

Global Ecosystem Assessment for Integrated Solid Waste Management

Overview

The Covenant of Mayors in Sub-Saharan Africa Program (CoM SSA Program) is aimed at scaling up the ability of local governments (LGs) to work together effectively with their national governments (NGs), the private sector, and civil society to significantly scale up climate action.

This paper is aimed at providing a concise roadmap for scaling up integrated solid waste management (ISWM) in SSA by leveraging best practices and lessons learned, outlining the building blocks for building related programs. The key topics include:

- (1) benefits of integrated waste management;
- (2) barriers to implementing integrated solid waste management in SSA;
- (3) how barriers can be addressed to unlock investment by both the public and private sectors;
- (4) business models and critical success factors;
- (5) how different models can address barriers in SSA;
- (6) roles and responsibilities; and
- (7) potential sources of support for sustainable integrated solid waste management interventions.

The assessment is intended to provide SSA LGs and their national governments with a roadmap of how to scale up integrated solid waste management in their respective countries.

While a limited number of large SSA creditworthy cities (or their utilities) may be able to develop and finance integrated solid waste management on a one-off transactional basis using Develop, Build, Operate, and Maintain/Finance contracts, most SSA LGs will need to have an aggregation of projects or a national integrated solid waste management program that serves to aggregate a critical mass of waste projects through technical assistance, grants, and risk mitigation from development partners, enabling the mobilization of private finance and engagement of technology equipment and service providers, as detailed below. Extended producer responsibility (EPR) programs are likely to be a key to unlocking private sector funding and expertise to divert waste away from LG owned landfills and the creation of a circular economy.

Keys to success for waste-management systems in emerging economies are the ability to aggregate waste flows into meaningful volumes around which businesses can be developed and the ability to organize the supply chain professionally at high levels of operational efficiency and environmental and societal effectiveness. Who or what mandates or operates such a system can vary, as long as the parties ramp up and yield results fast staying on top, and preferably ahead, of the large and growing volumes of waste that are developing in emerging economies.

For more information, please contact GlobalDF at feedback@globalclearinghouse.org or using the Contact form on the website www.globaldf.org.

1.0 Benefits of Integrated Waste Management

Numerous expert studies and projects have provided undeniable evidence that integrated solid waste management projects offer extensive development, economic, and climate benefits, including carbon emission reductions as well as job creation and support for SMEs.ⁱ Further benefits can be realised by adopting a circular economy approach, including: improving the security of the supply of raw materials, increasing competitiveness, stimulating innovation, boosting economic growth and creating jobs.ⁱⁱ

Therefore, in the current environment in which both SSA local and national governments face severe budget constraint due to COVID and the massive economic downturn, solid waste projects can provide LGs and national governments with significant opportunities to deliver short-term demonstratable benefits, as listed in the below table.

Table 1: Benefits of ISWM Projects to Sub-Saharan Africa

Development Benefits	Economic Benefits for LGs	Climate Benefits
<ul style="list-style-type: none"> - Improved public health and sanitation conditions due to diminished disease vectors that breed in open waste - Reduced contamination of ground water, surface water and other resources by controlling nutrient runoff and reducing harmful pathogens - Electricity generated can drive economic growth and allow electricity security for key social services such as clinics and schools - Delayed capital expenditure in respect of landfill sites by diverting waste - Operational savings for LGs as a result of the reduced need for landfilling and transporting waste - Job creation through labour intensive recycling processes - Creation of downstream economic opportunities for entrepreneurs 	<ul style="list-style-type: none"> - Generated revenue from the sale of recyclables, renewable electricity or biogas - Integrated waste management savings as a result of lower waste volumes that need to be treated and landfilled - Stimulated local economy by maximising employment opportunities for citizens and creating opportunities for Small and Medium-Sized Enterprises (SMEs) through local content requirements - Overall increased local economic activity and job creation, tax revenues from payrolls, land values, etc. 	<ul style="list-style-type: none"> - GHG emissions savings as a result of methane avoidance at landfill sites - GHG emissions savings as a result of the production of biogas at markets, abattoirs and landfill sites that can be used to generate electricity or for cooking, replacing thermally generated electricity or charcoal stoves - GHG emissions savings related to the avoided transportation of waste to landfill sites - Replacement of waste burning practices that cause air pollution and respiratory issues

In all cases, waste projects can be structured to include job creation, as well as the potential for the development of local manufacturing and SMEs. In some cases, contracts have also been structured to improve gender equality. The challenge is how to transition from informal to structured sector, as explained in the next section.

2.0 Barriers to Implementing ISWM in SSA

Financial impediments

Integrated waste management is an expensive service and requires substantial investments in physical infrastructure and long-term operations. According to the WB, the largest financial challenge for LGs in respect of ISWM is usually the coverage of operational costs related to labour, fuel, and the servicing of equipmentⁱⁱⁱ.

The largest one-off waste management expenditure for a LG is typically for CAPEX related to the construction of a sanitary landfill site and the purchase of collection and disposal equipment and bins. For example, landfill construction can cost a municipality roughly US\$10 million to serve a population of 1 million people and large new waste collection trucks can cost in the region of US\$250,000. Basic transfer stations can cost around US\$500,000, however, when recycling and sorting functions are included, the investment increases significantly.^{iv}

As illustrated below, the cost of open dumping is a fraction of the cost of sanitary landfilling and the transition to sanitary landfilling or other waste treatment is unlikely to result in a cost neutral solution for LGs in the absence of grants. While a number of alternatives to landfilling exist, the cost of diverting waste away from landfills is often higher than sanitary landfilling. In developed countries mechanisms such as

landfill taxes have been introduced to make landfill costs comparable to diversion alternatives, enabling climate friendly alternatives.

Table 5.2 Typical Waste Management Costs by Disposal Type

US\$/tonne

	Low-income countries	Lower-middle-income countries	Upper-middle-income countries	High-income countries
Collection and transfer	20–50	30–75	50–100	90–200
Controlled landfill to sanitary landfill	10–20	15–40	20–65	40–100
Open dumping	2–8	3–10	—	—
Recycling	0–25	5–30	5–50	30–80
Composting	5–30	10–40	20–75	35–90

Source: World Bank Solid Waste Community of Practice and Climate and Clean Air Coalition.

Note: — = not available.

Source: WB SWM Study 2.0

Tariffs are not cost reflective

According to the WB, the cost of integrated waste services (collection, transport, treatment, and disposal) in most countries cannot be fully recovered from tariffs and requires subsidies through government transfers or external budget support^v. At the same time, fully cost reflective tariffs are unlikely to be affordable to all beneficiaries in low- and middle-income countries.

The introduction of cost reflective tipping fees at landfill sites is seen as a risk by many LGs as it can result in illegal dumping that can cost LGs more to clean up than it would have cost to landfill. As a result, many LGs charge the public less per tonne of waste delivered to the landfill site than it incurs^{vi}.

Budgets are often not prioritised

ISWM does not tend to be a political priority for LGs which often results in inadequate CAPEX budgets being allocated for ISWM interventions or the reallocation of ISWM budgets to other services during the budget period.^{vii}

Guaranteed feedstock

Most waste diversion projects rely on the availability of a reliable stream of waste as feedstock for their processes that meets certain quality criteria. For PPPs, funders will want to see a feedstock agreement between a LG and the SPV which transfers the feedstock risk to the LG. However, LGs are often reluctant to guarantee minimum levels of waste or the quality of the waste.

Volatile export markets

In the absence of beneficiation processes that allow recyclables to be turned into new products for domestic use, recyclers are reliant on international markets that have proven to be volatile in the past. For example, when China banned the import of most recyclables in 2017 it had a significant impact on global prices.

Land issues

Securing land for new landfill sites is problematic as existing landowners and residents are unlikely to welcome a landfill site which may result in odour and land value issues. At the same time, landfill sites need to be located close to the source of waste to avoid excessive transport costs. Unless future sites have

been earmarked and secured as part of long-term integrated solid waste management plan, it may take years to secure a suitable site as a result of disputes with surrounding landowners.

Informal sector

Informal waste pickers operate at dumping and landfill sites earning a living by collecting recyclables and selling them to buy back centres or the buyers of recyclables. New waste management processes need to include this sector to protect livelihoods and ideally upskill the informal waste pickers. Ignoring this sector can result in protests and violence that can delay and derail projects.

Lack of separation at source

Most alternative waste treatment technologies rely on waste being separated at source, i.e., at a household or business level. Separation at source results in additional costs as waste streams need to be collected and stored separately. Buy-in for separation at source needs to be created through a combination of mechanisms, including communication campaigns, enforcement and assigning value to waste (through a deposit type EPR scheme).

Tariffs required by WtE projects

In the absence of subsidies or landfill taxes, WtE projects normally require tariffs that are higher than the levelized cost of electricity in most SSA countries and therefore not affordable.^{viii} Concessional finance is only likely to be available for biomass WtE projects as incineration projects are unlikely to be attractive to DFIs and other providers of concessionary finance.

Shortage of data on the real cost of services

LGs in SSA often have very limited data available that allows them to understand their costs and the tonnages transported. This is largely due to inadequate accounting systems, lack of weighbridges or poorly maintained weighbridges. In the absence of a true understanding of the current spend on landfilling and transport (expressed on a per tonne basis) it is difficult to conclude on the affordability of alternative technologies and solutions.

Relatively small transaction sizes

A typical alternative waste treatment project, other than WtE, requires capital expenditure of less than US\$2 million while DFIs typically favour projects that require more than US\$10 million in funding. The small project sizes result in high transaction costs as a percentage of CAPEX and lack of interest from DFIs who require scale to finance.^{ix}

Lack of creditworthy off takers that can sign long term offtake agreements

Most alternative waste treatment products or by-products (e.g., compost, recyclables, biogas etc.) will need to be marketed and sold to local buyers that are neither credit worthy nor want to enter into long term offtake agreements at pre-agreed prices. For example, the price of recyclables will fluctuate in line with international demand and prices unless a local market for beneficiation can be established. While the sale of electricity and/or steam from a biogas WtE plant is more likely to result in a long-term offtake agreement, most of SSA Africa's utilities are not credit worthy.

Most LGs will not be able to borrow to fund an ISWM project

The vast majority of LGs in SSA have weak balance sheets and poor credit ratings and limited own sources of revenue. As a result, LGs often cannot borrow to fund infrastructure projects and are heavily reliant on fiscal transfers to fund infrastructure.

Replicability of business models and technologies used in developed countries

While a number of off-balance sheet business models exist internationally to fund ISWM projects, they often rely on landfill taxes to achieve bankability. In a SSA where landfill taxes do not exist, many technologies and business models are unlikely to be bankable as they rely on landfill taxes to close the affordability gap.

Lack of EPR policies and enforcement of policies

E-waste and packaging waste is a growing challenge in Africa and the proper disposal of e-waste requires training and investment in recycling and management technology as improper processing can have severe health effects. Illegal imports of second-hand electronics are a driver of e-waste in Africa in addition to growing domestic waste generation. Imported e-waste either takes the form of near end of life products that still have some use but which is sold to consumers and waste imported to avoid disposal costs in developed countries. Distinguishing between these 2 categories is often difficult for enforcement officers. Only 10 African countries have developed national e-waste legislation or policies and enforcement of these is often poor. The main barriers for an e-waste EPR policy are enforcement, lack of clarity on the definition of a producer, the prevalence of “no-brand” equipment and lack of formal treatment facilities.^x

An unstructured informal sector can hamper the growth of formal recycling facilities

In many African countries the informal sector competes for waste with recycling facilities. Since the informal sector is more localized and faces lower compliance costs it competes with more formal recycling facilities, hampering their growth and ability to scale.^{xi}

Lack of sufficient climate benefits

Key ISWM interventions such as the construction of a sanitary landfill site are unlikely to qualify for climate finance as they may not result in GHG emission savings. An integrated solid waste management project would then need to be developed that optimises collection routes and diverts organic waste from landfilling to demonstrate GHG emission savings.

A business case for a private sector led ISWM project that requires significant investment in infrastructure can only be made if most of the following issues are addressed:

- The LG or waste owner is able to enter into a longer-term feedstock agreement guaranteeing minimum waste quantities to the private sector;
- the LG or landfill operator is able to make payments to the private sector for diverting waste by ringfencing landfill cost savings;
- the private sector can enter into off-take agreements for its products with credit worthy off takers or develop a sustainable market for its products; and
- The project can access grant funding or blended finance.

3.0 How Barriers Can Be Addressed to Unlock Investment by both the Public and Private Sectors

According to the WB, the following factors are key to unlocking private sector partnerships for ISWM, namely:^{xii}

- simple and transparent procurement processes;
- minimal political and currency risk; and
- strong legal systems that enforce payments and encourage user compliance with waste management rules and regulations (curtailing littering and enforcing separation at source).

In addition to above, revenue certainty and guaranteed access to sufficient waste of a certain quality are likely to be key consideration for private sector partners and funders as discussed in more detail below. Since alternative waste treatment processes generally require higher upfront investment, financing

mechanisms that allow these costs to be spread over a period of time or secure revenue through EPR schemes are likely to be key to achieving affordable ISWM solutions.

A circular economy can reduce waste volumes and shift responsibility for treatment to the private sector

The circular economy is an economic system aimed at eliminating waste and the continual use of resources. Circular systems employ reuse, sharing, repair, refurbishment, remanufacturing and recycling to create a closed-loop system, minimising the use of resource inputs and the creation of waste, pollution and carbon emissions.^{xiii} In a circular economy, solid waste is seen as an input material and resource rather than something that needs to be disposed of. Extended Producer Responsibility (EPR) is an instrument used to develop a circular economy that shifts responsibility to the producers or importers as discussed in more detail below. A number of initiatives have been launched to support the circular economy in Africa, including:

- The African Circular Economy Alliance (ACEA) was established in 2017 as collaboration between the governments of Rwanda, Nigeria and South Africa.^{xiv}
- The African Development Bank is setting up the Africa Circular Economy Facility, a multi-donor trust fund to support circular businesses. This is being supported by research carried out by the African Circular Economy Alliance.
- The African Circular Economy Network (ACEN) was established in July 2016. Its purpose is to build a circular economy through research, training & awareness and knowledge sharing.
- ICLEI Africa and ACEN released a report on Circular Cities in Africa in 2020.
- The European Union published the results of its study on the circular economy in EU-Africa cooperation

Extended Producer Responsibility (EPR) Programs

EPR can act as a crucial tool for stimulating secondary markets for ISWM products/by-products and funding investment in ISWM infrastructure. EPR schemes have been adopted in many countries, across a broad range of products to deliver higher collection, recycling and recovery rates reducing the need for landfilling. According to a recent study by the Hanns Seidel Foundation (HFS), the most successful schemes encourage more sustainable design decisions at the production stage thereby working across the full value chain from design to end of use^{xv}.

Mozambique is expected to introduce SSA’s first EPR tax on packaging in 2021 which will require large-scale manufacturers to take increased financial responsibility for what happens to packaging like cardboard, PET bottles and aluminium cans. The taxes will be used as a source of co-financing for Mozambique’s circular economy NAMA project discussed in more detail below.^{xvi} The table below lists policy instruments/schemes that generally used to implement EPR programs^{xvii}

Table 1. EPR policy mechanisms or schemes

Policy instrument/scheme	Description
Product take-back requirements	Producers assume the responsibility of taking back their products (in whole or part) at the post-consumer stage.
Performance standards	Determine the extent to which producers are required to recycle their post-consumer products. Standards provide incentives for producers to choose production processes and/or products that are easier to reuse and recycle.
Deposit/refund schemes	Involve the consumer paying a deposit when purchasing a product and then receiving a refund when returning the post-consumer product, the container, or the packaging. The aim is to facilitate product take-back.
Advance disposal fees (ADF)	Involve charging consumers at the point of purchase for the cost of treating and recycling post-consumer products (including the

	cost for take-back). This system can also influence consumer product choice by adding fees to product prices.
Material taxes	Are usually imposed on raw materials that have high environmental risks to encourage a shift towards use of more environmentally friendly materials in products. Tax revenues could also be used for the collection, separation, proper treatment and recycling of such products.
Other measures	Include regulating the disposal of waste (e.g., landfill taxes imposed at a metered rate, stiffer punishments for illegal dumping) and promoting environmentally friendly designs and products through tax benefits and subsidies; eco-labels and awareness-raising to expand markets for environmentally friendly products; and promotion of innovative business models, such as toward dematerialising the economy.

Source: Applying EPR in developing countries, IGES

Funding mechanisms

The African Development Bank is setting up the Africa Circular Economy Facility, a multi-donor trust fund to support circular businesses. This is being supported by research carried out by the African Circular Economy Alliance and Dalberg. EPR schemes such as China's e-waste program makes use of a fund that is established to collect EPR taxes/fees and to distribute the proceeds to the implementers of the program (recyclers, the informal sector, etc.)

Economies of scale

A steady supply of affordable recycled inputs is key to the financial sustainability of privately operated recycling businesses. Reducing logistical costs by aggregating recycling materials at scale tends to lower costs and increase profits for the private sector creating a business case for investment in the required technology and infrastructure. Cost sharing through EPR schemes also help lower the burden of recycling for some of the materials with very low recyclable value.^{xviii}

Aggregation

National ISWM programs, such as South Africa's Waste Diversion Program, aggregate ISWM projects across 30 to 40 LGs to achieve sufficient scale to justify an application to the Green Climate Fund and to achieve economies of scale in respect of transaction costs that are spread across a number of projects.

Technology

A recent World Economic Forum Report on the circular economy in Africa found that increased access to technology via mobile phones is key to facilitate consumer use of circular economy solutions and connecting processors with imported green technology.^{xix} ICT platforms such as South Africa's Kudoti recycling platform connects buyers and sellers of recyclables and assigns a value to waste that encourages households to separate their waste at source.

Enabling legislative, regulatory and policy environment

EPR schemes will require both national and regional enabling legislation and policies to succeed as well as the means to enforce the laws. While the need for national legislation is self-evident, regional trade also needs to be regulated to avoid illegal imports or exports to neighbouring countries and to achieve sufficient scale for smaller countries. For example, regional standards and certification for recycled plastics allows for easier plastic trade between countries and helps ensure sufficient raw material/feedstock for large investments and scaling in recycling plants. This means that recycling plants in smaller countries such as Rwanda do not have to depend solely on an in-country supply of feedstock.^{xx} Regional harmonisation will also be required to prevent the illegal export of e-waste from countries with more onerous EPR requirements to neighbouring countries with less onerous requirements.

Job creation potential can be harnessed to gain support for ISWM projects

ISWM projects and EPR schemes offer significant opportunities for creating sustainable jobs. The quantification of potential jobs that can be created will be key to gaining buy-in from NG and LGs. For example, In Ghana a newly established waste and plastics recycling plant is expected to create green jobs for 2,300 people (800 direct and 1,500 indirect jobs). In Nairobi County, Kenya, Unilever's Zero Waste project created 70 green jobs for young Kenyans and opportunities for 1,700 informal waste collectors.^{xxi}

De-risking investment for the private sector by reducing their investment in fixed infrastructure

The public sector can reduce the private sector's investment by funding CAPEX via climate facilities. In Rwanda, FONERWA provided funding for an e-waste facility that was subsequently leased to the private sector. The lease terms allow the Government of Rwanda to recoup the initial investment over a 10-year period via lease payments. Over and above the lease payments, the private sector operator also made commitments in respect of investment in e-waste collection points/centres and new equipment.

South Africa's Waste Diversion Program makes use of publicly sourced Green Climate Fund grants and concessionary loans to fund the majority of the infrastructure. The private sector operators of the infrastructure may be required to invest in moveable equipment under service level agreements.

Leveraging existing government infrastructure to reduce upfront investment

Existing government premises can be made available for the storing, sorting and recycling of waste, reducing costs for private sector/NGO partners.

Tax incentives

Tax incentives can be used to make investment in ISWM more attractive to the private sector. For example, Ghana offers a seven-year tax exemption for companies recycling plastic and polythene material for agricultural or commercial purposes.^{xxii}

Formalising waste picking to create a more level playing field for women waste pickers

A recent WEF study found that women waste pickers in Africa are often not allowed access to high-value recyclables and are also often paid less for the same recyclables. Formalizing the process through an EPR scheme could alleviate some of the oppression faced by women waste pickers within the plastic waste sector. Collectivization models have been successful in addressing some of these challenges for women waste pickers. In Brazil, cooperatives have helped waste pickers (particularly women) to address a wide range of important day-to-day issues, including negotiating with public authorities and private intermediaries, occupational safety and health (particularly during the pandemic), gender-based violence, legal protection, social protection and access to storage space and local marketplaces.^{xxiii}

SSA governments can overcome many of the barriers outlined above and support the establishment and growth of scaled integrated solid waste management by undertaking a set of legislative, regulatory, and policy initiatives targeted at:^{xxiv}

- Creating **stable demand** for integrated solid waste management projects in the public and private sectors through regulations that enable the aggregation of LG procurement and technical support;
- Implementing cost reflective tariffs and tipping fees that will allow LGs to recover investment in new infrastructure;
- Removing **barriers** to the public **procurement** of waste services and increasing overall procurement capacity;
- Unlocking affordable **financing** for waste projects through blended finance using grants and risk mitigation (such as first loss mechanisms and guarantees); and

- Implementing EPR programs that **shift the responsibility** for waste treatment to the producers of waste, encourages the beneficiation of waste and diverts waste away from landfills to achieve a circular economy.

Table 2: Actions to overcome barriers and unlock investment at scale^{xxv}

Create Stable Demand for ISWM Projects	Remove Barriers to Public Procurement of ISWM	Unlock financing For ISWM projects
<ul style="list-style-type: none"> • Cost reflective tariff structure that creates the necessary price incentives to invest in ISWM • Increase public entities’ knowledge and awareness of ISWM and its benefits • Legislate and enforce separation at source as well as educating households and businesses on the need for S@S • Implement EPR schemes that assign value to waste for households, businesses and the informal sector • Increase the capacity of public entities to identify ISWM opportunities • Impose regulatory obligations (e.g. min % of waste diversion) • Aggregate similar projects across public entities to achieve scale • Accredite or certify service providers • Introduction of tax exemptions or benefits for investors in ISWM and providers of equipment/services¹ 	<ul style="list-style-type: none"> • Allow public entities to sign multiple-year contracts • Create a centre of excellence for procurement of waste services that can support the public sector with procurement and feasibility studies • Encourage public entities to use ISWM business models • Insure public sector against breaches by the supplier, including issues resulting from poor execution^{xxvi} • Find risk mitigation solutions to guarantee minimum waste supply to the private sector • Create a stable market for recyclables through EPR schemes that target beneficiation • Develop model M&V protocols and other standards 	<ul style="list-style-type: none"> • Structure and EPR scheme that includes a funding mechanism (tax, deposit, advance treatment payment, etc) that can be ring-fenced to fund infrastructure and subsidise operations. • Establish an aggregation entity that is capacitated to mobilise blended finance for the implementation of projects • Marketing of available business models and blended finance solutions to beneficiaries (LGs, utilities, etc.) • Secure climate and national grants to reduce the pay-back periods of ISWM contracts • Secure climate PPF funding to structure a program and blended finance facility • Build capacity within local finance institutions to unlock funding through on-lending facilities, grants, and risk mitigation

Other tools that can be developed to unlock the SSA ISWM market include:

- Identification of the roles, conditions and contractual requirements to be fulfilled by potential market players engaged in project development and monitoring (i.e., service providers, insurers of project performance, project certifiers and verifiers);
- Assessment of opportunity for local content throughout the project life cycle, including beneficiation facilities;
- Guide on waste criteria in selecting and contracting technology for waste projects, setting out criteria and minimum technical requirements;^{xxvii}
- A standard methodology for assessing projects from a technical and financial/economic perspective; and^{xxviii}
- Development of toolkits for the procurement and funding of ISWM projects, incorporating the above guidelines and assessment methodologies that facilitates implementation with procurement contract templates, financing models, and links to sources of technical assistance and finance.

¹ South African government introduced the 12L Tax incentive, which allows for an amount per kWh saved that can be deducted from taxable income.

4.0 Business Models and Critical Success Factors

The research undertaken by the authors identified the following eight business models that are likely to unlock funding for ISWM interventions in SSA, namely:

In SSA today, there are multiple ongoing efforts to scale up ISWM with support from development partners e.g., AFD, AfDB, EC, JICA, the Nordic Development Fund, the World Bank Group, etc. as well as international organizations e.g., COM SSA and the Ellen McArthur Institute. Different blended finance models and EPR schemes have been developed, using grant and debt finance combined with user fees, taxes and guarantees, as noted in the examples cited below.

The opportunities for changing to integrated solid waste management is illustrated through an assessment of the various approaches used worldwide and in SSA, as outlined below.

1) Public owned & operated

a. Definition:

ISWM infrastructure such as landfill sites, material recovery facilities (MRFs) and collection vehicles are owned and operated by the public sector. Funding is generally provided by NG in the form of fiscal transfers, but LG own sources of funds (e.g. rates and ISWM tariffs) may also be used to fund new infrastructure. In some instances, NGs or credit worthy LGs also borrow from DFIs to implement large scale interventions.

b. SSA Example:

Senegal's Municipal Solid Waste Management Project raised around US\$300 million from DFIs and donors in 2020 to improve waste management services in selected municipalities and to strengthen the country's solid waste management system. The World Bank approved a \$125 million loan to the Government of Senegal for the project in 2020 while additional co-financing was secured from the Agence Française de Développement (AFD), the Spanish Agency for International Development Cooperation (AECID), the Government of Senegal and other donors.

The Reppie WtE incineration plant in Addis Ababa was financed by the Government of Ethiopia. A US\$120 million EPC contract was concluded in 2013 between Ethiopian Electrical Power (EEP) and a consortium comprising Cambridge Industries and China National Electric Engineering Co. The facility is designed to process 1,400 tons of municipal waste per day and to produce 185 GWh of electricity annually (equal to 25% of Addis Ababa's power needs. While the joint EPC consortium provided training, first-year spare-parts, and full consumables as well as continued warranty, the EEP will operate the plant^{xxix}.

2) Public owned & private sector operated

a. Definition:

ISWM infrastructure and equipment is owned by the public sector but operated by the private sector under a service level agreement. Funding is generally provided by NG in the form of fiscal transfers, but LG own sources of funds (e.g. rates and ISWM tariffs) may also be used to fund new infrastructure. In some instances, NGs or credit worthy LGs also borrow from DFIs to implement large scale interventions.

b. SSA Example:

The City of Cape Town's Kraaifontein MRF is publicly owned but privately operated. The City raised funds to construct the 100 ton/day public owned MRF as part of a larger multi-purpose

waste management facility that handles 1,000 tons/day. Waste Plan, a private sector company, operates the MRF under a 3 year service level agreement, employing more than 120 people.^{xxx}

Kenya's County Governments contract private waste management firms to collect, transport and dispose waste. Franchising systems for waste collection have been tried by a number of counties whereby a county is zoned, and private sector firms assigned to deliver waste management services to the designated zones, including collecting fees. This approach has not been efficient as the firms compete for contracts in the wealthier areas but decline to service poorer areas and are vulnerable to corruption.^{xxxi}

c. Other Example:

India's Pune Municipal Corporation (PMC) signed a five-year memorandum of understanding with the SWaCH collective of informal workers that mandated the collective to collect source-separated waste from households and to charge households a fee. PMC partially subsidizes collection costs in slums to ensure affordability for poor households.^{xxxii}

Indian based **Sampurn(e)arth** has an agreement in place with the Municipal Corporation of Mumbai to use their warehouse facilities to sort waste. The enterprise organizes waste pickers into co-operatives to collect and process recyclables for sale to the private sector. MCC enables the informal MRF by giving Sampurn(e)arth access to publicly owned warehouses and avoids costs related to the collection and disposal of waste.^{xxxiii}

3) Commercialised utility

a. Definition:

A commercialised utility is a unit within government that operates like a commercial organisation but that provides one particular service, e.g. integrated solid waste management. They are staffed by public employees and any profits are channelled into reserves or public funds rather than going to shareholders. Their revenues and expenditures are ring-fenced and they are able to raise their own funding. They can set their own tariffs, subject to approval by municipal or regional authorities. Commercialised utilities may provide a service to one city or to a group of towns and cities. Their boards usually comprise senior municipal administrators. Commercialised utilities cannot be expected to be effective unless they have a high degree of independence. If well managed and allowed this independence, they can enjoy many of the benefits associated with the private sector while retaining the focus of providing a service according to the general direction of municipal leaders.^{xxxiv}

b. SSA Example:

Pikitup was established in 2000 as an independent municipal entity wholly owned by the City of Johannesburg (CoJ). It is mandated via a service delivery agreement with the CoJ to provide sustainable integrated solid waste management services to all residential areas and business in the CoJ. It serves more than 5 million people and handles 1.4 million tonnes of waste per year. Pikitup is not mandated to borrow and is therefore reliant on the CoJ for funding. It is also reliant on the CoJ's billing and collection services as it does not invoice households and businesses directly.^{xxxv}

4) Public private partnership (PPP)

a. Definition:

Public private partnerships can take different forms, but ultimately transfer significant risk to the private sector over the life of the project. In its purest form, the private sector is responsible for designing, operating, maintaining and funding a project. An alternative models requires the

private sector to only design, operate and maintain the infrastructure while the public sector provides the funding.

b. SSA Examples:

Accra Waste PPP - the Ghana Ministry of Local Government and Rural Development signed a contract with a private sector company to enable waste management for Accra, requiring the company Armech to receive the waste collected in Accra, extract recyclable material, and then convert the waste to electricity through incineration.

South Africa's first grid connected biomass plant - a 25 MW biomass WtE Project reached financial close in April 2019 as part of the South African government's Renewable Energy Independent Power Producer Procurement (REIPPP) Programme. Eskom, South Africa's national power utility, will be the off-taker under a 20 year PPA. The REIPPP program set a biomass tariff ceiling which the project was able to use to achieve bankability.

A 275 kW biogas-to-power plant located in Ouagadougou, Burkina Faso was the first grid-connected biogas plant in West Africa. The plant was developed by Fasobiogaz SARL, a Dutch owned company that is supported by the Dutch government. It has the capacity to treat 40 tons of waste daily from the nearby municipal abattoir and a large brewery. The plant supplies electricity to the national utility (Sonabel) and generates heat that is used by neighbouring industries and produces organic fertilizer .

c. Other Example:

The **UK's Waste Infrastructure Delivery Programme (WIDP)** was Established by the Department for Environment, Food and Rural Affairs (Defra) in 2006. WIDP was intended to accelerate the delivery of residual waste treatment infrastructure such as energy-from-waste plants. This was imperative at the time to meet strict landfill diversion targets and to offer support to councils. Its focus was contracts delivered under the Public Finance Initiative (PFI), the UK's equivalent of a PPP, that makes use of design, build operate and finance principles. WIDP features about 24 local authority-led waste management projects (largely energy from waste schemes) which collectively received over £100 million in grant funding from Defra per year. The Department is making a total long-term investment of £2.9 billion into these projects.^{xxxvi}

5) Private owned & operated

a. Definition:

Private sector owns, funds and operates infrastructure that makes use of municipal waste as feedstock, reducing the need for landfilling

b. SSA Examples:

Kenya's Mr Green Africa (MGA) is a recycling company that partners with large corporates to develop innovative waste reduction solutions. MGA's core business is to turn recyclables into high-quality plastic pellets, suitable for direct feed into plastics injection moulding equipment to make new products. The pellets are then used by companies like Unilever to produce new packaging material. MGA developed the following initiatives:

- Together with TOTAL Kenya, MGA is setting up a consumer facing collection model housed at TOTAL petrol stations.
- Unilever supports MGA to build sustainable collection infrastructure and pioneer local circular economy initiatives.
- MGA implemented prototypes in low-income areas in Nairobi that allows consumers to return plastics to their local 'Duka' shop and to receive credits that can be spent at the 'Duka' shop.

The New Horizons Integrated Resource Recovery Centre (IRRC) which was substantially completed in Cape Town in 2017. It was developed through a joint venture between Waste Mart (a South African waste collector) and Clean Energy Africa and raised debt from South Africa's Industrial Development Corporation (IDC). Waste Mart had a guaranteed waste stream in place as it is contracted to collect municipal waste in the City of Cape Town. The facility was designed to produce Bio-CNG (for Compressed Natural Gas) for sale as gaseous fuel; liquid carbon dioxide; recyclable plastic, paper, metal and glass; Refuse Derived Fuel (RDF); and organic fertilizer. Gate fees and revenue from Bio-CNG sales were expected to account for 90% of the project's revenue. Whilst the project was proven to be technically sound, higher than expected CAPEX and poorly negotiated offtake agreements led to the lender stepping in to take the project over. The IDC is currently seeking a buyer for the project.^{xxxvii}

6) Private ICT platforms

c. Definition:

Technology platforms connect the producers of waste (households, businesses, etc.) with recyclers that collect waste from the producers, diverting the waste away from the LG's landfill. Recyclers pay producers for their waste and the applications normally disclose the per kg prices.

d. SSA Examples:

South Africa's Kudoti recycling platform connects buyers and sellers of recyclables. It uses a digital platform to streamline collection, sorting, processing and recycling of material streams across South Africa to reduce pollution and improve material recovery.^{xxxviii}

e. Other Example:

India-based Gain Waste offers an on-call waste collection service called Kabadiwala. The Kabadiwala is an online platform that allows households to sell waste such as newspapers, plastic, books, and metals. Pickup vehicles weigh and collect waste and pays household based on weight. The business has an annual turnover of \$1.2 million and raised more than \$400k of equity^{xxxix}

7) National EPR programs that are self-funded

a. Definition:

Nationally led extended producer responsibility (EPR) programs that make use of advance disposal fees, deposits/refunds, EPR taxes or government funds to divert waste from landfills.

b. SSA examples:

The **Recycling and Economic Development Initiative of South Africa (REDISA)** was set up in late 2012 to tackle scrap-tire collection and distribution to processors for the whole of South Africa. The objective of the REDISA plan was to remediate waste tyres and to develop the market for recycled tyre products. The integrated waste tyre management plan that underpinned REDISA was intended to create employment, as well as develop small, medium and micro-sized enterprises (SMMEs). REDISA appointed a management company, Kusaga Taka, to handle all operational aspects of the integrated waste tyre management plan. The scheme was put into liquidation in 2017 at the behest of the minister of environmental affairs based on the following audit findings:

- Inadequate governance and conflicts of interest;
- REDISA failed to meet any of its targets;
- Serious deviations from the approved REDISA Plan including the exporting of waste tyres;
- Misuse of public funds; and

- Non-alignment of the REDISA Plan to the new regulatory framework.

South Africa's Western Cape Industrial Symbiosis Programme (WISP) is a free facilitation service accessible to companies of all sizes that matches the supply and demand for secondary raw materials of manufacturing companies to divert waste from landfill. It is recognised as Africa's first industrial symbiosis programme, funded by government and delivered by GreenCape, a non-profit organisation. To date, the programme has diverted more than 104,900 tonnes of waste from landfills, while creating 218 economy-wide jobs, mainly in SMEs. The Western Cape Government Department of Economic Development & Tourism (DED&T) initiated and funded the programme in 2013. The City of Cape Town has been providing funding to the programme since 2016. In addition, the City provides non-financial strategic support.^{xi}

c. Other Examples:

Tunisia' Eco-Lef Program is partly financed by the private sector through an eco-tax of 5 percent on the net added value of certain locally manufactured or imported plastic polymers. Waste collectors receive remuneration based on the type and quantity of packaging collected which is subsidised by the eco-tax.

Palau's Beverage Container Recycling Program levies a US\$0.10 deposit fee on consumers for plastic, glass, and metal containers. Deposit fees are partly returned to consumers but also used to fund the program. The program began with a 6-month fundraising period to ensure operational sustainability during which beverage containers were taxed but the refund program was not yet in operation. This initial effort led to more than US\$659,000 in revenue and funded the initial phases of the refund program.

China established an **e-waste disposal fund** in 2012 as part of a larger EPR scheme that sought to promote the collection and disposal of e-waste. Producers and importers of electronic and electrical products are required to charge an advance disposal fee on each unit they produce or import². The fees are collected by the tax authority on behalf of an EPR fund which is housed within the Ministry of Finance. Certified recyclers who can provide the necessary proof of the e-waste they have recycled or disposed of receive subsidies from the fund. Some of the subsidies are used to buy waste from the informal sector that collects waste and sells it to the certified recyclers.^{xii}

8) National EPR programs funded by climate facilities

a. Definition:

EPR schemes that use grants from climate facilities to design and implement a nationally led EPR program.

b. SSA Examples:

The Rwanda Green Fund (FONERWA) funded a 15,000 t/annum e-waste facility which cost \$1.5 million to construct. The facility was constructed by Rwanda's Ministry of Trade and Industry who signed a 10-year lease agreement in 2018 with a Rwandan subsidiary of Dubai based Enviroserve to operate and expand the facility. Under the agreement, the ministry will receive \$2.6 million in lease payment allowing the government/FONERWA to recover its upfront investment. The private sector will be responsible for:

- Operating and managing the facility

² Excludes those products which are exported

- Developing e-waste collection points/centres around the country to ensure the proper collection and treatment of electrical and electronic waste.
- Expanding the e-waste facility by introducing new machinery and equipment
- Conducting regular public awareness campaigns.

South Africa's Waste Diversion Programme makes use of GCF grants and concessionary finance to achieve cost neutral waste diversion solutions for LGs. It unlocked \$1.5 million of project preparation funding from GCF and in design phase. The program was developed by South Africa's Department of Environmental Affairs in partnership with GIZ

Mozambique's circular economy waste project (NAMA) - In 2015 the Nordic Climate Facility (NCF) issued a EUR 500,000 grant to a Mozambican recycling company called 3R . The grant was used to develop a NAMA Facility application to promote waste recycling in Mozambique and to fund a pilot Material Recovery Facility. The goal of the national program is to develop 10 integrated waste infrastructure sites across Mozambique. The sites will combine material recovery, composting, and sanitary landfills, including methane recapture. The NAMA application, developed in partnership with the AFD, should unlock EUR18m in grant funding and is currently in its detailed project preparation phase. Co-financing will take the form of an Extended Producer Responsibility (EPR) tax on packaging. The EPR tax will require large-scale manufacturers to take increased financial responsibility for what happens to packaging like cardboard, PET bottles and aluminium cans, and will be based on production numbers. Over a five-year period, an estimated USD 20 million of tax will be earmarked to support the program.

In each approach to ISWM, success depends on having defined accountabilities that meet the financing requirements of public and private sectors. Key roles include:

- 1) Beneficiaries who justify the provision of support from the project given the scope of services they are expected to receive from the project
- 2) Project Owner who is accountable for the project and is accountable to providers of support (technical and finance).

Likewise, each approach has different requirements and financing implications, as summarized in the below table.

	Public owned & operated	Public owned & private sector operated	Utility	PPP	Private owned & operated	Private ICT platforms	National EPR programs that are self-funded	National EPR programs funded by climate facilities
Size of transaction required to raise finance	DFI funded programs where NG is borrower (e.g. Senegal) requires significant scale (>\$100m). DFIs such as EIB require minimum project size of EUR 25 million.		Could fund smaller investments off own balance sheet if credit worthy. DFIs such as EIB require minimum project size of EUR 25 million.	Project finance lenders will require larger transactions (> EUR25 million)	Could fund smaller investments off own balance sheet if credit worthy. DFIs such as EIB require minimum project size of EUR 25 million.	ICT platform development funded through equity. Collection services can be outsourced to minimise upfront investment.	Aggregates a number of interventions to achieve required transaction size (>EUR20 million)	
Type of Project Owner	LG or NG		Utility	SPV	Private sector company or SPV	Private sector company	NG in collaboration with LG	
Type of Funding	Grant issued by NG to LG Concessionary loan to NG		Commercial and concessionary loans, grants from NG	Commercial and concessionary loans, grants from NG/DFIs, equity	Commercial and concessionary loans, equity	Equity, commercial loans	Grants. DFIs may be able to lend against ringfenced EPR taxes and fees to fund upfront investment.	Grants and concessionary loans

5.0 How the Different Models can Address Barriers in SSA

The approaches above can be categorized into eight business models that have successfully raised finance for ISWM projects and programs in developing countries. The below table highlights the barriers that each model addresses and whether the model is likely to achieve scale in SSA.

Table 3: Illustrative Business Models

Business Model	Barriers Addressed	Opportunity for Scale in SSA
1) Public owned & operated <i>Example: Senegal's Municipal Solid Waste Management Project</i>	<ul style="list-style-type: none"> Can achieve scale through aggregation of interventions at several LGs, achieving a big enough ticket size for DFI funding NG is the borrower, avoiding the need for credit worthy LGs Capacity building support required as part of program to address capacity issues at LGs 	<ul style="list-style-type: none"> Limited opportunity as 100% reliant on DFI finance and NG's ability and willingness to take on debt
2) Public owned & private sector operated <i>Example: The City of Cape Town's Kraaifontein MRF</i>	<ul style="list-style-type: none"> The City of Cape Town used its own balance sheet to fund the MRF as the project would not have met minimum DFI transaction size requirements Investment by the CoCT de-risked the project for the private sector operator 	<ul style="list-style-type: none"> Limited opportunity in the absence of grant funding from NG as not many cities in SSA are credit worthy and able to raise their own funding
3) Commercial utility <i>Example: Pikitup (City of Johannesburg)</i>	<ul style="list-style-type: none"> A standalone entity or utility has more control over its budgets and is less at risk of political interference and budget cuts that undermine investment in new infrastructure A creditworthy utility can use its ringfenced revenues to borrow to fund infrastructure³ 	<ul style="list-style-type: none"> Limited opportunity unless NG/LG can implement cost reflective solid waste tariffs that will underpin a financially sustainable separate legal entity
4) PPP <i>Example: South Africa's first grid connected biomass plant (25 MW)</i>	<ul style="list-style-type: none"> South Africa's REIPPP was structured to allow the private sector a long enough period (i.e., 20 years) to recover their investment A market tested offtake agreement was used that was well understood by banks and that unlocked debt funding for the project The tariff ceiling offered to bidders supported a bankable project 	<ul style="list-style-type: none"> To achieve scale, a national program will need to be structured that makes use of realistic feed-in tariffs and a credit worthy off taker. In the absence of a credit worthy utility, a credit enhancement mechanism will be required.
5) Private owned & operated <i>Example: Mr Green Africa (MGA)</i>	<ul style="list-style-type: none"> Leverages private sector capital and partnerships to collect recyclables at source Through beneficiation of plastic waste MGA is able to produce new plastic products for use in Kenya, avoiding dependence on volatile export markets, while creating local jobs Makes use of innovative collection and payment systems that encourages voluntary separation at source 	<ul style="list-style-type: none"> Significant opportunity for scale as it makes use of private sector capital

³ While Pikitup has ring-fenced revenues, it is not mandated to borrow and is therefore reliant on the CoJ's ability to raise funding for new infrastructure.

Business Model	Barriers Addressed	Opportunity for Scale in SSA
6) Private ICT platforms <i>Example: Kudoti recycling platform</i>	<ul style="list-style-type: none"> Requires limited investment as producers of waste are matched with the buyers of waste Private sector provides funding and expertise while LGs benefits from avoided cost of landfilling and collection 	<ul style="list-style-type: none"> Significant opportunity for scale as it makes use of private sector capital
7) National EPR programs that are self-funded <i>Example: Tunisia' Eco-Lef Program)</i>	<ul style="list-style-type: none"> Tax mechanism ensures that program is self-funding while achieving savings for LGs Creates a stable market for recyclables thereby providing more revenue certainty to the informal waste collectors 	<ul style="list-style-type: none"> Significant opportunity as waste is assigned a value, encouraging separation at source and the collection of recyclables
8) National EPR programs funded by climate facilities <i>Example: Rwanda's e-waste facility</i>	<ul style="list-style-type: none"> Reduces investment risk for the private sector while benefiting from private expertise to build a market for recyclables Access low-cost financing via climate facilities 	<ul style="list-style-type: none"> Significant opportunity as waste is assigned a value, encouraging separation at source and the collection of recyclables

The relevance of the above eight models can be assessed through national scans that map the enabling environment and enabling factors at the LG and NG levels, including risk factors and ways to leverage current initiatives, programs, actors, financial models, and risk mitigation solutions.

6.0 Roles and Responsibilities

The implementation of the above five models requires a keen understanding of the roles and responsibilities of LGs, national government, utilities, and development partners for each model. These roles may need to be adjusted based on the specific context of the country and the findings of the national scan, as illustrated in the indicative table below.

Table 3: Indicative Roles of Key Actors

Models	Roles and Responsibilities
1) Public owned & operated	<ul style="list-style-type: none"> LG identifies ISWM needs and budgets and develops an integrated solid waste management plan to address needs LG uses ISWM plan to engage with NG and potential funders to secure transaction advisory support DFI supports feasibility work that concludes on pay-back period and affordability for the LG and NG and optimal contractual structures Capacity needs within LG to implement program are identified and capacity development program is designed DFI and NG agree on blended finance structure that may include national grants, a concessional loan, other grants, and guarantees. NG advances funding to LGs. Program terms are agreed by the NG, DFI and LG.
2) Public owned & private sector operated	<ul style="list-style-type: none"> Same as above LG procures service provider with support of DFI and NG LG monitors service provider
3) Commercial utility	<ul style="list-style-type: none"> Utility identifies ISWM needs and budgets and develops an integrated solid waste management plan to address needs

	<ul style="list-style-type: none"> • Utility uses ISWM plan to engage with potential funders to secure transaction advisory support • DFI supports feasibility work that concludes on pay-back period and affordability for the utility and optimal contractual structures • Capacity needs within utility to implement program are identified and capacity development program is designed • DFI and Utility agree on blended finance structure that may include national grants, a concessional loan, other grants, and guarantees • Program terms are agreed by the Utility and DFI
4) PPP	<ul style="list-style-type: none"> • NG, with support from DFIs, appoints an international transaction advisor (TA) team to develop PPP program and to conclude on structure, credit enhancement needs and tariff mechanism (e.g., feed-in or auction with capping) • NG undertakes stakeholder engagements with private sector, funders, LGs, informal waste sector etc. to get feedback on the proposed scheme • TA team revises program based on stakeholder engagements • NG develops standardised contracts that have been market tested with banks and developers to ensure that they are bankable • Private sector developers develop projects in anticipation of RFP and obtain letters of commitment from funders • NG issues RFP for private sector to respond to • NG and its transaction advisor team evaluates bids and award preferred bidder status • Private sector finalises projects and funding to reach financial close.
5) Private owned & operated	<ul style="list-style-type: none"> • Private sector led process that requires it to assess market opportunities, develop partnerships with producers of packaging waste and enter into supply agreements with producers who will buy the beneficiated waste. • Private sector develops cost effective collection system that assigns value to waste and makes use of localised drop off points. • Private sector leverages existing infrastructure (e.g., kiosks) to reduce cost
6) Private ICT platforms	<ul style="list-style-type: none"> • Private sector led process that requires it to assess market opportunities for the sale of recyclables and enter into offtake agreements with large recyclers who will buy the recyclables at pre-agreed prices • Private sector develops an ICT platform that allows households/businesses to sell their recyclables to a mobile recovery unit (or van) that collects the waste from their home • Private sector invests in mobile recovery units or subcontracts collection service
7) National EPR programs that are self-funded	<ul style="list-style-type: none"> • NG, with support from a DFI, appoints a TA team to develop an EPR program and to conclude on the most suitable funding mechanism (e.g., advance disposal fees, deposits/refunds, EPR taxes, etc.) • NG undertakes stakeholder engagements with private sector, LGs, informal waste sector etc. to get feedback on the proposed scheme. • TA team revises program based on stakeholder engagements • NG passes EPR legislation that specifies funding mechanism and enforcement measures • EPR office is established within the most suitable ministry to implement the scheme and to manage funds.
8) National EPR programs funded by climate facilities	<ul style="list-style-type: none"> • NG, with support from a DFI and consultants, develops a concept for an EPR program that is submitted to a climate facility • Climate facility makes funding available to develop the program • NG appoints a TA team to develop an EPR program and to conclude on the most suitable funding mechanism (e.g., advance disposal fees, deposits/refunds, EPR taxes, etc.). A blended finance mechanism is structured to fund infrastructure that will be owned by the public sector.

	<ul style="list-style-type: none"> • NG undertakes stakeholder engagements with private sector, LGs, informal waste sector etc. to get feedback on the proposed scheme. • TA team revises program based on stakeholder engagements • NG passes EPR legislation that specifies funding mechanism and enforcement measures • EPR office is established within the most suitable ministry to implement the scheme and to manage funds.
--	---

7.0 Potential Sources of Support for a National ISWM Programme

The design of an integrated solid waste management program needs to be customized based on the specific country. The assessment of the country context will require desk research and interviews. The below table lists key success factors for designing and implementing a scaled integrated solid waste management Program for several LGs or on a national basis, breaking out potential sources that could serve as building blocks.

Table 4: Potential Building Blocks for a Scaled ISWM Programme

Key Success Factors for ISWM	Potential Sources to Leverage & Examples (for desk research and interviews)
<p>1) Existing National Waste Infrastructure and Ecosystem?</p> <p>-Status of ISWM in country including demand, key players (public and private)</p> <p>-Types of waste</p> <p>-History of development to date</p> <p>-Perceived benefits (e.g., health, operational savings, job creation, promotion of a circular economy, revenue from the sale of recyclables, biogas, etc.)</p>	<ul style="list-style-type: none"> • Studies of waste ecosystem in country, circular economy studies national development plan, regional harmonization efforts (e.g., regional e-waste regulations) • Scan of stakeholders: LGs, utilities, NGOs (regulatory commissions, standard agencies, ministries of local governments/decentralization/urban planning, energy, finance, NDBs, etc.), providers of ISWM equipment and services • Role of development partners (local, regional, and international) • Business associations • National business associations and experts • Regional Business Associations: Technical support programmes of development partners, relationship to regional programmes (e.g., regional circular economy programs)
<p>2) Status of national legal, regulatory, policy frameworks for LGs, utilities, private companies, consumers?</p> <p>-Any regulations that incentivize ISWM and the circular economy (LGs, utilities, banks, pension funds, stock market, etc.)</p> <p>-Any adoption of waste management standards?</p> <p>-Ability to leverage country development plans (National, Agenda 2030, NDC, SDG)? For example, targets or specific projects in national development plan and/or budgets?</p>	<ul style="list-style-type: none"> • Studies of waste in country, national development plan, regional harmonization efforts • Input of stakeholders: LGs, utilities, NGOs (climate funds, regulatory commissions, standard agencies, Ministries of local governments, NDBs, etc.), providers of ISWM equipment and services • Business associations • Support from development partners in enabling environment, policies, regulations, standards, procurement, PPPs, SME development, etc.

<p>3) Demand for scaled integrated solid waste management, Incentives, and Benefits</p> <p>-Current public discussions on waste services?</p> <p>-Potential for champions to sell internally and recruit other cities? (LG/utility support from senior technical staff in larger cities can help recruit smaller cities)</p> <p>-Level of demand from LGs, utilities, business, experts, civil society, NGOs?</p> <p>-Key incentives for key players (LGs, utilities, NG?)</p> <p>-Scope of expected savings (CAPEX, O&M, etc)?</p> <p>-Job creation, gender equity, etc</p>	<ul style="list-style-type: none"> • Existing waste providers: LGs, utilities, national agency, private sector companies, etc. • Business Associations • National waste associations and experts • Technical support programs of development partners • Regional waste associations: Technical support programs of development partners, EACREEE, SACREEE, etc.
<p>4) Other key factors driving business model (required for scaling up!)</p>	
<p>4a) Potential sources of funding support from LG, utility, national government, development partners, private sector</p>	<ul style="list-style-type: none"> • LG: Contributions from own source revenues, land value capture, new charges on earmarked taxes, etc. • Intermediary and National government: Ministries, Climate Funds, Development Banks (national, subnational), programs, budgets • Private sector: Equity, debt, off-take agreements, etc. from international companies, local companies, banks, funds, etc
<p>4b) Other sources of grant funding and technical support</p> <p>-Development of program & procurement process</p> <p>-Reduction of CAPEX cost? OPEX cost?</p> <p>-Possible blended finance and credit enhancement structures that unlock private funding?</p>	<ul style="list-style-type: none"> • National links to sources: Designated Authorities for Global Funds (e.g., Green Climate Fund, GEF, etc.), Banks with on-lending from development partners, government agencies working with development partners on EE interventions • Private sector associations with links to development partners and ISWM interventions • Regional development banks (e.g., DBSA, TDB, AFC, etc.). • International: Development partners with programs committed to ISWM and technical advisory such as IFC, WB Global Infrastructure Fund, GCF, GEF, CIP, etc. • Bi-lateral development partners: COM SSA partners (AFD, CICLIA Project Preparation Facility, Team Europe, EIB); Australia, Canada, China, Denmark, Japan, The Netherlands, Sweden, USA; others include Nordic Development Fund, SECO, FMO, etc. • City support vehicles: City Climate Finance Fund
<p>4c) Sources of concessional finance (debt, equity)</p>	<ul style="list-style-type: none"> • DFI: National and subnational development banks, AfDB, World Bank, IFC, EIB, African Regional Banks (AFC, TDB, West Africa, etc.) • Climate funds: National, Subnational, GCF, GEF, etc. • Commercial Banks using on-lending facilities • Microfinance Institutions • Specialized on-lending programs: AFD, IFC, other • International: WBG (IFC), City Finance Gap Fund, EIB, European Investment Plan, Team Europe, KfW, FMO, USAID, etc. • Funds: Nordic Development Fund, Emerging Africa Infrastructure Fund, international funds

	<ul style="list-style-type: none"> • Impact Funds & Foundations: Rockefeller Foundation, Shell Foundation, Ellen McArthur Institute, Coca Cola Foundation, African foundations, etc.
4d) Sources of guarantees and credit enhancements	<ul style="list-style-type: none"> • Creditworthy cities • National governments & development partners • Providers of Guarantees & Credit Enhancements (EIB, External Investment Plan, AfDB, ATI, Africa Export-Import Bank, GuarantCo, WBG (IDA, MIGA, IFC), SIDA, USAID, KfW, etc.)
4e) Proofs of concept to leverage -Examples of success stories & failures -Best practices, lessons learned, case studies	<ul style="list-style-type: none"> • Resource Center (PPPLRC), a website that provides sample legal materials that can assist in the planning, design and legal structuring of infrastructure projects, has recently launched a sub-national section. One part of this section focuses on a Municipal Solid Waste and Waste Management PPP. Building on best practice cases, the new resource gives access to a variety of standardized and sample contracts and bidding documents, as well as laws and policies that are used worldwide to implement successful PPP arrangements for the delivery of small and large scale ISWM projects.

8.0 Next Steps: The Development and Finance of SSA National Solid Waste Programs

This document is intended to give an overview of the solid waste management sector. In order to successfully develop and finance specific waste projects, three steps are needed:

- 1) **National Scan:** To assess the enabling environment and the optimal scaling up business model for ISWM programs for a SSA country, a national scan can be implemented to assess the potential to create aggregated demand and to engage the required technical and funding support. Each national scan needs to identify which of the national, regional, and international entities are most relevant, documenting contact details within each entity that can participate in consultations.
- 2) **National Agenda:** Consultations and approvals will be required before developing an ISWM program.
- 3) **Bankable Projects:** After approvals are secured from decisionmakers and stakeholders, one or more investable ISWM projects and/or programmes can be developed and financed.

For more information, please contact GlobalDF at feedback@globalclearinghouse.org or use the Contact form on the website www.globaldf.org.

ENDNOTES

-
- ⁱ <https://comssa.org/new-study-finance-roadmaps-for-climate-projects/>
- ⁱⁱ [https://www.europarl.europa.eu/news/en/headlines/economy/20151201STO05603/circular-economy-definition-importance-and-benefits#:~:text=Moving%20towards%20a%20more%20circular,creating%20jobs%20\(700%2C000%20jobs%20in](https://www.europarl.europa.eu/news/en/headlines/economy/20151201STO05603/circular-economy-definition-importance-and-benefits#:~:text=Moving%20towards%20a%20more%20circular,creating%20jobs%20(700%2C000%20jobs%20in)
- ⁱⁱⁱ WB What a Waste 2.0, 2018
- ^{iv} WB What a Waste 2.0, 2018
- ^v WB What a Waste 2.0, 2018
- ^{vi} Based on author's experience in South Africa
- ^{vii} Based on authors experience in South Africa
- ^{viii} Gopa SWM study for Kenya
- ^{ix} <https://cdkn.org/wp-content/uploads/2017/07/Up-LED-street-lighting-in-India-1.pdf>
- ^x https://pacecircular.org/sites/default/files/2021-04/WEF_Five_Big_Bets_for_the_Circular_Economy_in_Africa_2021.pdf
- ^{xi} https://pacecircular.org/sites/default/files/2021-04/WEF_Five_Big_Bets_for_the_Circular_Economy_in_Africa_2021.pdf
- ^{xii} World Bank, "What a Waste 2.0," 2018
- ^{xiii} <https://www.repository.cam.ac.uk/handle/1810/261957>
- ^{xiv} Accelerating the transition to a circular economy in Africa
- ^{xv} HFS Study, 2019, titled Inception Study for the "Transforming Traditional Waste Material Flows in Urban and Peri-Urban Areas of Kenya" Project
- ^{xvi} <https://www.nordicclimatefacility.com/news/mozambique-transforming-its-waste-management-sector-backed-by-catalytic-funding-from-ncf>
- ^{xvii} <https://www.jstor.org/stable/pdf/resrep00770.pdf?refreqid=excelsior%3A65ea3928767c6dc9538cd6f90bf2a47e>
- ^{xviii} HFS Study, 2019, titled Inception Study for the "Transforming Traditional Waste Material Flows in Urban and Peri-Urban Areas of Kenya" Project
- ^{xix} https://pacecircular.org/sites/default/files/2021-04/WEF_Five_Big_Bets_for_the_Circular_Economy_in_Africa_2021.pdf
- ^{xx} https://pacecircular.org/sites/default/files/2021-04/WEF_Five_Big_Bets_for_the_Circular_Economy_in_Africa_2021.pdf
- ^{xxi} https://pacecircular.org/sites/default/files/2021-04/WEF_Five_Big_Bets_for_the_Circular_Economy_in_Africa_2021.pdf
- ^{xxii} https://pacecircular.org/sites/default/files/2021-04/WEF_Five_Big_Bets_for_the_Circular_Economy_in_Africa_2021.pdf
- ^{xxiii} https://pacecircular.org/sites/default/files/2021-04/WEF_Five_Big_Bets_for_the_Circular_Economy_in_Africa_2021.pdf
- ^{xxiv} https://www.naesco.org/data/industryreports/2020_11%20New%20Perspective%20Publication_korr6.pdf
- ^{xxv} Refined from https://www.naesco.org/data/industryreports/2020_11%20New%20Perspective%20Publication_korr6.pdf
- ^{xxvi} <https://www.thegef.org/project/public-lighting-energy-efficiency-program-public-lighting-replacement-low-efficiency-vsap>
- <https://www.greenclimate.fund/sites/default/files/document/funding-proposal-fp065-world-bank-brazil.pdf>
- <https://www.greenclimate.fund/sites/default/files/document/funding-proposal-fp065-world-bank-brazil.pdf>
- ^{xxvii} <https://www.thegef.org/project/public-lighting-energy-efficiency-program-public-lighting-replacement-low-efficiency-vsap>

-
- xxviii <https://www.thegef.org/project/public-lighting-energy-efficiency-program-public-lighting-replacement-low-efficiency-vsap>
- xxix Extracted from CoMSSA Financing Roadmaps
- xxx CoMSSA financing roadmap study
- xxxi National Sustainable Waste Management Policy, 2019
- xxxii <https://unfccc.int/climate-action/momentum-for-change/activity-database/sampurnearth>
- xxxiii <https://unfccc.int/climate-action/momentum-for-change/activity-database/sampurnearth>
- xxxiv Collection of Municipal Solid Waste in Developing Countries, UNH
- xxxv Pickup 2019 Annual Report
- xxxvi <https://larac.org.uk/news/waste-infrastructure-delivery-programme-moving-new-phase>
- xxxvii Extracted from CoMSSA Financing Roadmaps
- xxxviii <https://kudoti.com/>
- xxxix <https://www.berojgarengineers.com/the-kabadiwala-case-study-funding-business-model-revenue-model-investors-competitor/>
- xl https://www.ellenmacarthurfoundation.org/assets/downloads/Africa%E2%80%99s-first-industrial-symbiosis-programme_Case_Study.pdf
- xli <https://www.oecd.org/environment/waste/China%20case%20study%20final.pdf>