

Draft Policy Brief

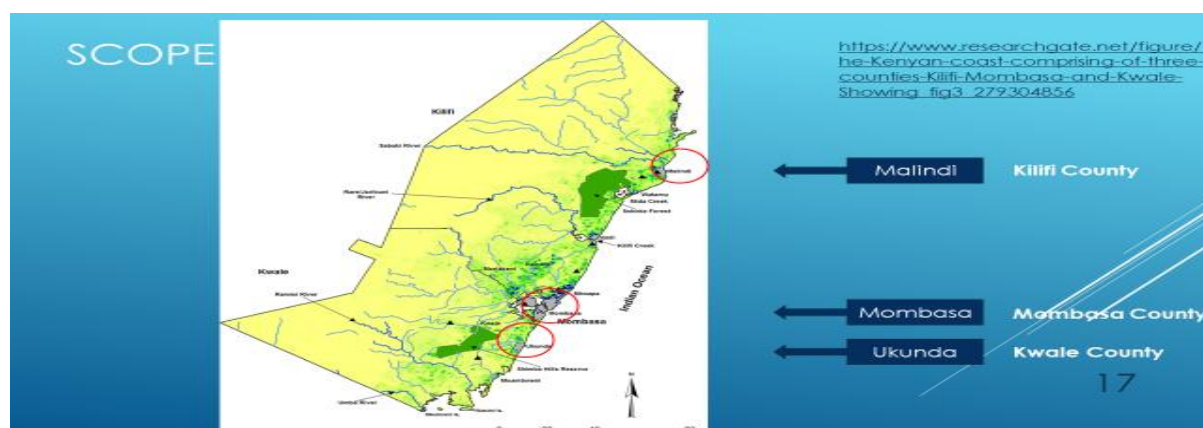
Sustainable Consumption and Production in Kenyan Coastal Counties: Addressing Food Losses and Waste through Effective Policy, Governance, and Institutional Frameworks and Appropriate “Bankable” Investments

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Summary

The **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 sectors are agriculture and food processing, tourism and hospitality, construction and infrastructure, and environment and natural resources. The project was focused on **three key locations: Mombasa City in Mombasa County, Ukunda/Diani municipality in Kwale County, and Malindi municipality in Kilifi County**. Figure 1 presents the project sites. The research analyzed national, sub-national, regional, and global frameworks on SCP with a view to addressing policy, legal and institutional gaps and suggest 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. One of the outputs of the research focused on food losses and waste and shows that the magnitudes are quite significant. The results show that minimal attention, be it in policy, legal frameworks or investments, has been given to issues related to food losses and waste and this poses challenges to achieving food security, environmental sustainability, and economic growth. This policy brief, therefore, highlights the study results and in particular the recommendation that there is urgent need for addressing issues related to food losses and waste in order to achieve sustainable consumption and production in Kenyan coastal counties. The study further points out that in order to achieve sustainability, there is need for designing and implementing robust and inclusive policy, governance, and institutional frameworks and bankable investments.

Figure 1: Project Sites



1. Current Agricultural Production Levels across the Project Counties

The *JKP* region is made up of 6 counties namely; Kwale, Mombasa, Kilifi, Tana River, Lamu and Taita Taveta altogether occupying approximately 79,968.1 km² and account collectively for 17% of the Kenyan population (KEFRI, 2016). An estimated 75% of these coastal areas lie in the arid or semi-arid zone (Muli, 2013). Kenya's coastal land is 25% non-agricultural, 50% ranching and 25% crop farming (Waaijbergen, 2000). The main crops farmed in the agricultural areas are cashew nuts, sisal, cassava and millet. Most of the farming is rain-fed which means that crop production is seasonal. The main food crops grown include cassava, sweet potatoes, maize, coconut, cowpeas and rice, which are grown in irrigated areas, marshes and floodplains. Vegetables and tropical fruits such as citrus, mangoes, bananas, pineapples and watermelons are grown for both subsistence and export. Other crops, which are mainly grown for export, include cashews, bixa and sisal. The average farm size on the Kenyan coast is between 6 and 8 ha, and tree crops (cashews, coconuts, citrus and mangoes) occupy about 50 percent of the coastal arable land.

The coastal counties of Mombasa, Kwale and Kilifi undertake significant agro processing activities. These include food processing and distribution/retail, crop production and especially fruits and vegetables, horticulture, cereals, livestock and animal husbandry, meat products, fisheries, poultry, etc. Crop and animal production is especially found in Kilifi and Kwale counties, which also have a lot of agricultural space in urban and hinterland areas. Agro processing including milling, fruit processing, fish processing, water processing and packaging, among others, is most established in Mombasa city, with less such establishments in Malindi and Ukunda/Diani.

Suffice it to say that coastal agricultural production is undertaken in low-lying and saline-prone soils where spatial competition with urban growth is an increasing problem. This land is usually sandwiched between land and sea. Coastal agriculture is thus more susceptible to climate change and anthropogenic disturbance compared to inland farming systems, and this includes temperature changes, erratic rainfall, sea-level rise, salinity, tidal processes, water stresses, waterlogging and land use changes such as increased population and pollution. According to USAID (2018), a sea level rise of 30 cm is estimated to threaten 17 percent (4,600 hectares) of Mombasa with inundation. This would greatly affect the limited available agricultural land for the coastal residents.

2. Policy, Legal and Relevant Institutional Frameworks

2.1 National Level

National frameworks reviewed include: National Food Safety Policy 2013, and its revised draft 2021; National Agricultural Policy; Veterinary Policy 2020; National Fisheries Policy; National Policy on Prevention of Anti-microbial Resistance; Food and Nutrition Security Policy (2011; Kenya Health Policy 2014-2030. These policy instruments deal generally with food production, food safety and nutrition security, but less directly with food waste and food losses. Some of the food laws of relevance herein include: Crops Act 2013, which mandates the Agricultural Food Authority to regulate safety of crops and crop products, handling, transportation, processing, packaging, preservation, conservation and market standards of food crops and crop products. Other SCP relevant laws reviewed include the Agriculture and Food Authority Act 2013; Agriculture, Drugs and Chemical Substances Act cap 254; Dairy Industry Act; Fisheries

Management and Development Act 2016; Kenya Plant Health Inspectorate Service Act No 54 of 2012; Pest Control Products Act cap 346; Fertilizers and Animal Foodstuffs Act cap 345; Meat Control Act cap 356; and Animal Diseases Act cap 364); Biosafety Act No 2 of 2009 and the Public Health Act, among others.

In general, these laws, while dealing with production and food safety, do not adequately or directly address food wastage and food losses; and they have overlaps and ambiguities; some are rather old and have not been updated for long; and implementation and enforcement mechanisms are generally weak. The Crops Act does not adequately address domestic food safety governance, which has direct and serious implications on protection of public health and trade in food.

The reviewed sector institutional mandates responsible for agriculture and food processing include the Ministry of Agriculture and Livestock; Ministry of Industry, Trade and Cooperatives; Ministry of Water, Sanitation and Irrigation, the Ministry of Mining, Blue Economy and Maritime Affairs (State Department of Fisheries and Blue Economy), among others. Key national institutions and agencies include Agriculture and Food Authority, National Biosafety Authority, Kenya Agricultural and Livestock Research Organization, Kenya Dairy Board, Kenya Bureau of Standards, Kenya Fisheries Service, Kenya Plant Health Inspectorate Service, and Pest Control Products Board. In general, these institutions' mandates often overlap and even conflict, and create production and related governance inefficiencies that lead to food waste and losses and compromise national food safety control systems.

2.2 Relevant Sub National Policy and Legal Frameworks

For the devolved system of government, relevant frameworks include county specific frameworks such as county integrated development plans, county spatial development plans, policies, laws and regulatory frameworks relevant to agriculture and food processing, for each of the counties of concern: Mombasa, Kwale and Kilifi. Key institutional mandates include the Council of Governors, county executive committees and directorates in charge of agriculture, livestock and fisheries, cooperatives and trade, health.

Kilifi County: The CIDP identifies agriculture as a key sector in the county's development priorities. Priorities under sector for the 2018-2022 CIDP implementation period mainly focused on increasing the acreage under crop production in order to increase crop productivity, and sustainable crop management. As a flagship project under crop management, the CIDP proposed the development of countywide food banks to improve food security through post-harvest management of produce to reduce post-harvest food loss by 20% by 2022. The current CIDP 2022-27 follows similar trajectory. However, there is no reference to reducing food waste in the CIDP.

Specific laws on agriculture in the County include the Kilifi County Agricultural Development Fund Act, and the Kilifi County Coconut Act. The Kilifi County Agricultural Development Fund Act is specifically for the establishment of the Agricultural Development Fund, to support agricultural production. The Kilifi County Coconut Act on the other hand, is focused on regulating the processing and marketing of coconut products. It establishes the Coconut Development Board which shall set standards for the production, promotion and marketability of coconut products. It also provides for the establishment of the Kilifi County Coconut Research Institute. The Act does not have any provisions on sustainable coconut resource

utilization, or coconut waste management. In this regard, the problem of coconut shell/husk disposal is particularly noticeable, especially in Mombasa public beaches where “madafu” is popularly sold on the beach front.

Mombasa County: Despite land ownership remaining a challenge, subsistence farming and livestock rearing is practiced by a significant population living in the county’s peri-urban areas. Farming is largely on cassava, sorghum, millet and maize, which are disease and pest resistant crops. Since only about 400ha is utilised for food crop farming, the county is heavily reliant on food and agricultural products importation from other parts of the country and from neighbouring countries, raising the cost of food. On the other hand, farming of fruit trees such as mango, coconut, lime, orange and grape fruit tree farming is prevalent in the County. The County has a Coconut Development Authority, established to promote economic use of the coconut trees in the region. The Authority has since introduced fast-maturing coconut varieties to make the crop more economically viable. However, it appears the ubiquitous problem of disposal of coconut shells/husks along the public beaches is not being addressed. Especially in busy public beaches where sale of “madafu” is prevalent, interventions are needed to help stem the public nuisance, and also to consider producing animal feeds and/or compost manure for use by peri-urban crop and livestock farmers.

The 2018-2022 CIDP identifies high post-harvest food losses as a challenge in the county’s Agricultural sector, and attributes it to lack of adequate storage facilities and lack of knowledge by farmers on post-harvest handling of agricultural products, the intervention strategies proposed are the construction of adequate storage facilities to reduce loss, capacity building for farmers on post-harvest handling of agricultural products, and introducing post-harvest management technologies. However, there is no reference to food waste. The 2022-2027 CIDP follows similar path.

Mombasa County Climate Change Policy proposes interventions to address the agriculture, fisheries and livestock sectors in order to enhance resilience in agricultural production. It proposes that the County should, among others, promote climate smart crop and livestock production technologies, and promote climate proof agriculture and fisheries value chain from farm to the consumer, to address post-harvest loss. However, again, there is no mention of food waste. There are no other laws or policies (online) on agriculture in the county.

Kwale County: One of the CIDP 2018-2022’s strategic objectives is to improve agriculture productivity, food security and nutrition. Similar to the other two counties, among the Plan’s development priorities in the sector is to establish infrastructure for strategic food and feed reserves at the county level. To reduce post-harvest losses, the county will increase the number of cereal stores, and build the capacity of management committees to improve post-harvest management. The Kwale CIDP 2022-27 follows a similar path. There are no other laws or policies (online) on agriculture in the county.

2.3 Regional and International Instruments

Some of the international legal instruments relevant to SCP and agriculture and food production, including food loss and waste include the FAO (2014) Building a Common Vision for Sustainable Food and Agriculture; FAO (2015) Global Initiative on Food Loss and Waste; and FAO 2019: The State of Food and Agriculture. FAO 2017: Policy Measures for Managing Quality and Reducing Post Harvest Losses in Fresh Produce Supply Chains in South Asian

Countries, Rome. World Bank 2011: Missing Food: The Case of post-harvest losses in Sub Saharan Africa, World Bank. Other Operational Studies 2824, Washington DC; UNSD 2018: Goal 12, New York, USA, United Nations Statistics Division. In general, these frameworks are soft law in nature and do not have firm and binding commitments on agriculture and food production, as well as on food loss and waste. However, their policy orientation, especially on food loss and waste, are quite commendable.

The African Union (AU) frameworks address SCP in agriculture and food systems in general. The Department of Agriculture, Rural Development, Blue Economy and Sustainable Environment (ARBE) leads the efforts to promote sustainable environmental management and agricultural development by boosting member states' rural economy, development and agricultural transformation by supporting the adoption of measures, strategies, policies and programmes on agriculture. The Department promotes the implementation of Agenda 2063 continental frameworks such as Comprehensive Africa Agriculture Development Programme(CAADP); promoting agricultural and rural development, promoting policies and developing strategies and programmes to ensure food security and nutrition; helping member states to achieve sustainable growth and improved livelihoods through sound environmental and natural resources management, and promoting multilateral environmental agreements (MEAs) Land Policy Initiative, climate and disaster risk reduction, among others. The African Union (AU) Malabo Declaration, adopted in June 2014 in Malabo, Equatorial Guinea, reaffirms previous commitments related to agriculture, food and nutrition. Among others, the AU Heads of State and Government recommitted to the principles and values of the CAADP process. They also committed to enhancing financial investments in agriculture, both public and private. In this regard they upheld the earlier commitment to allocate at least 10% of public expenditure to agriculture and to ensure its efficiency and effectiveness, *inter alia*.

3. Key Findings on Extent of Food Losses and Waste

3.1 Extent of Food Losses and Waste

In understanding the concept of food loss and waste, it has been argued that it is deceptively simple, but there is no commonly agreed definition of the terms. The various definitions often reflect the different problems that stakeholders or analysts focus on or associate with food loss and waste. Consequently, analysis of food loss and waste is hampered by lack of a common definition (FAO 2019). The Food and Agriculture Organization (FAO) defines food loss and waste as the decrease in quantity or quality of food along the food supply chain. "Food losses" occur along the food supply chain from harvesting/slaughter/catch, up to but not including retail level. "Food waste" occurs at the retail and consumption level. However, food diverted to other economic uses, for example animal feeds, or inedible parts of food, are not considered as food loss or waste. The difference between food loss and food waste aligns well with the distinction implicit in SDG 12.3. It is also apparent that food loss or waste has been typically measured in physical terms using tonnes as reporting units.

According to the 2019 FAO report entitled "The State of Food and Agriculture: Moving Forward on Food Loss and Waste Reduction" the need to reduce food loss and waste is firmly embedded in the 2030 Agenda for Sustainable Development. Food loss and waste reduction is considered important for improving food security and nutrition, promoting environmental sustainability and lowering production costs. However, according to the report, efforts to

reduce food loss and waste will only be effective if informed by a solid understanding of the problem. Indeed, the report is substantially about understanding the problem of food loss and waste on a global scale, including constraints of data and methodology. While the reduction of food loss and waste appears as clear and desirable objective, actual implementation of it is not simple and its complete elimination may not be realistic. The need to reduce food loss and waste presents new insights on what is known and what is not, and provides guidance on how to target interventions and policies depending on policy makers' objectives and the information available (FAO 2019). The report provides new estimates of the percentage of the world's food lost from production up to the retail level. The report also finds a vast diversity in existing estimates of losses, even for the same commodities and for the same stages in the supply chain. The report affirms that clearly identifying and understanding critical loss points in specific supply chains – where considerable potential exists for reducing food losses – is crucial to deciding on appropriate measures. The report provides some guiding principles for interventions based on the objectives being pursued through food loss and waste reductions, which may primarily include: improved economic efficiency, food security and nutrition, or environmental sustainability.

The critical loss points, presented as potential direct causes and indirect drivers of food loss and waste, include agricultural production and harvest/slaughter/catch, storage and transportation, processing and packaging, whole and retail, and consumption (households and food services). At the stage of agricultural production and harvest, food loss occurs when produce is left in the fields due to quality standards or sharp drop in prices, poor production and agronomic practices and choices such as crop or seed varieties, machine or human damage, and poor harvesting scheduling, among others (FAO 2019). At the stage of storage and transportation, another critical loss point, suppliers and consumers may fail to have adequate or appropriate storage to enable them to optimize the timing of marketing and marketing decisions. Storage provides stability for producers by helping prevent losses. However, the lack of refrigerated warehouse spaces or other cold storage facilities, especially in Sub-Saharan Africa and elsewhere in the global south, significantly increases food losses. Transportation introduces a time gap between various stages of the food supply chain, from production to consumption. The time gap increases the risk that food products, especially perishable ones, may be damaged or lost either due to excessive heat or cold, damage in transit, contamination, or the like. (FAO 2019).

At the stage of processing and packaging, the amount of food lost depends in large part on the type of raw material and the nature of the processing operations. Lower income countries, including Sub-Saharan Africa, often suffer from inadequate or non-existent processing facilities especially for products that are highly perishable such as milk and fish, seasonal such as mangoes and other fruits. As a category, fruits and vegetables are generally highly perishable, and once harvested need to be handled and packaged with care, using appropriate practices to maintain their quality. Transport is a critical loss point in the supply chains of fruits and vegetables, owing largely to inadequate use of bulk packaging and poor temperatures and humidity management. Losses occur from mechanical damage evidenced by bruising, distortion in the shape of produce, cracking and punctures, which leads to discoloration, accelerated ripening, weight loss due to increased transpiration and accelerated decay, which all lead to economic losses (FAO 2019).

Another critical loss point is wholesale and retail. The causes of food waste at this stage are linked to the limited shelf life of perishable foods, private quality standards of buyers, and variability of demand, especially for fresh produce. Actions and decisions taken by retailers often dictate those of their suppliers. Storage conditions, packaging quality and handling practices greatly impact on the quality, shelf life and acceptability of food products (FAO 2019).

Finally, according to the FAO report, the consumer and food services is a critical loss point. Food waste by consumers is a problem especially associated with and reported in high income countries, and only to a smaller extent in low and middle income countries. Indeed, emerging economies are increasingly faced with this problem. The higher the household wealth, the more food consumer's waste. Growing incomes and demographic and cultural changes over the past decades have led to changes in eating habits which often favor convenience. Consumer waste is particularly highest in perishable foods, such as animal products (14-37%) and fruits and vegetables (9-20%). In this regard, most consumer waste studies take place in high income countries where the problem is particularly acute, and especially in the United States of America (USA) and Europe) (FAO 2019, p39).

Of the most critical loss points, in Africa, the highest levels of loss for cereal grains and legumes are consistently at the harvesting and on farm storage stages, regardless of location or climate. This also applies for roots, tubers and fruits, which are also impacted at the packing (handling and treatment operations) and transportation. The causes of harvesting losses frequently reported by farmers include attacks by pests and insects and the effects of diseases, adverse climatic conditions such as heavy rains during harvesting, inappropriate timing of the harvest and lack of labor or funds. Inadequate or inappropriate storage facilities and poor handling practices are among the main causes of on farm food losses. For fruits, the most frequently reported causes of loss during harvest relate to the stage of maturity, timing and scheduling, poor sorting, handling and harvesting methods, adverse climatic and weather conditions, diseases and attacks by insects and birds. Losses during packing and transportation were mostly associated with poor handling, inadequate storage conditions and inappropriate packaging (FAO 2019).

3.2 Field Visit Results

From the series of targeted field/site visits and focus group discussions (FGDs) conducted during 2021-22, there were various useful responses and findings. The research team focused mainly on county departments and directorates of agriculture and trade (Kwale, Mombasa and Kilifi), retail/wholesale food markets, and landfills/dumpsites and covered large sections of peri-urban Ukunda/Diani, Mombasa, and Malindi. The focus on the departments and directorates was because we needed to discuss with policy makers and managers of the sector, while retail and whole markets enabled us to address food trade, food losses and waste. This also applied to the focus on dumpsites/landfills.

As far as Kwale is concerned, the research found that, in general, pressing needs for Kwale's agriculture included on-farm food losses. Unsegregated food waste in the Kinondo landfill/dumpsite on the outskirts of Ukunda was noted. Food waste originates in the retail markets, households and hotels and catering establishments, among others. According to the management of Ukunda/Diani Municipality, the land fill is designed to handle segregated waste, and there are plans for recycling of waste.

The field/site visits and FGDs at the wholesale and retail food markets in Mombasa and Kilifi showed that at the Kongowea market, which is the largest retail/wholesale food market in Mombasa city and by extension the whole of the coastal region, there are huge amounts of food losses and waste. However, there were no data sets or information on amount of food waste recorded. Structural problems that contribute to food waste include power interruptions especially in the upper floors, broken pipes and leaking roofs which affect foodstuffs during rains and inadequate cold storage facilities. Other challenges include market politics and governance problems, and widespread general market food waste. Although demand is rising for animal feeds especially for green maize husks and remnants of vegetables, food waste is a major problem. Open air sales contribute to food waste mainly due to hot weather/sunny conditions.

4. Best Practices in Sustainable Agriculture: Lessons from Around the World and the African Continent

To effectively address food losses and waste in Kenyan coastal counties, it is essential to draw inspiration from successful practices and initiatives implemented globally and within the African continent. The following best practices highlight successful approaches that can be adapted to the local context:

- **The European Union (EU) - "Farm to Fork Strategy":**

The EU is committed to the global fight against food loss and waste. Food waste prevention was singled out as a priority area in the EU Circular Economy Action Plan, adopted in 2015.^{39, 40} This called on the European Commission to establish a multi-stakeholder platform dedicated to food waste prevention. The EU Platform on Food Losses and Food Waste, established in 2016, brings together all key actors representing both public and private interests from farm to fork to advance EU progress towards SDG Target 12.3. The EU's Farm to Fork Strategy aims to build sustainable food systems, including reducing food losses and waste by 50% by 2030. It promotes sustainable agricultural practices, efficient supply chains, and improved consumer awareness through policy measures and targeted investments. The Platform aims to support all actors in defining measures to prevent food waste, including possible recommendations for EU-level action, sharing best practices and evaluating progress. With the support of the EU Platform on Food Losses and Food Waste, the European Commission has adopted EU guidelines to facilitate food donations and the redirection of food no longer fit for human consumption into feed. It has developed a food waste measurement methodology and is working to improve date labelling practices. Measurement is critical to food waste prevention. Revised EU waste legislation adopted in May 2018 has introduced specific measures which will provide the EU with new and consistent data on food waste levels. On 3 May 2019 the European Commission adopted a Delegated Act laying down a common food waste measurement methodology to help Member States quantify food waste at each stage of the food supply chain. Based on a common definition, the methodology will ensure coherent monitoring of food waste levels across the EU. The Delegated Act was expected to come into force in 2019. EU Member States are expected to provide data separately for five stages of the food supply chain: primary production, processing and manufacturing, retail and other distribution of food, restaurants and food services, and households. This covers the scope of both sub-indicators proposed to measure progress towards SDG Target 12.3.

- **The United States - "Good Agricultural Practices" (GAP):** The United States' GAP program provides guidelines for farmers to minimize food losses and improve safety and quality standards. It emphasizes practices such as proper handling, storage, and transport, ensuring traceability, and training farmers on risk management strategies.
- **South Africa - "The National Development Plan":** South Africa's National Development Plan emphasizes the need for sustainable agriculture and food security, with specific measures to reduce food losses and waste. It includes interventions such as investment in post-harvest infrastructure, research and technology development, and farmer support programs.
- **Nigeria - "The Zero Hunger Initiative":** Nigeria's Zero Hunger Initiative focuses on achieving zero hunger through sustainable agricultural practices, including addressing food losses and waste. It emphasizes the adoption of modern storage and processing technologies, capacity building for farmers, and the establishment of commodity value chains.
- **Kenya - "The National Food and Nutrition Security Policy":** Kenya's National Food and Nutrition Security Policy includes strategies to reduce post-harvest losses and waste. It emphasizes the development of infrastructure, market linkages, and the promotion of sustainable farming practices.

5. Gaps, Challenges and Business Case for Food Losses and Waste

A first estimate of overall food loss throughout the FAO report concludes that globally, 13.8% of all food is lost from post-harvest up to but excluding retail and beyond. However, while the food loss estimates help draw attention to the problem and incite action, effective interventions to reduce food loss and waste must be based on more detailed information regarding where it occurs in the food supply chain, for which foods and in which regions it occurs, and the extent of the problem and underlying reasons (FAO 2019). This means that there are huge data and information gaps that ought to be filled in order to help better understand the problem and design appropriate responses. The report also urges that a business case be made out, with system of incentives, investments and regulations which should be established, especially to enable private actors to reduce food loss and waste. It argues that actors in the food supply chain are driven by self-interest: producers aim to maximize profits and consumers their well-being. As rational decision makers, they reduce food losses or waste as long as the benefits outweigh the costs. The report also states that completely eliminating all food loss and waste is unrealistic as the costs would be exorbitant (FAO 2019).

There is a persuasive case for public sector involvement in the food loss and waste management, based on both business case and economic case. There are tangible benefits of public sector investment in this regard, including food and nutritional security, environmental sustainability and mitigation of climate impacts, and increased productivity and economic growth. The business case for reducing food losses and waste, where incentives and adequate information can encourage the private sector to reduce food loss and waste in their own interest, should be completed by an economic case for waste. The economic case goes beyond the business case, and focuses on the broader benefits that can accrue to society from reducing

food loss and waste, and this may include improved incomes for other actors in society, improved food security and nutrition, and environmental sustainability.

The FAO 2019 Report also finds that both global and national estimates of food loss are important to monitor progress over time, but additional information is needed to understand the variability of food loss and waste percentages across different contexts and at critical loss-points along the food supply chain. Also, information on the location, extent and underlying causes of food loss and waste is fundamental in drawing up strategies aimed at food loss and waste reduction. Moreover, representation of food loss and waste data is imbalanced. Most studies focus on fruits, vegetables, cereals and pulses at the farm level, and these are mostly from Central and Southern Asia, Sub-Saharan Africa and Eastern and South Eastern Asia. The report also finds that loss and waste percentages are generally higher for fruits and vegetables than for cereals and pulses, especially in situations where cold storage or processing conditions are inadequate. The wide variability of food loss and waste across commodity groups and supply chain stages, particularly in Sub Saharan Africa and Eastern and South Eastern Asia, points to the need for improved data collection to inform targeted reduction strategies. (FAO 2019)

The UNEP (2021) Food Waste Index Report complements the FAO (2019) Food Loss Index. The Food Waste Index covers the later stages of food's journey – food waste – occurring at household, food service and retail levels. According to UNEP (2021) Food Waste Index Report, which focuses on a global scale, food waste reduction offers multi-faceted wins for people and planet, improving food security, addressing climate change, saving money and reducing pressures on land, water, biodiversity and waste management systems. Yet this potential has until now been woefully under-exploited. This potential may have been overlooked because the true scale of food waste and its impacts have not been well understood. According to the UNEP Report, global estimates of food waste have relied on extrapolation of data from a small number of countries, often using old data. Few governments have robust data on food waste to make the case to act and prioritize their efforts. Sustainable Development Goal 12.3 (SDG 12.3) captures a commitment to halve food waste at the retail and consumer level and to reduce food loss across supply chains.

The UNEP (2021) Food Waste Index Report aims to advance progress on SDG 12.3 in two ways: firstly, it presents the most comprehensive food waste data collection, analysis and modelling to date, generating a new estimate of global food waste. Country-level food waste estimates have been calculated, and while confidence intervals for estimates vary by region and by sector, they offer new insight into the scale of the problem and into the substantial prevention potential in low-, middle- and high-income countries. Secondly, the report publishes a methodology for countries to measure food waste, at household, food service and retail level, in order to track national progress towards 2030 and to report on SDG 12.3. Countries using this methodology should generate strong evidence to guide national strategies on food waste prevention, food waste estimates that are sufficiently sensitive to pick up changes in food waste over two- or four-year intervals, and that enable meaningful comparisons among countries globally.

According to Inger Andersen, the Executive Director of UNEP, “If food loss and waste were a country, it would be the third biggest source of greenhouse gas emissions. Food waste also burdens waste management systems, exacerbates food insecurity, making it a major contributor

to the three planetary crises of climate change, nature and biodiversity loss, and pollution and waste. This is why Sustainable Development Goal 12.3 aims to halve food waste and reduce food loss by 2030” (UNEP 2021). In support of this vital target, UNEP’s first Food Waste Index Report provides insights into the scale of food waste and a methodology that enables countries to measure baselines and track progress in meeting the SDG target. The report estimates that food waste from households, retail establishments and the food service industry totals 931 million tonnes each year. Nearly 570 million tonnes of this waste occur at the household level. The report also reveals that the global average of 74 kg per capita of food wasted each year is remarkably similar from lower-middle income to high-income countries, suggesting that most countries have room to improve. From both the UNEP 2021 Food Waste Index Report and the FAO 2019 report, Kenya is not among the “List of countries officially reporting data on food loss to FAO for at least one year between 1990 and 2019”.

6. Conclusion

Addressing food losses and waste is crucial for achieving sustainable agriculture in Kenyan coastal counties. It requires a comprehensive approach that integrates policy, governance, and institutional frameworks. By promoting efficient post-harvest practices, enhancing coordination among stakeholders, and strengthening institutional capacity, the region can reduce food losses, enhance food security, protect the environment, and promote socio-economic development.

7. Recommendations

- i. **Policy Development and Implementation:** a. Formulate and implement comprehensive policies and strategies to promote sustainable agriculture, focusing on reducing food losses and waste. b. Integrate food loss and waste reduction targets into national and county-level agricultural plans.
- ii. **Infrastructure Development:** a. Invest in the development of post-harvest infrastructure, including storage facilities, transportation networks, and market access points. Improve cold chain systems to reduce spoilage and preserve perishable produce.
- iii. **Awareness and Education:** a. Conduct targeted awareness campaigns to educate farmers, traders, and consumers about sustainable agriculture practices, post-harvest handling, and waste reduction techniques. b. Promote knowledge sharing platforms and training programs.
- iv. To effectively address food losses and waste in Kenyan coastal counties, it is essential to draw inspiration from successful practices and initiatives implemented globally and within the African continent.
- v. **Public-Private Partnerships:** Foster partnerships between government institutions, private sector actors, research institutions, and farmers' associations to jointly address food losses and waste including encouraging private sector investments in post-harvest infrastructure, technological innovation, and capacity building programs.
- vi. **Research and Innovation:** Allocate funding for research and innovation in sustainable agriculture practices, post-harvest management, and waste reduction technologies and support collaboration between research institutions, universities, and farmers to develop context-specific solutions.

- vii. **Monitoring and Evaluation:** Establish a robust monitoring and evaluation system to track progress, identify bottlenecks, and make informed policy decisions and regularly assess the effectiveness of interventions and adjust strategies accordingly.

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