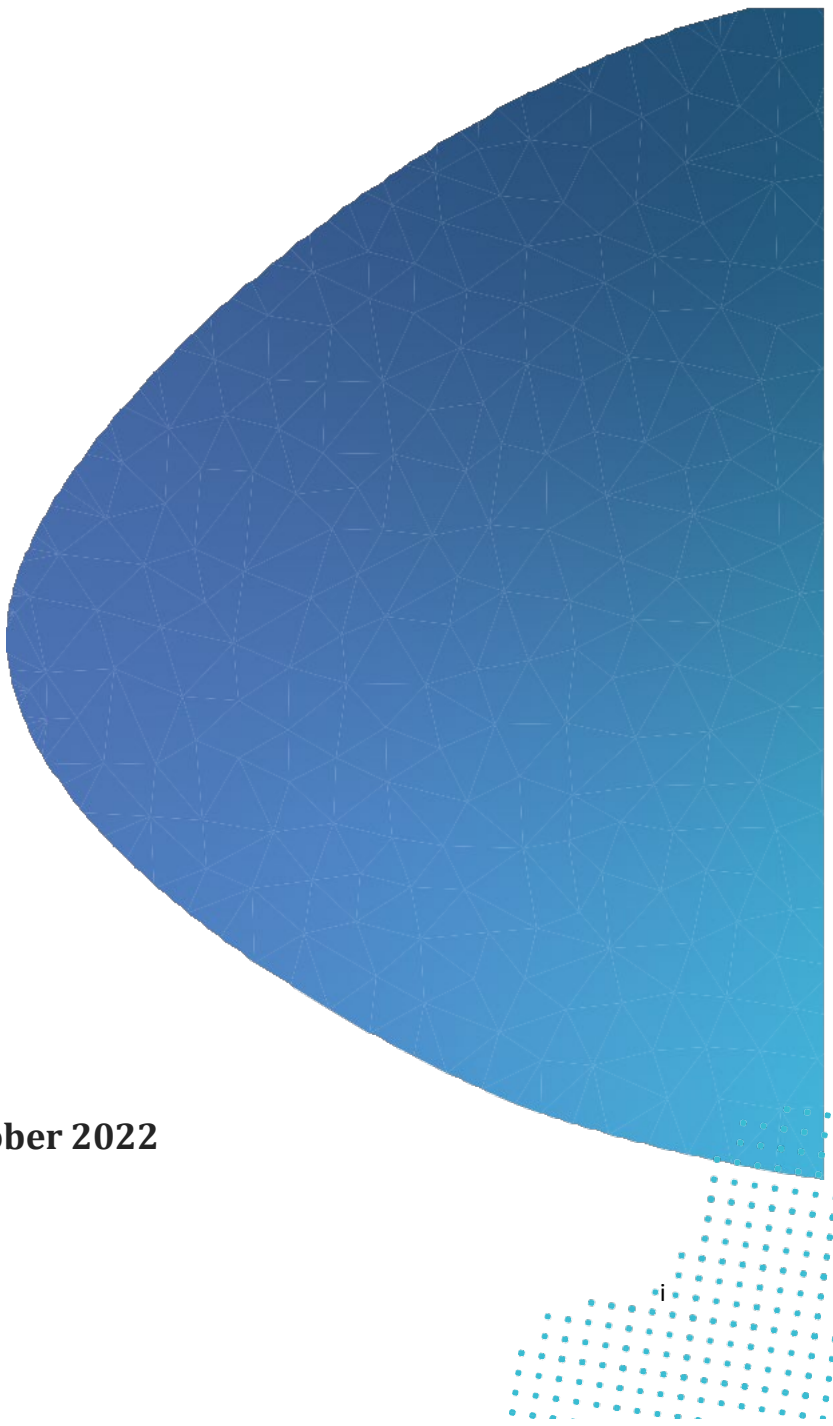


# Investment climate assessment for circular bioeconomy – Review of national policies and strategies in Kenya

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## Summary

This study assessed the investment climate for circular bioeconomy in Kenya by reviewing the national policies, strategies and regulations, financing mechanisms, infrastructure and business environment. The study identified key gaps in these areas affecting waste management and entrepreneurship development in the circular bioeconomy sector. There are key developments at the policy level and some developments in entrepreneur promotion in resource recovery from different waste streams. The specific focus of the policies, strategies and regulations in the waste sector, lack of coordination of the relevant sectors in waste management, weak horizontal communication between sectors and implementation and compliance problems are main gaps in promoting circular bioeconomy. Absence of drastic changes in actual behaviour such as waste separation at source and lack of incentives in entrepreneurial development are also critical challenges. While addressing these gaps, the progresses identified need to be further scaled out to make waste management and circular bioeconomy in Kenya sustainable. Establishment of multiple stakeholder platforms involving key actors in the sector and enhancing awareness is important in promoting resource recovery and reuse. Promotion of incubator centres to enhance local capacity and foster uptake of resource recovery and reuse businesses is critical.

## 1. Introduction

The circular economy (CE) concept has gained momentum both among scholars and practitioners (Kirchherr et al. 2017; Arruda et al. 2021; Meseguer-Sánchez et al. 2021). Updated definition of CE is one that has low environmental impacts and that makes good use of natural resources, through high resource efficiency and waste prevention, especially in the manufacturing sector, and minimal end-of-life disposal of materials (Ekins et al. 2019, p. 14). CE is a paradigm with environmental, economic and social implications, both for the productive system and for consumers (Meseguer-Sánchez et al. 2021). CE operates at the micro, meso and macro level (Ghisellini et al. 2016), with the aim to simultaneously create environmental quality, economic prosperity and social equity, to the benefit of current and future generations. CE necessitates a systemic shift (Geissdoerfer et al. 2017), and it is linked to sustainable development (Kirchherr et al. 2017), entailing slow depletion of scarce natural resources, reduce environmental damage from extraction and processing of virgin materials, and reduce pollution from the processing, use and end-of-life of materials. CE aims to make the productive process more efficient, reducing, reusing and recycling the results of the productive process as much as possible (Morales et al. 2021).

Morales et al. (2021) reported that circular strategies generate the greatest synergies by preserving materials through recycling, downcycling, and the measurement of indicators or reference scenarios, indicating the synergy between CE strategies and certain Sustainable Development Goals (SDGs). The concept has gained traction with policy makers, influencing governments and intergovernmental agencies at the local, regional, national, and international level. The dominant scholarly and policy debates on the CE-based transition so far have largely focused on the technological and industrial aspects, such as business model innovation and process engineering (Khitous et al. 2020; Murray et al. 2017). The success of the CE model largely depends on the relational dynamics that underlie industrial, regional, and national development (Henrysson and Nuur, 2021). Along with the lack of knowledge of institutional determinants as both enabling and hindering factors of regional transformation, the CE in the context of, for example, natural resource-based regions remain understudied.

CE in Kenya is still in a nascent stage, more needs to be done to ensure policy priorities are budgeted and appropriated for the economy to fully go circular. Companies need to get ready for a circular economy approach and look at all aspects of their business and value chain (The Royal Netherlands, 2021). CE practices already occur in certain businesses and contexts.

Examining both drivers and barriers to CE provides a useful platform from which to propose measures to enhance CE, by removing barriers and sharpening or enhancing drivers (Barriers to and drivers of a circular economy (Nicholas Hughes, Lorenzo Lotti, 2019).

The main objective of this study is assessment of investment climate (IC) by reviewing the national policies, strategies and regulations, financing mechanisms, and infrastructure and business environment in Kenya. Moreover, the study will identify main gaps in these areas affecting waste management, in general, and entrepreneur development in resource recovery and reuse in particular. The structure of the report is as follows. A background on concept of CE is laid down in section one followed by an overview of waste generation, waste management and circular bioeconomy in Kenya in section two. Section three describes the typology of public intervention, followed by methods and approaches of the review and followed by results, including legislative and economic basis of CE, waste management policies and strategies, waste management regulations, the institutional landscape, support in scientific research and awareness creation, fiscal incentives, business support services and gender equity followed by discussion in section five. The final part draws conclusion and policy implications.

## **2. Overview of circular bioeconomy in Kenya**

Increase in population, urbanization, and change of consumption patterns will continuously increase the waste generation and put a challenge in the waste disposal and management in Kenya (GoK, 2015; GoK, 2021b). Recent data indicates that Kenya generates an estimated 22,000 tons of waste per day, an average of per capita waste generation of 0.5 kilogrammes, translating to 8 million tonnes annually (GoK, 2021a). The same source indicates that about 40% of the waste is generated in urban areas. And by 2030, 34.8% (about 10 million) of the total population of Kenya will reside in the urban centres generating about 5.5 million tonnes of waste every year, which is three times more the amount of waste generated in 2009 (GoK, 2021a). The largest five cities (Nairobi, Mombasa, Kisumu, Nakuru and Eldoret), accounting for a third of the urban population, will produce 2400, 2000, 1000, and 500 tonnes of solid waste daily respectively in 2030 (GoK, 2021a).

The composition of waste stream varies considerably between households, businesses and industries. It also varies between urban and rural settings (GoK, 2015, p. 24). In Thika Municipality, for example, about sixty eight percent of the waste consisted primarily of four components: paper, plastic, organics and food (Ephantus et al. 2015). Less than 40 per cent

of the solid waste generated is collected by private sector waste collection companies from households and businesses and disposed of at designated open dumpsites or at various illegal dumpsites. The official dumpsite and even more so the illegal ones operate in an unsystematic, unplanned and highly unsanitary way (GoK, 2016a). Waste collection in low income and informal settlements is mainly done by organized groups and CBOs. Waste is largely collected by the county governments while private operators dominate collection in residential areas at a fee. Waste collectors obtain permits from the county governments to collect waste from designated areas. However, all counties in Kenya currently have uncontrolled waste dumpsites where leachate pollute waterways and underground aquifers, and where burning waste emit toxic air and noxious fumes that contaminate the air (GoK, 2021a).

Available data also indicates that very few households segregate waste at the household level (GoK, 2015), there is minimal waste segregation at source within the CBD areas, industries, institutions in most towns or cities although recovery of recyclable items like plastics, papers, glass and metals is done by increasing number of informal groups. While 95 per cent of Nairobi's waste is potentially reusable, only 5 per cent is actually recycled and composted. The key problems are, not only all waste is not collected, but also the disposal sites are inadequate, or waste is contaminated with hazardous materials, with serious impacts on human health, posing serious challenges to the national and county governments (GoK, 2016a). As national waste management regulation (GoK, 2006, p. 8) indicates that high generation of solid waste, comprising solid waste, industrial waste, hazardous, pesticides and toxics, biomedical waste, radioactive substances and wastewater effluents has not been matched by the provision of adequate infrastructure for the segregation, regular waste collection and adequate treatment and disposal of the waste.

Waste valorisation, any activity aimed at converting waste, including materials, chemicals and sources of energy, into useful products is also recommended (GoK, 2021b). Composting and recycling, besides reducing the amount of waste can reduce costs for waste collection significantly by reduced disposal fees, reduced land use for dumpsites and distances to often far-away dumpsites. Second, selling recyclable materials to recycling industries generates additional revenues in the waste management value chain. Only 10 per cent of potentially recyclable materials are currently recovered for recycling (GoK, 2016a). Several industries exist that receive recovered materials such as paper, polythene, plastics, glass, scrap metals, used oil, e-waste and waste tyres for recycling (GoK, 2016a). Recovery of recyclable waste is done by "junk shops" and waste pickers from mixed waste, having high contamination.



Recycling industries do incur high cleaning costs, making the recycling of most materials economically unattractive.

Organic waste, which constitutes 69 per cent of Nairobi's waste, can be converted into various reuse products. There exist large underserved markets in Kenya for these waste-to-value products (GoK, 2016a). In Thika Municipality, food waste had the highest recovery rate which is used as animal feed followed by plastic (soft plastic). The market for compost has enormous potential in Kenya (GoK, 2013; 2021a). Moreover, waste in this dumpsite can be exploited by converting it to energy (Ephantus et al. 2015).

Several policy instruments are widely used such as the fiscal framework concerning the lifecycle of materials in the economy, with a substantial focus on reducing waste disposal and pollution. These instruments include landfill taxes, often in combination with landfill bans (OECD, 2016), incineration taxes, disposal fees, deposit-refund systems, taxes on the extraction or use of virgin materials, etc (Drummond and Lotti, 2019). In Kenya, waste minimization programme or waste reduction programme are implemented through deposit-refund or take-back schemes (GoK, 2021b).

There are fiscal policies, as outlined in section 4.2, targeted to households, producers and waste recovery entrepreneurs in Kenya and their effectiveness requires further examination. Governments and regulators are also currently reviewing their policies in light of insights from behavioural economics, which may suggest changes in policy design. For instance, if consumers do not fully rationally react to price changes because of inertia, status-quo bias, limited attention, and inconsistent time discounting, then command and control (default) options may be more effective in promoting pro-CE behaviour than price instruments (OECD, 2017; Drummond and Lotti, 2019).

Green public procurement (GPP) policies are another widely recommended effective policy tool for providing a market for products and services with high environmental performance (Cheng et al., 2018). This area requires revisiting in Kenya as waste entrepreneurs complain of absence of market for their recycled product. Public support for research, development, and demonstration (RD&D) of new technologies, practices and business models for a CE, and promoting their diffusion through financial, technical and training support (Prendeveille et al., 2018) is important. Moreover, in the increasingly interconnected global economy,

establishing circularity at the rate and to the degree required, will involve substantial international co-operation in data and knowledge gathering and sharing, investment and policy co-ordination (Geng et al. 2019). Finally, environmental labelling and information schemes, widely practiced in Kenya, are important policy instrument for waste management.

### **3. Methodological approach**

This study was based on review of literature, both peer reviewed and grey literature, from the national and global literature and existing policies/strategies for CE in Kenya. The selection followed a mix of approaches, i.e., systematic, bibliometric analysis and snowballing techniques. The search was done from ScienceDirect, SCOPUS, and Google search. Grey literature was retrieved through searches conducted in the databases of Ministry of Environment and Natural Resources, Ministry of Environment and Forestry, United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP), etc. The search terms are CE, policy, strategies and regulation on solid waste management (SWM) in Kenya, green economy strategy and its action plan, finance and circularity, business model in CE, etc. Finally, the collected data was analysed and the results from the review on policies and strategies was complemented by stakeholder consultations, undertaking IC workshop to share the report to stakeholders and get their feedback, held on 6 December 2022.

## **4. Results**

### **4.1 Policy and regulatory framework for circular economy sector**

Building a CE is a complex, multifaceted challenge, need to be addressed by appropriate policy mixes (Wilts & O'Brien, 2019). An enabling environment consists of ingredient at all levels necessary to encourage entrepreneurship, including macroeconomic and political stability, traditions and culture, physical infrastructure, availability of capital, and human resources. Institutional, policy and regulatory factors also play an important role which are grouped under IC (Gebrezgabher et al. 2019a).

The government of Kenya (GoK), through its Ministries, local government (counties), as well as multilateral agencies, has developed legal and policy frameworks and initiating meaningful partnerships between government agencies and the private sector, to ensure a smooth transition from a linear economy (Gebrezgabher et al. 2019a). Thus, Kenya is on a path to strategically integrating circularity in key sectors that will result in the development of new businesses active in redesigning, recycling and waste management. This will be the focus of this report, which documents changes in IC and incentives for business models on rural (agricultural) and peri-urban waste and its determinants.

#### *4.1.1 Legislative and economic basis of CE*

The constitution of the country (article 42) lays the basis for CE stating that “every person has the right to a clean and healthy environment, and have the environment protected for the benefit of present and future generations” (GoK, 2010, p: 15). This provision authorized the parliament to enact appropriate legislations relating to the environment. The government has laid a solid foundation for economic development in its *Kenya Vision 2030*, the country’s development blueprint covering the period 2008 to 2030, implemented through a series of five-year development plans. The policy document, in its social pillar, states that addressing sanitation and waste management is critical for economic development (GoK, 2012, p. 37). This was complemented in 2017 by the so-called Big Four: universal health care, affordable housing, food security and manufacturing jobs. Kenya’s Vision 2030 sought to relocate Dandora dumpsite as well as develop flagship sustainable waste management systems in Nairobi, Kisumu, Eldoret, Nakuru, Thika, and Mombasa by the year 2030 (GoK, 2021a).

*National Sustainable Waste Management Bill 2021* ( GOK, 2021b, pp. 6-7), establishes the legal and institutional framework for the sustainable management of waste, promote and ensure the effective delivery of waste services, create an enabling environment for employment in the green economy in waste management, recycling and recovery, establish an environmentally sound infrastructure and system for sustainable waste management, mainstream resource efficiency principles in sustainable consumption and production practices and inculcate responsible public behaviour on waste and environment. The specific policies and strategies will be outlined below.

#### 4.1.2 Sustainable waste management policies and strategies

*The Environmental Management Coordination Act (EMCA)* provides an appropriate legal and institutional framework for the management of the environment in Kenya (GoK, 1999, p. 11). EMCA has established the National Environment Council (alternatively National Waste Council) responsible for policy formulation and directions, set national goals and objectives and determine policies and priorities for the protection of the environment, promote co-operation among public departments, local authorities, private sector, non-governmental and other organizations engaged in environmental protection programs (GoK, 1999, pp. 18-19). This act also led the establishment of national and county implementation institutions like National Environment Management Authority (NEMA), defining its role as being responsible, beyond coordination and implementation of regular activities, for granting environmental impact assessment license, undertaking environmental audit and monitoring, and environmental restoration orders and conservation orders.

The *Environmental Management Policy* of the country (GoK, 2013, PP. 14-15), which aims to ensure that policies are reviewed and formulated to meet the aspirations of the Constitution and emerging issues in the management of the environment. The policy demands that environment is integrated in all government policies to facilitate and realize sustainable development at all levels, such as help promote green economy, enhance social inclusion, improve human welfare, and create opportunities for employment and maintenance of a healthy ecosystem. It strives to strengthen the legal and institutional framework for good governance, effective coordination and management of the environment and natural resources. The specific objectives of this policy are i) develop an integrated national waste management strategy, ii) promote the use of economic incentives to manage waste, and iii) promote establishment of facilities and incentives for cleaner production, waste recovery, recycling and re-use (GoK, 2013, p. 51). This strategy paper requires that any investment submits a report, incorporating but not limited to, the products, by-products and waste generated; and environmental audit and monitoring, an indication of the various materials, including non-manufactured materials, the final products, and by products, and waste generated (GoK 2013, p. 15).

This strategy also states minimum requirements for SWM for the counties (GoK, 2013), which includes waste collection, waste transport, waste disposal site, and requirement for licensing. Although a lot remains to be done (see GoK 2013, p. 20), there are some cases where governments have privatized waste transportation through Private-Public-Partnership arrangements.

The policy framework for green economy (GE), as laid down in the *Green Economy Strategy and Implementation Plan (GESIP) 2016 – 2030* (GoK, 2016b), which is geared towards promoting globally competitive low-carbon growth pathway by promoting resilient and efficient sustainable management of natural resources, sustainable development of infrastructure and promoting social inclusion. Five thematic areas, namely, sustainable infrastructure development, building resilience, sustainable natural resources management, resource efficiency and social inclusion and sustainable livelihoods are identified in the GESIP (GoK, 2016b, p. 13).

Equity and social inclusion, resource efficiency, Polluter-Pays-Principle, precautionary principle, good governance, and public participation are principles identified to boost sustainable production and consumption in GESIP. This strategy is meant to contribute to the Paris agreement and attainment of Sustainable Development Goals (GoK, 2016b). GESIP (GoK, 2016b), in view of increasing resource efficiency, seeks to manage waste as a resource, include promoting efficient and cleaner production, eliminates land fill for recyclable waste, build infrastructure and technical capacity for waste prevention, segregation and recycling and industrial symbiosis, and develop functional markets for secondary raw materials and recycled products and develop and implement legislation for sustainable management of emerging waste streams like e-waste and plastics.

In the *National Climate Change Action Plan (NCCAP) (2018-2022)* (GoK, 2018), Priority No. 5 on Health, Sanitation and Human Settlement, calls for circular waste management 'to substantially reduce waste generation through prevention, reduction, recycling and reuse with the goal to reduce GHG emissions through adoption of circular approaches to waste management and engineered landfills. The government also commits to develop Five County-based waste management plans and regulations that are consistent with National Waste Management Strategy and other relevant policies.

National Sustainable Waste Management Policy (GoK, 2021a), which is aimed to more sustainable and circular, green economy, lays the framework for improved solid waste management including plastics to ensure that waste is collected, separated at the source, reused and recycled, and that the remaining waste stream is destined to a secure, sanitary landfill. The policy encourages establishment of collaborative ways for major counties in Kenya to act systematically, and achieve the overarching goal, which is zero waste (GoK, 2021a). This policy will build long-term resilience, while generating new business and economic opportunities and providing broad environmental and social benefits. This policy

needs, however, to be accompanied with regulatory frameworks and incentives, which is reported in the subsequent sections.

The policy stipulates that waste recovery and recycling can create new jobs and attract new investment in a diversified waste sector. The policy suggests adoption of a waste hierarchy (see Figure 1) that includes reducing or preventing waste generation at the source and reuse of materials, effective and affordable waste collection in all neighbourhoods, where waste is to be separated at source ensuring that recyclable materials are not contaminated by or mixed with waste (GoK, 2021a). Moreover, policy also supports the creation of the planning, finance, technical and governance capacities (GoK, 2021a).

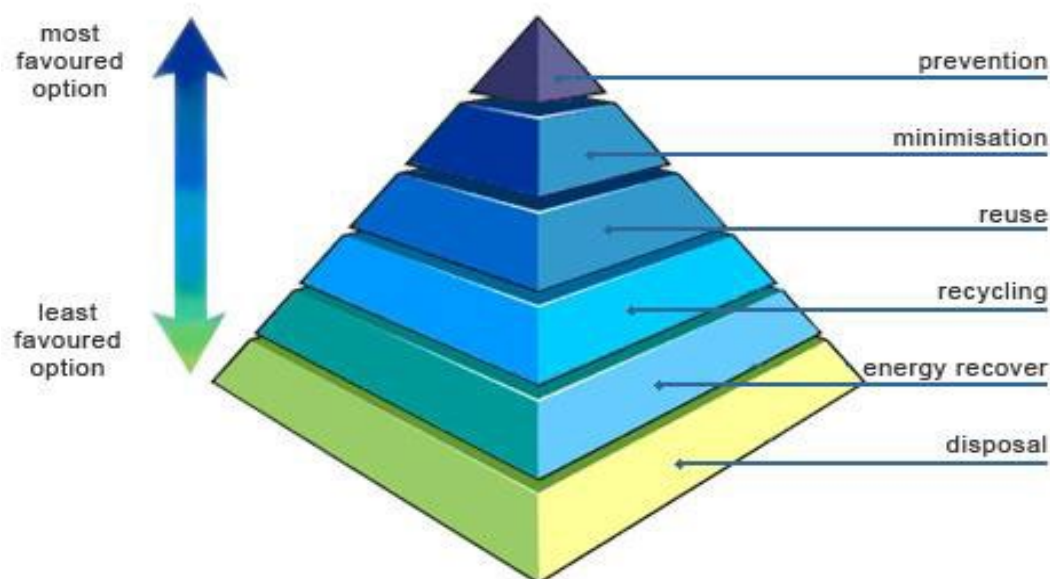


Figure 1: The solid waste management hierarchy (GOK, 2015)

The hierarchy adopted in solid waste management is an integrated approach to protecting and conserving the environment through implementation of various approaches of sustainable waste management: waste reduction, reuse, recycling, resource recovery, incineration, and landfilling (GoK, 2015, p. 33).

The National Solid Waste Management (SWM) Strategy (GoK, 2015), formulated with an aim of achieving sustainable solid waste management with Zero Waste, lays the framework for

long-term goal to achieve approximately 80% waste recovery (recycling, composting and waste to energy) and 20% landfilling in a Sanitary landfill by 2030. SWM strategy indicates that improper management of waste poses a threat to climate change and eventually in the achievement of sustainable development. Sound environmental management entails use of waste reduction technologies in production, sustainable product design, resource efficiency and waste prevention, re-using products where possible, i.e. recovering value from products (GoK, 2015). SWM strategy highly recommends thermal treatment of waste as it leads to the generation of useful products besides waste treatment (GoK, 2015, p. 39).

The E-waste recovery and recycling bill (2020), Kenya National Energy & Conservation Strategy (2020) Nationally Appropriate Mitigation Actions (NAMAs) on Circular Economy Solid Waste Management Approach for Urban Areas in Kenya (2016), Bio-energy Strategy 2020-2027 (2020), The ban on single-use plastic carrier bags (2017) and Ban on the use of single-use plastics in natural areas (2020) are also other relevant strategies for CE in Kenya, however, these strategies were not considered in this study.

#### *4.1.3 Waste management regulation*

The Sustainable Waste Management Regulation (SWMR) (GoK, 2006) provides guidelines, procedures and standards for the environmental governance to ensure compliance. It provides guidelines for licensing, monitoring and enforcement of waste management. Moreover, the regulation provides licensing procedure, fees, offences and penalties as well as operational guidelines.

SWMR provides a framework for sustainable management of waste that include transportation, recycling, and recovery up until disposal of waste. It provides mechanisms for managing solid waste including 'promotion of cleaner production technologies, segregation at sources, recycling and reuse' (GoK, 2006, p. 5). This regulation defines responsibility of the generator to collect, segregate and dispose or cause to be disposed off waste, etc support the application of cleaner production technologies in relevant facilities to minimize waste generation and maximize use of raw materials (GoK, 2006, p. 10). Extended producer responsibility (GOK, 2006), which includes waste minimization programs, deposit-refund and take-back schemes, financial arrangements for any fund established for the promotion of reduction, reuse, recycling or recovery of waste, awareness programs to inform the public on the impacts of waste emanating from the product on health and the environment, and any other measures to undertaken for the reduction of the potential impact of the product on health and the environment (GoK, 2021a, pp. 3-4).

Recycling also provides an opportunity for material recovery for re-use, for example, it presents an alternative measure for managing organic biodegradable waste, key products include manure and biogas which boosts agricultural productivity and alternative clean energy respectively (GoK, 2006, p. 20).

It also seeks to stop and reverse environmental pollution, promote mechanisms including promotion of cleaner production technologies, segregation at sources, recycling and reuse (GoK, 2006, p.12). This regulation provides a mechanism for licensing and monitoring of waste transportation (GoK, 2006, p. 18). Environmental Inspectors of the NEMA will undertake regular monitoring of waste disposal facilities to ensure compliance with the regulations (GoK, 2006, p. 25). The regulations require that any operator/owner of plants or recycling sites established for re-use or re-cycling of wastes should apply for waste disposal license. Moreover, any agency working for reusing waster needs get license from the monitoring agency. This regulation also indicates that no person shall be permitted to use wastewater for irrigation purposes, unless such water complies with the quality guidelines set out in the Eight Schedule to these Regulations (GoK, 2006, p.13).

The Cabinet Secretary and county government, in collaboration with their relevant stakeholders, are expected to develop new policies and regulations for the proper administration of waste management Act (GoK, 2021a, p.11).

#### *4.1.4 Understanding the institutional landscape*

The transition to CE takes multi-faceted nature of the environment and the need to integrate environmental considerations in all development planning and activities calls for cooperation and consultation among responsible government agencies and stakeholders at all levels (GoK, 2013, p. 57). In other words, waste management requires the involvement of a broad range of stakeholders in their implementation (GoK, 2015). The strategy recommends decentralized SWM, public-private partnerships (e.g. voluntary agreements), strengthened entrepreneurial activities (e.g. for SMEs) training of SWM managers, demonstrations, promotion of research and development in SWM (GoK, 2015, p. 43) (For details see GoK, 2015, pp. 43-46). This implies that the roles and responsibilities of the various groups need to be clearly defined (GoK 2013, p. 63).

In Kenya the following organizations are actively driving the shift towards a CE (The Kingdom of Netherlands, 2021). The Ministry of Environment and Natural Resources is at the forefront of transition to CE by partnering with the private sector (The Royal Netherlands,



2021). The Ministry issues policy direction on solid waste management initiatives country-wide; Channel funding to NEMA, for benchmarking and for capacity building and technology development (GoK, 2015, p. 48). Environment Management Policy develops and implements a Strategy on Partnerships and Stakeholder involvement to enhance environmental management: (i) ensure wider representation from across the private sector and civil society organizations and (ii) ensure that community voices are brought forward (GoK, 2021a, p. 8). The Cabinet Secretary, in the Ministry of Environment and Natural Resources, is responsible for sustainable waste management in collaboration with county governments, development of regulation in consultation with NEMA, adherence to international obligations and oversight and coordination of the administration (GoK, 2021b, p. 8).

Waste management council <sup>1</sup>, higher body established by the Cabinet Secretary, is responsible for providing analytical support on sustainable waste management to ministries, agencies and county governments, serve as national knowledge and information management centre on sustainable waste management, in consultation with county governments, and develop strategies on pollution abatement.

National Environment Management Authority (NEMA) is the principal instrument of government in the implementation of all policies relating to the environment. NEMA issues policies, legislations and economic instruments relevant to achieving sustainable waste management, develop and disseminate public information on the regulatory requirements for waste management in Kenya and undertake benchmarking, regionally and internationally, on appropriate waste management technologies, support research and its dissemination and capacity building of county governments on waste management systems and undertake wider awareness creation (including use of social media) and attitude changes, among others (GoK, 2015, pp. 48-49). It also undertakes enforcement activities of the laws developed on solid waste management and surveillance exercises on illegal waste related activities, monitoring and evaluation of the strategy by developing regulations prescribing the procedure for reporting on compliance with the government act by private entities, regulate private sector that has waste management obligations, monitor and enforce compliance, monitor, investigate and report on whether public and private entities are in

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<sup>1</sup> The Waste management council are composed of Cabinet Secretary (chairman), Environment Committee of the Council of County Governors (co-chair), representative from Ministry of Environment and Natural Resources, representative from Treasury, representative from National Environment Management Authority, chairperson of the caucus of county executive committee members in charge of environment, and three other persons appointed by the Cabinet Secretary, with option of co-opting other members, if necessary (GoK, 2021b, p. 8). The Cabinet Secretary shall establish a secretariate for the council.

compliance with the provisions and county governments in carrying out their functions (GoK, 2021a, p. 19).

The County governments are responsible for drawing up action plans (devolved functions) for implementation of applicable solid waste management systems within their counties and establishing the financial and operational conditions for the effective performance of this function (GoK, 2021a, p. 10). The county government will ensure that the county’s legislation in in conformity with this act, disposal of waste generated within the county is done within the county’s boundaries (except in case of an agreed framework for inter-county transportation and disposal of waste). County governments will provide central collection centres for materials that can be recycled and establish waste management infrastructure to promote source segregation, collection, reuse, and set up for materials recovery (GoK, 2021a, pp. 10-11). Finally, the count governments will maintain data on waste management activities and share the information with NEMA and mainstream waste management into county planning and budgeting (GoK, 2021a, p. 11). The government also indicate that benchmarking of best practices of appropriate technologies, source adequate funding for development of sustainable waste management initiatives in the entire cycle, put in place measures for enhanced Public-Private-Partnerships (PPP), among others, are responsibilities of the county (GoK, 2015, pp. 48-49).

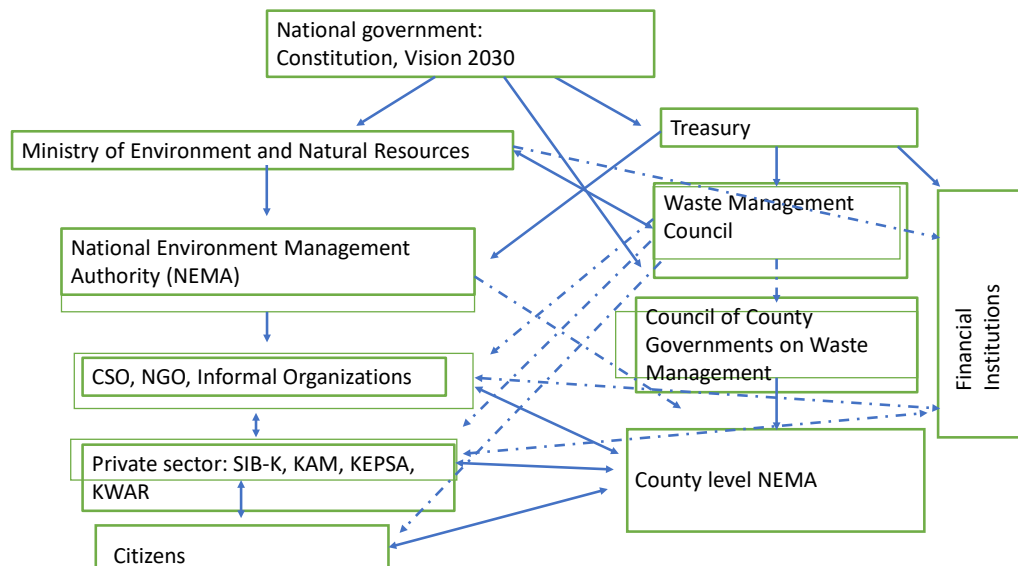


Figure 2: Institutional framework for waste management in Kenya

The National Treasury channels funding to the respective government agencies and institutions for development of waste management initiatives and facilities civil society actors and communities play a central role in environmental conservation and management (GoK, 2013, p. 59). A National Environment Complaints Committee is responsible for establishing complains and redress mechanisms, provided that the complaint made by any persons is based on evidence (GoK, 2021b, p. 9). Several community-based organizations such as Kenya Green Building Society, Kenya Association of Resident Associations, Civil Society Organizations (CSOs) and NGOs do operate in solid waste management (GoK, 2015, p. 49). The private Sector, through PPP, involve in the development of effective and efficient solid waste management facilities, prioritize on corporate social responsibility (CSR) on waste management and empower communities and other stakeholders in understanding waste management related issues and in finding solutions for the same (GoK, 2015, p. 49). The Sustainable Inclusive Business Kenya (SIB-K), Kenya Association of Manufacturers (KAM), Kenya Private Sector Alliance (KEPSA), and Kenya Association of Waste Recyclers (KAWR) are main private sector actors involved in waste management (GoK, 2015, p. 49).

Finally, the involvement of citizens/public is important in waste management. Change in attitudes and practice to embrace the concept of a waste generator's responsibility, adopt the 7R (Reuse, Recycle, Reduce, Rethink, Refuse, Refill, Repairing) and/or an integrated solid waste management approach in the management of all waste streams and collaborate with other government entities, CSOs, NGOs and other informal groups in waste management (GoK, 2015, p. 49).

#### *4.1.5 Support in scientific research and awareness creation*

Scientific research, technology development and innovation are central to a sound environmental management. High quality data generated from environmental research and monitoring improves the country's information base for decision-making on environmental issues (GoK 2013, p.55). Strengthening the National Environmental Information Management System (NEIMS) (GoK 2013, p.55) is envisaged as one goals in achieving CE. Developing and implement standardized indicators that will form the basis of monitoring the status of the environment so-called National Environmental Monitoring and Assessment Programme (GoK 2013, p.56), which is indicated as critical. Absence of capacity in developing standards needed for waste management is considered limiting the transition Environmental education, both formal and informal, is vital to changing people's attitude to appreciate environmental concerns, and to develop a strong sense of responsibility on environmental issues (GoK 2013, p.55). Developing a curriculum on sustainable waste

management (GoK, 2021a, p. 21) is considered important. Advocacy for behavioural change through media campaigns, communication and technology, dissemination of waste management information (GoK, 2015, p.43) are also important.

Karcher et al. (2020) reported that in addition to state-organised donor- and state-funded initiatives, social entrepreneurs in Kenya are also increasingly involved in awareness-raising efforts for CE. However, Kenyan Association of Manufacturers and low levels of consumer awareness are mostly due to a lack of comprehensive strategies on building consumer awareness through e.g., campaigns or integration into curricula (Karcher et al. 2020).

## **4.2 Fiscal incentives**

GoK propose fiscal and economic incentives to promote investments in environmental efforts and programmes (GOK, 2013). The government's budget is the single largest source of funding for protection and conservation of the environment and natural resources, harnessing additional funding from multilateral funding mechanisms, development partners, private sector and civil society organizations (GoK, 2013). GoK indicate PPPs, waste generators and the development partners as main sources and partial funding from various partners can also be explored for the infrastructural components of the strategy (GoK, 2015, p. 58), increased through regional and international Cooperation (GoK, 2013).

Article 57 of EMCA (GoK, 1999). also “propose to introduce Government tax and other fiscal incentives, disincentives or fees to induce or promote the proper management of the environment and natural resources or the prevention or abatement of environmental degradation”. These may include “customs and excise waiver in respect to imported capital goods, tax rebates to industries or other establishments that invest in plants, equipment and machinery for pollution control, recycling of wastes, among others, tax disincentives to deter bad environmental behaviour and pay proper value of those who use environmental resources for their utilization” (GoK, 1999, pp. 40-41).

Nonetheless, low funding has also affected investment in waste management facilities and equipment (GoK 2015, p. 28). Levying taxes as disincentives for landfilling to encourage source reduction, provide incentives for waste recyclers, preferential use of recovered materials over virgin materials (GoK 2015, p. 43). Moreover, GoK (2015, p. 58) indicated that there is need to introduce service charge to the residents for solid waste collection, to offer commensurate service provision, and encourage reducing waste generation by producers.

GoK (2021a, p. 18) proposes to introduce incentives for locally produced and imported sustainable waste management equipment and materials including collection machines, equipment for recycling, composting, transporting and waste compacting, and to expand private investment in materials recovery and recycling activities. Fees to be allocated to county waste management facilities, i.e., county government shall allocate all waste collection and tipping fees or other charges levied on waste received at a county government waste management facility for the improvement of waste management activities and services (GoK, 2021c).

Kenya being a party to the United Nations Framework Convention on Climate Change (UNFCCC), its Kyoto Protocol, and the Paris Agreement, institutional and financial mechanisms are in place so that resources are directed efficiently toward national climate and development priorities (GoK, 2021c). Agriculture transport, forestry, water, land use, and waste sectors are identified as mitigation sectors; implementation of incentives and subsidies to create a more attractive enabling environment for private investment in these sectors are therefore of critical importance (GoK, 2021c).

To achieve what is envisaged in its Vision 2030, both the public and private sector will need to scale-up and mainstream climate-related investments and it is important to track whether climate finance is enough to meet the ambitions of Kenya's nationally determined contribution (NDC) (GoK, 2021c). There is a need for international public finance to focus on more challenging sectors which are not receiving private finance at scale, e.g. using innovative financing to mobilize investment into key underfunded sectors, such as forestry, transport, and water (GoK, 2021c).

#### *4.2.1 Financing circular economy sector*

Finance is an enabling asset that facilitates investments in capital assets, including natural assets, and plays a role in influencing both supply and demand sides and enhances sustainable use and societal benefits (Dasgupta, 2021). According to UNEP Finance Initiative (UNEP FI) (2020, p. 14), financing for circularity covers any type of financial service where money is exclusively used to finance, re-finance, invest in or insure in part or in full, new and/or existing companies or projects that advance the circularity of our economies. CE creates business opportunity for the financial industry as substantial financial resources are needed to induce structural change in production and consumption alongside technology change to enhance economic efficiency and optimize use of financial capital. The opportunities include rethinking of the design and manufacturing of products and services, circular agriculture and digital solutions to transform industries, coupled with waste

management models designed to close material and resource loops and water management for efficiency, quality and supply security (UNEP FI, 2020, pp. 4-5). Details of strategies of financial institutions to accelerate financing circularity is given in UNEP FI (2020, P 4).

Evidence as reported in section 4.5 in this report indicate that the support rendered to waste business entities from the finance sector is still insignificant. It implies that the finance sector hasn't exploited the opportunities and the reasons could be diverse. Dasgupta (2021) indicated that although there is growing understanding that environmental issues should be part of asset managers' fiduciary duty and growing trend of its increase, there are concerns of profitability, scale of the project investment (often too small to attract financial investment), and lack of standardized data and transparency on financial investments and returns (for details see Dasgupta, 2021, pp. 479-482). UNEP FI (2020, pp. 8-9) recommends policymakers, financial industry regulators and supervisors to address barriers and stimulate opportunities to integrate measures to bring about the transition into existing and planned climate policies, rules and regulations and should promote and accelerate the transition. Whether banks and other financial institutions accelerate financing circularity in Kenya needs further exploration, beyond this report.

#### *4.2.2 Public and private funding sources for circular bioeconomy*

Most current sources of finance devoted to supporting the stock of natural assets are being public funds. These could be applied to improve "the condition of natural assets and the extent of the sustainability of their use by providing incentives for more sustainable production or consumption patterns, or generating revenue that can be used to support conservation and restoration initiatives" (Dasgupta, 2021, p. 473), including domestic budgets and tax policies (Deutz et al. 2020), so that concessional public financing, grants and donations are essential contributors to the financing of investments in ecosystems and their biodiversity (UNDP, 2020). In this light, financial tools are used in investments in ecosystems and biodiversity and sustainable management of waste in Kenya.

Dasgupta (2021) indicates that there is growing understanding that environmental issues should be part of asset managers' fiduciary duty. Disaggregated figures in Kenya, show that in 2018, public investment from domestic and international providers totalled KES 144.3 billion (59.4%) while investment from the private sector totalled KES 98.9 billion (40.7%) (Table 2) indicating that in order to meet the climate ambitions outlined in the NDC, both public and private climate finance needs to be scaled-up significantly by 2030 (GoK, 2021c). The Kenyan government disbursed KES 76 billion (USD 752.4 million) in climate-related development expenditures in the fiscal year 2017/18. This amount included KES 42 billion

(55%) of external resources from international partners channelled into the national budget, while KES 34 billion (45%) was from domestic public resources (GoK, 2021b).

Seventy-nine percent of international public climate finance was delivered through debt and was mostly channelled towards mitigation activities (55%) (GoK, 2021c). Investment from the private sector totalled KES 98.9 billion (USD 979 million), 34.4% originating domestically from Kenyan companies through their own resources and 65.6% from overseas private companies investing into projects (GoK, 2021c). Most 41% of total climate finance tracked in Kenya was directed to renewable energy generation.

Table 2 Reported investment from public and private fund investments in climate related ventures

<b>Source</b>	<b>% Total Finance Tracked</b>	<b>Entities</b>	<b>KES Billion</b>	<b>% central budget</b>
Public - Domestic	28.3%	Ministries, State Departments	33.7	33.7
		SAGAs	35.0	-
Public - International	31.1%	Bilateral development partners	43.5	21.8
		Multilateral development partners and funds	32.1	20.4
Private - Domestic	14.0%	Kenyan banks	27.4	-
		Kenyan private sector	6.6	-
Private - International	26.7%	Project developers and investors	64.6	-
		Philanthropic Foundations	0.3	-
<b>Total</b>			<b>243.3</b>	<b>75.9</b>

Foreign private sector actors invested KES 64.9 billion (USD 643 million) in climate-related capital in Kenya, predominantly in renewable energy projects (99.7% of the total). Beyond renewable energy, philanthropic foundations are the only international private actors that have invested in other climate sectors, in particular supporting adaptation, health, and water projects in Kenya (GoK, 2021c). The mitigation measures focus on renewable energy (geothermal, solar, and Wind), transmission system, energy efficiency, waste and wastewater, agriculture, forestry, land use and natural resource management, low carbon technologies, and others (GoK, 2021c). The KES 12.9 billion investment in the water and wastewater sector falls short compared to the KES 100.7 billion needs in 2018/2019 estimated by the National Climate Change Action Plan (GOK, 2018).

### **4.3 Business support services**

Gebrezgabher et al. (2019b) identified investment criteria, taking sector-based perspective, as the conditions that favour or hamper the investment attractiveness of a particular economic sector may not be similar to those that are important for other sectors. Criteria as policy and infrastructure, finance, business support and markets, where additional indicators across each of the criteria were also identified. Reform priorities of waste reuse sector vary across countries depending on the country's current situation; to elicit priority ranking of investment criteria and indicators for waste reuse enterprises.

A firm-level survey of circular bioeconomy firms differentiated into nutrient and waste-to-energy enterprises reported that all firms indicated that there is less hindrance with respect to getting access to electricity and telecommunications. Both waste-to-energy and nutrient firms reported that they face major problem with business licensing and registration (Gebrezgabher et al. 2019a). To start a new waste-to-energy business activity, with the aim of selling the reuse product, the average number of days required is 45 days, biogas institutions requiring approximately one-third less time. The nutrient businesses even require more days (62 days) to start a new business. Access to water, access to land, construction permit, business licensing, environmental regulations and product certification as important bottlenecks (Gebrezgabher et al. 2019a). General government support to the RRR businesses in terms of access to utilities and permits, business license, permits and construction permits is marked by corruption.

### **4.4 Market environment and infrastructure**

Market environment describes the needs in the market that drive the existence and development of the business, i.e., it describes what the business does and how it serves market needs (Otoo et al. 2018, p. 5). The market environment also includes macro-economic environment, the global or national market conditions or economic infrastructures that enable or represent a supportive factor or a constraint to the business. Relevant information on the macro-economic environment could be gathered from country policy reviews and other relevant literature (Otoo et al. 2018, p. 5). This may include value chain and position in the chain, describing the value chain in which the enterprise positions itself (Otoo et al. 2018, p. 6).

Nutrient and energy producing firms are faced with the challenge of getting a market for their product at a reasonable price. Institutions which have implemented biogas generators are faced with the challenge of optimally operating and maintaining the institutional biogas plants. RRR firms are unaware about relevant market information, i.e., availability or supply



of a product, the present and expected level of demand for the product, price of the product and future trends in price of the product (Gebrezgabher et al. 2019a). RRR enterprises in Kenya lack innovation and product certification. This is due to the absence or lack of reinforcement of laws related to standardization.

#### **4.5 Finance support**

Reporting the source of financing for the enterprise, the key capital and operational costs, revenue streams and cash flow statements are important (Otoo et al. 2018, p. 6). A firm-level survey of 2015 (Gebrezgabher et al. 2019a) indicated that most of the RRR firms rely on their internal funds to finance their investments. Access to finance is the topmost obstacle to waste-to-energy entities compared to the nutrient based firms. Banks play a rudimentary role in disbursing loans to these enterprises. Waste-to-energy firms finance more than 90% of their working capital needs from retained earnings while biogas institutions rely on retained earnings (49%) and government grant (49%). Nutrient firms finance about 86% of their working capital needs with retained earnings. Loan application rate is low amongst the surveyed RRR firms. The firms reported that they are apprehensive of loan rejections which is the main reason for lower application rates (Gebrezgabher et al. (2019a). Other sources of financing include donor financing. NGOs operating in Kenya also play a significant role in financing waste-to-energy firms than nutrient firms.

#### **4.6 Gender equity and circularity**

The management of the environment and natural resources requires equitable access to resources for present and future generations (IISD, 2021). Different social groups and demographics are impacted differently by environmental challenges. They also play unique roles in managing the environment given their unique capabilities, experiences and knowledge relating to the environment. Access to and ownership of natural resources should be enhanced for all gender, people living with disabilities, marginalized and minority groups (GoK, 2013, p. 47). The relevant policy statements in National Environment Policy (GoK, 2013, p. 47) provide incentives to attract the under-represented gender and other vulnerable groups into environmental management careers, occupations and programmes, and mainstream gender and equity in all sustainable development policies.

In business model of waste recovery, analysing equal employment opportunities and other gender-specific benefits or burdens, i.e. assessing how far either men or women might be (dis)advantaged in engaging in the waste valorisation process, as an entrepreneur or worker, or as a direct beneficiary of the resulting products are important (Otoo et al. 2018, p. 11).

A small percentage of firms are run by women (29%) and women owned firms in the nutrient sector is lower than that of waste-to-energy sector (Gebrezgabher et al. 2019a). Waste recovery entrepreneurs are faced with the challenges of accessing space, water, financial support. Women are found facing unique limitations in accessing these resources than men, and there are poor perceptions of their product by potential customers (Njenga et al. 2013; Gebrezgabher, et al. 2018), inhibiting their potential to develop their enterprises. Gebrezgabher et al. (2018) also reported that women's participation in the Waste-to-Energy Enterprises are affected by many factors including regulatory and legal conditions, physical infrastructure, access to resources, availability of capital and human resources. In another study, Gebrezgabher et al. (2019a) reported that female entrepreneurs felt that availability of land, water utilities and business licensing and permits are major constraint. Tax rate as well as the tax administration was another problem cited by women representatives Gebrezgabher et al. (2019a). Women entrepreneurs also face a severe challenge accessing loans compared to their male counterparts. Collateral requirements and application procedures for debt are reported as severe constraints by women than men (Gebrezgabher et al. 2019a).

Women entrepreneurs receive certain incentives for business, however. It costs on an average 20% less, in terms of time and money, for female owned waste-to-energy firms to obtain the license than male owned firms and it also takes female owned firms, in nutrient firms, on average 25% less time and money to obtain business license (Gebrezgabher et al. 2019a).

## **5. Discussion**

Kenya has several relevant pieces of legislation and policies such as The Constitution and Vision 2030, SWM Policy, strategy and regulation on SWM and strategies on Climate Smart and action plans to promote the transition to CE. Moreover, appropriate institutional landscape was shaped to promote compliance to these provisions. Nonetheless, waste management in Kenya has remained a major challenge due to diverse factors ranging from problems associated with waste management systems, limited knowledge, attitude and practices, political will, technical and financial resources (GoK, 2015, p. 27).

Recent published country report, funded by the EU, outlines some of the limitations related to this including absence of a holistic CE framework (not horizontally prioritised across the different parts of the Kenyan national government). The policies focus on the classical

objectives of effective collection and land filling than enhancing reuse and recycling. Some other sectors, where significant potential for CE measures exist, like the construction sector, are only starting to translate the CE concept to tangible actions in their sector (Karcher et al. 2020).

Looking at the institutional landscape for SWM, there are gaps of communication and common action between national and county stakeholders perhaps requiring harmonization of national and county provisions, but further harmonisation with core economic policy is needed (Karcher et al. 2020). SWM remains a critical concern and a major challenge in Nairobi and Mombasa as a result of weak institutional structures and capacity, weak enforcement of regulatory frameworks (Haregu et al. 2017). The institutional landscape for SWM has focus on waste sector, all other sectors are not aligned with waste sector. There is weak link between Ministry of Environment and Natural Resources and NEMA, the key sectors in waste management, and financial institutions. There is also weak link between financial institutions and private sector and CSOs engaged in waste recovery. The current legal framework at national and sub-national levels of government is unlikely to achieve a CE approach necessary for realizing SWM and its operationalization is impeded by inadequate financing, weak institutional coordination, gaps in private sector and informal actors' engagement and risks associated with investments in large-scale waste recovery initiatives (Kituku et al. 2020).

SWM and CE-technology lack a clear base in school curricula and Kenyan companies need to further develop their expertise and awareness of sustainability and CE-related techniques (Karcher et al. 2020). SWM required behavioural change, as segregation 'at the source' is not widely practiced and extended producer responsibility is low partly because of low enforcement and national awareness. Recycling, although considered as an important strategy in waste management, it has proved difficult to implement and the involvement of private sectors (entrepreneurs in waste management) are still at embryonic stage. This is due to insufficient business support services, market environment and infrastructure, financial support, and gender equity concerns, as discussed in section 4.3-4.5. Weak enforcement and gaps in regulatory and supervision (IWMI, 2015; Haregu et al. 2017) is made difficult because of poor development of indicators and standards, which is explained by absence of local laboratory and capacity. Adherence to strict international standards makes the product costly (IWMI, 2015).

## 6. Conclusion and policy recommendations

Kenya is one of the frontrunners sub-Saharan Africa in terms of policy development in circular economy. Encouraging developments have been witnessed in the enabling environment for investment in circular economy. The constitution, Kenya Vision 2030, various Policies, strategies and regulation for Sustainable Waste Management and Green Economy Strategy and its action plans lay the policy and legal framework to enable transition to circular economy. These policies, among others, envisage programmes to support country's development, including developments in the social sector, provide legal and policy framework for the management of the environment and waste, to reduce waste related emissions and enhance green investments, provide finance incentives for improved waste management and foster science and technology. These investment climate policies and strategies also hypothesise the institutional landscape, with clear definition of the roles and responsibilities of the key sectors, accountability and communication lines between institutions involved in Sustainable Waste Management.

Despite these institutional developments, waste management in Kenya remains a major challenge. There are several reasons for this. Weak enforcement and gaps in regulatory and supervision, poor coordination and weak horizontal communication between relevant stakeholders at the national and county level are exacerbating the problem. Limited knowledge, attitude, and practices, encompassing producers and consumers, including behavioural problems of households is also another problem. Moreover, the involvement of private sectors (entrepreneurs in waste management) is still at embryonic stage due to weak business services, financial support and access to market and infrastructure.

Weak implementation and enforcement are exacerbated by poor development of standards, explained by weak local laboratory capacity, limitations in development of key indicators making monitoring and evaluation difficult. Adherence to strict international standards makes the products from recycling and composting costly, hence, making the recycled products unsellable.

There are some developments in enhancing awareness and actual behaviour such as waste separation at source and entrepreneurial development in waste recovery. These progresses need to be further scaled out/up to make waste management and circular economy more sustainable. Establishment of multiple stakeholder platforms, involving key actors in the sector, to enhance further awareness is important. Furthermore, promotion of incubator centres is critical for uptake of resource recovery investments of potential entrepreneurs.

Finally, all streams of waste should be given equally weight. While focusing on plastics and emerging attention on e-waste are important given the socio-economic development and environmental conditions, yet the weight given to rural and per-urban (agriculture) waste is still minimal. Developing waste stream specific policies could be necessary.

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