

Draft Policy Brief

Sustainable Consumption and Production in Kenyan Coastal Counties: Case for the Achievement of Zero Waste in Construction and Infrastructure Development through Effective Policy, Governance, and Institutional Frameworks Coupled with Appropriate “Bankable” Investments

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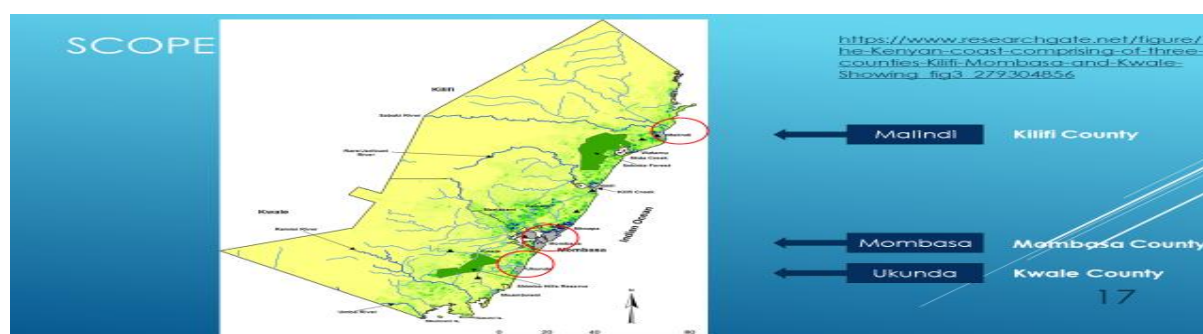
Summary

This policy brief presents research findings of an assessment on the possibilities of achieving Zero Waste in the Construction and Infrastructural Development Sector in Kenyan Coastal Counties. The brief enumerates the current status of the Construction and Infrastructural Development Sector in the said Counties, outlines the national and county level policy, legal and institutional frameworks governing Construction and infrastructure development while giving their interconnectedness with regional and international frameworks, presents roles of the national and county governments, private sector, and the potential for private-public partnerships. It also highlights, key findings, gaps and challenges in the local legislations while highlighting best practices from the region and from the international scene. Additionally, it presents a compelling business case for the preparation of a portfolio of “bankable” investments in these sectors. The brief ends with some recommendations and a conclusion.

*The brief hinges on a bigger research project whose **main aim** of this research project was to investigate how to integrate sustainable consumption and production (SCP) in Kenya’s coastal cities and urban areas, mainly through the coastal counties’ development plans, urban planning, legislation, regulatory frameworks, investments and policy decisions. The research focused on four (4) sectors in three project sites in Mombasa, Kwale and Kilifi counties which fall within the **Jumuiya ya Kaunti za Pwani (JKP)**. The studied sectors included agriculture and food processing, tourism and hospitality, construction and infrastructure, environment and natural resources. The project focused on **three key locations: Mombasa City in Mombasa County, Ukunda/Diani municipality in Kwale County, and Malindi municipality in Kilifi County**. **Figure 1**, below, presents the project sites. The research analyzed existing SCP frameworks at the national, sub-national, regional, and global levels with a view to addressing policy, legal and institutional gaps and suggesting possible interventions. It also sought to present good practices on how SCP policy and governance can support the development and implementation of the Blue Urban Agenda for Kenya’s coastal region, and use this as a basis for replication elsewhere in the Western Indian Ocean (WIO) region. In terms of application, the results and outcomes of the project are expected to provide innovative policy and governance pathways for SCP that will aid Kenya’s coastal cities and urban areas develop and implement a sustainable Blue Urban Agenda for the country, with possible replication elsewhere in the WIO region.*

The project embraced the concept of circular economy, which aims to reach the maximum efficiency in the use of finite resources, the gradual transition to renewable resources, and recovery of the materials and products at the end of their useful life. Moreover, it targets the rebuilding of all available types of capital, including financial, human, social, and natural. Essentially, a circular economy describes a regenerative economic system, that also promotes “zero waste” approaches.

Figure 1: Project Sites



One of the outputs of the research focused on construction and infrastructural development which include development of commercial and industrial buildings, residential housing, institutional developments, public infrastructure like roads, rail, power, health, water and sewerage infrastructure, ports, airports, religious establishments and other amenities. These sectors are both labour-intensive, therefore, providing the much-needed employment opportunities and highly impactful socio-economically. They are, as well, large consumers of natural resources including land, stones and blocks, asbestos, sand, ballast, murram, timber and wood products, water and energy. Nevertheless, these sectors' activities generate enormous wastes including waste water, dust and fumes, oils and chemical wastes, debris, waste wood, litter, plastic wastes, soil and rocks, etc. They are also detrimental to the environment, the marine ecosystem and polluters thereby compromising the now internationally accepted tenets of "zero/low carbon" emissions and the shift to "green growth". As such these sectors were identified as ideal candidates for consideration under the sustainable production-consumption paradigm and also perfect for a whole Value-Chain Analysis. Needless to say, that these sectors are also regulated by various policy, legal and institutional frameworks some of which are either overlapping, inadequate, or need to be aligned with other national/sub-national, regional and international best practices.

In general, the project sites' results, both from desktop review and field visits, indicate that construction works, especially of commercial buildings and residential units were many and diverse. Equally noticeable was the expansion of public infrastructural facilities, including roads and bridges, ports, airports as well as recreational facilities including public parks. The constructions typically used conventional building materials, including stones, sand, concrete, cement, wood and timber products, water, and electricity. There was also a lot of usage of water and electricity thereby producing lots of waste water, chemical wastes and fumes. The results also show the presence of old and dilapidated infrastructure, unplanned settlements, poor road conditions due to lack of maintenance, and lack of drainage systems.

The research results also indicate that construction and infrastructural development waste management practices in Kenyan coastal cities are largely inefficient and unregulated, resulting in significant waste generation and detrimental environmental impacts. Most of the waste is disposed off in open dumpsites or mixed with municipal solid waste, leading to inadequate recycling and resource recovery. Limited data and lack of proper waste tracking systems make it difficult to accurately assess the scale of waste and monitor progress towards waste reduction goals. There is insufficient legal, policy and institutional frameworks specifically targeting waste management. Noticeable was the limited awareness and understanding of sustainable construction practices among stakeholders, including construction professionals, developers, and local authorities. Other findings include: inadequate infrastructure and facilities for waste sorting, recycling, and disposal, inadequate

enforcement mechanisms to ensure compliance with waste management regulations, limited research and development efforts focused on innovative solutions for construction waste reduction and recycling.

Several challenges were also noticed, among them: lack of coordination and collaboration between different stakeholders involved in the sectors, limited financial resources and investment in sustainable construction practices and waste management infrastructure, and resistance to change including reluctance to adopt new technologies and practices. In addition, rapid urbanization and increasing construction activities pose additional challenges in managing waste effectively while limited capacity and technical expertise for implementing sustainable practices and waste management strategies tend to compound the problem. The study recommends that by embracing sustainable consumption and production practices and implementing robust policy, legal, and institutional frameworks coupled with the implementation of related “bankable” investments, Kenyan Coastal Counties can move closer to achieving zero construction waste, promoting environmental preservation, and facilitating the transition to a circular economy. To achieve this, the crucial role of government both national and county level, the private sector, and private-public partnerships cannot be gainsaid while leveraging on international best practice is also of paramount importance.

1. Status of Construction and Infrastructure Development in the Project Counties

Kwale County’s physical infrastructure has, for the most part, remained underdeveloped. The County has a total of 2,028 Km of classified roads of which 212.5 Km are Bitumen surface (paved surface), 425.2 Km is graveled and 1,695.5 Km of earth surface roads/rural access roads. There are 4 Km of railway line and four (4) airstrips at Ukunda/Diani, Shimba Hills National Reserve, Msambweni and Kinango although only Ukunda/Diani is operational. There is a small port at Shimoni. Much of the housing developments in the county are traditional in nature. It was also observed that the construction materials for the walls of these dwellings is mud, wood, cement and stones. Majority of stone dwellings are found in the urban areas.

The status of construction and infrastructure is rapidly changing as new projects are under implementation which include:

- The Dongo Kundu road project which links with the county of Mombasa,
- Diani Resource City which is part of the Kenya Vision 2030 projects. Its construction will improve tourism, infrastructure development and development of other amenities,
- Shimoni Fishing Port, whose construction is yet to begin, aims at improving trade and conservation of fisheries. The facilities will have a market hall, cannery, storage facility and a wastewater treatment facility,
- The Samburu-Kinango-Kwale road has partially been upgraded to bitumen standards. The road connects Samburu with the Mombasa-Lunga-Lunga highway through Kwale- Kombani. It will ease congestion at the Likoni ferry channel as well as opening up Kwale to more business and developments,

- Development of the Tsunza Resort City is part of the developments within the broader LAPSET project. The aim of the resort city is to provide economic development and open up the area for more trade development. Other key infrastructure projects include strengthening the water supply infrastructure; expanding the road network and making it more resilient to weather patterns, which are largely national government projects.

Mombasa County is divided into four administrative areas that include Mombasa Island (renamed Mvita Constituency), Chagamwe, Likoni, and Kisauni. The island is linked to the mainland by roads at two points, Makupa and Kipevu Causeways. Mombasa island is the business hub of Mombasa County. The County has one international airport, the Moi International Airport in Chagamwe sub-county. The airport is the second largest airport in Kenya and is used by both domestic and international flights. The main residential areas are to be found north and south of the mainland. Majority of the structures commercial and residential are constructed using stones. Nevertheless, there are mud walled houses found in the slum areas. The development of the GOK affordable programme is set to begin in the following areas: Buxton, Mzizima, Likoni, Chagamwe, Khadija, and Miritini estates.

The following are the other main infrastructure projects:

- The new Kipevu Oil Terminal at the Port of Mombasa. Phase one of the project is complete. The project consists of one offshore island terminal with four berths, one work boat wharf and five sub-sea pipelines. and phase II of the second container terminal at the Port of Mombasa. The second container terminal project is also complete and helps to increase the number of containers the port can handle,
- The Likoni floating bridge is complete. The bridge complements the ferry services by providing commuters access through the Likoni Channel,
- A modern cruise ship terminal at the Port of Mombasa has been constructed and is in use,
- Dongo Kundu bypass project, which is being undertaken in two phases, will connect Mombasa Mainland West to Mombasa Mainland South, without entering Mombasa Island. It will ease traffic pressure at the Likoni ferry. Phase one of the project is complete. It is from Mombasa Port's second container terminal and joins the Mombasa-Nairobi highway at Bonje, near Mazeras. The second Phase, consists of an interchange at the Likoni-Lunga Lungu highway and erection of two bridges: at Mwache and Mteza. This phase is also known as the Mombasa – Mtwapa – Kilifi dual carriageway project. This phase is ongoing. Ultimately the Dongo Kundu project will help in easing transportation between Mombasa and Kwale, enhance Mombasa's port efficiency.

- The Mombasa-Mariakani Road which encompasses the Makupa bridge which also incorporates a pedestrian walk is complete. The road connects the Tudor and Port Reitz creeks and does away with the Makupa causeway. It includes a three-deckers inter-change at Changamwe. The road provides a link between Kenya's inland and the island of Mombasa. Moreover, it eases movement from the Moi International Airport into the mainland.

Suffice it to say that while the major roads are in fair condition, access roads within the residential and industrial areas are in deplorable state. The situation is worsened by the poor storm drainage systems most of which are in dilapidated conditions. The roads are maintained by the national government through Kenya Rural Roads Authority (KeRRA) and overseen by Sub-County Road Committees, Kenya Urban Roads Authority (KURA) and the Kenya National Highways Authority (KeNHA) and the private sector.

The Kilifi County government's infrastructure projects have focused on upgrading/rehabilitation of internal roads and construction of bridges¹. With regard to residential infrastructure, the county government is focused on achieving the following: developing a housing estates master plan and development guidelines for all the county estates; undertaking estate management and maintenance, the upgrading of informal settlements and settlement schemes; upgrading of access roads to bitumen standards or making them murrum standard; and purchasing land for housing development. A 40 MW solar plant, located in Langobaya, is complete and has been connected to the national grid. This project boosts the production of green energy.

2. Policy, Legal and Relevant Institutional Frameworks

2.1 National Level

Construction and infrastructure development are developed and regulated under specific legislative and regulatory frameworks through Government ministries, departments and agencies.

Constitution of Kenya, 2010: The Constitution of Kenya has provisions for sustainable land use planning. Article 60 provides that land in Kenya is to be held, used and managed in an equitable, efficient, productive and sustainable manner, including through sustainable and productive management of land resources, as well as sound conservation and protection of ecologically sensitive areas. The Constitution classifies land as public, community or private². All roads and thoroughfares

¹ See Kilifi County Annual Development Plans for the years 2020 to 2022

² The Constitution of Kenya 2010, Article 61(2).

provided for by an Act of Parliament are defined as part of public land.³ Therefore all roads and public accesses and spaces across the country, including in the sites and cities of concern herein, are part of public land. In general, public land under certain categories shall vest and be held by a county government in trust for the people resident in the county, or in national government in trust for the people of Kenya, and shall in both cases be administered on their behalf by the National Land Commission⁴(NLC). One of the key functions of the NLC, which is one of the constitutional Commissions established under the Constitution, is “to manage public land on behalf of the national and county governments”.⁵ It is also mandated “to recommend a national land policy to the national government”.⁶ Under the Constitution, private land consists of land held by any person under any freehold tenure; land held by any person under leasehold tenure; and any land declared private land under an Act of Parliament.⁷

In terms of regulation of land use and property, the State may regulate the use of any land, or any interest in or right over land, in the interest of defense, public safety, public order, public morality, public health or land use planning.⁸ Thus, the State has a mandate to regulate land use, whether in public, community or private land. This has a direct bearing on construction and infrastructure developments in urban, peri-urban and rural areas.

However, while the Constitution provides a broad framework for sustainable utilization of resources including land, it does not directly address sustainable consumption and production. Ultimately, though, it is supportive of SCP and provides a good basis upon which specific legislative, regulatory and policy frameworks can further anchor SCP, including in the construction and infrastructure development sector.

Physical and Land Use Planning Act, No. 13 of 2019: The Act provides for organizing the physical infrastructure in an orderly and effective manner that encompasses deliberate spatial plans that achieve the optimum level of land utilization in a sustainable manner.⁹ In fulfilling this overarching mandate, the Act prescribes the incorporation of sustainable consumption and production practices. The Act is guided by the need to plan development activities in a manner that integrates economic, social and

³ Ibid, Article 62 (1)(h)

⁴ Ibid, Article 62(2),(3).

⁵ Ibid, Article 67 (2)(a)

⁶ Ibid, Article 67(2)(b).

⁷ Ibid Article 64

⁸ Ibid, Article 66(1).

⁹ Section 3, Physical Planning and Land Use Act, 2019

environmental needs of present and future generations.¹⁰ In planning for the use of land, the Act prescribes the integration of new technologies and environmentally friendly approaches to achieve sustainable development and efficient use of natural resources. The Act also provides for the development of a National Land Use Development Plan for among other purposes the conservation, protection and improvement of the environment in development of land.

County Government Act, 2012: The Act, requires that a county government shall plan for the county and no public funds shall be appropriated without a planning framework. It also states that the county planning framework shall integrate economic, physical, social, environmental and spatial planning. In addition to an integrated county development plan, each county is expected to have the following:

- i) County Sectoral Plan (for the county departments and other county entities);
- ii) County Spatial Plan; and
- iii) City and Urban Areas Plans.

Climate Change Act, 2016: The Act reaffirms the government commitment to promote low carbon technologies and reduce carbon emissions through uptake of technologies that support low carbon and climate resilient development.¹¹

National Land Use Policy, 2017: The Policy addresses the use of locally available materials for purposes of construction. The Policy notes that the use of locally available material poses a danger to the environment.¹² To address the problem, the policy recommends that the government should come up with guidelines and standards for the utilization of natural resources in the construction industry. The policy also recommends the promotion and application of environmentally friendly technologies in construction.

National Building Code, 2015: The Code has antecedents of sustainable consumption and production. Rule 54 of the Code provides that where there is excessive rubble, debris, or combustible waste on a construction site the approving authority may order the owner of the premise to remove the waste within a specified period. Rule 161 of the Code provides that a designer designing a building may conform with the sustainable design strategies derived from independent green building organization certificates. The Code also recommends the installation of renewable energy under Rule 162. Rule 167 provides that a building should conform with sustainable building designs that minimizes the use of non-renewable resources. In the event of demolitions, the Code recommends that efforts should be

¹⁰ Ibid, Section 5

¹¹ Section 3, Climate Change Act, 2016

¹² Ministry of Lands and Physical Planning 'National land use policy' (2017) Available at <https://repository.kippra.or.ke/bitstream/handle/123456789/489/Sessional%20paper> Accessed on 9th February 2023

made to reduce wastage and recycle salvaged materials. The Code also recommend the use of other SCP practices in construction such as: use of natural ventilation and cooling systems, conserving the existing trees and topography in a project site to up to 2.5%, use of locally available building materials that are sustainably harvested, use of water efficient appliances, use of environmentally friendly toilets and sewerage systems and use of sustainable design innovations. Table 48 First Schedule recommends that waste water from construction sites should be recycled and used for irrigation and outdoor cleaning.

Green Economy Strategy and Implementation Plan Kenya, 2016-2030: The policy provides a pathway for Kenya's low carbon, resource efficient, equitable and a socially transformative approach.¹³ Under broad Objective 1.4, the strategy addresses sustainable designs, construction and maintenance buildings. To achieve the objective the Plan lays out strategies including; to ensure that 75% of new and renovated public and private largescale buildings are green by 2030, capacity building for professionals in the construction sector on integrated green technologies on design and construction and to develop green certification standards.

Other national pieces of legislation that were reviewed include the Kenya Roads Act, No 2 of 2007 and National Construction Authority Act, 2011. Notably, the Acts makes no reference to sustainable consumption and production practices in the construction and maintenance of the roads.

2.2 Relevant Sub National Policy and Legal Frameworks

2.2.1 Kwale County

Public Participation Act: The enactment of this statute stems from the requirement in the Constitution that public participation is a guiding principle in governance of the county. The statute also provides guidelines on how the participation shall be undertaken. Likewise, there is a guiding policy in place. The statute has made a good attempt at laying the foundation for the facilitation of public participation in the county. It would be vital in efforts to advance the SCP agenda as the success of sustainable consumption and production initiatives would have to include public participation and buy-in. Nevertheless, the main challenge relates to its effective implementation.

Monitoring and Evaluation Policy: This policy is quite broad in terms of its applicability and measures both financial and physical project performance which is important for construction and

¹³ Government of Kenya 'Green Economy Strategy and Implementation Plan 2016-2030' (2016) At p. 22 Available <https://faolex.fao.org/docs/pdf/ken170764.pdf> Accessed on 9th February 2023

infrastructural development. This also makes it an important tool for ensuring the ultimate success of SCP initiatives.

2.2.2 Mombasa County

Public Participation Act: The Act is pegged on the Constitution, specifically chapter 11, the general principles on public participation and part VIII of the County Governments Act. Generally, it provides a legal framework for facilitating public participation in the County Government processes and decision making as relates to issues affecting them. Overall encouraging public participation, the Act seeks to: promote participatory democracy; transparency and accountability in decision making; community empowerment and support; promote partnership and collaboration in public processes; enhance public awareness and understanding of government processes; reduce conflicts related to public or government decisions; and enhance community ownership of public decisions.

2.2.3 Kilifi County

Kilifi County also has the following Acts; Valuation for Rating Act, Roads & Bridges Act, 2015, Public Entertainment & Amenities Act and Water & Sanitation Services Act.

2.3 Regional Framework

The East African Community Vision 2050: The common shared vision outlines the major infrastructure development programs within the EAC community. Notably, one of the sites, Mombasa, is a major transport corridor in the EAC. In addition, the EAC intends to harmonize the policy, legal and regulatory frameworks to create an enabling environment that will harness economies of scale through regional integration. Notably, in the preambular text the Vision is aimed at ensuring assimilation of the SDGs within the Community. However, despite the emphasis on construction and infrastructure as a key integration pillar the Vision falls short of mentioning sustainable construction and infrastructure practices as a critical element of building resilient cities.

2.4 International Legal framework

New Urban Agenda, 2016: In 2016, countries came together under the auspices of the UN-Habitat and adopted the New Urban Agenda. The agenda captures sustainable consumption and production trends in construction towards sustainable urbanization practices. The State parties commit to develop and adopt sustainable, renewable and affordable energy and energy-efficient buildings and construction modes. Under the Agenda, the parties commit to making sustainable use of natural resources and focusing on the resource efficiency of raw and construction materials such as concrete, metals, wood, minerals and land. In developing sustainable and resilient buildings parties commit to

and prioritizing the use of local, non-toxic and recycled materials and lead-additive-free paints and coatings as SCP approaches in the construction industry

International Building Code, 2018: The International Building code (IBC) is a model code that provides minimum requirements to safeguard the health, safety and general welfare of occupants in building structures.

International Green Construction Code, 2018 (IgCC): The code is designed to propose provisions that promote safe and sustainable construction in an integrated fashion with the (International Construction Code) ICC Family of Codes. The IgCC provides minimum requirements to safeguard the environment, public health and safety to minimize the negative impacts of the built environment to natural resources. The Code addresses among others water efficiency, energy efficiency, planting trees on site and site waste management. Regulation 5.3.8.1 recommends that land clearing debris, rock and soil should be diverted from disposal by compositing, recycling or reusing. On wastewater management the Code under Regulation 6.3.6 prescribes reusing water including the use of reverse osmosis for water treatment.

3 Key Findings

3.1 Analysis of Desktop Reviews

Generally, the reports in the three counties observe that, firstly, the use of locally available materials for construction is common in the three counties. Secondly, the materials are made available through large industries, small cottage industries, fabricating, sand harvesting, and quarrying. Thirdly, the construction materials are produced for in-county use and use by other counties. Thirdly, building materials in the coastal region have been changing over time with a slow-paced replacement of traditional building materials such as *makuti* and coral stones with modern technologies. Lastly, the three reports call for the use of modern technologies and sustainable building designs due to the threat of depletion of natural resources posed by the use of traditional building materials.

3.2 Analysis of Field-based Responses

The filed work findings are based on an analysis of responses given by various stakeholders during interviews as well as focus group discussions. In general, it was observed that in all sites of concern, construction works, especially of commercial buildings and residential units were many and diverse. Equally noticeable were expanding infrastructure facilities, including roads and bridges, as well as recreational facilities including public parks. The constructions typically used conventional building materials, including stones, sand, concrete, cement, wood and timber products, water, and electricity.

There were also several yards holding construction waste and used materials that were for resale. In general, though, it appears that construction waste was not as ubiquitous as normal consumption solid waste including food waste. As usual, construction and infrastructure developments consume lots of water and electricity which, in turn, produce significant waste water, chemical wastes and fumes.

4 Gaps and Challenges

The study results indicate that there are several gaps in terms of the available legislations and policies that need to be addressed in order to effectively embrace the SCP paradigm. The findings suggest that while existing policies and legislations do not ‘speak to each other’, other pieces of legislation lack appropriate policies required for their implementation. Other legal instruments have no provisions geared towards ensuring the development of sustainable/green infrastructure. In addition, there is lack of awareness of the legislations and policies that are already in force. Other gaps identified include weak legal and regulatory framework, lack of sub-department policies and regulations, lack of policy documents to guide most of the county functions, lack of a projects implementation framework and weak link between the County Integrated Development Plans, Annual Development Plans and Budgets.

The results point out that the National Construction Authority (NCA), as the industry regulator, deals with the policy framework on construction and related areas. In line with this overarching mandate, NCA conducts research on environmentally efficient construction practices. However, the Agency lacks the mandate to enforce regulations on environmentally friendly construction practices. Contractors and clients have the discretion to decide on the materials to be used in construction. NCA also lacks the mandate to address waste management generated from the construction and infrastructure sectors. This mandate is left to NEMA. It was also observed that there is need for a multi-agency approach in addressing waste control and management as well as complete the development of planning frameworks in the respective counties, including spatial plans and land use planning instruments.

5 Best Practices and Lessons from Other Jurisdictions

Based on the Study results, it is noted that to effectively address construction and infrastructural development waste and effectively embrace SCP, it is essential that Kenya Coastal Counties and the Country at large draws inspiration from successful best practices and initiatives implemented elsewhere in the world.

The **European Commission** published a research report by the Sustainable Consumption and Production Unit of the Institute for Prospective Technological Study, outlining best environmental management practices for the building and construction sector. These include: Land/Physical planning which protects biodiversity such as wildlife, and fragile ecosystems, Green/sustainable procurement

that establishes criteria for the green procurement of construction services, both for public and private sectors. These could include considering: energy performance of buildings; whether any renewable energy will be produced in the new/renovated building; recyclability of construction material; environmental friendliness of construction material; proposed water saving measures; environmental performance of the construction site; eco-design of the building structure; how the contractors will handle construction and demolition waste, among others. Other best practice candidates include: the use of environmentally friendly heating and cooling systems, using better designs to prevent and reduce waste generation during construction, use of environmental selection criteria for construction material, establishment of specific environmental management plans where all the measures to prevent, control and monitor construction pollution and natural resource use are contained, training construction personnel on environmental management requirements and practices, environmental monitoring of construction sites, formulation of site waste management plans consisting of actions for different types of waste; expected amount of every type of waste; resource allocation to waste management; responsible parties, among others, waste segregation and sustainable procurement.

The ASEAN Countries Sustainable Urbanization Strategy promotes an integrated approach to urban planning. It provides a framework for sustainable urbanization, focusing on mobility, building and construction, and urban climate resilience. The building and construction sub-area focuses on improving efficiency and sustainability in the construction sector by promoting energy efficiency in buildings, modular buildings, sustainable construction material, and smart buildings and construction¹⁴.

Inter-American Development Bank recommends four dimensions of infrastructure sustainability that include economic sustainability, social sustainability, environmental sustainability, and institutional sustainability. Under environmental sustainability, infrastructure projects should take into account climate and natural disasters, pollution prevention and control, efficient use of natural resources, and conservation of the natural environment¹⁵.

The Integrated Strategy for Sustainable Cities¹⁶ elaborates four pillars for cities' sustainability. Pillar 1 on social development includes green housing and buildings, water and sanitation, green public transportation, green energy access, recreation areas and community support. Pillar 2 is on environmental protection, while Pillar 3 includes green productive growth, production and distribution of renewable energy, technology and innovation. Pillar 4 on effective urban governance includes decentralization and planning, and reduction of inequities.

Other best practice countries include: Sweden, Singapore, Netherlands, Denmark, Japan, Brazil, South Korea, Vietnam, India, and Ghana, among others.

¹⁴ See the ASEAN Countries Sustainable Urbanization Strategy, available at <https://asean.org/book/asean-sustainable-urbanisation-strategy/>. Accessed on 8th February 2023

¹⁵ See the Inter-American Development Bank, the four dimensions of infrastructure sustainability, available at <https://publications.iadb.org/en/what-sustainable-infrastructure-framework-guide-sustainability-across-project-cycle>

¹⁶ UN-DESA Policy Brief No 40, [Department of Economic and Social Affairs | Economic Analysis \(un.org\)](#). Accessed on 8th February 2023

6 Business Case Scenario for Zero Waste Investments in Construction and Infrastructure Development

Investments in zero construction and infrastructural development waste can yield substantial economic, environmental, and social benefits. A business case scenario can be developed to demonstrate the advantages of such investments. These include:

- i. Cost Savings could be realized through the implementation of waste reduction and recycling measures by reducing the need for virgin materials and landfilling expenses,
- ii. Adoption of efficient construction practices, such as accurate material forecasting and supply chain management can minimize material waste and optimize resource utilization,
- iii. Embracing sustainable construction practices can enhance the reputation of construction companies and developers, attracting environmentally conscious clients and investors,
- iv. In addition, as sustainability becomes a critical criterion in project prioritization, companies with expertise in zero construction waste can gain a competitive edge and access new market opportunities,
- v. In terms of Regulatory Compliance, investing in zero construction waste aligns with future regulatory requirements and demonstrates commitment to environmental stewardship. Compliance with waste management regulations mitigates the risk of penalties and costly legal litigation,
- vi. Environmental Benefits could be realized in that minimizing construction waste reduces resource depletion and the need for energy-intensive material extraction and manufacturing processes,
- vii. Last but not least, waste recycling and resource recovery contribute to the circular economy, promoting sustainability and reducing carbon emissions.

7 Role of Different Actors

To optimally achieve “bankability” of Zero Waste Investments, it’s critical that National Government, County Governments, the Private Sector and Private-Public Partnerships work together and in a complimentary version.

National Government-It would be the role of government to, among other things, develop and enforce comprehensive policy frameworks specifically addressing construction/infrastructure waste management, including setting targets, regulations, and incentives. Government would also ensure the allocation of adequate funding for waste management infrastructure, research, and capacity-building programs, facilitate the development of technical guidelines, standards, and certifications for sustainable construction practices and strengthen institutional capacity for monitoring, compliance, and enforcement.

County Governments-County Governments could align their waste management policies with the national policy and adapt them to local conditions. They could set targets and action plans for construction waste reduction and coordinate their efforts with relevant stakeholders. There would be need for County Governments to invest in waste management infrastructure, including recycling facilities, sorting centres, and waste collection systems that support zero construction waste initiatives. They would be responsible for monitoring construction activities within their jurisdictions and ensuring compliance with waste management regulations. Regular inspections and audits would be conducted to identify and address non-compliance. In addition, to realize the intended benefits, County Governments could engage the public and construction industry stakeholders through awareness

campaigns and education programs, promote sustainable construction practices and encourage active participation in waste reduction efforts.

The Private Sector, on the other hand, could adopt sustainable construction practices and at the same time invest in waste reduction technologies and processes. It could also ensure the integration of waste management considerations into project planning and design. The Private Sector could also collaborate with waste management companies and recycling facilities to ensure the establishment of efficient waste collection and recycling systems. It could also be encouraged to share best practices and knowledge within the industry to drive sector-wide improvements.

Public-Private Partnerships (PPPs) could be established and incentivized to finance and operate waste management infrastructure, such as recycling facilities and sorting centres. Therefore, collaborations between government agencies, construction companies, waste management firms, and research institutions need be encouraged. There would be need to jointly invest in research and development for innovative waste reduction and recycling technologies. Collaboration in undertaking public awareness campaigns to promote sustainable construction practices and waste reduction has to be the order of the day.

Suffice it to say that by leveraging the strengths and resources of government, the private sector, and public-private partnerships, the transition towards zero construction waste in Kenyan Coastal Counties can be accelerated, leading to improved environmental outcomes, economic growth, and sustainable development.

8 Recommendations

Some of the specific recommendations include:

- ☐ Propose and plan model coastal cities-Malindi, Mombasa and Ukunda/Diani,
- ☐ Move towards zero construction waste, through RRRR- reuse, recycle, restore, return,
- ☐ Apply smarter technologies in construction and infrastructure developments, including those that use less water, sand, stones, energy, etc.,
- ☐ Provide incentive schemes to discourage single use of wood products such as formwork, scaffolding, props, etc.,
- ☐ Encourage or enforce use of cleaner and sustainable energy solutions,
- ☐ Adopt low carbon construction technologies,
- ☐ National and county governments should collaborate closely to align their efforts in promoting zero construction waste. Regular communication and information-sharing platforms should be established to foster cooperation,
- ☐ National and County Governments should consider providing incentives, such as tax breaks or subsidies, for construction companies that adopt sustainable practices. Simultaneously, penalties should be enforced for non-compliance with waste management regulations.

- ❑ Foster partnerships between the public and private sectors to leverage resources and expertise in advancing zero construction waste initiatives. Jointly invest in research, infrastructure, and public awareness campaigns.
- ❑ Establish a robust monitoring and reporting system to track progress towards zero construction waste targets. Regular updates on achievements and challenges should be made public to maintain transparency.
- ❑ Adopt a long-term perspective in planning and implementing zero construction waste strategies. This involves setting realistic milestones and ensuring continuous improvement through regular evaluations and feedback mechanisms.

9 Conclusion

Achieving zero construction waste in Kenyan Coastal Counties requires a comprehensive approach that integrates policy, legal, and institutional frameworks within the context of sustainable consumption and production. The suggested measures, including the development of a national policy, strengthening of legislation, establishment of a dedicated authority, and promotion of sustainable practices, will play a crucial role in transforming the construction sector into a sustainable and resource-efficient industry. By learning from best practice experiences and tailoring approaches to local contexts, Kenya Coastal Counties can make significant progress in achieving zero construction waste.

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