretariat and the United Cities and Local Governments of Africa (UCLG Africa) Secretariat. As part of this, in 2024, the United Nations Environment Programme (UNEP) Climate & Clean Air Coalition funded a consortium consisting of Engineering X, Practical Action, UN-Habitat, the Institute for Global Environmental Strategies (IGES) and the International Solid Waste Association (ISWA) to develop regional roadmaps for ending open burning in Africa, Asia, and Latin America and the Caribbean.

The overall objective of the Transformative Action to End Open Burning of Waste project is to enable conditions for change in policy, processes and practices in the waste sector by increasing the ability of local and national governments to reduce emissions of SLCPs caused by open waste burning. The specific objectives are:

- the development of regional roadmaps for Africa, Asia, and Latin America and the Caribbean informed by the specific contexts and consultation with key partners and stakeholders,
- the facilitation of active partnerships between financing institutions, development partners, and national and local governments to tackle open burning,
- and the delivery of awareness-raising campaigns for governments, civil societies and the public on the importance of eliminating open waste burning.

The Africa Roadmap came out of this project and consists of two sections. The first section outlines the methodological approach and provides context for the Roadmap, while the second section presents the Roadmap itself. The Roadmap aims to provide African governments at national and local level with a broad framework for transformative action to end open burning of waste and includes guidelines for African local governments and municipalities to implement transformative action plans relevant to their local context.

2 Methodology and approach

The lead responsibility for implementing the project activities in the three target regions is shared between the consortium partners. Engineering X has led the development of the Africa Roadmap, the Institute for Global Environmental Strategies (IGES) has led on the Asia Roadmap, and the International Solid Waste Association (ISWA) has led on the Latin America and the Caribbean Roadmap.

2.1 Baseline study

Engineering X carried out an extensive baseline study to 1) understand the specific context of waste management and open waste burning in Africa and 2) produce a baseline that

² See the [Multi-Stakeholder Partnership](#).

would serve as the foundation for developing the regional Roadmap. The following are the main components of the baseline study methodology:

- 1 **Literature review:** a detailed desktop review of existing literature and policy documents was carried out to consolidate existing knowledge on waste management and open waste burning in Africa; define the challenges; and understand the regional and national policy and regulatory contexts.
- 2 **Regional survey:** a systematic survey covering key aspects of waste management and open waste burning was drafted and disseminated to key national, regional and local stakeholders. The purpose of the survey was to identify existing strengths, weaknesses, opportunities and threats in each region.
- 3 **Country engagement:** detailed consultations were carried out with key stakeholders at the country level to substantiate key findings from the literature review and baseline survey. This included:
 - a. in country semi-structured interviews in Kenya (Nairobi and Kisumu), Rwanda (Kigali), South Africa (Cape Town) and Mauritius (Port Louis),
 - b. a webinar held in January 2025 with ~sixty representatives,
 - c. and a workshop held in Nairobi with forty participants from national and local government and national development finance institutions from twelve different African countries,
- 4 **Emissions estimates:** UN-Habitat collated emissions estimates, looking at emissions discharged from open waste burning in Africa. It provided feedback at different stages of the estimation, and the key findings from the estimation exercise were incorporated into the baseline study.

2.2 Roadmap development

The regional Roadmap was developed through the following four steps and incorporating the findings of the baseline study:

- 1 **Theory of Change (ToC):** a Theory of Change was prepared for the regional Roadmap and was discussed at side events of the tenth special session of AMCEN, the International Solid Waste Association (ISWA) World Congress 2024, and the Chief Executive Officer (CEO) Forum of African Development Finance Institutions 2024.
- 2 **Draft regional Roadmap:** the draft Roadmap, which includes guidelines for developing a transformative action plan, was prepared based on the basic outline captured in the ToC and the feedback received from the different forums and stakeholders.
- 3 **Pilot validation:** the draft regional Roadmap was tested and validated during the development and implementation of the action plan for transformative action on waste for Kisumu City in Kenya, the pilot city. Further improvements to the Roadmap were made based on the feedback received from the pilot implementation.
- 4 **Final document:** the regional Roadmap document was then produced based on the baseline study, the ToC and the pilot validation as outlined above

2.3 Framework of the Roadmap

The regional Roadmap is structured in line with the below three blocks: the why, the what and the how (see Figure 2.1).

- **‘The why’** (section 3 and 4) presents the state of waste management and its associated health and environmental impacts and outlines the issues of the financing of waste management.
- **‘The what’** (section 5) presents the core components of the regional Roadmap, focusing on what needs to be done to overcome the challenges and achieve a transformational outcome.
- **‘The how’** (section 6) presents guidelines on how to develop a transformational action plan at the local level, building on the regional Roadmap.

Figure 2.1 Framework of the Roadmap



Source: Author's own.

2.4 How to use the Roadmap by stakeholder type

While the effective implementation of the Roadmap requires the development and implementation of a context-specific action plan at the local level based on the guidelines provided in Section 6, based on the holistic transformative action framework presented in Section 5, the following primary actors are expected to take a lead role in creating the necessary conditions for actions, while recognising the need for collaborative action:

- 1 **The national governments** of African countries play a leading role in laying down the foundations of the Roadmap (in terms of policy guidelines, behavioural change and financing) to create the necessary conditions for transformational action. National governments should particularly consider the Foundational Pillars of the Transformative Action Framework (see figure 5.6).
- 2 **Local governments and municipalities** need to take the lead in creating the required operational conditions (related to the prevention of open burning, the circular economy and correct disposal of waste), building on the favourable conditions created by national governments. Local governments should particularly

consider the Transformative Action Framework (see figure 5.6) and the local level based guidelines (see section 6).

- 3 **Community-based organisations (CBOs) and civil societies** need to play a strong role in actively implementing both the foundational and operational elements of the Roadmap. They need to generate context-relevant and need-responsive solutions and mechanisms that are inclusive, just and sustainable.
- 4 **Private sector actors** need to take the opportunities created by the implementation of the Roadmap and increase their participation towards the delivery of efficient waste management services. They should generate economic value and create decent jobs by investing in the recycling of waste into useful products.
- 5 **Development partners and development financing institutions** need to increase their financial allocation and support African countries to introduce innovative financing mechanisms. This will optimise the effective use of resources mobilised from local, national, bilateral and international financing institutions. Development Financing institutions should particularly consider section 4, 'Financing Waste Management' and the Transformative Action Framework (see figure 5.6).

3 The state of waste management

From a sustainability science perspective, waste is defined as a resource that is an outcome of any production and consumption activity, whether natural or human made. The main difference is that natural systems can reprocess and use whatever is generated through processes such as nutrient cycles. In contrast, the linear nature of production and consumption in most human-made systems has resulted in the accumulation and disposal of huge volumes of waste into the natural environment. The increasing volume of waste and its complex composition is causing significant health and pollution impacts. It is therefore critical that better waste management practices are implemented. Section 3 presents the state of waste management in Africa, starting with an overview of global waste management trends.

3.1 The Global Waste Management Outlook 2024 report

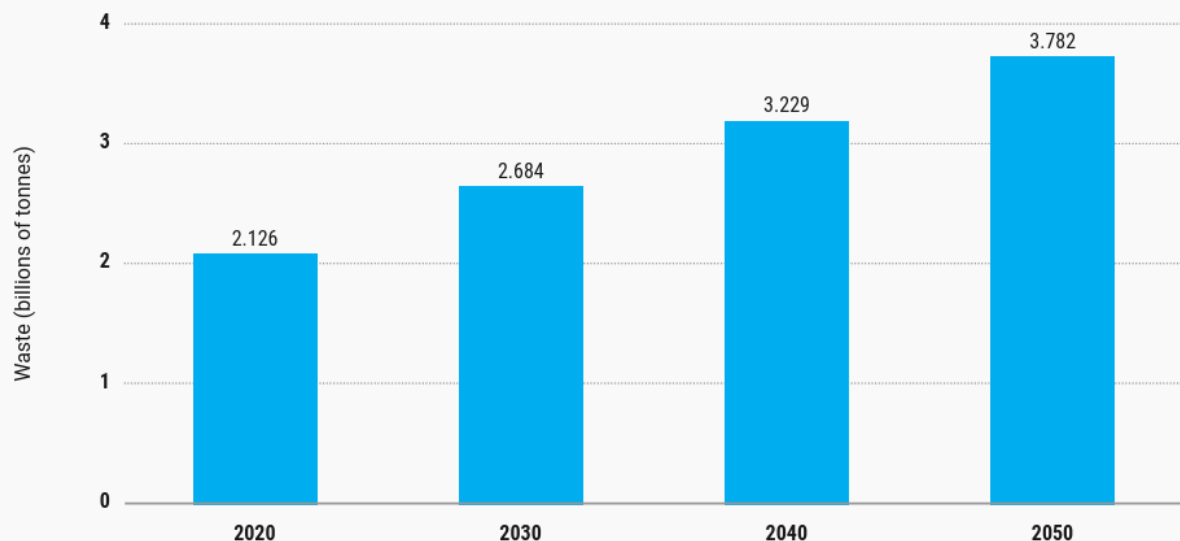
In 2024, the UNEP produced the comprehensive report *Global Waste Management Outlook 2024* with the theme 'Turning Rubbish into Resource'. The report mainly focuses on municipal solid waste (MSW) but also presents broad trends in waste generation and management and recommendations for both reducing and reusing waste. The report outlined the following key points:

- Every year globally, more than 2 billion tonnes of MSW is generated, as well as significant amounts of waste relating to agriculture, construction and demolition, industry, commerce and healthcare.
- The way people buy, use and discard materials determines the amount of energy and raw materials used and how much waste is generated. Municipal waste is thus intrinsically linked to the triple planetary crisis of climate change, pollution and biodiversity loss.

- It is projected that global MSW production will jump from 2.1 billion tonnes in 2020 to 3.23 in 2040 and 3.78 billion tonnes in 2050, if urgent actions are not taken to change our consumption and production patterns (see Figure 3.1).
- Since the production of the first Global Waste Management Outlook (GWMO) report in 2015, little has changed despite efforts being made. If anything, humanity has moved backwards, generating more waste, more pollution and more greenhouse gas (GHG) emissions.
- Access to MSW collection varies significantly between regions, with North Africa having the highest (77% coverage) and sub-Saharan Africa having the lowest (38% coverage).
- Only 19% of MSW is currently recycled (which includes metals, glass, paper and cardboard, some plastics, and biodegradable waste treated through composting and anaerobic digestion).

Figure 3.1 Projection of waste from 2020 to 2050

Figure 3: Projections of global municipal solid waste generation per year in 2030, 2040 and 2050 if urgent action is not taken.



Source: UNEP (2024).

The management of MSW poses unique challenges due to its sheer volume, continual growth, diverse composition, ubiquity in human settlements, variability and influence by cultural change, and the intricate web of social, economic and environmental impacts that arise from its management. As a result, the management of MSW by municipal governments, formal and informal private actors, and civil society involves questions related to global social and environmental justice. Waste management is strongly linked to the

Sustainable Development Goals (SDGs) as shown in Annex A1 (UN, 2015) which highlights the specific contribution of good waste management to the fulfilment of the SDGs.

Effective management of waste requires a combination of both upstream and downstream actions to be taken by actors involved in generating and managing waste (UNEP 2015, 2024). From a sustainability perspective, such actions are more efficient when they are based on an integrated waste management hierarchy that prioritises 1) prevention, 2) reduction, 3) reuse, 4) recycle, 5) recovery and 6) disposal.

Figure 3.2 shows the role of different actors in the management of waste. Governments, both local and national, and consumers have key roles to play across the upstream and downstream phases, while actions taken by producers and retailers are more in the upstream phase.

Figure 3.2 The role of different actors in the waste management hierarchy

		Governments	Producers	Retailers	Waste management sector	Consumers
UPSTREAM	Prevent	✓	✓	-	-	✓
	Reduce	✓	✓	✓	-	✓
	Reuse	✓	✓	✓	-	✓
DOWNSTREAM	Recycle	✓	✓	-	✓	✓
	Recover energy, heat and control emissions	✓	-	-	✓	✓
	Dispose	✓	-	-	✓	✓

Source: UNEP (2015, 2024).

Existing waste management methods are broadly categorised into controlled and uncontrolled methods:

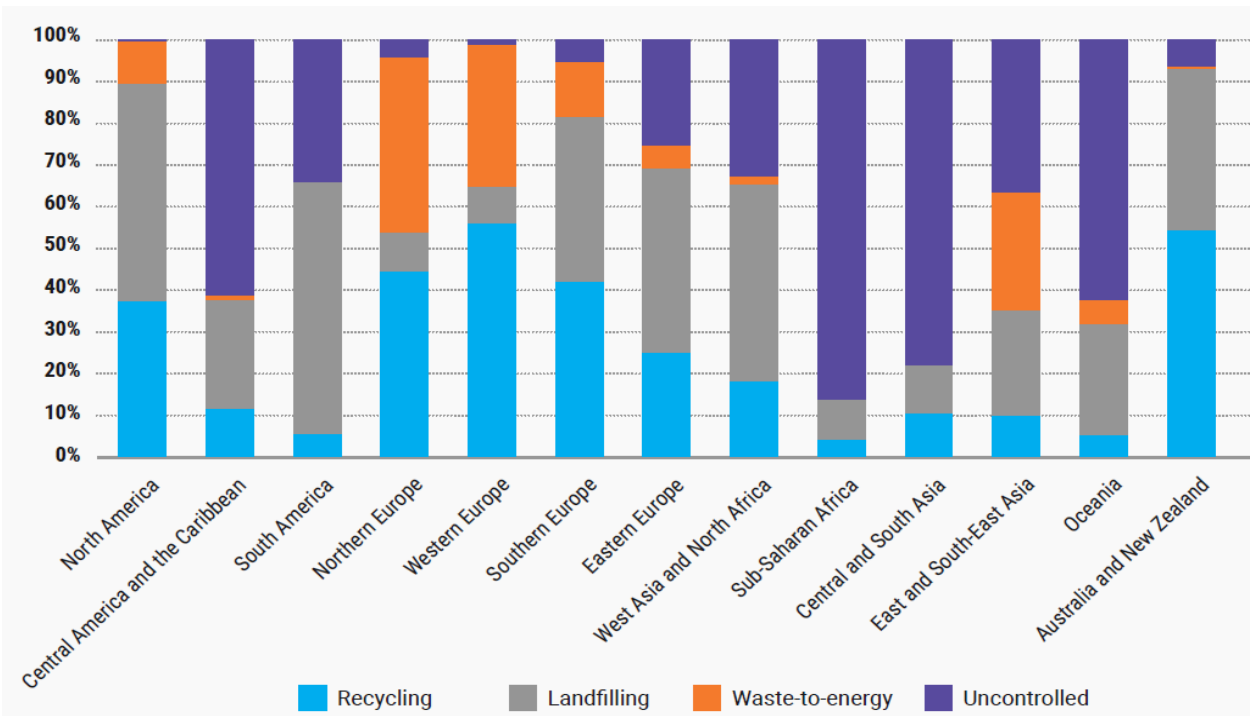
- Controlled method: waste is collected and then either recycled or disposed of in a controlled facility.
- Uncontrolled method: waste is either not collected, and so by necessity dumped or burnt in the open by the waste generator or collected and then dumped or burnt at its destination.³

The degree to which MSW is managed in a controlled manner varies significantly across regions (UNEP 2024). The lowest levels of MSW management are in sub-Saharan Africa and Central and South Asia, whereas in North America and Western Europe, almost all waste is managed in controlled destinations (see Figure 3.3). Looking specifically at the

³ For more information and the criteria used to classify recovery and disposal facilities as controlled or uncontrolled, see UN-Habitat's [Waste Wise Cities Tool](#).

breakdown of MSW destinations for sub-Saharan Africa, more than 85% of the waste generated is uncontrolled while about 5% is recycled.

Figure 3.3 Regional distribution of MSW destinations



Source: UNEP (2024).

The GWMO 2024 report presented three scenarios that may emerge over the coming decades based on how waste generation and management evolves (UNEP 2024):

- Waste management under business as usual (BAU)
- Controlled waste management
- The circular economy.

Under the business-as-usual scenario, global waste generation is estimated to reach about 4.7 billion tonnes in 2050. This figure is reduced to 3.3 billion tonnes a year under the controlled waste management scenario and to about 1.7 billion tonnes under the circular economy scenario. Table 3.1 presents the main features of the different scenarios.

Table 3.1 Possible waste management scenarios to 2050

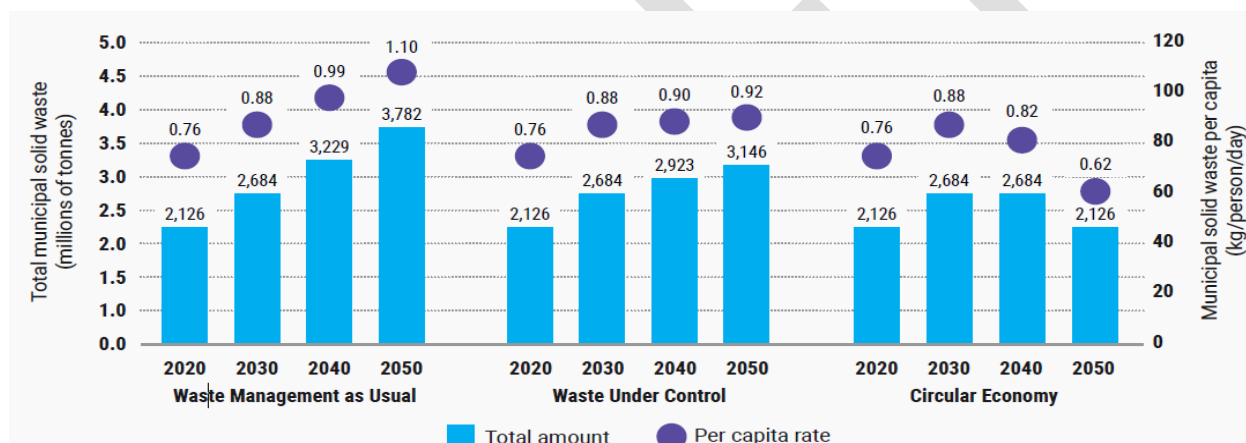
Scenario		Main feature	Collection, recycling and disposal
1	BAU waste management	Waste generation continues and investments in infrastructure remain limited.	Collection, recycling and disposal practices remain unchanged.
2	Controlled waste management	Policies and producer actions make progress towards designing out	Waste generation is decoupled by economic growth and collection coverage increases to

		waste, and investments in waste prevention and management increase.	100%. Uncontrolled disposal ends by 2050.
3	Waste management under circular economy	Government policies and producer responsibility action to design with modularity and end-of-life plans for products, further designing waste out of consumption and production.	Collection coverage at 100%. MSW recycling rates increase to 60%. Uncontrolled disposal of waste ends and waste generation falls to 2020 levels by 2050.

Source: UNEP (2024).

The scenarios analysis of the second GWMO clearly shows the benefit of moving towards scenarios 2 and 3 in reducing global waste by 2050 (see Figure 3.4). For further details on actions needed by regions such as North America, Australia, New Zealand, and most of Europe see the GWMO 2 report, UNEP 2024.

Figure 3.4 Comparative analysis of three scenarios for global solid waste generation



Source: UNEP (2024).

The second GWMO also looked at the potential impacts of the three scenarios on GHG emissions, ecosystem quality and human health. While noting the importance of taking the results of the model from a relative perspective, the report makes the following preliminary conclusions (UNEP 2024).

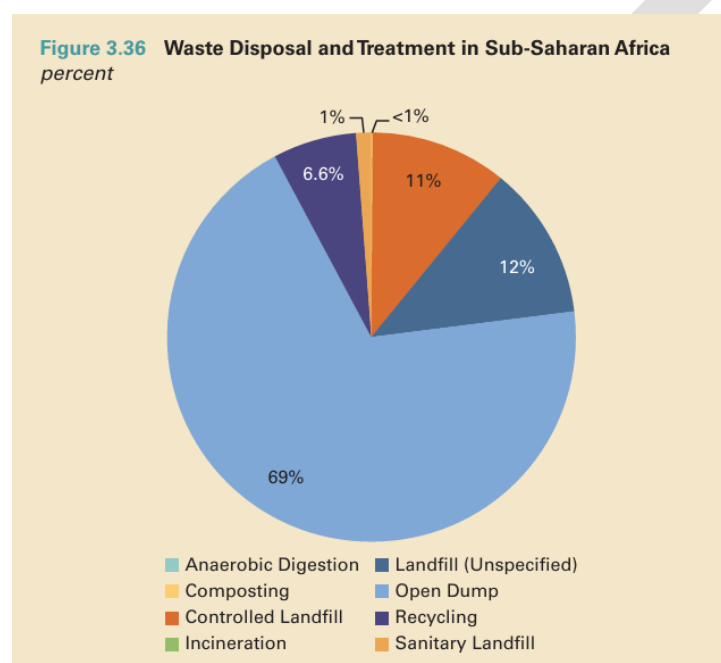
- The BAU scenario shows consistently an increasing negative impact on the climate, ecosystem quality and human health.
- The waste under control scenario reduces negative impacts on the climate and, to a lesser extent, human health from the 2020 baseline but is only able to stabilise the impacts on ecosystem health to 2020 levels.
- The circular economy scenario has a net-positive effect on GHG emissions and human health and significantly reduces the negative impact on ecosystem quality, though it may not bring this down to zero by 2050.

For further details on the cost specifications for the different scenarios, see the GWMO report (UNEP 2024).

3.2 The state of waste management in Africa

It is estimated that up to 90% of waste in African countries is openly dumped and often burnt (Cogut 2016; Kaza and Bhada-Tata 2018; UNEP 2018). Figure 3.6 gives a snapshot of how waste is managed in the SSA region. Most municipalities rely on uncontrolled disposal sites which are often left unattended and unregulated and most waste recovery is handled by the informal waste sector. About 20–84% of households in the global South separate their waste to give or sell to traders (Practical Action 2021). There are therefore opportunities in African countries to include the informal waste sector as part of a similar model.

Figure 3.6 Snapshot of waste management in sub-Saharan Africa



Source: Kaza et al. (2018).

Despite variations between cities and countries, there are common challenges across Africa regarding waste management: infrastructure, institutional, financial and attitudinal. The institutional challenges stem from lack of capacity, poor coordination and limited resources. In many countries, the implementation of integrated waste management is the mandate of city and local municipalities who are often under resourced and have a big lag in service provision. However, despite having a higher budget share allocation from cities, there is still a large budget shortfall for providing efficient waste services and sound disposal (Mebratu & Mbandi 2022). Although rarely considered, the attitudinal challenge needs to be examined through the lens of the required behavioural change.

3.2.1 Regional assessment of waste and open waste burning

As part of the implementation of this project, UN-Habitat carried out a study to calculate an estimation of the emissions discharged from open waste burning for African cities and countries. Due to data limitations, this analysis relies on single point data on waste collection fractions, which is combined with time series data on population and GDP trends⁴. An increasing number of countries have put in place mechanisms to increase efficiency in the waste collection and management systems which may change the results if integrated into the analysis. It was not possible to consider the impacts of these changes currently due to lack of publicly available information on such interventions. However, the assessment results provide useful insight on waste management and open waste burning in Africa.

Table 3.2 presents the estimated total MSW and the amount of waste burnt in the year 2020 as calculated by UN-Habitat.⁵ According to this estimate, African cities, for which data is available, generated about 10.5 million tonnes of waste a year, of which about 4 million tonnes is burnt at different levels (i.e., households or dumpsite). Out of the total volume of waste that is burnt, about 82% is burnt in residential areas and along the roadside, while the remaining 18% is burnt at landfills and open dumpsites. A significant share of open waste burning could therefore be reduced or eliminated through a coordinated awareness campaign aimed at behavioural change. This needs to be supported by the provision of a functional waste management service to residents.

Table 3.2 Estimate of waste generation and open waste burning in Africa

	Total MSW generated (Kg/Year)	MSW burned in the residential/ roadside kg/day	MSW openly burned at landfill/dump sites kg/day	Total amount of waste burned (kg/year)
Reference Year	2020	2020	2020	2020
Africa	10,497,474,548	8,934,019	2,000,212	3,990,994,316
Central Africa	10,364,217,196	10,072,788	2,456,738	4,573,276,871
Eastern Africa	7,813,430,930	8,138,108	1,109,592	3,375,410,392
Northern Africa	15,941,320,192	11,838,847	4,146,056	5,834,489,472
Southern Africa	18,263,457,514	8,145,342	899	2,973,377,970
Western Africa	4,080,817,940	3,629,206	1,099,705	1,726,052,206

Source: UN Habitat, 2024 (unpublished)

The study also included an analysis of the trends in waste generation and open waste burning at the country level. Annex A2 presents the summary result of this analysis which

⁴ The observed trends are thus directly a factor of changes in both population and GDP and hence the observed trends need to be considered with this limitation.

⁵ The calculations faced certain limitations due to gaps in data availability. Waste management data is generally scarce, and when available, it is often outdated. To mitigate these gaps, population-weighted calculations were applied for regional aggregation and all regional averages were harmonised to the year 2020 to maintain consistency across the estimates.

indicates that there was a steady increase between 2016 and 2020 in both the total amount of waste burnt and GHG emissions in most countries. However, some countries showed a decline in both indicators. South Africa, Angola and Libya indicated the highest reduction while Egypt, the United Republic of Tanzania, the DRC and Ethiopia are the countries that showed the highest increase in estimated open waste burning.

An analysis was also undertaken for Africa using the adopted methodology for national and population-weighted regional estimates for the years 2016 and 2020. Table 3.3 summarises the results per subregion, which shows an increasing trend in the total amount of waste burnt and GHG emissions across the subregions except for the Southern Africa subregion which showed a decline. This could be associated with the progress made in improving the waste management systems of the Southern African cities including increased levels of waste recycling promoted by the private sector and local community groups. Although MSW generation in Africa is relatively low compared to other regions, the ratio of GHG emissions from open waste burning to MSW generation in Africa is the highest of all regions. This could possibly be due to the low waste collection rates in sub-Saharan Africa.

Table 3.3 Estimated amount of waste burnt and emissions generated, by region

	Number of countries included	Total amount of waste burnt (kg/year)*		Total climate impact (tonnes CO ₂ -eq emissions)	
		2016	2020	2016	2020
Africa	38	3,446,364,991	3,990,994,316	4,679	5,439
Eastern Africa	15	2,767,910,504	3,375,410,392	3,451	4,200
Central Africa	7	4,005,123,699	4,573,276,871	6,105	6,981
Northern Africa	6	5,059,622,311	5,834,489,472	7,771	8,954
Southern Africa	3	3,143,469,498	2,973,377,970	1,743	1,649
Western Africa	7	1,440,113,871	1,726,052,206	1,545	1,855
<i>* Population-weighted averages</i>					

Source: UN Habitat, 2024 (unpublished)

The 2023 Gallup World Risk Poll introduced three questions asking people around the world about their household waste practices – what type of material they discard most commonly, whether they separate their rubbish, and how that rubbish is removed from their household. The poll aimed to provide a new source of quality global data on waste which is self-reported. As can be seen from Table 3.4, Southern Africa has the highest dry recyclables, while other subregions have a higher percentage of food and biodegradable waste.

Table 3.4 Percentage of dry recyclables and food and biodegradable household waste

	Regions	Dry recyclables (%)	Food and biodegradable (%)
1	Southern Africa	59	33
2	Northern Africa	39	58
3	West and Central Africa	33	61
4	East Africa	28	66
5	Global average	51	45

Source: Gallup and Lloyd's Register Foundation (2024).

The World Risk Poll also looked at the percentage of households that separate their waste at the household level before disposal (see Table 3.5). Interestingly, the Eastern Africa subregion has a slightly better percentage of households that separate their waste compared to other subregions while the whole of Africa has a significantly lower percentage of households compared to the global average.

Table 3.5 Percentage of households that separate their waste before disposal, by region

	Regions	Percentage of households that separate waste (%)		
		Yes	No	Sometimes
1	Southern Africa	27	61	11
2	Northern Africa	33	60	6
3	West and Central Africa	24	69	6
4	Eastern Africa	39	57	4
5	Global average	53	40	6

Source: Gallup and Lloyd's Register Foundation (2024).

3.2.2 Regional survey and consultation

A regional survey was carried out based on an open-ended questionnaire followed by a country-level consultation with the key stakeholders to further validate the findings from the desk review and assessment. More than 70 respondents from 26 African countries, consisting of governmental agencies, NGOs, private enterprises, community organisations, academic institutions and development partners responded to the regional survey. The following are the major findings from the regional survey:

- 1 While almost all countries have policies and legislations that refer to the need for effective waste management, more than 50% of the respondents believe that there is a significant gap in addressing waste management through national environmental policy and strategy frameworks.
- 2 Similarly, most of the respondents said that provisions that discourage or prohibit open waste burning are not sufficiently covered in national policy and legislative frameworks. Two-thirds of the respondents indicated that there are legislative and regulatory frameworks that prohibit and penalise the open burning of waste at the local government level. However, enforcement is very weak and, as a

result, the practice of open burning of waste is widespread in almost all neighbourhoods.

- 3 Less than 20% of respondents confirmed that the 3R principles (reduce, reuse, recycle) were sufficiently integrated into existing policy and legislative frameworks. However, except for a few, almost all the respondent countries lack the necessary policy and legislative instruments that could promote this effective implementation.
- 4 The response showed that there is a huge gap in terms of the infrastructure required for waste management in African countries. Except for a few countries in the Northern and Southern Africa subregions, most African countries do not even have a single sanitary landfill that meets the necessary engineering and operational requirements.
- 5 More than 50% of the respondents indicated that their countries allocate less than 5% of their infrastructure budget for waste management infrastructure and operation, while local governments allocate up to 20% of their annual budget for provision of basic waste collection and transfer services.
- 6 Lack of the necessary waste management infrastructure as well as lack of awareness are identified as the major contributors for the proliferation of open waste burning in African cities.
- 7 65% of respondents perceived residential neighbourhoods to be the main contributors to open waste burning in African cities, while 30% indicated agricultural waste. However, industrial waste and agricultural waste were also cited as either second or third contributors by many.
- 8 While nuisance and air pollution were cited as the main environmental impacts associated with open waste burning, one-third of the respondents indicated that soil and water pollution were also major impacts affecting the health and livelihoods of people living around open and uncontrolled dumps.
- 9 Half of the respondents indicated that recurrent cultural and seasonal practices such as annual festivals, concerts and cultural events contributed to the practice of open waste burning.
- 10 Most respondents indicated that local governments, private enterprises and waste management service providers are the main actors that are driving the limited efforts that are being made in African cities to promote waste-to-resource conversion and the appropriate collection and disposal of waste.

A series of consultations was held with more than 100 stakeholders at the country level based on the findings from the desk review, assessment and regional survey. This was carried out in conjunction with other forums to which contributions were made on waste and open waste burning in Africa (Côte d'Ivoire, South Africa, Mauritius) or country-specific missions for consultation (Kenya and Rwanda). The following are the main conclusions from the stakeholder consultations:

- 1 All stakeholders recognise the multiple economic, environmental and social benefits that African countries could secure by addressing the prevailing systemic deficiencies in waste management systems, and with priority given to conversion of waste to resource.

- 2 While ongoing efforts are being made by national and local governments in regulating waste management and encouraging recycling, a lot still needs to be done to support their action in relation to the required institutional and physical infrastructure.
- 3 There are pockets of recycling activities that deal with the different types of waste such as biodegradable, plastic and e-waste that are mainly led by private enterprises. However, they are faced with various institutional and operational challenges to scale up their activity.
- 4 Despite the significant role played by community-based organisations (CBOs) and private collectors in filling the significant gaps and limitations of waste management services, they too are faced with major barriers that limit their

Box 3.1 Waste management in Mauritius

The consultation at the country level has shown that Mauritius has made significant progress in transitioning from a country with open dumps and burning since the end of the 1980s to opening an engineered landfill in 1993 and now having almost a 100% collection rate across the island. It now has a dedicated Solid Waste Management Department within the Ministry of Environment that provides the regulatory guidance and enforcement for waste management across the country. The Solid Waste Management Act issued by the Ministry has helped further action, and it is now looking at separation at source (most plastic being currently landfilled), developing transfer stations, the vertical expansion of landfill, composting, and the regulation of construction and demolition waste.

A new [Waste Management and Resource Recovery Act](#) came into effect in 2023. This legislation focuses on promoting the segregation of waste at the household level to create more efficient conditions for the promotion of circularity. Currently, the necessary preparations are being made to significantly increase the rate of recycling through the provision of marked waste segregation bins and creation of awareness at the household level. Through these actions, the Ministry aims to extend the lifespan of the existing sanitary landfills by diverting up to 60% of the waste generated into recycling facilities.

Port Louis City has a wide network of waste collection and transportation that facilitates the collection and transportation of waste twice daily from the business centre, and every two to three days from residential areas. Business Mauritius (BM), which represents all sectors of business associations, has an active committee that works on the circular economy and has made an active contribution to the development of the [Mauritius circular economy roadmap](#). Both Port Louis City and Business Mauritius are collaborating with the Ministry in the implementation of the Waste Management and Resource Recovery Act.

The circular economy roadmap and action plan has been developed for Mauritius for the period 2023 to 2033 to support the transition from a linear economy to a circular and resilient economy. The Action Plan details 80 actions across the priority focus areas, including waste management. While the situation in Mauritius has its own specificity, the leadership provided by the Ministry and the existing partnerships provides useful insights for other African countries.

ability to provide more efficient services and benefit from generating higher value from recyclable waste.

- 5 Even if the development of sanitary landfills is one of the top priorities for all local governments, it becomes one of the least priorities at the national level because of a lack of appreciation and competing infrastructural interests. Thus, waste management infrastructure is rarely presented to development partners as a priority.
- 6 The development of the regional Roadmap for transformative action in the waste sector is expected to create better enabling conditions to address the existing gaps and challenges. It will do this by identifying the missing links between the main actors and intervention points and mobilising the required resources for actions at the local level.
- 7 Many of the SSA cities have made numerous attempts to develop properly engineered sanitary landfills. However, most of these efforts did not come to fruition except for a few cities such as Port Louis in Mauritius (see Box 3.1)

Box 3.2 The South Africa Waste Picker Registration System (SAWPRS)

The waste picker integration guidelines for South Africa issued in 2020 recognises the pioneering role of waste pickers in the development of recycling collection systems. Integration is necessary to ensure that waste picker incomes, conditions, job security, position in the value chain, and dignity is improved as the recycling economy is expanded. Integration advances key government priorities related to job creation, poverty alleviation, environmental protection, and economic transformation. It ensures that overseas recycling programmes are appropriate for the South African context and increases their viability by building on (rather than competing with) waste pickers' informal collection systems.

While this is a laudable exercise that needs to be emulated by other African countries, its effective implementation requires active consultation and the engagement of all actors including the waste pickers. According to feedback received from representatives of waste pickers:

- There is a lack of trust between the major actors in the waste recycling value chain that affects the efficient operation of the system.
- While they appreciate the recognition that is provided through the system, most waste pickers feel that some actors tend to use it to forcefully formalise and integrate waste pickers.
- The lack of willingness of aggregators or waste recyclers to pay a reasonable price for recyclable waste collected by waste pickers is discouraging most waste pickers from registering in the system.

The [South African Waste Pickers Association](#) (SAWPA), which has between 4,000 and 6,000 members across all nine provinces of South Africa, could play a critical role in building trust among the key players and facilitating the effective functioning of the system.

which managed to transition from open dumpsites to controlled dumpsites and sanitary landfills.

- 8 In recent years, some African countries and city municipalities have started taking measures that would help streamline the operation of different actors in the waste management value chain. This includes the South African Waste Picker Registration System (SAWPRS) (see Box 3.2).
- 9 CBOs and informal waste pickers and recyclers are filling a major gap caused by the lack of efficient waste management systems in most African cities. Despite the enormous service they are providing, most African countries do not have a specific legal framework that attempts to recognise and improve their performance and contribution.

Box 3.3 A CBO in Kangemi, Nairobi

Clean Vision Waste Management group is a CBO that handles waste collection in Kangemi, one of the major informal settlements in Nairobi County. It was established in 2012 as part of the implementation of the Integrated Solid Waste management strategy supported by the Japanese International Cooperation Agency (JICA) by bringing together seven informal groups of waste collectors in the area. Since it started, it has been instrumental in eliminating about 74 local dumping sites within Kangemi, replacing them with one collection point, and creating more than 100 jobs for its members.

- 1 CBO members are stigmatised by the local community whenever there is a failure on the part of the County in transporting the collected waste to the dumpsite, despite their significant personal risk.
 - 2 The absence of segregation at the household level due to lack of public awareness has made the task of sorting recyclable materials from the waste collected very challenging.
 - 3 The CBO has a high level of membership turnover due to the absence of any prospects for improved livelihood and wellbeing. Members have a strong desire to move up the value ladder of waste management by engaging in the recycling and reprocessing of valuable waste.
 - 4 Promoting the active involvement of CBOs in the operation of the material recovery facility could provide an incentive for members to generate more value and greater benefit to themselves.
 - 5 The so-called 'aggregators' (the middlemen between the CBOs and the recyclers who collect the recyclable materials and deliver to the recyclers) benefit more than the CBO members.
 - 6 It was suggested that members should also continuously redefine their role in the overall waste management chain by focusing on exploring the possibility of engaging into waste-to-resource conversion.
- 10 CBOs primarily prefer to be recognised as partners rather than being forcefully formalised, which many countries have tried but failed to do. They also wish to move up the value ladder of the waste-to-resource conversion, rather than staying as collectors and providers of recyclable materials for which they receive the least price.

- 11 Several cities across Africa have project documents on sanitary landfills in greater or lesser detail and developed mainly through bilateral development assistance programmes. However, progress has been hampered due to extremely high upfront investment requirements, an inability to secure land because of the 'not in my back yard' (NIMBY) syndrome, and lack of appreciation and commitment at the national government level.
- 12 Besides the exorbitant upfront investment requirement, the development of sanitary landfills without an integrated solid waste management (ISWM) plan has led to extremely high operational costs that have gone beyond the budgetary capacity of local governments.
- 13 An increasing number of African countries are introducing legislation on extended producer responsibility (EPR) that could be instrumental in promoting waste-to-resource conversion through more efficient segregation at source and material recovery facilities (MRFs). However, there is still much work to be done to ensure that the revenue to be collected from the EPR system reaches the appropriate level of action. This includes support to CBOs and private enterprises engaged in waste recycling.
- 14 Innovative public–private partnerships are growing in the waste management sector in Africa. This has led to improved waste management cycles, from collection to sanitary disposal, in some urban areas. Such partnerships also promote circularity through resource recovery and the use of waste as a secondary resource input.
- 15 Existing efforts on waste-to-resource conversion including plastics recycling and composting of biodegradable materials underscore the importance of private sector partnerships with governments, the informal sector, and other key stakeholders.

According to the African Waste Management Outlook, UNEP (2018), 70–80% of MSW generated in African cities is recyclable, with an estimated economic value of US\$8 billion a year. It is estimated that only about 11% of the waste is recycled, with informal waste service providers and recyclers handling most of the recovery and recycling operations. Major opportunities exist to use waste as a secondary resource and to generate jobs and sustainable livelihoods.

The regional survey showed that in almost all African countries, there is one or another form of recycling mainly being carried out by small-scale private enterprises or CBOs. This includes the recycling of plastic materials (mainly polyethylene terephthalate (PET) bottles), organic waste, and electronic waste. Most of these enterprises focus on recycling a single waste stream while a few, such as Integrated Recycling and Composting Plant Ltd in Ghana (see Box 3.4), cover several waste streams. Almost all the recyclers consulted through the regional survey outlined the same barriers and challenges:

- There is significant lack of awareness regarding the multiple economic, social, and environmental benefits of recycling across all levels. Almost all recycling operations are driven by the motivation of the recyclers alone.

- In several African countries, recycling enterprises are subjected to income tax regimes with little economic incentive for their operations.
- The limited financing support they get comes from bilateral donors and philanthropic organisations on a piecemeal basis which limits their growth.

Box 3.4 Waste recycling in Ghana

Ghana has actively promoted and supported the recycling of different waste streams at different levels. This has enabled the involvement of private companies in large-scale waste management and recycling businesses, while at the same time encouraging the involvement of many CBOs in the promotion of a circular economy.

Integrated Recycling and Compost Plant Ltd, Jospong Group (IRECOP)

As part of the Environment and Sanitation arm of Jospong Group, IRECOP covers over 60% of the operations, with businesses in the circular economy comprising waste management, public cleaning and residential waste collection, transfer stations, recycling and landfill management. IRECOP is an integrated waste-processing and recycling company established to receive, sort, process, and recycle MSW to produce organic compost for agronomic purposes in Ghana and the subregion. It has been in operation for more than 14 years and consists of 32 subsidiary companies with more than 3,500 employees.

The Green Africa Youth Organisation (GAYO)

GAYO was founded in 2014 as an environmentally aware youth-based organisation. It has worked with a variety of industries on climate change, the circular economy, disaster risk reduction, sustainable agriculture, and renewable energy activism. In recent years, it has become more actively involved in fighting environmental pollution from waste, with a particular focus on reducing air pollution from waste through the promotion of waste reduction and recycling at the local level. GAYO was awarded the 2024 Earthshot Prize in the Clean Our Air category. Recognised for its impactful zero-waste model, GAYO is making strides in sustainable waste management and air quality improvement across Africa.

Box 3.5 Electronic waste management in Africa

Electronic waste is one of the fastest-growing waste components in Africa and a cause of growing concern for most African cities owing to the complex and hazardous nature of the waste. The issue of e-waste management is increasingly being recognised by policymakers, and there are a growing number of enterprises that are involved in recycling the valuable as well as the polluting components of e-waste.

[EwasteAfrica](#)

eWasteAfrica is a South African registered company that recycles all lighting and e-waste. It offers corporates, government institutions, and the public several options for lighting and electronic waste recycling. Its services include onsite storage solutions, collection, logistics, and the heart of our business, recycling and beneficiation of lighting and electronic waste (e-waste). So far, it has provided services for 310 corporate clients and has collected and processed more than 2.5 million kg of lighting and electronic waste and removed more than 1,500 tonnes of CO₂eq of emissions.

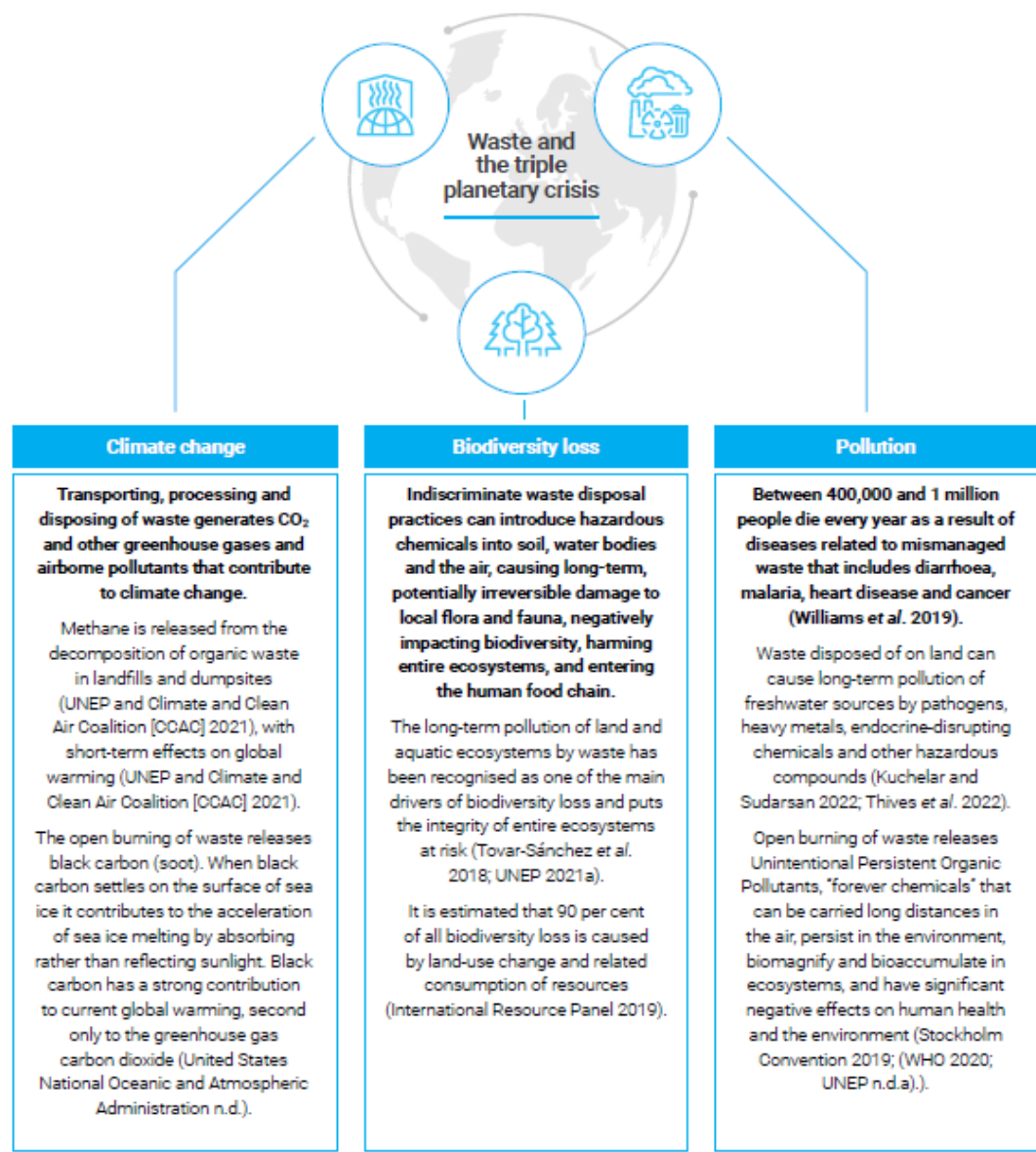
[Enviroserve Rwanda](#)

Enviroserve Rwanda Green Park is a private company dedicated to electronic and electrical waste recycling, green growth, and the circular economy. Enviroserve is pioneering e-waste management in East Africa and operates the region's only state-of-the-art e-waste dismantling and recycling facility. It provides an end-to-end e-waste recycling solution for electrical and electronic items that is ethical and compliant with local regulations. It currently refurbishes, repairs, or reworks more than 600,000 items annually and has the capacity to process tens of thousands of products every month. It collects and recycles different types of batteries to extend their lifespan and prevent pollution from dangerous chemicals. Enviroserve has a network of collections that covers the whole country and is expanding to neighbouring countries in the Eastern African Region.

3.3 Impacts of open burning of waste

UNEP (2024) highlights the contribution of waste generation and management to the triple planetary crisis of climate change, biodiversity loss, and pollution (see Figure 3.7). This aligns with the main impact of open burning of waste on air, land, and water systems as identified by the regional survey respondents.

Figure 3.7 Waste and the triple planetary crisis



Source: UNEP (2024).

The open burning of waste is an age-old waste management practice and despite progress made in waste management techniques and technologies, it is still being practised widely (see Table 3.6). According to the research carried out by Gallup, 41% of households globally still use the open burning of waste as a primary disposal mechanism. However, the proportional incidence of open burning is significantly more in Eastern Africa (41%), Western and Central Africa (34%), and Southern Africa (28%). The only exception is Northern Africa where the overall rate of open waste burning is 8% (Gallup and Lloyd's Register Foundation 2024)

Table 3.6 Open burning as a primary waste disposal practice

	Subregion	Percentage
1	Eastern Africa	41
2	Western and Central Africa	34
3	Southern Africa	28
4	Northern Africa	8
5	Global average	14

Source: Gallup and Lloyd's Register Foundation (2024).

The study conducted by Gallup also estimated the number of households per country, Table 3.7 presents the top ten countries that have the highest percentage of households that use open burning as the primary disposal practice.

Table 3.7 Countries with the highest household percentage using OWB as primary disposal method

	Country	Percentage
1	Eswatini	77
2	Chad	64
3	Uganda	61
4	Malawi	55
5	Kenya	54
6	Gambia	49
7	Burkina Faso	48
8	Mozambique	46
9	Zimbabwe	45
10	Democratic Republic of Congo	42

Source: Gallup and Lloyd's Register Foundation (2024).

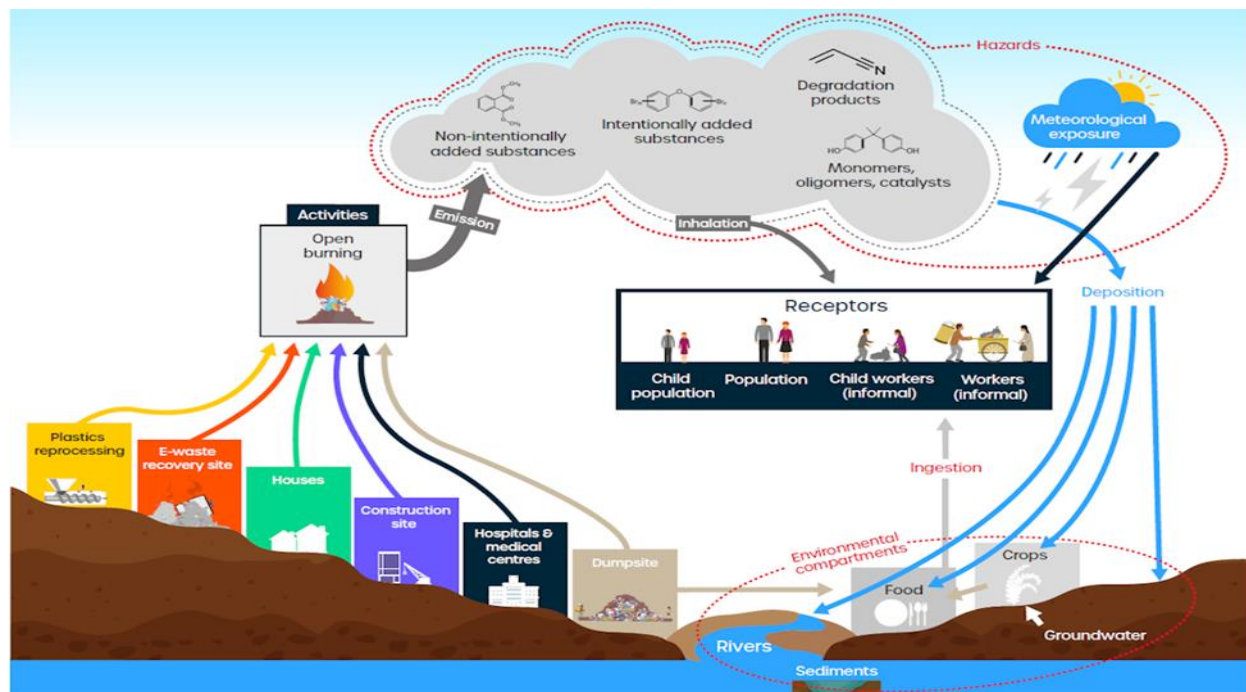
Emissions from the open burning of waste results in the release of short-lived climate pollutants (SLCPs) such as black carbon (BC) and methane, PM, POPs such as dioxins and furans, and polychlorinated aromatic hydrocarbons (Cogut 2016; UNEP 2018; Cook and Velis 2021). The open burning of waste can also produce emissions of a variety of heavy metals including but not limited to cadmium, chromium, manganese, antimony, arsenic, lead, and mercury. This depends on the quantity of e-waste in the composition of the waste.

Communities living close to dumpsites, including children, have been found to have higher levels of toxic substances through ingestion and inhalation of contaminants in those environments (Cook and Velis 2021).

“Uncontrolled waste knows no national borders. It is carried by waterways across and between countries, while emissions from the open burning of waste are deposited in terrestrial and aquatic ecosystems and in the atmosphere” seen in Figure 3.8 (UNEP, 2024). Besides the direct contamination of soil and ground water caused by leachates, metrological exposure of the hazardous pollutants emitted into the air result in systemic

deposition on land and the sea through precipitations. These hazardous pollutants, which in many cases are carcinogenic, come back to humans through the food chain, resulting in numerous health hazards.

Figure 3.8 How emissions from burning waste reach people and the environment



Source: Cook and Velis (2021).

Open burning is an environmentally unacceptable process that generates chemicals listed in Annex C of the Stockholm Convention on persistent organic pollutants (POPs) and numerous other pollutant products of incomplete combustion. Consistent with Annex C, Part V, section A, subparagraph (f) of the Stockholm Convention, the best guidance is to reduce the amount of material disposed of via this method with the goal of elimination altogether (UNEP 2008). Some of the negative impacts to health range from upper respiratory tract infections, dermatological illnesses, immunological, reproductive and developmental abnormalities.

The waste sector is a significant source of fine particulate matter (PM) contributing to approximately 29% of global estimates (Wiedinmyer *et al.* 2014). In addition, methane generated from decomposing organic waste contributes to ~20% of global methane (UNEP and CCAC 2021), while open waste burning accounts for 11% of black carbon. Both methane and black carbon are short-lived climate pollutants that contribute to climate change, while the latter is also an important component of PM (Wiedinmyer *et al.* 2014).

According to UNEP (2021), air pollution was responsible for 1.1 million deaths across Africa in 2019 with household air pollution (HAP) accounting for 697,000 deaths and ambient air pollution (AAP) accounting for 394,000 deaths. Furthermore, it reported that AAP-related deaths increased from 361,000 in 2015 to 383,000 in 2019 with greatest increases in the

most highly developed countries (UNEP 2021). Two-thirds of AAP-related mortality is due to non-communicable diseases. Economic output lost to air-pollution-related disease was US\$3.0 billion (in 2019) in Ethiopia (1.16% of GDP), US\$1.6 billion in Ghana (0.95% of GDP), and US\$349 million in Rwanda (1.19% of GDP). Exposure to air pollution during pregnancy and early childhood can cause brain damage defects in children that reduces their cognitive function (as measured by IQ). Cognitive function – often measured by IQ – is a key predictor of earning potential, health, and longevity, and in this way underpins human capital and national progress. PM2.5 pollution was responsible for 1.96 billion lost IQ points in African children.

4 Financing for waste management

Financing for sustainable development has always been the challenge faced by developing countries. The Addis Ababa Action Agenda⁶ for sustainable development financing was an attempt by the international community to provide a blueprint for addressing this challenge. While there has been some progress in establishing new financing mechanisms to support the implementation of the SDGs, the actual delivery of financing, particularly for developing countries is still lagging. The consultative workshop for this Roadmap, held in April 2024, highlighted the key challenges that hinder the appropriate financing of waste management systems:

- **Priority mismatch:** waste is a high priority for local governments, but it is not prioritised at national government level.
- **Lack of political will:** insufficient national government commitment to prioritise and fund waste management initiatives.
- **Urban planning:** ad-hoc and unsustainable urban planning processes result in failure to deliver adequate waste management services.
- **Resource misallocation:** sizeable portion of local government spending already goes towards linear waste management, leaving little room for circular economy investments.
- **Weak institutional mechanisms:** lack of the required policy, legislative, regulatory and enforcement mechanisms.
- **Complexity of waste:** the growing trend of ‘use and throw’ practice combined with changing lifestyle increases the complexity of waste generated.
- **Waste pickers and collectors:** who form the backbone of current waste management services are not duly recognised and included in national waste management strategies.
- **Fragmented funding:** the limited funding that goes into supporting waste management and recycling is highly fragmented and piecemeal.

As can be seen from the data presented in this section, the attention given and the resource allocated for developing efficient waste management systems is even worse. Concrete actions are needed to develop and implement innovative financing mechanisms to enable

⁶ [The Addis Ababa Action Agenda](#) is a comprehensive framework for financing sustainable development, adopted in 2015, that outlines a set of policy actions to achieve the Sustainable Development Goals (SDGs).

African countries to address the systemic deficiencies within their waste management systems and generate economic and social benefits through waste-to-resource conversion.

4.1 Overseas development finance for waste management

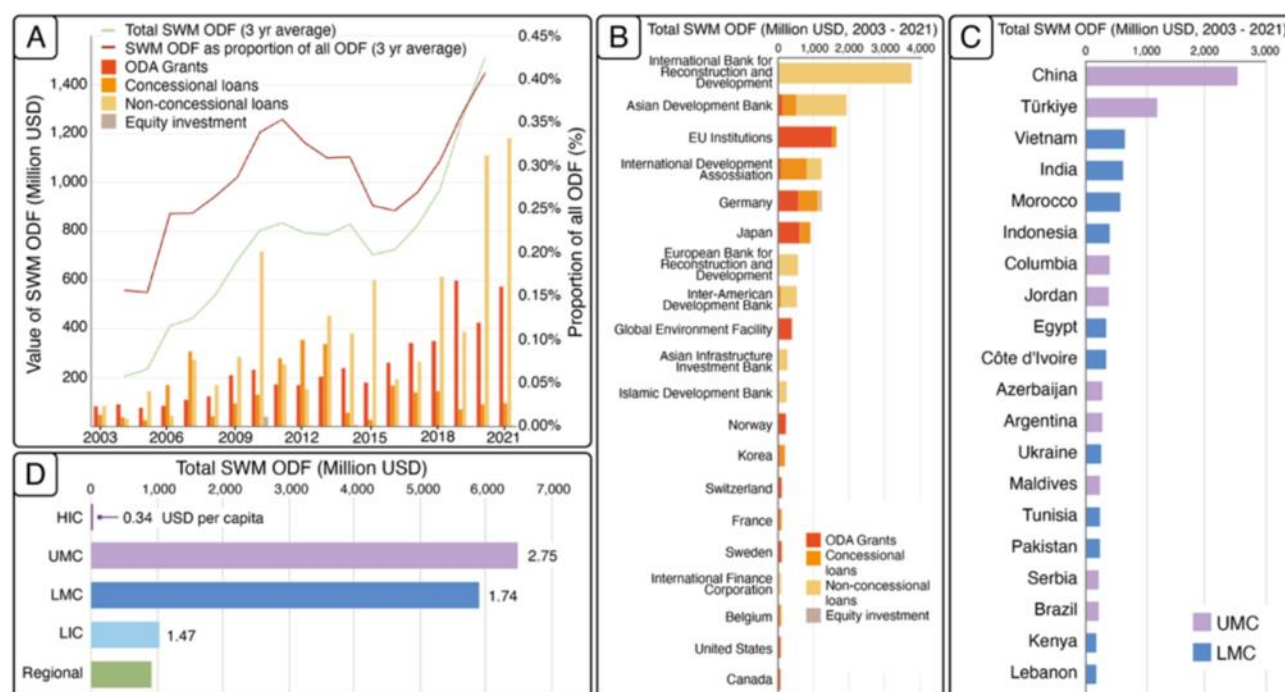
Overseas development finance (ODF) plays a key role in providing solid waste management (SWM) infrastructure and services. Lerpiniere *et al.* (2024) developed a standardised methodology to analyse OECD development finance data and applied it to data for 2003–2021 to provide insight on the scale, flows, and changes in SWM ODF over time. The key findings related to ODF for SWM are presented in Figure 4.1.

Overall analysis of the available data indicates that an estimated US\$14,527 million of development finance was committed to SWM between 2003 and 2021. This corresponds to over 8,526 grants (with a total value of US\$4,525 million), 209 concessional loans (US\$2,617 million), 295 non-concessional loans (US\$7,336 million) and 9 equity investments (US\$50 million). Out of this, the largest grant was a commitment of over US\$300 million from the European Union (EU) to Türkiye in 2019 associated with providing SWM-related support to the large population of refugees from Syria, while the median concessional loan was US\$6.3 million and the median non-concessional loan was US\$6.7 million (Lerpiniere *et al.* 2024). The study concluded the following:

- Despite an eightfold increase between 2003 and 2021 in the overall ODF allocation, ODF focused on SWM is still very low, representing just 0.41% out of the overall ODF provided to countries by 2021.
- The ODF allocation for SWM is dominated by five main donors who account for over three-quarters of the overall flow: the World Bank Group, Asian Development Bank, EU Institutions, Germany, and Japan.
- Many recipients of SWM ODF are low- and middle-income countries who received only 8% of SWM ODF between 2003 and 2021.
- Total ODF commitments for SWM in 2021 were about US\$1.8 billion, which is significantly short of the over US\$30 billion investment estimated to be needed to develop SWM and substantially reduce pollution.
- International treaties such as the Global Plastics Treaty⁷ that is in the final stages of negotiation represent a key opportunity to rapidly scale up international cooperation and ODF on SWM, help tackle the triple planetary crisis, and enable a just transition to a circular economy.

⁷ [Global Plastics Treaty](#), Intergovernmental Negotiating Committee on Plastic Pollution

Figure 4.1 Overseas development finance for solid waste management projects



Source: Lerpiniere *et al.* (2024).

As part of development of the regional Roadmaps, a scoping study was done on the financing sector to identify potential global and regional funders to support the elimination of open waste burning and the associated financing mechanisms to address waste mismanagement in developing countries. The report identified the following key issues that need to be addressed at national and local level to ensure adequate flow of financing and investment for transformative action on waste and open waste burning (Ecopsis and Practical Action 2024).

- 1 **National policies and regulations:** demand at national and municipal levels is crucial for initiating investment in sustainable waste management. However, waste management often competes with other developmental interests for limited public funding. Financing institutions vary their support based on the economic classification, market development, and vulnerability of countries.
- 2 **Financing instruments for city pilots:** city pilot projects often require subnational financing for project preparation and technical assistance. However, issues related to 'bankability' must be addressed for investors to engage. The City Climate Finance Gap Fund⁸ and Subnational Climate Fund⁹ are relevant financing opportunities.

⁸ [The City Climate Finance Gap Fund](#), helps cities in developing and emerging countries realize their climate ambitions, turning low-carbon, climate-resilient ideas into strategies and finance-ready projects.

⁹ [The Subnational Climate Fund](#), The Subnational Climate Fund (SCF) is a global blended finance initiative that aims to invest in and scale mid-sized (5 – 75 M \$USD) sub national infrastructure projects in the fields of sustainable energy, waste and sanitation, regenerative agriculture and nature-based solutions in developing countries.

- 3 **Commercially viable projects:** municipalities struggle to generate the necessary fee collection rates due to poor service, which creates a cycle of inadequate supply of commercially viable waste management projects. Investing in commercially viable and sustainable businesses is essential. Feasibility studies for city pilots must be founded on robust economic analysis to support the business case for investment.
- 4 **Engaging the private sector:** the private sector's role in climate and developmental objectives has been limited due to perceived risks. Developing public–private partnerships and sector-specific bonds can enhance private sector engagement in waste management.
- 5 **Engaging the informal sector:** informal waste collectors play a key role in waste management. Improving financial literacy and establishing cooperative funding entities can provide low-interest credit to support informal waste workers. Governments can also establish national funds using fees collected through extended producer responsibility (EPR) approaches.
- 6 **Opportunities for climate finance:** large disbursements of climate finance are currently directed to other sectors. Given the GHG emissions associated with open burning, the waste sector should be eligible for scaled-up financing. Robust data collection and local community education are crucial to increasing demand for SWM and accessing climate finance.

The study identified the major group of financing institutions and mechanisms that are providing different forms of financing, including financing for infrastructure development, climate action, SDG implementation, and the promotion of a circular economy:

- International and regional development financing institutions (DFIs)
- Multilateral financing institutions
- Bilateral development financiers
- Environment and climate funds
- Philanthropic organisations.

For further details on these organisations, see Annex A3.

4.2 Innovative financing mechanisms

The development financing landscape is dynamic and constantly changing. Many countries are now able to mobilise more domestic resources for development. Foreign direct investment (FDI) flows are on the rise combined with increased capacities to leverage finance from domestic and international capital markets (UNDP 2018). New development partners, development finance institutions, public–private 'single issue' vertical funds, philanthropic organisations, and private 'impact' investors have also emerged or expanded their activities in recent years and now work actively alongside traditional donors. This, combined with increased diversity and sophistication in financial instruments, has enabled financing to be used in increasingly sophisticated and creative ways to meet public policy objectives. Table 4.1 presents the major types of financing models that have emerged over the last decade in response to the increasing demand for financing sustainable development.

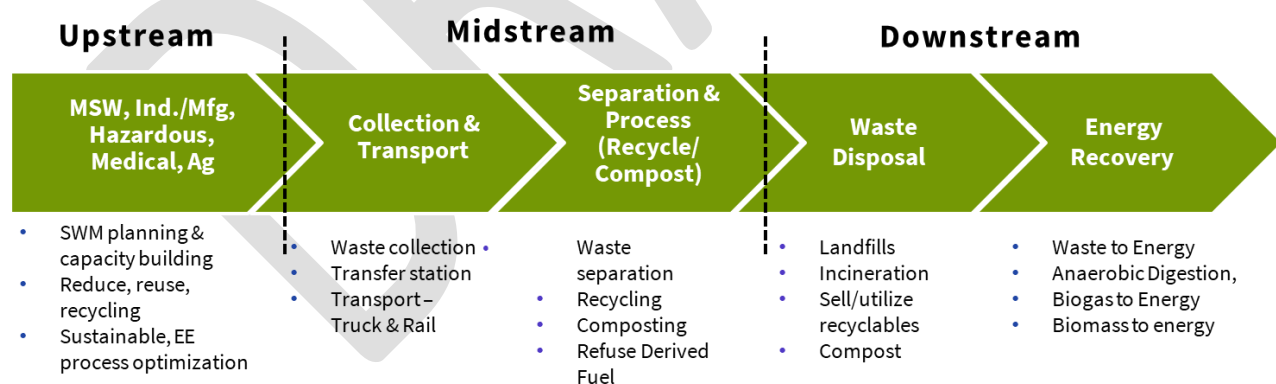
Table 4.1 Main features of emerging financing models

	Financing model	Main feature
1	Blended finance	Concessional public finance is blended with non-concessional public or private finance
2	Green and blue bonds	Bonds are issued on domestic and international capital markets for the financing of environmentally sound infrastructure
3	Islamic financing	Use of instruments such as Islamic bonds or sukuk which are asset-backed instruments
4	Guarantee schemes	Designed to reduce/share risk
5	Diaspora financing schemes	Diaspora communities are supported and incentivised to invest in projects and businesses 'back home'
6	Impact investment	Investments that aim to create positive social or environmental returns in addition to a financial return
7	Crowdfunding	Practice of funding a project by raising monetary contributions from many people)

Source: Author's own extracted from UNDP (2018).

When it comes to financing waste management actions, the UNEP Climate & Clean Air Coalition (CCAC) proposes a value chain perspective that covers the various interventions at upstream, midstream, and downstream levels (see Figure 4.2).

Figure 4.2 Financing the SWM value chain



Source: [The Climate & Clean Air Coalition](#).

The CCAC also underlines the need to cover all stages of the planning and development process: preparation; design; and implementation of projects, to improve the management of solid waste as per the following.

- 1 Planning, preparation, and design, including needs assessment and feasibility studies, environmental and social impact assessments, project design, financial and economic analysis, technology selection and procurement planning.
- 2 Infrastructure development: to construct or upgrade physical infrastructure and equipment installation for recycling facilities, landfills, and waste collection systems.
- 3 Capacity building and training: to ensure that personnel are well trained to operate and manage new systems, including training programmes, workshops, and certification courses.
- 4 Public awareness and community engagement: to educate the public and ensure community participation in waste management initiatives, including public campaigns, workshops, and informational materials.
- 5 Operations: covering the day-to-day costs of running waste management facilities, including labour, maintenance, repair management, and administrative expenses.

As part of stakeholder engagement during the development of the Roadmap, Engineering X had a series of consultations with key regional and national DFIs. This included engagement with the African Development Bank, African Finance Corporation (AFC), African Association of Development Financing Institutions (AADFI), and several national DFIs including the Development Bank of South Africa (DBSA) and the Development Bank of Ghana. The following key action points emerged from this engagement:

- 1 Closing the funding gap for sustainable waste management in Africa will require a coordinated approach that involves a range of national and international stakeholders, both in the public and private sectors.
- 2 Utilising the increasing financial resource that is available for climate action and circular economy promotion will require the development of innovative financing mechanisms at the national level.
- 3 National DFIs have a critical role to play in establishing innovative financing mechanisms and mobilising the required financial resource for addressing systemic deficiencies and promoting waste-to-resource conversion at the local level.
- 4 International and national development partners and DFIs need to provide more resource for transformational action on waste, recognising its contribution to the SDGs and climate action.

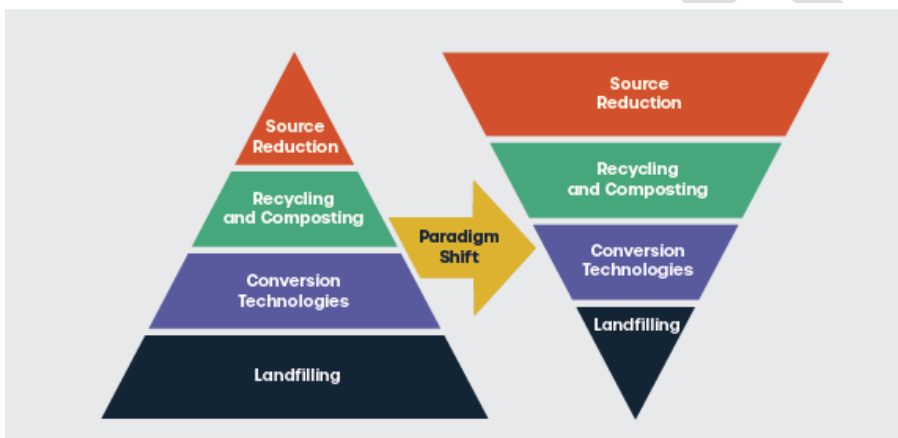
5 The Africa Roadmap for eliminating the open burning of waste

The resolution of the eighteenth Regular Session of the African Ministerial Conference on Environment (AMCEN) on eliminating open waste burning in Africa represents a defining moment from a policy commitment perspective. However, its effective implementation very much depends on the actions that are to be taken by all actors at all levels. Support from international development partners is also critical. This section presents the Africa roadmap, detailing the conceptual basis, the Theory of Change, and a Transformative Action Framework that stakeholders can use to guide their interventions.

5.1 The conceptual basis

The conceptual basis for the regional Roadmap has been informed by the key findings from the desktop study, the regional study, and stakeholder consultations and based on the key principles and approaches of integrated and sustainable waste management. Addressing the problem of open burning through piecemeal and isolated interventions at arbitrary points of the waste management system is neither effective nor efficient (Mebratu and Mbandi 2022). A transformational change in the waste management system in Africa is needed. Such a transition requires a paradigm shift in the waste management hierarchy towards an integrated waste management system prioritises prevention and circularity over treatment and disposal (see Figure 5.1).

Figure 5.1 The required operational paradigm shift



Source: Mebratu and Mbandi (2022).

UNEP (2018) estimates that 70–80 per cent of MSW generated in African cities is recyclable with an estimated economic value of US\$8.0 billion a year. The systematic integration of informal waste recyclers (who currently play a vital role in getting waste back into the African economy as secondary resources through reuse, recycling, and recovery of end-of-life products) would strengthen local manufacturing, create jobs, reduce unemployment, promote the circular economy, and build more inclusive and sustainable local and regional economies. This would require the following commitments (Practical Action 2021):

- Recognising the vital role they play in the sector;
- Providing the required technical and institutional support to improve their operations and working conditions;
- Building upon their creativity and expertise on waste recycling and reuse;
- Paying attention to gender-based considerations targeting women who are both victims and value-creators.

The main factors affecting the state of waste management in Africa are the following:

- Lack of public awareness

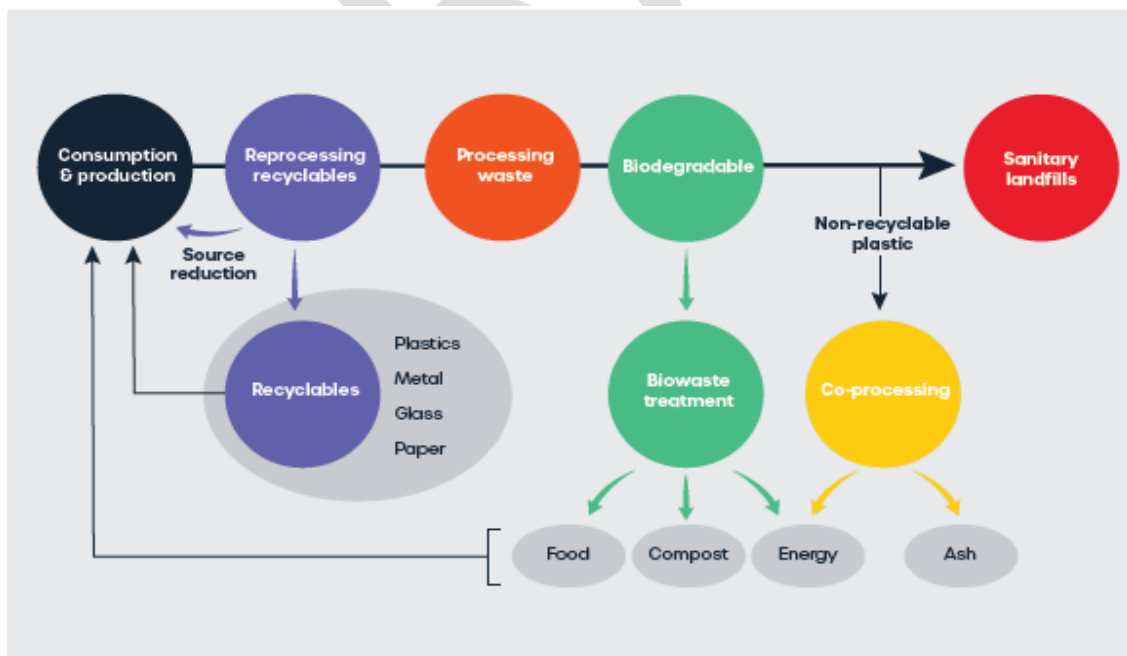
- Weak legislation and enforcement
- An insufficient budgetary provision for waste collection and disposal
- Inadequate and malfunctioning operations equipment
- Lack of effective public participation
- Inadequate waste management governance frameworks.

Addressing these challenges requires integrated action at the following major intervention points (Mebratu and Mbandi 2022).

- **Attitudinal:** changing the mindset of the public, the private sector, and policymakers on waste generation and management;
- **Institutional:** introducing and enforcing contextual regulation and economic instruments that incentivise waste reduction and utilisation as secondary resources (circularity);
- **Infrastructural:** building efficient infrastructure combined with a distributed grid that reduces environmental and climate impacts;
- **Operational:** building the required operational and technical skillsets for implementing an integrated waste management hierarchy.

Integrated implementation of the proposed interventions across is important, and all interventions need to be designed and implemented within the context of achieving systemic transformation across the broad consumption and production system. This requires transforming the linear structure of the extract, produce, consume, and dispose mode of production to a more circular structure focused on prevention, reduction, reuse, and recycling that is more resource efficient (see Figure 5.2).

Figure 5.2 integrated action for transformational change

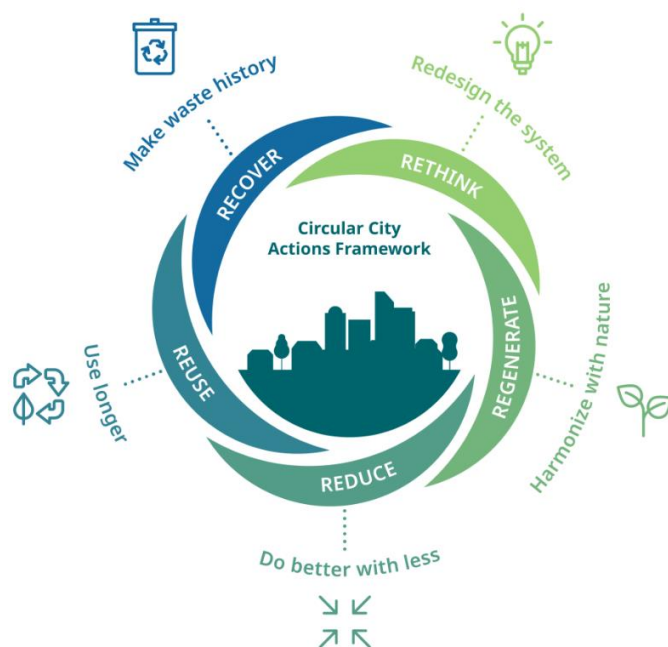


Source: Mebratu and Mbandi (2022).

Given the current composition and characteristic profile of MSW, African urban centres could reduce the volume of waste that needs to be disposed of in landfills by up to 60–80% if they manage to reprocess recyclables and biodegradable waste. This could amount to a reduction of open burning of waste of up to 90–100%, as such an approach would practically take out almost all the combustible elements from the waste stream (Mebratu and Mbandi 2022).

Figure 5.3 presents the Circular City Actions Framework that was developed as a collaboration between ICLEI-Local Governments for Sustainability, Circle Economy, Metabolic and the Ellen MacArthur Foundation (2021) which assist local governments to develop and implement circular economy programmes at the city level. The framework consists of five overarching strategies and the related actions. The actions are clustered under the strategies of rethink, regenerate, reuse, recycle, and recover.

Figure 5.3 Circular City Actions Framework



Source: ICLEI-Local Government for Sustainability *et al.* (2021).

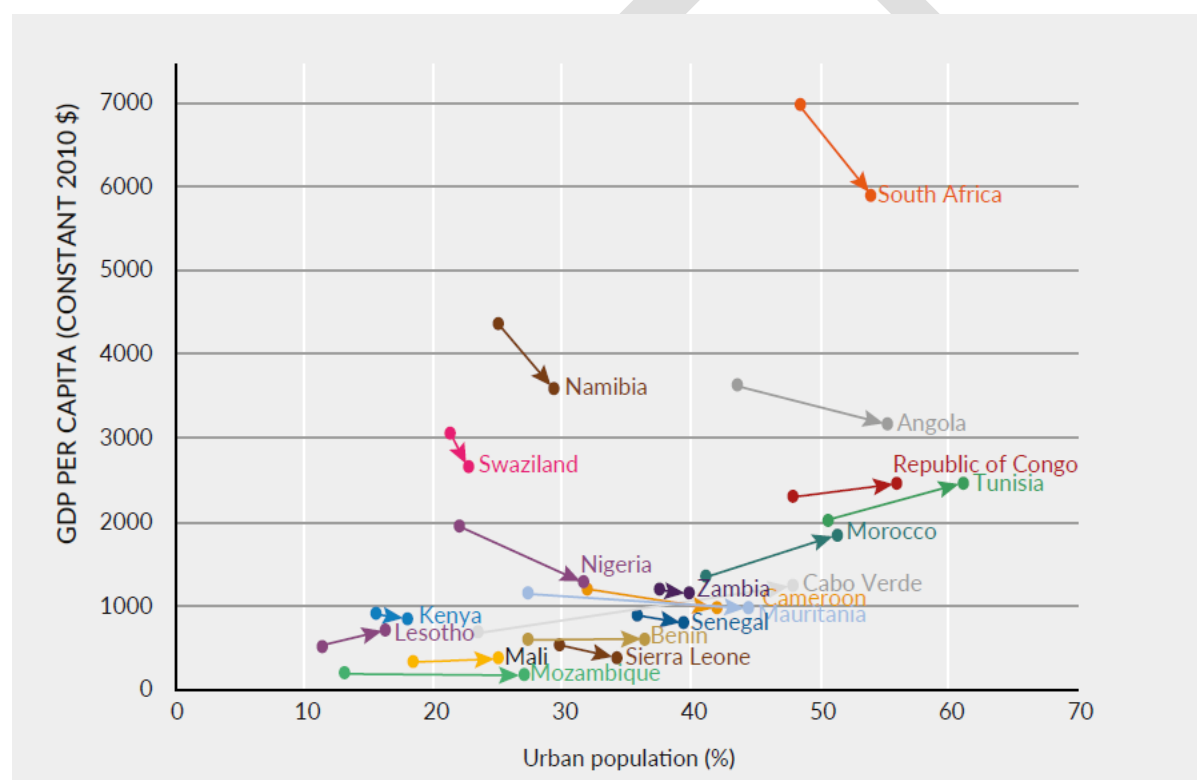
5.2 The Theory of Change (ToC) for the regional Roadmap

Urbanisation is a mega-trend, with profound implications for Africa's growth and transformation. The rate and scale of urbanisation is reshaping not only the demographic profile of the continent but also economic, environmental, and social outcomes. By 2035, about half of Africa's population will be living in urban areas, presenting considerable demands for employment, services, and infrastructure, but creating advantages for economic growth (UNECA 2017). History and experience demonstrate that urbanisation is closely linked to economic growth and the transformation of economies towards productive

sectors, namely industry and services. Available evidence suggests that urban and industrial development in Africa are disconnected, resulting in lost opportunities for job creation and improved wellbeing.

African economies are mostly characterised by extractive economies that are based on the provision of raw materials and minerals to the global market. This is largely related to the absence of structural transformation of national economies. When urbanisation happens in the absence of structural transformation, it results in the decline of GDP per capita of residents (see Figure 5.4). In this context, it is not surprising that Africa's cities are crippled by severe infrastructure and service gaps and are unable to generate employment at the level and scale required to meet ever increasing demands, especially for youth. Urban slums are believed to be the result of urbanisation happening in the absence of structural transformation.

Figure 5.4 Urbanisation and GDP per capita, 1980–1994, selected African countries



Source: UNECA (2017).

Addressing the structural limitations of African economies is one of the fundamental factors that would ultimately determine the progress to be made in ensuring effective waste management. This requires transformative action across African economies to ensure their transition from an extractive economy (largely characterised by rent collection) to a productive economy (that add values to its natural resources and creates decent jobs for its ever-growing youth population) (UNECA 2024).

The ToC (Figure 5.5) for the Africa Roadmap has been developed with a specific focus on the key drivers identified through the baseline study, while recognising the broader issues related to urban slums because of the lack of structural transformation. It includes the main drivers, interventions, outputs, outcomes, and impact.

5.2.1 Main drivers

While the continued expansion of slums in African urban centres is one of the fundamental drivers for the state of waste management in Africa, this is a strategic issue that needs to be addressed in the broader context of the structural transformation of African economies.

Based on the findings from the baseline study and stakeholder consultations, the following are the main drivers affecting the state of waste management open waste burning in Africa:

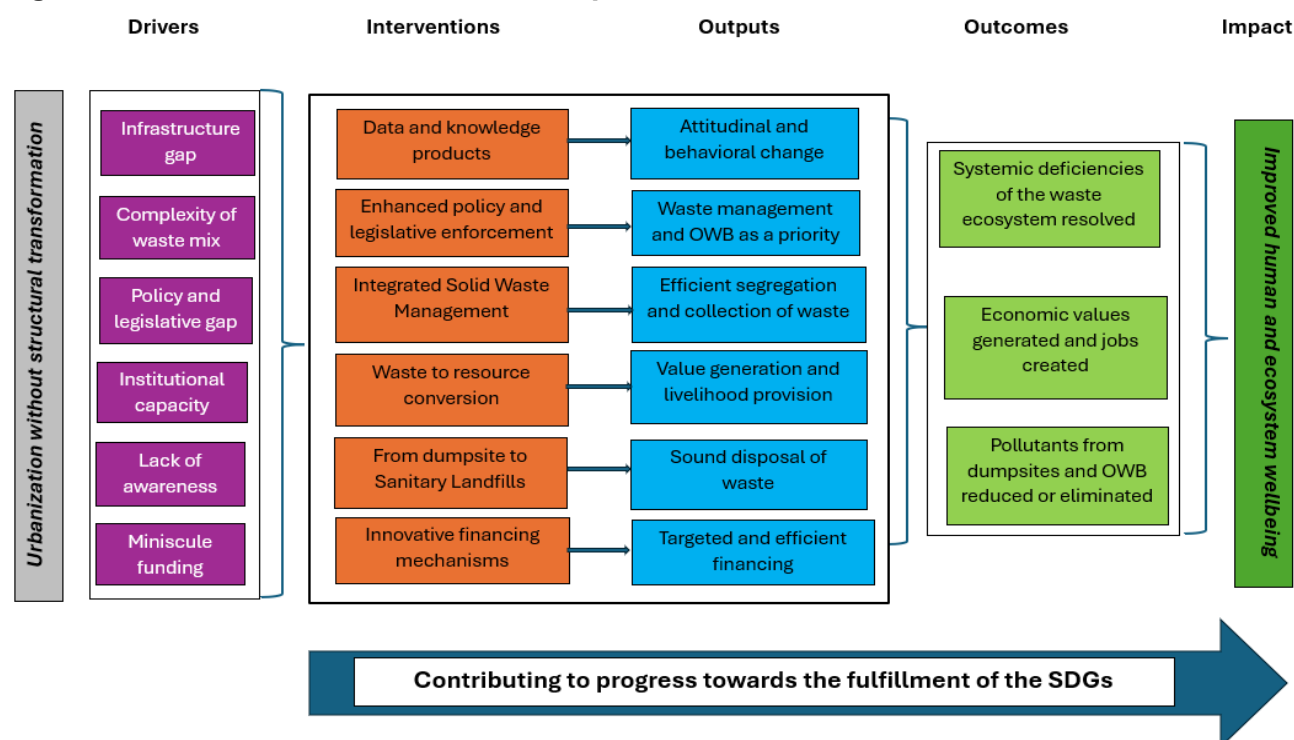
- 1 **Infrastructural gap:** addressing the significant infrastructural gap for economic development is a key challenge faced by most African countries. The infrastructure gap in waste management service delivery is even worse. The widespread absence of waste collection, transfer, and disposal infrastructure in African cities, including the absence of sanitary landfills, is identified as one of the main drivers for the widespread practice of the open burning of waste.
- 2 **Changing waste characteristics:** open waste burning has been and still is the primary disposal practice of waste management in Africa. However, the environmental and health impacts of open waste burning has changed significantly over the last couple of decades due to the changing characteristics of waste generated in African urban centres. The transition from largely natural products to processed products, combined with the increasing 'use and throw' consumption culture of affluent societies has contributed to the complexity of waste in Africa.
- 3 **Policy and legislative gap:** as much as the growing challenges associated with waste management are evident, particularly at the local government level, most of the existing policy and legislative frameworks, which are often fragmented, do not respond effectively to the complexity of the challenges. This is further reinforced by the weak enforcement and implementation capabilities of the existing policy and legislation instruments.
- 4 **Lack of knowledge:** almost all urban inhabitants, including many policy and decision-makers at national and local level, are aware of the wide occurrence of open waste burning. However, almost of them lack specific knowledge about the damaging health and environmental impacts of open burning. As a result, both waste management and the open burning of waste are not recognised as a priority.
- 5 **Scarce funding:** while most local governments dealing with waste management services recognise it as a priority, it's not seen as a development priority. As a result, the total amount of financial resource that goes into development waste management infrastructure development and operational services, both from national and international financial sources, is very limited.

5.2.2 Strategic interventions

The ToC for the Africa Roadmap focuses on the following strategic interventions related to the main drivers identified through the baseline study and stakeholder consultations:

- 1 **Data and knowledge production:** lack of knowledge has been identified as a main driver, related to the lack of data and knowledge on the volume and characteristics of waste generated, the health and environmental impacts of the open burning of waste, and emerging challenges associated with waste management, such as the impact of SLCPs.
- 2 **Promote policy coherence and enforce legislation:** promoting coherence between national and sectoral policies and legislation at the national and local level and ensuring effective enforcement of existing policy and regulations at all levels of governance is key to achieve an effective waste management system at all levels.
- 3 **Develop and implement integrated solid waste management system:** developing and implementing an ISWM that is responsive to the specific characteristics of waste generated is central for achieving transformative action on waste. Such an approach would ensure addressing the economic, environmental, and social dimensions of waste management from a holistic perspective. It would also provide the basis for effective design of disposal mechanisms that are economically efficient.
- 4 **Promote circularity:** promoting circularity through maximised waste-to-resource conversion that would generate economic value and create jobs as well as reducing environmental and health impacts is key for achieving transformative action. Building on existing experience and the dynamism of small enterprises and CBOs engaged in waste recycling is vital.
- 5 **Transition from dumpsites to landfills:** while prevention and reduction of waste generation followed by generation of value from waste are the priority intervention focuses, African cities need to invest in developing sanitary landfills that take care of the residual waste that is not reusable or recyclable. Such interventions need to focus specifically on the disposal of complex waste streams such as hazardous industrial waste, hospital waste, and obsolete stocks of chemicals and pesticides.
- 6 **Develop innovative financing mechanisms:** given the critical contribution waste management has for the fulfilment of most of the SDGs (see Annex A1), financing waste management needs to be taken as a key development priority by national government and international development partners. Besides prioritising waste management financing as one of the sustainable development financing, African countries need to develop innovative financing mechanisms that facilitate the efficient mobilisation and allocation of the required financial resources.

Figure 5.5 The ToC of the Africa Roadmap



Source: Author's Own

5.2.3 Outputs

While the actions taken under the main strategic intervention areas may lead to multiple outputs, the following are the consolidated outputs that need to be achieved through implementation of the Regional Roadmap.

- 1 **Attitudinal and behavioural change:** carrying out consistent and coherent awareness and education programmes informed by scientific knowledge products generated by different partners would result in attitudinal and behavioural change leading to transformative action at the institutional and individual level.
- 2 **Evidence-based policy and decision-making:** continuous monitoring and data generation on waste and open waste burning with its associated health and environmental impacts strengthens evidence-based policy and decision-making at the national and city level.
- 3 **Waste management and OWB prevention as a priority:** the institutional awareness and behavioural change that would be achieved based on the commitment made through the African Ministerial Conference on the Environment (AMCEN) needs to be translated into the recognition of waste management and the prevention of open waste burning as a priority.
- 4 **Efficient segregation and collection:** the development and implementation of an ISWM system based on the specific context and characteristics of the waste of the respective African cities would result in the efficient segregation and collection of waste. This is a fundamental prerequisite for eliminating the open burning of waste in urban neighbourhoods.

- 5 **Value generation and livelihood provision:** transformative actions on waste and open waste burning are expected to lead to enhanced economic value and job creation at the local level by transforming the enormous waste-to-resource conversion potential that exists within the waste stream.
- 6 **Sound disposal of waste:** the transition from open dumpsites to sanitary landfill systems based on the effective implementation of a context-specific ISWM system would result in the sound disposal of waste, including industrial and hospital waste.
- 7 **Targeted and efficient financing:** the development of innovative financing mechanisms at the national level would enable countries to provide targeted and efficient financing support to the private sector and CBOs actively engaged in the provision of waste management services and the recycling of waste.

5.2.4 Outcomes

The actions to be taken and the cumulative effect of the outputs generated are expected to lead to the following strategic outcomes:

- 1 **Systemic deficiencies addressed:** the development of an efficient waste management ecosystem enables the fundamental deficiencies in current waste management practices to be addressed.
- 2 **Waste-to-resource conversion:** maximising the existing potential for waste-to-resource conversion creates added economic value at the local and national levels and contributes to job creation and livelihood provision at the local level.
- 3 **Reduction and elimination of pollutants:** reduction in the open burning of waste through transformative action results in the reduction and elimination of pollutants released into the natural environment.

5.2.5 Impact

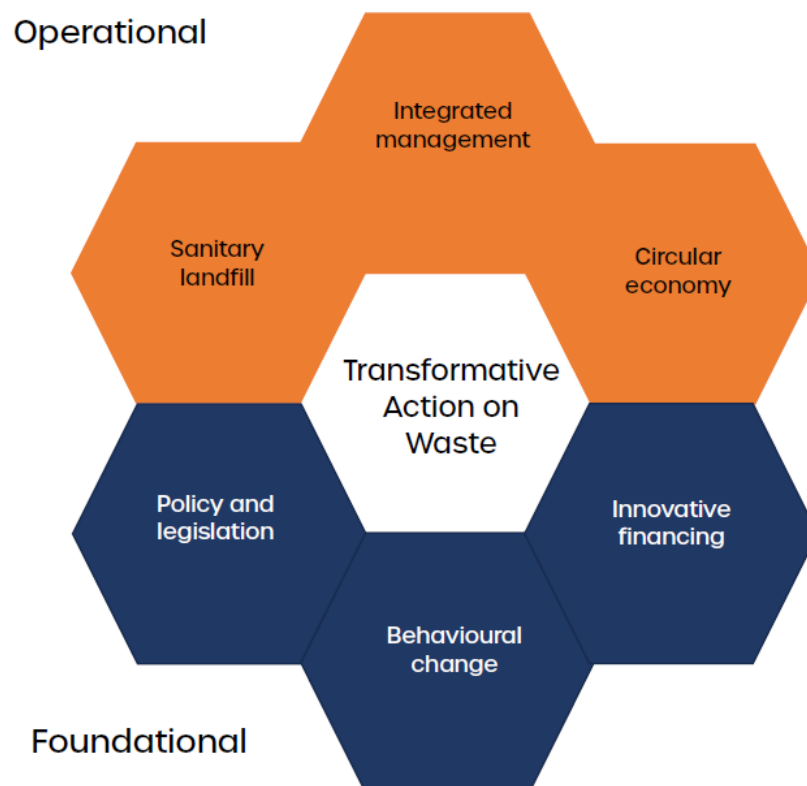
UNEP (2024) notes that there are some key questions of global social and environmental justice associated with the issue of waste generation and management, as illustrated by the many links between waste management and the fulfilment of the SDGs (see Annex A1). UNEP further highlighted the connection between waste management and the triple planetary crisis of climate change, biodiversity loss, and pollution. The overall impact is to eliminate open burning of waste by 2040 in Africa through transformational action to improve health and safety for both people and the environment, ensuring no one is left behind.

5.3 The Framework for Transformative Action

The Roadmap promotes a holistic approach to eliminating open burning of waste. To support this thinking, the Transformative Action Framework (see Figure 5.6) is included to help stakeholders visualise the whole and avoid piecemeal interventions. The framework consists of two parts:

1. **Foundational Pillars:** Core actions for all African countries and cities.
2. **Operational Actions:** Context-specific measures tailored to different challenges.

Figure 5.6 Framework for Transformative Action on Waste



Source: Author's own

The specific transformative actions that need to be taken at country and city level can take different forms since the nature of the challenges and operational realities vary from one place to another. Thus, the actions that are proposed in this section are neither exhaustive nor applicable to all conditions. However, they serve as a dynamic framework for the required actions that can be adapted and modified.

5.3.1 Foundational Pillars

Policy and legislation

Addressing the existing limitations and gaps in policy and legislation is one of the primary tasks that must be undertaken by national governments and should include:

- 1 **Addressing policy gaps:** a policy can only be effective if it is supported by the required legislation and regulations. Such gaps were identified as one of the major barriers for action by many stakeholders and development partners. National and local governments need to address these gaps by interrogating their existing policy regimes on waste management.
- 2 **Enhancing policy coherence:** even in the case of a few countries which have relatively strong policy regimes on waste management, lack of coherence across existing national, regional, and sectoral policy regimes is adversely affecting their

effective implementation. Countries should enhance policy coherence across the different regimes.

- 3 **Proactive fiscal policy:** subjecting private and social enterprises engaged in generating economic value from waste and creating jobs through waste recycling facilities to the same tax regimes as any other business is a limiting factor. In this context, countries need to introduce proactive policy regimes that promote the transition to a circular economy.
- 4 **Adaptive approach:** one of the key principles for the effective development and implementation of policy regimes that promote sustainable development is the deployment of an adaptive approach in policymaking and implementation. In this context, countries need to continuously learn and adapt their policy regimes for transformative action on waste.
- 5 **Waste management as a priority:** while waste management is recognised as one of the highest priorities by most local governments, it usually drops down to be the least priority at the national level. While most bilateral development partners are keen to support waste management infrastructure in African countries, the mismatch between local- and national-level priorities is acts as a barrier in their decision-making.

Behavioural change

Achieving behavioural change both at the institutional and individual level is critical. Key actions include:

- 1 **Data and information generation:** lack of data and information on the specific nature and impacts of the open burning of waste is one of the main reasons for low levels of awareness at all levels. In this context, academic and research institutions need to work more on generating such data with particular focus on the direct and indirect health and social impacts of the open burning of waste.
- 2 **Awareness creation materials:** local governments, civil societies, and development partners need to produce context-relevant awareness creation materials based on the available data and information.
- 3 **Medium of delivery:** implementation partners and stakeholders need to identify the most efficient awareness delivery mechanisms and utilise a combination of the best mechanisms to deliver the message. This could include brochures and leaflets, public service announcements, road shows, and public rallies.
- 4 **Grass-roots organisations:** utilising existing CBOs and establishing community action groups for awareness creation at the community level has proven to be effective. Reaching out to every household through their children via school environmental clubs are the most effective channels for awareness creation and behavioural change.
- 5 **Traditional structure:** existing cultural and religious platforms which have a significant influence on the behaviour of any community can also be used as an efficient vehicle for the delivery of targeted messages about the impacts of the open burning of waste.

Innovative financing

There is a huge financial gap for infrastructure in Africa and the gap is even worse for waste management which affects actions at the local government level. Addressing this limitation requires the introduction of innovative financing in relation to the following elements:

- 1 **Service fees and taxes:** cities and local governments need to introduce incremental (not flat) service fees and taxes for the waste management services they provide, or an agreed set of rules for the setting of tariffs by service providers licensed by them. Such a service fee and tax regime does not only assist local governments to generate revenue that would enable them to provide efficient services, but it would also encourage consumers and businesses to develop the required behavioural change for integrated waste management.
- 2 **National revolving fund:** the introduction of service fees and tax regimes without a mechanism for a targeted utilisation of the revenue generated for waste management services and infrastructure development could lead to inefficient utilisation of the resource and possible embezzlement. The establishment of a national revolving fund with dedicated allocation of the revenue collected would help cities to leverage more resources and provide targeted financing for those projects that deliver concrete results and impact to communities.
- 3 **Resource governance:** the regional survey and stakeholder consultation has shown that most of the ongoing waste management and recycling activities by CBOs and private enterprises are supported by bilateral donors and philanthropic organisations. Furthermore, these organisations wish to do more in recognition of the critical contribution of transformative action to support climate action and promote the circular economy. To make the best use of this opportunity, a resource governance mechanism needs to be developed that brings the relevant stakeholders under the coordination of the national development financing institutions (DFIs).
- 4 **DFI leadership:** given the critical and multiple contribution of a transformative action on the open burning of waste to the fulfil the SDGs in African countries, regional DFIs such as the African Development Bank and international DFIs such as the World Bank and European Reconstruction and Development Bank need to increase their financing for the development of the required waste management infrastructure based on an ISWM approach.
- 5 **Project capacity building:** lack of capacity for developing and reviewing viable waste management and recycling projects by project proponents and bank experts respectively has been recognised as one of the major barriers for securing funds from existing climate and environmental funds. The development of a waste management financing toolkit coupled with a module for 'training the trainers' is essential to overcome this challenge. To enhance capacity, it is also important to share lessons and best practice insights regionally.
- 6 **Enabling economic environment:** national governments can play a key role to create the enabling environment to generate revenue for waste management systems by:
 - a. increasing prioritisation of waste (i.e., including measurable targets in Nationally Determined Contributions (NDCs) and allocating financial

- resources to waste in national budgets. This will support cities and countries to leverage further financing towards waste management systems,
- b. and through implementation of policies such as extended producer responsibility schemes. This can enhance the engagement of the private sector and support management of post-consumer waste.
- 7 **Inclusive financing:** informal waste pickers and recyclers, waste collection service providers, and CBOs, including women's groups, are the major players in current waste management practice in Africa. In this context, ensuring the inclusivity of these groups in the development and implementation of innovative financing mechanisms is critical for their effectiveness.

5.3.2 Operational actions

Developing an integrated solid waste management system

The development of an integrated solid waste management (ISWM) system is recognised as one of the operational pillars. While the development and implementation of an ISWM system must be context specific, the following elements need to be taken into consideration:

- 1 **Household segregation and recycling:** a major proportion of the waste generated by African households consists of biodegradable and recyclable materials. In this context, the ISWM for African cities needs to give primary attention to the promotion of the segregation and recycling of waste at the household level. Such an action supported by a fundamental behavioural change, as well as the appropriate technology and equipment, would result in a significant reduction of waste needing to be collected and transported.
- 2 **Transfer and waste recovery stations:** the appropriate designation and distribution of waste transfer and recovery stations would determine the efficiency of waste collection in different neighbourhoods. This includes the proper allocation of responsibility of collection and transportation of waste by private and community-based service providers based on income groups, complexity of the waste stream, and capacity to pay for the service.
- 3 **Gender inclusivity:** while bearing the brunt of the environmental and health impact of the open burning of waste, women are also major players in the provision of waste management services and recycling in African cities. The development and implementation of an ISWM also needs to give maximum consideration to gender inclusivity.
- 4 **ISWM governance:** the relationship between national regulatory agencies and local governments, waste-generating entities and service providers, and waste pickers and recyclers is a significant challenge in most cities. An efficient ISWM should provide the foundation for improved governance of these relationships, including building the capacity of local institutions.
- 5 **Fostering partnerships:** the development and implementation of an efficient ISWM system requires the fostering of a dynamic partnership between the major actors and stakeholders across the waste management value chain. Such partnerships need to give maximum consideration to the role and contribution of CBOs, women's groups, and youth groups, which forms the foundation of transformative action.

Transitioning to a circular economy

Historically, the recycling and reuse of materials has been an inherent practice of many African communities, either because of cultural practices or because of necessity caused by scarcity of resources. This, combined with the specific characteristic of the waste generated in most African cities, provides a valuable foundation for promoting circularity through waste-to-resource conversion. The actions include the following:

- 1 **Resource cascading:** the economic value that could be generated from any waste stream needs to be guided by resource-cascading principles that move from higher- to lower-value products. In this context, the option of promoting waste-to-energy conversion, through incineration, as a green solution for waste management in some countries needs to be considered as the last resort when dealing with non-recyclable or low-value waste.
- 2 **Building on local creativity:** the regional survey and stakeholders' consultation has shown that there is a lot of local creativity promoted by small and medium-sized enterprises (SMEs) and CBOs actively engaged in waste recycling. It is essential that the promotion of a circular economy in the waste sector builds on existing local creativity and includes the transfer of appropriate technologies.
- 3 **Operationalisation of EPR:** the regional survey and stakeholders' consultation has shown that several African countries are already in the process of enacting a regulation on extended producer responsibility (EPR). The effective operationalisation of an EPR system that facilitates a circular economy requires a transparent governance structure that ensures the active involvement of producers, wholesalers, distributors, and consumers with different levels of responsibility.
- 4 **ISWM as a foundation:** while they are making some positive contributions to reducing the possible environmental impacts of waste, ongoing recycling practices across Africa are inefficient. The efficiency of a significant number of the existing recycling facilities and those to be established in the future can be improved through effective implementation of an ISWM system.

Sanitary landfills

There will always be a significant volume of waste that needs to be disposed of even after exhausting all possibilities of reduction and recycling. African cities need to invest in developing appropriately engineered and operated landfills as an important part of the transformative action on eliminating the open burning of waste. The following are the key elements to consider under this pillar:

- 1 **ISWM as a prerequisite:** cities need to take the development and implementation of an ISWM system, that includes the phased closure of existing dumpsites, as a fundamental prerequisite before investing in any sanitary landfill design and development. The benefits of this approach are significant: a reduction in upfront investment costs; reduced load on operational expenditure; and extended lifespan of the sanitary landfill due to the reduced volume of waste that needs to be disposed.
- 2 **Pre-design considerations:** the selection of sites, with due consideration for the environmental sensitivity of the specific ecosystem and meteorological factors across the seasons, supported by transparent consultation with communities in close

proximity to the potential site, is an important first step that would determine the success of sanitary landfill development and operation.

- 3 **Engineering considerations:** the incorporation of engineered barriers (liners) that ensure an efficient leachate collection and treatment system is critical to prevent groundwater contamination. The engineering design should also give due consideration to proper air space management and efficient compacting procedures which would ensure the effective capturing and possible utilisation of methane gas.
- 4 **Specialised waste management:** urban centres produce various types of hazardous wastes, including industrial and hospital waste, that would require special handling and disposal procedures. The landfill development process should have a specialised waste management component including the provision of clear guidelines for the collection, transportation, and pretreatment requirement of the specific types and quantities of hazardous waste accepted.
- 5 **Operational practices:** the regular compacting and covering of the disposed waste to reduce odours, pests, and windblown debris; efficient monitoring and management of leachate and gas emissions; the maintenance of detailed records of waste receipt and emissions for regulatory purposes; and the provision of information on landfill operations and environmental protection measures to the public are some of the main factors for ensuring efficient operational practices.
- 6 **Closure and post-closure management:** sustainable sanitary landfill design and development needs to have a detailed closure plan and final design that minimises infiltration and monitors the environmental impacts post-closure through a long-term maintenance plan and possible landfill rehabilitation plan.

6 Guidelines for a transformative action plan on waste and the open burning of waste

The provision of waste management services is one of the primary services provided by municipalities and local governments to inhabitants of their cities. The regional survey and stakeholder consultation carried out during the development of the Roadmap has clearly shown the primary role of African cities and local governments under very challenging circumstances. The Roadmap's effective implementation very much depends on the active engagement and involvement of African cities and local government. The following guidelines are prepared based on the draft architecture of the Africa Roadmap to serve as a guide for the development of a transformative action plan for Kisumu City (the city pilot).

6.1 Key guiding principles

The baseline study showed that there has been a plethora of initiatives, programmes, and projects that have been promoted at global, regional, national, and local levels.

Unfortunately, the impact of all of these efforts has been limited mainly due to the fragmented and piecemeal nature of these interventions. The Africa Roadmap underlines the importance of adopting a key set of guiding principles in developing and implementing waste management actions. The following are the main guiding principles for the

development and implementation of a transformative action plan for reducing open waste burning in Africa:

Principle 1: upholding the right of every citizen to a clean and healthy environment and the protection of the common (public) goods for current and future generations needs to be recognised as a basis for achieving a just and sustainable economic transition.

Principle 2: addressing the systemic deficiencies that exist within the waste management ecosystem at the city level based on an integrated waste management principle is a fundamental prerequisite for eliminating open waste burning at the city level.

Principle 3: developing and implementing transformative action for eliminating open waste burning from Africa requires taking coordinated and holistic actions at the behavioural, institutional, infrastructural, and operational (technical) levels.

Principle 4: achieving behavioural change at every level of the community is based on the recognition that all citizens contribute to the growing problem of open burning of waste and could be part of the solution.

Principle 5: a primary focus on converting waste to resources, based on the principle of the circular economy, provides the foundation for achieving broader economic, social, and environmental goals including revenue generation and job creation.

Principle 6: the policy and legislative actions that need to be taken at the national and local level need to focus primarily on removing existing barriers, including distortionary subsidies, and incentivising transformative actions that contribute to having an efficient waste management system.

Principle 7: the development of the action plan needs to be guided by ‘smart urbanism’ principles that promote Massive Small changes through the efficient combination of top-down strategic guidance and bottom-up operational planning.

Principle 8: building upon existing local capacities and experiences, including community-based waste management processes and private recycling enterprises, is essential to achieve a sustainable smart urban development.

Principle 9: the action plan needs to include financing modalities that facilitate the mobilisation of resources from public, private, international, and local community financing sources, based on the principles of the ‘Addis Ababa Action Agenda (AAAA) for financing sustainable development’.¹⁰

Principle 10: developing a built-in adaptive mechanism for the continuous monitoring and improvement of the system is critical for ensuring the responsiveness and effectiveness of the action plan at the local level.

¹⁰ See the [Addis Ababa Action Agenda](#).

6.2 The planning model

The conventional thinking on waste management in African cities is mainly focused on building large-scale sanitary disposal sites or, of late, waste-to-energy conversion incinerators as the primary solution. The transition from ‘Bigness’, which is the dominant model of conventional urban development and the main driver to unsustainable cities, to the ‘Massive Small’ model constitutes the core of the promotion of sustainable smart urbanism. Table 6.1 presents the distinct features of planning under ‘Bigness’ and ‘Massive Small’ urban development models and provides useful insight into planning models for African cities.

Transformative action on open burning in Africa requires a collection of actions at the individual, household, community, city, and national government levels. In this context, the Roadmap recommends that cities adopt the planning approach that efficiently combines top-down strategic planning with bottom-up operational planning. Such a planning approach aims to catalyse the development of the infrastructural backbone that facilitates Massive Small changes, both at the national and local level.

Table 6.1 Bigness versus Massive Small planning model

	Planning features	Bigness model	Massive Small model
1	High-level drivers	Single vision , mostly imposed by one leader or a party	Collective vision , shared by a broad segment of stakeholders
2	Planned outcomes	Social utopia in the form of a distant imaginary state	Emergent vernacular anchored in responding to local reality
3	Approaches	Top-down with central command and control	Bottom-up that facilitates collective creativity
4	Methods	Predict and plan in detail based on limited information	Learn by doing based on what is known and learning from mistakes
5	Tools	Arrestive policies that are rigid and restrictive	Generative protocols that are adaptive and responsive
6	Controls	Restrictiveness with coercive emphasis	Responsiveness with more proactive engagement
7	Community roles	Consultation that is mainly focused on co-opting others	Collaboration
8	People focus	The individual as the primary actor and beneficiary	The collective with a focus on the common goods of the public

9	Social outcomes	Low social capital utility and accumulation	High social capital utility and accumulation
10	Community types	Transient community with low regard for a sense of community	Stable community based on a strong sense of community

Source: Author's own adapted from Campbell (2018).

6.3 The field of transformative action

Based on the principles and planning models highlighted earlier in the Roadmap, the following are the proposed elements of the template to develop a transformative action plan. This can be adapted to suit specific municipality or city needs.

6.3.1 Executive summary

The Executive Summary provides a broad overview of the waste management situation in the city with an emphasis on the cost of inaction, a focus on the primary challenges and opportunities, and the key objectives of the action plan.

6.3.2 Introduction

The introductory section underlines the importance of waste management for public health, the environment, and sustainability and describes the purpose of the action plan based on the main section of the report.

6.3.3 Assessment of the waste management system

The assessment of the existing waste management system is the foundational work that will form the basis of the detailed content of the city waste management action plan. The following are the key elements that need to be covered during the assessment stage:

- 1 **Policy and strategy framework:** while waste management operations largely take place at city level, they are influenced significantly by existing policy and strategy at the national level and their level of implementation. The development of a city-level waste management action plan must take stock of existing policy and strategy frameworks and their level of implementation at the city level.
- 2 **Waste quantification and characterisation:** the development of an effective waste management action plan requires quantification of the volume of waste generated from all sources, together with the characterisation of both chemical and physical properties of the different types of waste. This can be done by source (household, industrial, agricultural, medical, etc.), content (biodegradable, recyclable, hazardous, etc.), and health impact (infectious, cardiovascular, carcinogenic, etc).
- 3 **Waste management operations:** a critical review of existing waste management operations as it exists is key for making the action plan more context specific and need responsive. The following are the key elements that need to be covered during the review of existing waste management operations:

- i. **Mapping community waste service providers:** community-based waste service providers are the main vehicles of waste management operations in most African cities that lack the basic infrastructure for waste management. Mapping the specific location and area of coverage of community waste service providers and ensuring their active involvement in the development and implementation of the action plan, including pooling of resource, is vital for a sustainable outcome.
 - ii. **Location of neighbourhood skip points:** the location of neighbourhood skip points is one of the key factors that determines the effectiveness of the service provided during waste collection. It is also a point of contention and conflict within a neighbourhood and between residents and waste collectors due to the 'not in my back yard' (NIMBY) syndrome. It will be important to identify the location of the neighbourhood skipping points together with the associated community perceptions and reservations.
 - iii. **Transfer stations:** the spatial coverage of transfer stations and their associated operations, including sorting of recyclable materials, are key factors that determine the efficiency of existing waste management operations. A transformative action plan for a city needs to have a detailed assessment of existing transfer stations with a purpose of achieving more efficient spatial coverage and associated waste management operations, including cost effective haulage.
 - iv. **Waste management facilities:** all types of waste will either end up being recycled or disposed of in landfills. Open dumping sites are the most common disposal mechanisms for most African cities that do not have properly designed and operated sanitary landfills. Capturing a full picture of the existing landfills, dumpsites, and recycling centres, together with the volume and type of waste handled, provides the basis for defining the specific interventions and actions.
- 4 **Public awareness and participation:** rallying the public to be part of the solution framework for the transformative action on waste is a key success factor that determines the sustainability of the overall outcome. Assessing the level of public awareness and identifying the most effective vehicles for promoting behavioural change will help to ensure the required public participation and buy-in for the implementation of the action plan.

6.4 Goals and objectives

Strategic goals and objectives must be defined in the plan, based on the guiding principles (see Section 6.1). The following goals and objectives could be considered.

6.4.1 Goals

The goals need to be aligned with the primary goals of addressing the systemic deficiencies within the waste management system and promoting circularity through waste-to-resource conversion. The following are the main elements that should be covered in the plan:

- 1 **Waste reduction:** minimise waste generation at the source to reduce environmental impact and resource consumption through responsible actions by consumers that uphold and promote a sustainable consumption lifestyle.
- 2 **Recycle and reuse:** achieve higher recycling rates and promote the reuse of materials by supporting CBOs and private enterprises that contribute to diverting waste from landfills.
- 3 **Control and closure of dumpsites:** control the proliferation of uncontrolled dumpsites around neighbourhoods, reduce the occurrence of open burning and hazard exposure at controlled dumpsites, and facilitate the closure of obsolete or overloaded dumpsites.
- 4 **Sustainable landfill management:** ensure environmentally responsible management of landfill facilities wherever they exist and extend their lifespan through better landfill management operations and practices.
- 5 **Public engagement and education:** foster community participation and awareness regarding waste management practices, emphasising individual accountability and sustainable behaviour and encouraging citizens to act as change agents.
- 6 **Financing mechanisms:** develop innovative financing mechanisms that could mobilise financial resources (from national government, local government, development partners, citizens), in the form of concessions and investments, and channel the resource to high-impact projects and interventions.
- 7 **Circular economy transition:** promote the waste sector as one of the strategic sectors that could contribute to the transition to a circular economy, creating decent jobs and providing sustainable livelihoods.

6.4.2 Objectives and targets

The goals of the transformative action plan need to be translated into clear objectives that are expressed in the form of specific time-bounded targets. The AMCEN resolution recommends a 60% reduction of open waste burning by 2030 and full elimination of open waste burning from Africa by 2040. This provides the basis for the definition of objectives and targets that could be considered by cities as per the following template (see Table 6.2). For the sake of harmonised monitoring and reporting of progress, 2030 is the proposed medium-term target date, while 2040 is taken as the long-term target date.

Table 6.2 Template for defining objectives, targets, and performance indicators

	Objectives	Achievable targets		Units of performance
		By 2030	By 2040	
1	Reduction of waste generated			Percentage or unit volume
	Reduction in overall waste generated			By volume or percentage
	Per capita waste generation			Kilogramme/person

2	Reduction of open waste burning			
	Reduction in neighbourhood open waste burning			Reduction in number of open burning incidents
	Reduction in open waste burning at uncontrolled dumpsites			Reduction in number of open burning incidents
3	Management of waste disposal sites			
	Closure of uncontrolled open dumpsites			Number of uncontrolled dumpsites closed
	Improved management of controlled dumpsites			Volume of waste managed
	Construction of sanitary landfills			Volume of waste managed
4	Recycling rate increased			
	Biodegradable waste			Percentage or unit volume
	Plastic			
	Paper			
	Other materials			
5	Improved access to efficient waste services			
	Enhanced coverage of waste services			Percentage of households covered
	Creation of decent jobs and livelihood			Number of decent jobs created or improved
	Improved routing efficiency			Number of days for collection
6	Development of innovative financing mechanisms			
	Establishment of national revolving fund			Level of effectiveness of the funding mechanism
	Development of an EPR system			Volume of financing contributed

	Budgetary contribution and revenue generation			Volume of funding made available
7	Achieving behavioural change			
	Engage wide range of waste producers, such as schools, hotels, religious centres, etc.			Number of transformational action centres on waste
	Creation of change agents for sustainable waste management			Number of waste management champions
	Establishment of waste management clubs and action groups			Number of waste management clubs
8	Partnership for sustainable waste management			
	Promotion of active stakeholder engagement			Number of stakeholder and community platforms organised
	Enhanced public–private engagement			Number of public–private partnerships
9	Waste management and urban planning			
	Integration of waste management in urban planning			Level of integration at city level
	Waste management as a priority			Priority at the national level
10	Monitoring and reporting			
	Periodic monitoring and reporting mechanisms			Cycles of monitoring and reporting
	Mechanism for corrective measures			Number of corrective actions taken

Source: Author's own

6.5 Financing and budgeting

The transformative action plan on waste should provide an indicative budget for the implementation of the identified intervention and the possible sources of funding as per the following outline:

6.5.1 Budget categories

The following are the main budget categories that must be presented as part of the action plan:

- 1 **Capital expenses:** this covers the cost of infrastructure and equipment, including the cost of bins, recycling centres, composting facilities, etc. The capital expenses associated with building sanitary landfills should be covered separately.
- 2 **Operational expenses:** covers day-to-day costs for waste management, including personnel costs, service fees for waste collection service providers, and other contractors.
- 3 **Public engagement:** covers the cost of education and outreach, materials for community education campaigns, workshops, promotional materials, and advertising.
- 4 **Monitoring and evaluation:** covers expenses related to tracking expenditure, data collection, analysis, and reporting.
- 5 **Contingency fund:** this is a percentage of the budget set aside for unexpected costs.

6.5.2 Funding sources

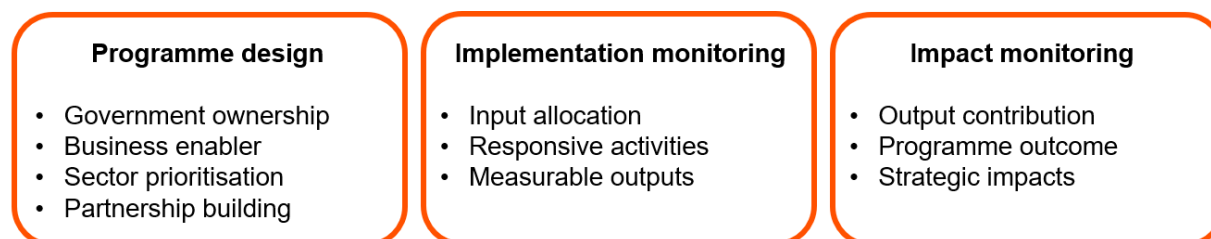
The following are the main sources of funding that could be explored for implementation of the action plan:

- 1 **Government budget:** the annual allocation of funds through the national and/or local government budget;
- 2 **Waste management service fee:** the financial flow from collection and/or disposal fees that are collected by the local government;
- 3 **Private sector contribution:** the financial flow from the private sector whether through a legally constituted EPR scheme or through voluntary sectoral initiatives and public-private partnerships;
- 4 **Community fundraising:** a periodic financial flow from local communities through various fundraising events to support local action;
- 5 **Development partner grants:** the finance that could come from different bilateral and international development partners either through project financing or direct budgetary grants.

6.6 Monitoring and evaluation

The local-level action plan needs to have a monitoring and evaluation framework that serves as the basis for the continuous improvement of the action plan based on the feedback and insight gained from its implementation. The monitoring and evaluation framework is presented in Figure 6.1.

Figure 6.1 Monitoring and Evaluation Framework



Source: Author's own.

- 1 **Programme design:** this looks at key factors that need to be considered at the programme design stage and includes government ownership, the context relevance of the actions, the need responsiveness of the plan, including gender responsiveness, and the building of effective partnerships.
- 2 **Implementation monitoring:** this refers to the continuous monitoring of key factors during implementation such as the allocation and mobilisation of the required resource and input, the effectiveness of implementation of the identified actions, and the level of measurable outputs achieved.
- 3 **Impact monitoring:** the impact of the implementation of the action plan needs to be continuously monitored and evaluated by focusing on the contribution of each output to the higher-level outcomes and impacts as defined in the transformational action plan. The impact monitoring should also ensure that communities directly impacted by a project are actively engaged in tracking the impact and benefits to them.

6.7 Piloting in Kisumu City, Kenya

The Transformative Action framework (figure 5.6) and the guideline for local level action plan development (section 6) is the basis for the development of the transformative action plan for Kisumu City in Kenya. This has been developed through a multi stakeholder Technical Committee chaired by Kisumu City. The lead partner for the pilot city, Practical Action, have provided technical guidance and support for the development and implementation of the action plan. The plan identified the following specific actions to be taken at city level:

- **No-cost actions:** these are actions that can be embedded in existing programs and initiatives related to environment, climate or sustainable development and which already have allocated budget but can achieve broader results with a slight fine-tuning of their actions.
- **Low-cost actions:** these are critical actions for implementation of transformational change (such as behavioural change, neighbourhood clean-up activities) which can be done in partnership with existing institutions and partners, but which may require limited amounts of funding.
- **Investment actions:** these are actions that require significant volume of investments (such as development of waste infrastructure), and which need leadership and support from national governments, development partners and national development financing institutions.

Kisumu city is currently in the process of implementing the no-cost actions and further refining its overall local action plan. For more information on the specific action points you may refer to Annex A4 of this document.

DRAFT

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Annex A1 Waste management and the Sustainable Development Goals



Goal 1. No poverty: Waste workers in informal economies who have no health or social protections are vulnerable to exploitation and are paid only the material value of the materials they collect. Inclusive municipal waste management policies are most effective for addressing both poverty and pollution.



Goal 2. Zero hunger: While global hunger is increasing, one-third of all the food grown in the world is wasted. Hunger can be reduced by preventing food waste and redistributing excess food. Converting unavoidable food waste into compost can replenish depleted agricultural soils.



Goal 3. Good health and well-being: Communities without adequate municipal waste management services resort to dumping and open burning, both of which have significant negative health consequences, particularly for women and children.



Goal 4. Quality education: Waste management courses in tertiary and higher education are uncommon, resulting in a lack of professional technical capacity and a shortage of workers with appropriate skills and knowledge.



Goal 5. Gender equality: People's experience with waste and its management is gender-differentiated: e.g. household purchasing and domestic waste-generating activities, and levels of influence over community decision-making regarding waste collection services.



Goal 6. Clean water and sanitation: Pollutants leaching from dumpsites can contaminate freshwater sources and associated food chains. Meanwhile, combining municipal solid waste and container-based sanitation services can achieve economies of scale that make both services more attractive to investors.



Goal 7. Affordable and clean energy: Unavoidable food waste can be used to make biogas, a clean-burning renewable fuel that could be used to tackle energy poverty, including in off-grid communities.



Goal 8. Decent work and economic growth: The waste management and recycling sector is uniquely positioned to improve global resource efficiency, decouple economic growth from environmental degradation, and provide safe and decent work opportunities for all.



Goal 9. Industry, innovation and infrastructure: Decentralised waste management systems can attract private sector investment, encouraging innovation, entrepreneurship, domestic technology development, greater resource efficiency and increased employment opportunities, and reduce financial risks for governments and municipalities.



Goal 10. Reduced inequalities: Intragenerational and intergenerational inequalities must be addressed through developing waste and resource management systems; attention is required from all stakeholders because the transition to a more circular economy will not occur by default.



Goal 11. Sustainable cities and communities: Solid waste management is a basic utility service without which air quality and living conditions become degraded, leading to poor health and social discontent. To make cities and communities inclusive, safe, resilient and sustainable, universal access to municipal waste management services is essential.



Goal 12. Responsible consumption and production: Production and consumption patterns directly impact municipal waste generation. To reduce waste and prevent pollution, efforts are needed by companies, governments and citizens.



Goal 13. Climate action: Poorly managed waste generates a wide range of emissions that contribute to climate change, most significantly methane from landfills and dumpsites, and black carbon and a range of other emissions from the widespread practice of the open burning of waste.



Goal 14. Life below water: Understanding why and how land-based waste reaches the sea, and introducing mitigation measures, is essential. Urgent action is particularly required in the case of Small Island Developing States, which face a complex set of waste management challenges.



Goal 15. Life on land: The terrestrial environment continues to be the primary sink for waste, while rural communities face complex waste management challenges that if left unmanaged can significantly impact ecosystems and dependent livelihoods.



Goal 16. Peace, justice and strong institutions: The increasingly global nature of waste management calls for heightened international cooperation to build national capacity for the safe management of hazardous waste and to prevent its illegal trafficking.



Goal 17. Partnerships for the Sustainable Development Goals: Current investments in waste management are insufficient. Far higher investments will be needed in the future to cope with increasing waste generation and the accumulation of legacy waste. The return on investment for waste management needs to be realised to catalyse increased finance.

Source: UN, 2015

Annex A2 Trends of waste generation and OWB in Africa, 2016–2020

Country	Country total population-2016	Country total population-2020	GDP-2016	GDP-2020	WB_2016	WB_2020	WB_diff
Angola	28,813,463	32,827,401	9,391	7,562	1,834,591,215	1,686,077,535	(148,513,679)
Sudan	39,578,828	43,541,203	4,374	3,581	1,156,585,233	1,042,451,689	(114,133,544)
Congo	5,125,821	5,686,917	8,057	6,407	344,088,984	303,936,530	(40,152,455)
Zimbabwe	16,150,362	17,680,465	3,542	3,083	754,032,212	718,469,603	(35,562,609)
Tunisia	11,403,248	11,903,136	12,520	11,721	1,122,364,787	1,097,651,697	(24,713,091)
Lesotho	2,203,821	2,322,217	3,021	2,501	42,279,924	36,931,260	(5,348,664)
Cabo Verde	539,560	567,348	7,234	6,367	57,594,999	53,367,083	(4,227,917)
Chad	14,452,543	16,285,093	2,083	1,843	699,919,945	698,176,903	(1,743,042)
South Africa	56,015,473	58,721,229	14,711	13,672	3,341,320,940	3,164,546,433	(176,774,507)
Libya	6,293,253	6,662,173	13,715	7,256	332,866,013	182,728,935	(150,137,079)
Algeria	40,606,052	43,333,255	15,711	14,390	1,896,621,712	1,789,913,101	(106,708,612)
Namibia	2,479,713	2,696,537	12,438	10,582	139,912,980	123,556,077	(16,356,903)
Equatorial Guinea	1,221,490	1,406,280	26,343	18,378	30,552,387	23,813,792	(6,738,595)
Mauritius	1,262,132	1,274,114	23,182	21,995	98,150,830	94,153,603	(3,997,227)
Botswana	2,250,260	2,415,766	16,060	15,135	43,173,127	41,829,752	(1,343,375)
Gabon	1,979,786	2,151,289	20,923	19,678	40,688,663	40,280,022	(408,641)
Seychelles	94,228	96,112	29,905	30,056	301,341	296,932	(4,409)
Sao Tome and Prin	199,910	218,011	5,364	5,711	10,428,426	12,135,543	1,707,117
Liberia	4,613,823	5,103,853	1,671	1,516	387,209,067	389,192,391	1,983,324
Djibouti	942,333	999,899	5,277	5,853	59,435,870	63,088,689	3,652,820
Comoros	795,601	869,601	3,381	3,420	41,479,913	45,892,224	4,412,311
Swaziland	1,343,098	1,439,295	9,109	9,308	86,157,798	94,390,303	8,232,505
Guinea-Bissau	1,815,698	2,000,694	2,085	2,189	135,968,296	157,479,493	21,511,196
Gambia	2,038,501	2,293,493	2,443	2,641	127,863,066	155,905,710	28,042,644
Eritrea	4,954,645	5,432,216	-	-	357,802,232	393,167,344	35,365,111
Mauritania	4,301,018	4,783,767	5,917	6,098	237,867,201	273,276,237	35,409,036
Sierra Leone	7,396,190	8,046,931	1,582	1,595	486,466,570	534,391,857	47,925,287
Central African Rep	4,594,621	4,920,889	1,032	1,069	535,835,774	595,312,869	59,477,096
Burundi	10,524,117	11,939,227	925	861	1,145,093,135	1,210,468,586	65,375,451
Zambia	16,591,390	18,679,273	3,630	3,415	1,304,447,222	1,383,849,881	79,402,659
Madagascar	24,894,551	27,690,798	1,693	1,591	1,670,848,002	1,750,392,045	79,544,043
Mozambique	28,829,476	32,309,195	1,518	1,448	1,240,207,740	1,327,991,932	87,784,191
Togo	7,606,374	8,384,291	2,416	2,557	543,253,322	635,040,523	91,787,202
Malawi	18,091,575	20,283,691	1,666	1,727	632,373,855	735,540,883	103,167,027
Somalia	14,317,996	16,105,174	1,484	1,460	1,038,559,167	1,152,156,585	113,597,418
Morocco	35,276,786	37,070,718	8,120	8,029	2,917,373,548	3,035,735,049	118,361,501
Mali	17,994,837	20,284,180	2,390	2,403	1,054,415,371	1,198,420,017	144,004,646
South Sudan	12,230,730	13,610,007	-	-	1,281,049,833	1,426,940,896	145,891,064
Cameroon	23,439,189	25,958,184	4,713	4,711	1,521,122,568	1,686,416,744	165,294,176
Guinea	12,395,924	13,750,826	3,136	3,684	567,102,156	739,828,682	172,726,525
Benin	10,872,298	12,122,985	3,078	3,430	801,691,537	998,090,572	196,399,035
Senegal	15,411,614	17,200,154	3,781	4,104	1,098,091,614	1,332,381,874	234,290,260
Burkina Faso	18,646,433	20,903,345	2,163	2,370	1,201,197,667	1,478,149,552	276,951,885
Rwanda	11,917,508	13,087,173	2,312	2,503	1,911,526,708	2,272,708,359	361,181,651
Niger	20,672,987	24,074,693	1,483	1,575	2,173,606,376	2,688,598,425	514,992,049
Côte d'Ivoire	23,695,919	26,171,750	5,711	6,242	2,562,770,255	3,097,391,889	534,621,634
Nigeria	185,989,640	206,152,701	5,951	5,558	15,054,130,305	15,618,155,237	564,024,932
Uganda	41,487,965	47,187,703	2,558	2,681	3,086,598,257	3,688,017,313	601,419,056
Kenya	48,461,567	53,491,697	4,795	5,080	3,715,339,892	4,350,464,440	635,124,548
Ghana	28,206,728	30,733,755	5,628	6,354	2,831,251,050	3,488,923,448	657,672,398
Ethiopia	102,403,196	112,759,070	2,113	2,554	3,117,702,053	4,155,623,067	1,037,921,015
Democratic Republic of the Congo	78,736,153	89,505,201	1,292	1,321	6,419,842,520	7,475,796,215	1,055,953,695
United Republic of Tanzania	55,572,201	62,774,619	3,180	3,409	5,275,687,684	6,404,705,501	1,129,017,817
Egypt	95,688,681	102,941,484	13,983	15,573	9,586,076,683	11,485,309,659	1,899,232,976

Source: Extracted from Gallup & Lloyd's Register Foundation, 2024.

Annex A3 Potential financing sources on waste management and the circular economy

Category	Name of organisation	Funding window/ strategic focus	Waste management intervention	Type of financing	Target recipient
Multilateral financing institutions	African Development Bank (AfDB) Africa Circular Economy Facility	The African Circular Economy Facility; Urban and Municipal Development Fund	Municipal waste management infrastructure; circular economy; recycling; resource recovery	Loans and grants for technical support	National governments
	World Bank/International Bank for Reconstruction and Development (IBRD) Global Partnership for Results-Based Approaches	Global Partnership for Results-Based Approaches (GPRBA); Plastic Waste Reduction-Linked Bond	Municipal waste management infrastructure; plastic recycling	Grants and private capital mobilisation	National governments
	International Finance Corporation, WBG Circularity Plus: Accelerating Waste-to-Value Solutions	Circularity Plus platform	Sustainable waste solution; circular economy	- Green and blue bonds - Loans - Equity instruments	Private sector
	European Bank for Reconstruction and Development (EBRD) Green Climate Fund	Green cities facility	Formalisation of informal waste pickers; industrial symbiosis	Grants and loans	National governments

	European Investment Bank (EIB) The EIB in Sub-Saharan Africa	The Gap Fund	Low-carbon solid waste management services	• Grants, loans, and technical assistance	Cities and local governments
Bilateral development financing	French Development Agency and Proparco	Infrastructure	Urban infrastructure; climate change and environment; health; sustainable cities	• Loans • Equity • Quasi-equity • Guarantees • Local currency • Financing • Technical assistance grants	Governments, private sector, CBOs
	KfW/DEG, German Development Bank	Sanitation and waste disposal; urban development	Waste management system and services	• Grants and technical support	Not specified
	US-American International Aid (US-AID)	Urban environment	Air quality monitoring	• Grants and technical assistance	National environmental authorities and cities
	Japan International Cooperation Agency	Urban waste management	Integrated solid waste management with focus on 3Rs and landfill management (Fukuoka method)	• Grants and technical assistance	National and local governments
	Swedish International Development Agency (SIDA) Sida's Work with Climate and Environment	Urban waste management	Integrated solid waste management plan	• Grants and technical assistance	National and local governments

Environment and climate funds	Green Climate Fund: Cities, Buildings and Urban Cities	Circular urban economy	Promotion of circular economy	Grants and concessional funding	Developing Countries
	Global Environmental Facility (GEF): Sustainable Cities	Climate change adaptation and mitigation	Sustainable cities and Chemicals and waste windows	Grants and blended financing	Developing countries
	Climate Investment Fund: Smart Cities Program	Clean Technology Fund (CTF) and the Strategic Climate Fund (SCF)	Smart cities	- Grants/contingent grants - Concessional loans - Equity - Guarantees	
	Catalytic Finance Foundation Subnational Climate Fund	Climate mitigation and adaptation solutions	Waste sorting, treatment, recycling Composting facilities	Private equity fund with grant-funded facility (US\$28 million) for technical assistance (TA)	Subnational level
Philanthropic organisations	Clean Air Fund	Breathe Cities initiative for action against air pollution	Data generation, policy action and behavioural change	Grants and technical assistance	National and local governments and CBOs
	Bloomberg Philanthropies	C40 Cities climate leadership group	Air pollution, promoting clean energy, and improving urban environments	- Grants - Technical assistance - Blended finance	Cities and local governments
	Rockefeller Foundation, Financing Climate-Health Solutions	Financing climate	Zero waste with focus on food waste	Equity provides financing and linkages to	

		health solutions		technical partners in waste management ecosystem	
	Lloyd's Register Foundation Engineering X	Engineering X	Open waste burning; safety, preparedness and sustainability challenges	Grants and technical support	All

Source: Author's own based on Ecopsis (2024).

Annex A4 Kisumu City Transformational Action Plan (no cost, low cost, investment)

Type of action	Objective	Costs	Actions
Cross-cutting	4: Engage and Empower stakeholders	No cost	4.1 Partner with schools, churches, and community organizations for commitments to action on their own waste and outreach programs 4.2 Training institutional stakeholders on waste management technologies 4.3 Encourage businesses to reduce, recycle and adopt circular economy principles 4.4 Creation of platforms for peer learning and engagement on eliminating open burning and findings alternatives 4.5 Feedback and continuous improvement through monitoring involving institutional stakeholders
Behaviour Change	3: Awareness to end open burning of waste	No cost	3.1 Awareness raising about effects of open waste burning and alternatives to avoid the practice 3.2 Organize neighbourhood clean-ups and Community Action Sessions to build ownership and participation 3.3 Awareness raising for informal waste groups on effects of open burning and alternatives to avoid the practice
		Low cost	3.4 Awareness raising on and stronger open burning rules and regulations, with periodic monitoring
Policy and Legislation	7: Enhance Policy and Regulatory Frameworks	Low cost	7.1 Complete domestication of legal and policy frameworks on open burning 7.2 Enforce existing laws on illegal dumping and open burning 7.3 Develop incentives for compliance with waste management regulations. 7.4 Train enforcement officers and community leaders on waste management laws
		Investment	7.5 Review existing policies
Innovative financing	8: Secure sources of innovative and sustainable finances	Low cost	8.1 Allocation from County Budgets 8.2 Identification of potential funding sources and creation of partnerships 8.3 Development of detailed proposals for larger scale investments
Integrated waste management	1: Promote uptake of waste collection services and segregation of waste at source	No cost	1.1 Launch promotion campaigns for uptake of waste collection services and segregation at source
		Low cost	1.2 Strengthen existing ward waste management committees to engage with landlords and care takers on matters of waste accumulation, collection and evacuation
		Investment	1.3 Support the use of green technologies by households 1.4 Providing alternative disposal methods 1.5 Facilitate the establishment and equipping of community recycling centres
Circular economy	2: Improve the working conditions and capacity of formal and informal waste businesses	No cost	2.1 Cross learning visits and benchmarking sessions 2.2 Increase awareness of the important roles informal waste actors play in waste management and lobby for policies that recognize their contributions and improve their working conditions 2.3 Increasing recycling by improving linkages in the waste value chain
		Low cost	2.4 Create structures for representation and recognition of waste workers and discussion between all those involved in the waste sector 2.5 Review and adopt a digital app and encourage consistent use by all waste collectors 2.6 Promote Sustainability initiatives like environmentally sustainable waste practices e.g. zero-waste, circular economy models and green technologies for waste handling groups
		Investment	2.7 Provide training and equip informal waste workers on safe and sustainable waste management

Source: Practical Action, Kisumu City Action Plan, 2024 (unpublished).