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Assessing the Implementation of Marine Fisheries Programmes under the Blue Economy Platform

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KIPPRA in Brief

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Abstract

The Blue Economy is one of the critical economies for economic transformation in the country. This paper assesses the status of implementation of the Blue Economy initiatives in the MTP III 2018-2022 and the 2018 Sustainable Blue Economy conference commitments for marine fisheries in Kenya using the Public Expenditure and Financial Accountability (PEFA) framework. The programmes in the MTP III and 2018 Blue Economy conference form the nine pillars for analysis including: Pillar 1-Development of Blue Economy; Pillar 2-Fisheries Infrastructure Development and Exploitation of Living Resources under Blue Economy; Pillar 3-Kenya Marine Fisheries and Socio-Economic Development; Pillar 4-Aquaculture Business Development Programme; Pillar 5-Kenya Marine Fisheries and Socio-economic Development (KEMFSED) Programme; Pillar 6-Aquaculture Technology Development and Innovation Transfer Programme; Pillar 7-Monitoring, Control and Surveillance Programme; Pillar 8-Development of a Fish Quality Laboratory; Pillar 9-Cooperation and Implementation of Regional and International Frameworks and Standards Programme, and Policy, Legal and Institutional Reforms. The key findings from each of the pillars were as follows: On Pillar 1, there is inadequate capacity building for Beach Management Units (BMUs) and fishermen both at national and county level, various document to guide the Blue Economy, such as master plan, and Blue book have not been developed. Under Pillar 2, there is inadequate monitoring and assessment systems to prevent projects from moving too quickly in reporting and execution. Under Pillar 3, there is insufficient supply of ice for fishermen to preserve fish during fishing and in transportation. Handling of fish is also poor. Under Pillar 4, most of the industrial fishing and aquaculture in Kenya is not accounted for in the GDP. Under Pillar 5, a functional fisheries information system is yet to be developed. Under Pillar 6, aquaculture technology and development and innovation transfer programmes have been developed to support diversification of aquaculture species. Pillar 7 monitoring surveys include Lake Victoria, Lake Turkana and marine waters. Pillar 8 covered development of fish quality programmes. Finally, under Pillar 9, most of fishery management regulation plans and policies are in place, though they have not been reviewed. The key recommendation for each pillar is as follows. In Pillar 1, there is need to build capacity for fish farmers to enhance their capacity and skills. This includes planned training sessions and field outreach to address farmer requirements to promote growth and the overall development of aquaculture in the area. Under Pillar 2 and 3, there is need to strengthen monitoring and assessment systems to ensure timely execution and reporting of projects. Pillar 4 requires establishment of reefer cool containers and flake ice cold chains at landing sites to reduce post-harvest losses. Pillar 5 indicates the need to increase fish production through targeted investment in fishing fleet and advance actualization of Kenya Marine Fisheries and Socio-Economic Development (KEMFSED) programme. Pillar 6 and 7 identifies the need to establish a Monitoring, Control and Surveillance (MCS) strategy to enhance enforcement towards eradicating the use of restricted fishing gears (beach seines, spearguns and monofilament gillnets). Under Pillar 8 and 9, there is need to support water quality, water harvesting, fish quality laboratories and sustain rehabilitation of fish landing sites in Lake Victoria and implement all the various regulatory frameworks.

Abbreviations and Acronyms

EAF	Ecosystem Approach to Fisheries
AUC	African Union Commission
BE	Blue Economy
BEIC	Blue Economy Implementation Committee
BMUs	Beach Management Units
CFP	Common Fisheries Policy
DWFN	Distant Water Fishing Nations
EAF	Ecosystem Approach to Fisheries
EEZ	Exclusive Economic Zones
EU	European Commission
FAO	Food and Agriculture Organization
FMDA	Fisheries Management and Development Act
GDP	Gross Domestic Product
ICZM	Integrated Coastal Zone Management
IORA	Indian Ocean Rim Association
IUU	Illegal Unreported and Unregulated
KCDP	Kenya Coastal Development Project
KCGS	Kenya Coast Guard Service
KEMFSED	Kenya Marine Fisheries and Socio-Economic Development
KFMA	Kenya Fish Marketing Authority
KMFRI	Kenya Marine and Fisheries Research Institute
KNBS	Kenya National Bureau of Statistics
LDCs	Least Developed Countries
MCS	Monitoring Control and Surveillance
MoALF	Ministry of Agriculture, Livestock and Fisheries
MPAs	Marine Protected Areas
MS	Monitoring Systems
NEMA	National Environment Management Authority
PEFA	Public Expenditure and Financial Accountability
PFM	Public Financial Management
SIDS	Small Island Developing States
STCs	Specialized Technical Committees
SWIO	South-West Indian Ocean
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea

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1.   Introduction

Marine fisheries is one of the conventional components of Kenya's Blue Economy which includes inland and marine fishing, aquaculture, maritime law, safety and security, tourism, marine transport, shipbuilding and repair, marine cargo logistics maritime education and training, marine cargo logistics, port-related services, port agency, water sport, marine and maritime governance, ship handling, marine insurance, cargo consolidation, bunkering, offshore mining, renewable energy, bio-prospecting, Blue data, marine biotechnology, transport, international shipping, among others (JICA, 2018). Relative to inland fishing, which dominates about 80 per cent of the fisheries sub-sector, marine fishing is less developed. This is despite Kenya's strategic location on the Exclusive Economic Zone (EEZ) along the most endowed tuna South-West Indian Ocean (SWIO) belt. The Indian Ocean is ranked as the second most productive tuna fishery in the world (MoALF, 2022).

Marine fisheries are an essential source of protein, food security and nutrition for billions of people, accounting for 16.7 per cent of the global population's intake of animal protein and 6.5 per cent of all protein consumed (FAO, 2014). Though predominantly small-scale in Kenya, it is the pillar for coastal livelihoods and is vital in the provision of food security along the coast and in supplying 95 per cent of the total marine catch domestically. In addition to providing a means of subsistence and wholesome food, fisheries also serve as a source of raw materials for the manufacture of animal feed, fish oil, and bioactive compounds used in the pharmaceutical sector. It directly and indirectly supports more than one million people in the fishing industry through fishing, boat construction, equipment maintenance, fish processing, and other auxiliary activities. The ancillary sectors that fisheries support include those that manufacture nets, make packaging materials, repair boats, provide transportation, and provide sports and leisure activities. About 60,000 fisherfolk and fish processors obtain income directly from marine fishing (Smart Fish, 2011; Kamau et al., 2021; MoALF, 2022).

While Kenya is yet to fully optimize the economic gains from marine fishing, the marine environment and resources are already threatened from the rapidly growing population - 4 million as of 2019 - habitat destruction, overfishing, weak governance and the growing effects of climate change. These pressures may adversely affect the sustainability and viability of the coastal fisheries in the long-run. The nature of oceans, open access to all and susceptibility to externalities may lead to degradation and over-exploitation. Therefore, oceans may end up under-achieving their true potential with regard to food security, human health, livelihoods, and broad-based economic growth for many littoral countries (Colgan, 2018; Kamau et al., 2021).

As of 2020, marine fish landing was about 27,300 mt against an estimated potential or total allowable catch of between 150,000 and 300,000 mt along the coast valued at Ksh 100 billion annually (KMFRI, 2018; KNBS., 2021 and MoALF, 2022). Close to 80 per cent of production is by small-scale artisanal fishers and the remaining 20 per cent is by semi-industrial and industrial fishers. Most of this unregulated small-scale fishing is in the inshore waters around mangrove creeks,

coral reefs and seagrass beds. The concentration of fishing on nearshore areas is mostly because local fishers have little capacity with regard to appropriate fishing vessels and gears to fish offshore in deep waters.

Further, Kenya has insufficient nationally owned industrial fishing vessels. Thus, a large portion of the fishing at Kenya's EEZ is unaccounted for, since the licensed Distant Water Fishing Nations (DWFN) do not report catches to Kenya's landing sites. About 30-40 purse seine licenses are mostly from the EU while 4-9 longline vessels are mainly from the Far East. As of 2015, most of the licensed vessels were from France/Mayotte, Seychelles and Spain. Mauritius also had two licensed shipping vessels on the Kenyan EEZ. It is estimated that if this marine fish was landed and valued on Kenyan shore, the country's revenue would amount to Ksh 5 billion annually. Presently, the average budget allocation for fisheries annually is about Ksh 2.2 billion,[1] implying that marine and inland sub-sectors can sustain themselves.

Kenya's marine sector performance is still dismal despite its potential and government revitalization efforts. In an attempt to further transform marine fishing, Kenya has recognized the potential of its marine fishery resources to thrust the country's economy. Kenya domesticated the promise in the Blue Economy by including it as the eighth sector priority in driving the actualization of 10 per cent annual economic growth envisioned in Kenya's Vision 2030. The specific priorities in Kenya's Blue Economy agenda includes, among others, the operationalization of five well equipped fish ports and processing sites linked to feeder beach management units (BMUs) landing sites with cold chain facilities and ice plants that are expected to generate 12,000 jobs and add about Ksh 20 billion to the GDP along the coast, setting up a National Fishing Fleet for the Exclusive Economic Zone (EEZ) by reflagging foreign fishing vessels within the EEZ, monitoring and assessment of fish stock, capacity building for artisanal fishers, regularizing fish landing sites, operationalizing fisheries management plans, and the development of a Blue Economy Masterplan, Book and Database (Kenya Vision, 2030)

Kenya made further commitments to advance the Global Blue Economy Sustainable Blue Economy during a conference held in Nairobi in November 2018 which were, among others, to counter illegal and unreported fishing and put in place initiatives to enhance security and safety of collective waters, ensure sustainable fishing to conserve high value stocks and endangered species, facilitate fish processing and storage capacities, and establish a Blue Economy bank for Blue Economy growth and development in Kenya.

It is against this backdrop, the burgeoning literature, little contextualization of the Blue Economy concept, the priorities in Kenya's Blue Economy agenda and the statement of intent in the Blue Economy conference that we propose an exploratory study on the status of implementation of the Blue Economy initiatives in the MTP III and the Sustainable Blue Economy conference commitments for marine fisheries in Kenya. We specifically intend to tackle four objectives. Firstly,

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[1] https://cob.go.ke/reports/national-government-budget-implementation-review-reports/#1640079218566-a8a20491-3c80

we identify the key initiatives for marine fisheries for Kenya as spelt out in the Medium-Term Plan (MTP) III from the Sustainable Blue Economy Conference in 2018. Secondly, we define the parameters for each of the initiatives that will be used in the assessment followed by a determination of the of achievement for each of the parameters in relation to the targets set. Lastly, we draw conclusions for policy implementation.

The rest of the paper is organized as follows: the next section provides the literature review. Section 3 presents methodology. Section 4 presents the results and findings. The last section concludes the paper with conclusions and recommendations.

2.   Marine Sector Performance

Fisheries resources in Kenya are spread out within the Indian Ocean and the inland freshwater bodies. Inland water and marine fisheries differ in markets, operations and geographical scope. While freshwater fisheries are classified based on water bodies, ecosystems and species, marine fisheries' classifications depend on fishing gears and operations, geographic scope and species.

Kenya has a 640 km coastline with a territorial sea of 12 nautical miles and an Exclusive Economic Zone (EEZ) expanding 200 nautical miles. The Kenyan coastal waters can be classified into three zones. The first zone stretches five nautical miles seawards. Only artisanal and sport fishers are allowed in this zone. Semi-industrial fisheries and certain gear types are prohibited in this zone. The other is between 5-12 nautical mile seawards where semi-industrial prawn trawlers are allowed at an annual license fee. Both the latter and former constitute the Kenya territorial waters. The third is the EEZ, which extends 12-200 nautical miles offshore. Commercial fishers are authorized to fish in this area but are urged to maintain a 15 nautical mile zone. Commercial fleets have to be licensed. The fleet comprises purse-seiners' and long-liners, who are mostly foreigners with a Kenya flag (van Hoof et al., 2017).

Kenya's EZZ is strategically situated along the Indian Ocean Tuna migratory belt that is ranked second globally in tuna production, with most tuna being caught in the western part of the ocean. This belt extends to Comoros, Seychelles, Mauritius, Tanzania, Mozambique, Maldives and Somalia (MoALF, 2022). Marine fishing is either offshore in the EEZ or the coastal artisanal inshore. Marine capture fisheries comprise industrial, semi-industrial, small-scale, aquarium and recreational fisheries landed at around 197 landing sites.

At least 45 per cent of Kenya's marine production is attributed to demersal reef fish while pelagic species, molluscs and crustaceans (including crabs, prawns and lobsters) account for 35 per cent, 9 per cent and 3 per cent, respectively, though the proportions could be higher if unclassified species are included. Other specialized fish stock include cephalopods (octopus and squids), elasmobranchs (rays and sharks) and sea cucumbers (KMFRI, 2018). Demersal fish dwell in the deep waters near the bottom of the sea while pelagic species live on the upper water layers or mid-water regions. The fishing capacity consists of around 14,000 fishers and approximately 3,000 small scale fishing crafts that are mostly wooded dugout canoes, outriggers and mashua, of which below 10 per cent are motorized. For semi-industrial and industrial fishing, there are 3-4 trawlers, 4-9 longliners and 30-40 purse seiners. Over 20 fishing gear types are used by fishers along the coast, with the five most used comprising spear guns, beach seines, basket traps, gillnets and handlines (KMFRI, 2018).

2.1   Contribution of Fishing and Aquaculture Contribution to GDP

The classification of fishing by the Kenya National Bureau of Statistics (KNBS), especially the contribution to GDP, is aggregated into fishing and aquaculture.

Figure 2.1 shows the contribution of fishing and aquaculture to GDP from 2003 to 2021. The graph shows a constant trend in 2003 and 2004 followed by a decline of 20 per cent in 2005. The 0.4 per cent GDP contribution persisted till 2009 but increased by 50 per cent in 2010. This could be attributed to a nationwide government-led farming campaign especially in 2009 to 2010 that led to an increase in the total area of fishponds to 468ha from 220ha (Van Hoof and Steins, 2017). A similar performance remained in 2011 and later declined by 16.7 per cent in 2012. The decline was countered by a significant increase of 40 per cent, 0.7 GDP contribution in 2013 that persisted in 2014.

Previous government initiatives in 2009-2010 were complemented by improved seed supply among other support initiatives, contributing to 40 per cent in 2013. The major species that was produced in 2013 was Nile Tilapia at 75 per cent followed by African catfish, common carp and rainbow trout (Van Hoof and Steins, 2017). However, there was a drop by 14.3 per cent in 2015 and a subsequent decline by 33.3 per cent in 2016. The GDP contribution then increased by 25 per cent in 2017 from the previous year. The performance remained at 0.5 in 2018 followed by an increase of 20 per cent, 0.6 GDP contribution in 2019. The contribution to GDP remained at 0.6 per cent in 2020 and then increased by 16.7 per cent in 2021.

Figure 2.1: Contribution of fishing and aquaculture contribution to GDP
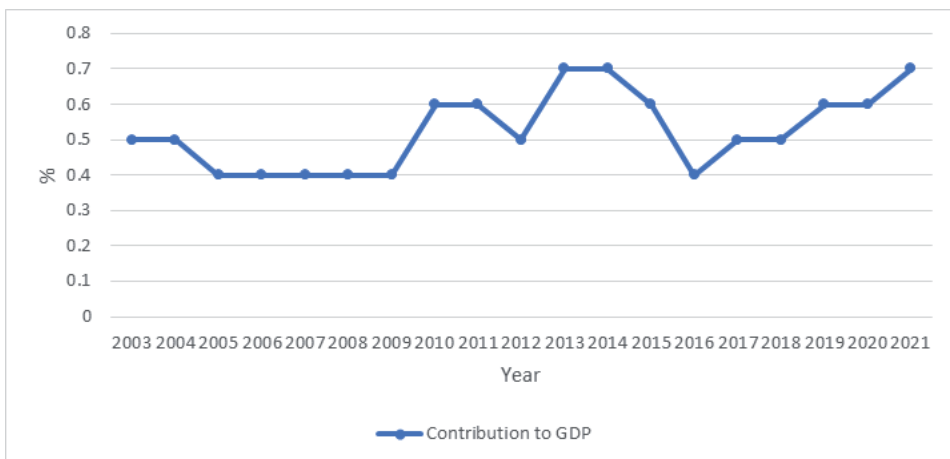
Data Source: KNBS (Various), Economic Surveys

2.2   Contribution of Marine Fishing in Tonnes, Per cent Growth and Per cent of Total Fishing

Figure 2.2 reports the quantity landed in tonnes and millions for marine fisheries from 2009. Prior to 2009, marine fisheries data was classified differently, thus it was not comparable with that of the subsequent years. The quantity of fish landed

presented on Figure 2.1 and Figure 2.2 is from data collected at local landing sites and excludes marine catches by distant water vessels on the Kenyan EEZ until 2017 where there are indications of marine industrial catches data. Figure 2.2 shows that different species of marine contribute more tonnes compared to crustaceans and molluscs. The proportion of marine contribution to overall fishing was within 5 per cent as from 2009 to 2013, followed by a sharp increase from 5.59 per cent in 2013 to 12.75 per cent, 13.51 per cent,16.36 per cent, 17.47 per cent in 2014, 2015, 2016 and 2017, respectively. It is evident that fish production was stable at between 7,000 and 9,000 mt from 2009 to 2013. The turnaround in 2014 and 2015 both in value in tonnes and million US$ is attributed to introduction methodologies in collection of catch data and estimation of fish catches by the State Department of Fisheries and Blue Economy. The data collection was conducted in 22 secondary and primary landing sites that were used to increase catches for sites that were left out using the frame survey data. This indicates that there were instances of under-reporting particularly where staff were not accessing. Further, the Prawn Fisheries Management Plan of 2010, Kenya Coastal Development Project (KCDP[2]) of 2011 to 2017 and launch of the Tuna Fisheries Development and Management Strategy of 2013 may have begun to make inroads in revitalizing marine fishing.

There was a slight fluctuation from 2018 to 2020. A drop to 16.63 per cent was experienced in 2018, followed by an increase to 18.52 per cent in 2019 and a fall to 16.98 per cent in 2020. The sub-sector saw further decline to 16.67 per cent in 2021. Therefore, marine accounts for less than 20 per cent of total fishing activity in Kenya.

The percentage growth in quantity landed per tonnes spiked in the year 2014 to 155 per cent from 3 per cent in 2013 but was followed by a drastic decline in the following year to -5 per cent. A recovery occurred to 9 per cent growth in 2016, which was followed by a negative growth of 2 per cent in 2017. An upward trend of 5 per cent and 11 per cent ensued in 2018 and 2019, respectively, followed by a negative growth of 7 per cent in 2020 that, however, rose to 6 per cent in 2021.

A report by KMFRI estimated that total annual landing may be around 53,700 mt and total annual fishing revenue of US$ 129,017, which are six and eight times the official estimates, respectively. In addition, the report revealed that the gross daily wage of an ordinary marine fisherman was Ksh 1,082 (US$ 11), on average, which is four times Kenya's minimum daily wage. The evaluation study therefore recommends a revision of the official marine fisheries statistics to account for under-valuation in small-scale marine fisheries (KMFRI, 2021).

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[2] https://projects.worldbank.org/en/projects-operations/project-detail/P094692

Figure 2.2: Contribution of marine fishing in tonnes, per cent growth and per cent of total fishing
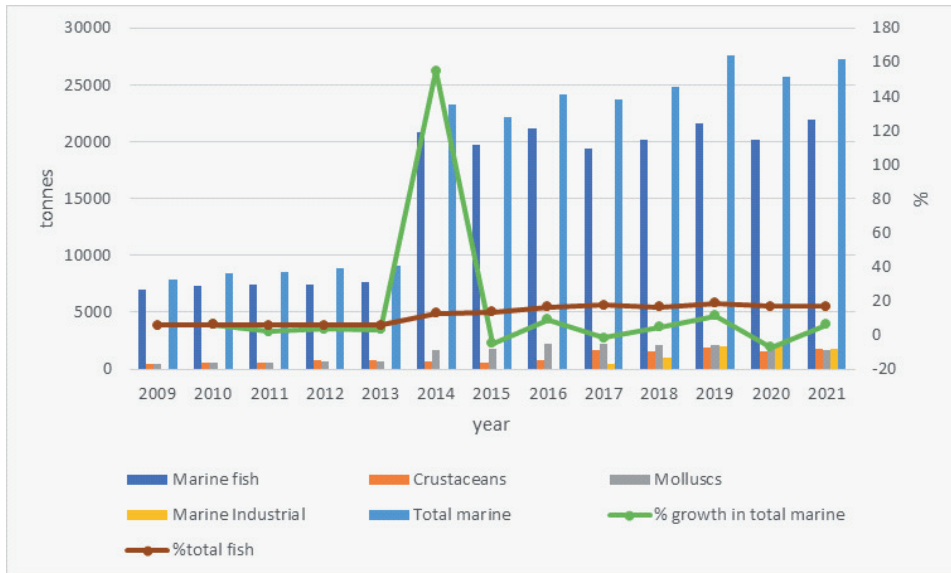
Data Source: KNBS (Various), Economic Survey

2.3 Contribution of Marine Fishing in Millions, Per cent Growth and Per cent of Total Fishing

Trends in Figure 2.3 are similar to Figure 2.2. The per cent quantity value added was between 5.08 per cent and 6.09 per cent from 2009 to 2013 before a rapid increase to 18.14 per cent in 2014. Although there was a decline to 15.46 per cent in 2015, marine fisheries accounted for approximately 19 per cent to 23 per cent in millions, slightly higher than the total contribution in tonnes. Unlike the percentage growth in Figure 2, there was a significant rise from 5.6 per cent to 16.3 per cent and to 42.5 per cent from 2010 to 2012. There was a drop to 7.5 per cent in 2013, which was accompanied by a rapid increase to 258 per cent in 2014. This growth dipped to -18 per cent in 2015, followed by alternating increases and declines in the subsequent years.

Figure 2.3: Contribution of marine fishing in millions, per cent growth and per cent of total revenue
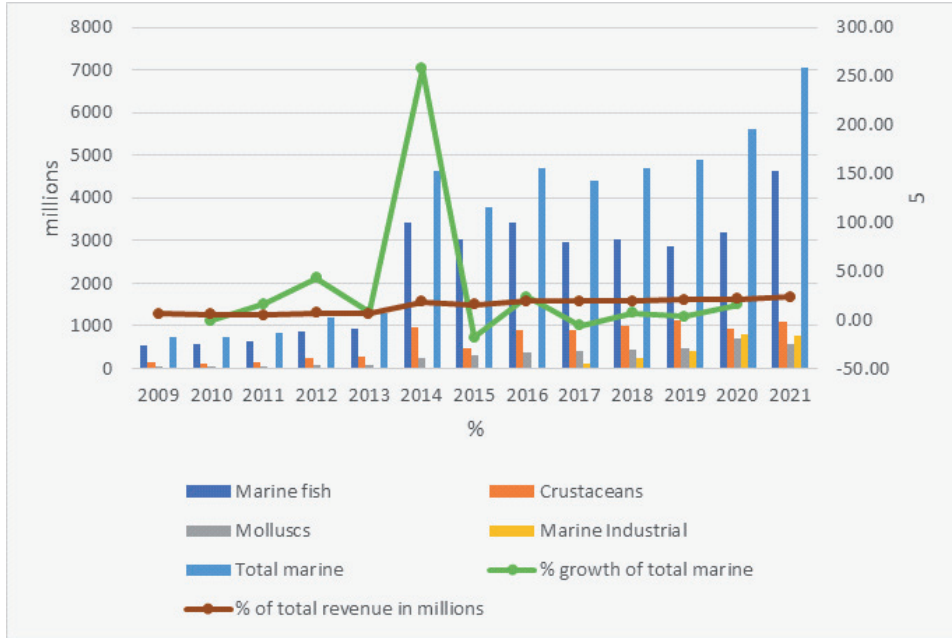
Data Source: KNBS (Various), Economic Surveys

2.4   Contribution of Marine to Imports and Exports

The available ocean trade data in Figure 2.4 shows the import and export performance of marine fisheries, aquaculture and hatcheries, which comprise of finfish, crustaceans, molluscs, aquatic invertebrates other than crustaceans and other living marine products (excluding fish, crustacean, molluscs and aquatic invertebrates). There was a steady increase in the value of exports particularly in 2018 by 87.9 per cent from 2017, though there was a decrease by 5 per cent in 2020 from 2019. For imports, a fluctuating trend is evident as from 2015 to 2018. However, there was a drop in the value of imports by 74.9 per cent, which rose again to 163 per cent in 2020. Exports outperformed imports from the middle of the year 2017 onwards. This may be attributed to increased demand of marine finfish in Europe, and government initiatives to strengthen domestic capacity for industrial and semi-industrial deep-sea fisheries (Kenya Vision 2030, 2022).

Figure 2.4: Contribution of exports and imports in millions US$
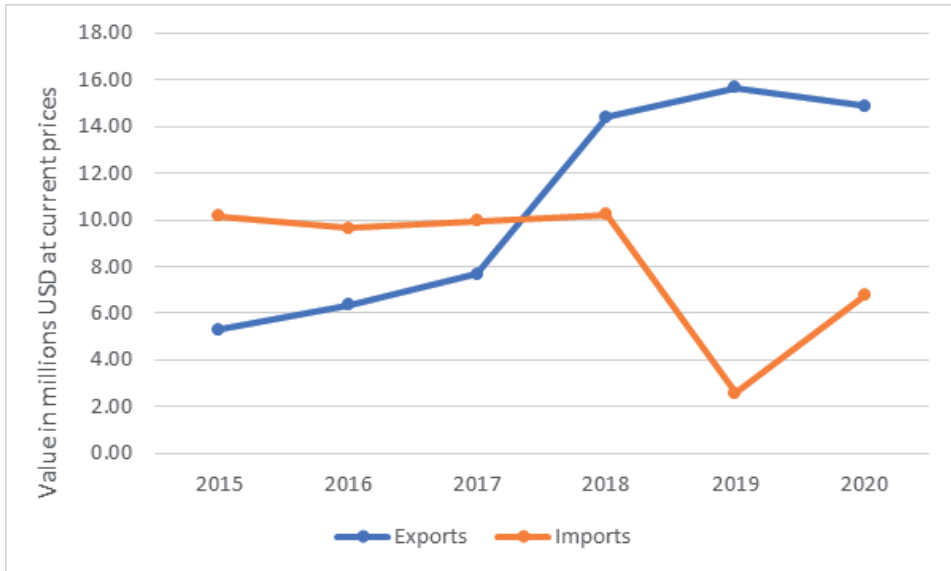
Data Source: UNCTAD Statistics (2022)

3.   Literature Review

3.1   Theoretical Literature

The Blue Economy concept is an advancement of the Green Economy when coastal Least Developed Countries (LDCs) and Small Island Developing States (SIDS) challenged the attention on 'Green Economy' during the United Nations (UN) Conference on Sustainable Development in 2012 (Rio+20 conference). It therefore heavily borrows concepts of Green Economy, Marine Economy, Coastal Economy and Ocean Economy, and has the potential to inspire greater and fast-paced growth Gross Domestic Product (GDP) globally.

The evolutionary Blue Economy concept has been viewed in terms of Kuhn's Theory of paradigm shift and Imre Lakatos Methodology of Scientific Research Programmes. A paradigm shift in the sense that the global development model has evolved with time from a focus on economic growth, use of resources and maintaining full employment equilibrium to amalgamating both sustainable development and growth-oriented approaches as the world continues to experience resource scarcity and possibilities of resource deprivation. Kuhn cycle considers change as inevitable and takes place in five stages. First, there is a scientific model of understanding what works. The model then drifts due to accumulated anomalies and thus cannot address existing problems. The world economy, for example, has neither promoted efficient resources such as ensuring Maximum Sustainable Yield (MSY) in fisheries[3] nor has it achieved goals such as alleviating poverty. Other than promotion of food and nutrition security, fisheries pose threats to the health of oceans and their sustainability over time through practices such as overfishing, habitat destruction, chemical use and so forth.

Thus, alternative revolutionary models are developed, and a paradigm shift or change emerges. The new paradigm is now the new normal science, and the paradigm is complete. The shifts in thinking and concepts do not occur spontaneously but are affected by change agents that transform the society (Blue Economy ecosystem in this case) through innovations and adaptations to sustain the ecosystem's evolutionary dynamism.

The paradigm in this case is a matrix of principles, issues, methods, assumptions, analytical and evaluative frameworks applied by professionals in the discipline. This 'paradigm' is a 'research programme' according to Lakato that is a sequence of progressive theories and empirics comprising: i) hardcore or negative heuristic aspects that are basic axioms and assumptions fundamental to the discipline; and ii) protective belt or positive heuristic aspects that defend ad hoc hypothesis used in the scientific inquiry. According to Lakatos, a practitioner undertaking a scientific inquiry adheres to a set of beliefs that can be termed as 'heuristic'. Therefore, natural sciences are 'hard' and social sciences are 'soft' sciences. Since Blue Economy is an interdisciplinary science, it can be explained by conventional interpretations of social and natural sciences.

The 'hardcore' of Blue Economy is not easily identifiable, but it is certain that

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[3] The highest theoretical equilibrium yield that can be continuously taken (on average) from a stock under existing (average) environmental conditions without affecting significantly the reproduction process (UN, 2003).

market mechanisms will still facilitate the allocation of resources in the next 100 years. Contrary to John Maynard Keynes (in the 1930s) assertion that nations would not need to accumulate wealth if they were four or eight times richer, countries have not yet overcome their greed to pile up wealth by ills such as Malthusian overfishing and illegal unregulated fishing (IUU) that permeates marine fishing globally.

Keen et al (2018) echoes that the Blue Economy concept should be more anchored to ecological economics unlike conventional definitions of the economy, which mostly focus on production and allocation. Rather, ecological economics definitions lay greater emphasis on the context, scale and socio-economic conditions. Adopting ecological economics to disentangle the Blue Economy concept better aligns with sustainable development goals that aim to incorporate social and economic systems. While many national Blue Economy policy papers draw attention to the opportunities and challenges in the Blue Economy, few have articulated practical actions or strategies that countries should adopt. The underlying challenge of the Blue Economy is to do more while doing less. For instance, to increase the wealth in fisheries, countries need to reduce fishing to biologically sustainable levels. More so, seabed mining may generate wealth today, but these effects will be short-lived if portions of the mineral wealth are not conserved for future generations (Colgan, 2018).

3.2   Empirical Literature

The United Nations (UN) Conference on Sustainable Development in 2012 (Rio+20 conference) has triggered a remarkable explosion of other global ocean-focused conferences and studies that are all geared towards extricating the unique concept of the "Blue Economy". Most of the studies have focused on developing a working framework and definition for conceptualizing the Blue Economy (Attri, 2016; World Bank, 2017; Attri and Bohler-Mulleris, 2018; Keen e al., 2018). In addition to the conventional ocean industries such as tourism, fisheries, maritime transport, new activities are emerging such as aquaculture, marine biotechnology, offshore renewable energy, seabed extractive activities and bioprospecting. Ocean ecosystems provide numerous services whose market does not exist but significantly contribute to human and economic activity such as waste disposal, biodiversity existence, coastal protection and carbon sequestration (World Bank, 2017).

Ebarvina (2016) argues that the linkage between economic growth, Blue Economy and ocean and coastal resource conservation is more elaborate if: (i) the Blue Economy incorporates all economic activities dependent on ocean or coastal and marine resources (both ocean-based and ocean-related); (ii) the Blue Economy also includes marine education and research and public sector agencies who are directly responsible for seas and oceans, i.e national defense; (iii) ocean that generates both market and non-market value such as carbon sequestration; (iv) new activities such as seabed mining, invasive water management, among others. Besides conceptualizing the Blue Economy, studies have suggested accounting

frameworks that countries can adopt in quantifying the size of the Blue Economy, though they are more confined to developed and emerging countries (Attri and Bohler-Mulleris, 2018; European Commission – EU, 2021).

Other reports and policy papers put emphasis on the importance of embracing sustainability while exploiting the economic potential in oceans. A recent report by the EU suggests that conservation and restoration of degraded marine resources such as fisheries and biotechnology yield direct economic benefits. The report further states that European fisheries have taken remarkable strides in restoring fish stocks to sustainable levels and to adhere to their Common Fisheries Policy's (CFP) sustainability standards, although implementation gaps abound, e.g. buttressing fisheries management, reducing waste disposal and revising the EU fisheries control system to improve traceability and combat Illegal, Unreported and Unregulated (IUU) fishing that is still the biggest threat to marine ecosystems.

A panel data study on 19 island states in the Asian and Pacific regions on the drivers of the size of the Blue Economy (fisheries production) finds that gross capital formation, previous years exports and electricity connectivity on inland regions had a positive effect on fish production (Bhattacharya and Dash, 2020). Using the Input-Output (I-O) model in Estonia and Finland to assess the job creation forward and backward linkage effects on Blue Economy sectors. Transport and storage in Estonia and Coke, refined petroleum products and nuclear fuel in Finland yielded the highest employment multiplier. However, agriculture, hunting, forestry and fishing registered the lowest job multiplier in Finland. The study did not specify the jobs that could be described as "green" since mining and quarrying and fossil fuel extractive jobs cannot be termed as such based on taxonomy regulations (Ashyrov et al., 2018).

Pauly (2018) examines the possibility of incorporating marine fisheries along with its associated ills (Malthusian overfishing and IUU) into the worldwide Blue Economy and in turn outlines constraints to suggest for such a shift to occur. The study alludes to the possibility of excluding smallscale fishers in Blue growth, who mostly catch fish for human consumption as opposed to industrial fishers who are likely to devote 25 per cent of the catch to processing fish meal and other animal feed. So eminent is the exclusion of artisanal fishers in fisheries decision-making to the extent that most FAO members fail to record their catch. The study then opines that for equitable access to marine resources for all, especially tuna and other large pelagic fish, countries need to fish within the EEZs and have high seas as replenishment areas. By closing tuna fishing in high seas, countries would mitigate illegal fishing fleets resulting in an increase in tuna fish catches globally, since fisheries resources are majorly "oligopolized" by industrialized countries such as Spain, Japan and France, among others. The study proceeds to suggest measures that would set fisheries on a sustainable path, including: well-monitored artisanal fishing to partly replace industrial fishing, stringent legislations requiring rebuilding of depleted stocks, avoiding destructive fishing methods such as trawls and setting up networks of marine reserves in all countries.

Rasowo et al. (2020) content analysis study on the prospect and challenges on the Blue Economy in Kenya suggests that for effective utilization of the Blue Economy, Kenya may need to, among others: support traditional industries such as fisheries, aquaculture, tourism, ports and shipping; make investments in marine scientific research and human capital through training and education; establish a Blue Economy database; and regulate IUU and promote policy integration, coordination and coherence. An examination of fish landing sites and market information towards quantifying the Blue Economy to promote fisheries management found that the volume of fish traded was driven by the quantity produced rather than the price at the landing site or market. The study recommended a review of policy targeting legal, social and economic obstacles that hinder sustainable fish production (Aura et al., 2019).

A report on coastal and deep-sea fisheries, mariculture and aquaculture[4] suggests that the establishment of offshore tuna fisheries would contribute to Kenya's GDP growth. It further reveals instances of under-reporting catch statistics largely from non-declared landings, spoilage and non-reporting of auto-consumption. Other hurdles identified were: few commercial fisheries management plans, inadequate infrastructure; incomplete data such as fishery distribution patterns, reference points, pressure and stock status; environmental pressure and climate change; overlapping policy, legal and institutional frameworks; and inadequate demonstration of Ecosystem Approach to Fisheries (EAF) management to stakeholders, such as artisanal fishers to promote acceptance at community level.

An assessment study of the beach seine fishery on three landing sites (Kiunga, Faza and Kizingitini) in Lamu undertaken in May 2014, March 2015, and May 2016 revealed that beach seines were still being used despite their ban by the State Department of Fisheries and the Blue Economy in 2001, and there were attempts to replace beach seines with more sustainable fishing gears. While beach seines are the most destructive gears depleting reef fish stocks in Kenya, prohibiting their use would even result in more harmful gears. Thus, in addition to alternative sustainable fishing methods, restricting the cod-end mesh size from 2 to 1 or 1.5 inches would result in a decline in capture and subsequent dumping of non-interest species. The study also found that post-harvest losses were threats to sustainability in the three study sites. Besides the need for cold chain facilities, the study recommended stringent regulation enforcement such as hefty fines, the need to for support in value addition activities such as fileting for the export market, increased credit access and promotion of partnerships between fishers and stakeholders in the sector.

Using biogeochemical and fisheries models (Wilson et al., 2021) project large reduction in marine fish biomass for Kenya and Tanzania EEZs by 63 to 76 per cent and 56 to 69 per cent, respectively, if little is done on reducing greenhouse gas emissions over the 21st century. Specifically, six modeled species of tuna portrayed biomass reductions of about 70 per cent in both EEZs in the absence of climate

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[4] https://nairobiconvention.org/clearinghouse/sites/default/files/Coastalper cent20andper cent20Deepper cent20Seaper cent20Fisheriesper cent2Cper cent20Maricultureper cent20Presentation.pdf

change mitigation. Thus, policy makers and stakeholders in the fisheries sector need to be cognizant of tuna depletion threats as they plan to expand national fleets to increase tuna catches. This study argues that such initiatives may not be sustainable in the long-run. However, the models find inshore reef fisheries more resilient to climate change as opposed to offshore pelagics.

This exploratory study therefore seeks to add to this incipient literature on marine fishing under the Blue Economy umbrella. Most of the studies in Kenya on marine fishing are more inclined to optimizing economic benefits, with less conclusive findings that thrust marine fisheries on a sustainable trajectory. We intend to contribute to this emerging concept by assessing the extent to which Kenya has operationalized national and global commitments, and invoke more studies in the area.

4.   Methodological Approach

4.1   Introduction

This study used an assessment framework to assess the extent to which Kenya has implemented the Blue Economy MTP III initiatives and commitments following the Sustainable Blue Economy conference held in Nairobi in 2018 on marine fisheries. The framework provides details of what is to be assessed as evidence of achievement or implementation outlined by the requisite guiding principles. The assessment framework comprises concepts (and definitions), and the "what" and "how" it will be operationalized. To effectively assess, one must measure achievement against a construct (Pearce et al., 2015). According to Crisp et al. (2007) and Wilkinson (2000), an assessment framework has a conceptual basis that lays down the parameters for assessment along with guidelines for practitioners. Rating scales must be included, which enable the examination of the specific domains identified.

The MTP III programmes act as our pillars or dimensions. Following the widely cited Public Expenditure and Financial Accountability (PEFA) framework and methodology, we employ the multidimensional dimension approach. PEFA provides a qualitative review of pillars of a country's Public Financial Management (PFM) that are attached to indicators, based on "generally accepted good practice". Each indicator is then rated against an ordinal scale from A to D based on specific criteria guided by evidence.

The upgraded PEFA framework of 2016 has a set of 31 high level parameters or indicators to assess performance against 7 pillars in a country's PFM system. The guiding principles termed as evidence-based are set by the Secretariat. If there is insufficient evidence, a dimension should not be scored above D. D* is used only at dimension level. "A" denotes internationally accepted "good practice". The criteria begins from "C", which signifies basic, and in turn moving upwards if evidence allows.

For an assessor to arrive at the PI scores, the dimension scores must be combined using either method 1 (M1) and method 2 (M2). Each dimension must be rated separately using the ordinal scale from A to D. For multidimensional indicators where one dimension has poor performance such as D that would negate good performance from an indicator such as B, assessors must apply M1 method. For this method, the indicator is assigned the score of the lowest dimension but with a "+". Since the score is determined by the lowest score, the M1 method is termed as the "weakest link" method. M2 method, the averaging method, is used for multidimensional indicators where the low score on one of the indicators may not undermine the effect of other scores on other dimensions.

PEFA framework also has conversion tables for two, three or four-dimensional parameters. For the P1-11, two Cs and one A result to C+ using M1, but it is rated B under M2. This is how P1-11 is assessed. Single dimension indicators take the rate of the single dimension and are not assigned a "+" score. PEFA bases most of its scores on the M1 methodology.

Since most parameters are multidimensional, we will compute percentages for quantifiable achievements against the documented target or potential. For dimensions whose information on targets/potentials against achievements are available, we compute a percentage for each, then we obtain the average for each pillar. We subject these percentages to ratings from poor to excellent. 0 per cent will be poor, 1 per cent to 25 per cent will be fair, 26 to 50 per cent good, 51 per cent to 75 very good and 75 per cent to 100 per cent will be excellent. For instance, most of the dimensions or parameters for the first three pillars (development of Blue Economy, fisheries infrastructure development, exploitation of living resources under Blue Economy) and dimensions have targets and achievements. The only single dimensional parameter is for the construction of fish laboratory programme. For policy, legal and institutional reforms and cooperation and implementation of regional/international frameworks and standards, and the fish information system dimension in the KEMFSED pillar, we use binary outcomes 0 (no) or 1(yes). A yes is equivalent to 100 per cent while no is 0 per cent. However, some dimensions for some pillars did not have targets that would aid the development of scores, including monitoring control and surveillance (MCS) and 2018 Global Sustainable Blue Economy conference.

PEFA is cognizant of such persisting methodological limitations in transforming grades to numerical values (percentages) and aggregating them (obtaining averages) due to flaws in assumptions made on scoring systems, weighting scores, performance measures, and other aspects of the framework. Despite its criticisms, PEFA is still a comprehensive measure through some of its remedies, such as provisions for narrative reports that delineate qualitative evidence to complement the quantitative scoring system (Kristensen et al., 2019). Similarly, to avoid bias and measurement errors, we refrain from computing percentages and scoring MTP III initiatives and Blue Economy conference commitments where targets have not been provided. We follow the 'best practice' on such instances or parameters by providing remarks and narrations. The approach on each parameter has been provided below.

4.2   Data and Sources

The study utilized data from special reports and consultations with the key institutions operationalizing the Blue Economy initiatives in Kenya, namely: Blue economy committee, which was converted to Blue Economy Implementation Committee (BEIC) and finally to TOBEO; State Department of Fisheries, Aquaculture and Blue Economy; Kenya Fisheries Service; Kenya Marine and Fisheries Research Institute (KMFRI); Kenya Wildlife Service; National Environment Management Authority (NEMA); National Maritime Centre (Bandari College); Kenya Maritime Authority; Kenya Ports Authority (KPA); Kenya Forest Service; and Kenya Fishing Industries Corporation.

To complement the available empirical literature, the study relied on fisheries annual statistical bulletins, national surveys, data collection survey on Blue Economy by JICA in 2018, convention presentations, speeches, bulletins,

convention reports, and statements of intent. The MTP III contains some targets, such as the frequency of catch assessment studies, which should be quarterly. The 2019 MTP III indicator handbook has targets for mainly plans and policies. We also obtain most of the achievements from the Kenya Vision 2030 progress report of 2022 prepared by the Vision 2030 Delivery Secretariat. Data on fish processing plants is obtained from county documents.

5   Results and Discussion

This section narrates the findings for each of the objectives.

5.1   Blue Economy Initiatives and Indicators for Assessment

Table 5.1 provides a portrait of marine fishery initiatives and their parameters to assess the progress made in actualizing Blue Economy strategies in the MTP III and the commitments made in the groundbreaking sustainable Blue Economy conference held in Nairobi in 2018.

Table 5.1: Blue economy programmes and parameters

MTP III Programmes	Initiatives	Parameters
Development of a Blue Economy (BE)	Develop a masterplan	BE Masterplan developed
	Develop a Blue book	Blue book developed
	Capacity building for Blue Economy BMUs and fishermen	Number of trainings
	Development and management of Blue Economy database	BE database developed
	Capacity needs assessment at both the National and County levels	No. of capacity needs assessment studies
Fisheries infrastructure development	Construction of fish ports in Mombasa, Kilifi, Lamu, Shimoni and small commercial port in Takaungu	No. of fish ports constructed
	Construction of fish markets in Mombasa, Lamu, Malindi, Kilifi and Shimoni	No. of fish markets constructed
	Cold storage facilities and ice plants	No. of landing sites with cold storage
	Installation of fish processing plants	No. of fish processing plants installed
Exploitation of living resources under Blue Economy (BE)	Establishment of a National Fishing Fleet for the Exclusive Economic Zone (EEZ)	No. of Kenyan owned fishing fleet
	Promotion of fish consumption	National per capita fish consumption
	Promotion of fish production	Production in metric tones
	Diversification of fish export markets	Growth in the value of export

Kenya marine fisheries and socio-economic development	A functional Fishery Information System will be developed	Fishery information system developed
	Fisheries management plans for priority fisheries operationalized	No. of fisheries management plans for priority fisheries operationalized
Monitoring, control and surveillance programme	Monitoring, control and surveillance in the EEZ	No. of surveillance initiatives in place
	Quarterly catch assessment surveys	Frequency of catch assessment surveys
Development of a fish quality laboratory	Rehabilitation, accreditation and operationalization of the Mombasa fish quality laboratory	Rehabilitated and operationalized laboratory
Cooperation and implementation of regional/international frameworks and standards programme	Implementation of the Indian Ocean Rim Association (IORA) processes	No. of national documents that have incorporated IORA process
	Implementation of the work of the African Union Commission's Specialized Technical Committees (STC) of Trade, Industry and Economic Development	No. of national documents that have incorporated the work of AU's STC
	Ratification and domestication of the Lomé Charter upon the completion and adoption of the draft Annexes	Ratification and domestication of the Lome Charter
Policy, legal and institutional reforms	Finalize the Integrated Ocean Development Policy	Integrated Ocean Development Policy finalized
	Develop a Fish Marketing Strategy	Fish Marketing Strategy developed
	Develop policy on incentives for materials used in boats and fishing gears, fish processing, among others	Developed policy on incentives for materials used in boats, fishing gears and fish processing
	Review of the Fisheries (Safety of Fish, Fishery Products and Fish Feed) Regulations 2007	2007 Fisheries regulations reviewed
	Review of Fisheries Beach Management Units (BMUs) Regulations 2007	BMU Regulations 2007 reviewed
	Develop the Marine and Inland Fisheries Regulations	Marine fisheries regulations developed
	Enact the Coast Guard Bill, 2017	Coast Guard Bill 2017 enacted
	Implement the Fisheries Management and Development Act, 2016	Fisheries Management and Development Act 2016 implemented

2018 Global Sustainable Blue Economy conference		
	Counter illegal and unreported fishing and put in place initiatives to enhance security and safety of collective waters	No. of surveillance initiatives in place
	Ensure sustainable fishing to conserve high value stocks and endangered species	Level of enforcement of fishing gear regulations
	Facilitate fish processing and storage capacities	No. of fish processing plants established and landing sites with cold storage
	Establish a Blue Economy bank for Blue Economy growth and development in Kenya	Blue Economy bank established

Source: Author's construction based on MTP 111 and Sustainable Blue Economy conference on 2018

5.2   Development of a Blue Economy

Developing a master plan was one of the flagship activities in the MTP III. Its objective is to sustainably manage and develop the Blue Economy resources for enhanced socio-economic benefits to Kenyans. There are several agencies mandated to implement this programme: the Ministry of Agriculture and Cooperatives; Ministry of Transport; Ministry of Tourism and Wildlife; and Ministry of Infrastructure, Housing, Urban Development and Public works. The Blue Economy master plan and Blue book are yet to be developed.

Capacity building for the Blue Economy (BMU's and fishermen) was a key activity aimed at ensuring development of the Blue Economy. The target for trained BMUs and fishermen was 440 and out of that number, 100 trained fishing crew were trained (Kenya Vision 2030). This means there was 22.7 per cent achievement on BMUs and fishermen training. The establishment of Beach Management Units (BMUs), which are a co-management strategy, has been a major governance structure inside the territorial seas.

Capacity needs assessment at both National and County levels for Blue Economy shows that a total of 281 county staff were trained on Participatory Integrated Community Development (PICD), 40 trained on Training of Trainers (8 from each county, Kwale, Mombasa, Kilifi, Lamu, and Tana River) and 241 county technical officers trained as Training of Facilitators (Kwale 55; Mombasa 60; Kilifi 64; Tana River 25, and Lamu 37).

The average per cent for this pillar is 5.7 per cent for development of Blue Economy initiatives. This achievement percentage accounts for master plan developed, Blue book developed, number of trainings and database developed parameters. Capacity needs assessment at both National and County levels initiative is not computed in the percentage because the target of the initiative was not indicated in the MTP III, but had an achievement of 562.

Table 5.2: Development of marine in the context of Blue Economy

Programme/ Pillar	Initiatives	Parameters	Target	Achievement	Per cent	Remark
Development of a Blue Economy (BE)	Develop a Master Plan	BE Master Plan developed	1	0	0	Poor
	Develop a Blue book	Blue book developed	1	0	0	Poor
	Capacity building for Blue Economy (BMUs and fishermen)	Number of trainings	440	100	22.7	Fair
	Development and management of Blue Economy database	BE database developed	1	0	0	poor
	Capacity needs assessment at both the National and County levels	No. of trained staff on Blue Economy at national and county level	-	562	-	
Average pillar score					5.7	fair

5.3   Fisheries Infrastructure Development

This programme was included in the Blue Economy with an objective of providing enabled infrastructure for the sustainable exploitation of the Blue Economy. One of the initiatives was the construction of fish ports in Mombasa, Kilifi, Lamu, Shimoni and Takaungu, expected to create 12,000 jobs and add Ksh 20 billion to GDP. Takaungu port is currently under construction. This initiative was not achieved as intended due to the outbreak of COVID-19.

The initiative to construct fish markets in Mombasa, Lamu, Malindi, Kilifi and Shimoni is 65 per cent complete with the construction of Likoni and Malindi fish markets (Kenya Vision 2030). Cold storage facilities and ice plants initiative is 75 per cent complete, with construction of Kichwa Cha Kati fish landing site (Vision 2030). This makes the completion of fish markets to be 26 per cent. This rating has been achieved by allocating each market 20 per cent to achieve the 100 per cent maximum rating. Since only two markets are currently complete at 65 per

cent each, we have added then divided it with the equal per cent of the markets to get an average completion rate.

Rehabilitation of fish landing sites is partially completed and achieved thus far as follows: Vanga 95 per cent, Gazi 85 per cent, Kibuyuni 45 per cent and Ngomeni 85 per cent complete. The purpose of land sites is to assist in quantifying post-harvest losses across the fish value chains using standard methods and to have measures in place for reducing post-harvest losses (KMFRI, 2018). On average, rehabilitation of fish landing sites has partially been achieved at 77.5 per cent. The pillar has been achieved at 32 per cent.

Table 5.3: Fisheries infrastructure development

Programme/ Pillar	Initiatives	Parameters	Target	Achievement	Per cent	Remark
Fisheries infrastructure development	Construction of fish ports in Mombasa, Kilifi, Lamu, Shimoni and small commercial port in Takaungu expected to create 12,000 jobs and add Ksh 20 billion to GDP	No. of fish ports constructed	5	1	20	Fair
	Construction of fish markets in Mombasa, Lamu, Malindi, Nairobi, Kilifi and Shimoni	No. of fish markets constructed	5	2	26[5]	Good
	Cold storage facilities and ice plants	No. of landing sites with cold storage	197	9	4.6	Fair
	Installation of fish processing plants	No. of fish processing plants installed	3	0	0	Poor
Average pillar score					12.7	Fair

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[5] Each of the 5 markets is awarded 5%, two markets were 40% completed. The computation of the percentage is (45/65*100).

5.4 Exploitation of Living Resources under Blue Economy

This programme was highlighted in MTP III, with an objective of increasing socio-economic benefits from Kenya's Exclusive Economics Zones and marine aquaculture; fish production from inland bodies; per capita fish consumption; and the diversity of export markets for Kenyan fish and fishery products (Vision 2030).

The initiative was to establish a national fishing fleet for exclusive economic zones with the aim of increasing the number of Kenyan-owned fishing fleets. The target was to develop 19 Kenyan-owned fishing fleets, though none was acquired. The licensed distant waters fishing nations (DWFN) fleet development was raised to 21, with two fishing vessels licensed and made operational (Ocean Eagle call sign 5ZAAX and RA-HORAKHTY Call sign 5ZAAT).

Foreign fleets catch far more fish in Kenya's EEZ than domestic fleets do since most of these boats transship in deep seas or sail away with their haul to dock in other ports in the area and foreign markets (MOALF). Establishment of local fleets is important in management of Kenya's marine fisheries, which is dependent on yearly licenses.

Kenya lands approximately 1,530 MT fish from foreign distant waters fishing nations (DWFN) fleet in the EEZ, estimated at about Ksh 306 million, which is a 0.68 per cent representation of the country's potential earnings (approximately at about Ksh 45 billion). According to KMFRI, the number of fish caught in Kenya's EEZ by foreign fleets is much higher because most vessels tranship in deep waters or sail away with their catch to land in other regions and international markets. Collectively, Ksh 2 trillion in potential earnings has been lost in Kenya from fisheries resources since the United Nations Convention on the Law of the Sea (UNCLOS).

Since the United Nations Convention on the Law of the Sea (UNCLOS) was ratified in 1982, Kenya has collectively lost at least Ksh 2 trillion in potential fisheries resource profits, along with 60,000 jobs yearly. The Food and Agricultural Organization (FAO) and other organizations have conducted numerous scientific studies that have estimated Kenya's annual potential catch (total catch allowed) of fish in the region of the Indian Ocean to be between 150,000 MT and 300,000 MT, valued at least Ksh 100 billion annually. This fish has the potential to provide at least 60,000 direct and indirect employment, and at least Ksh 5 billion in yearly state income.

Promotion of fish production increased to 149.9 metric tonnes at the end of the year 2020. Unfortunately, marine industrial fishing vessels in the EEZ bring in roughly 1,972 MT of fish for the nation, with a market worth of about Ksh 792 million (KNBS, 2021). The Blue Economy agenda continues to place a high priority on increasing per capita fish consumption in the country from the current estimated 4.7 kg - the target is 10 kg annually, along with investments in the sustainable exploitation of non-extractive ecosystem services such as aquarium trade, recreational fisheries, eco-tourism, and the development of nutritional or medical bioactive compounds and industrial materials (KMFRI, 2018). This representation shows Kenya at 47 per cent achievement.

Table 5.4: Exploitation of living resources under Blue Economy

Programme/ Pillar	Initiatives	Parameters	Target	Achievement	Per cent	Remark
Exploitation of living resources under Blue Economy	Establishment of a National Fishing Fleet for the Exclusive Economic Zone (EEZ)	No. of Kenyan-owned fishing fleet	19	0	0	poor
	Promotion of fish consumption	National per capita fish consumption	10 kg[6]	4.7 kg	47	good
	Promotion of fish production	Production in metric tones	150,000 and 300,000 mt	1796mt	1.2	Fair
	Diversification of fish export markets	Growth in the value of export	2.3 billion 460 million[7]	14.88 million	3.2	Fair
Average pillar rating					12.9	Fair

5.4 Kenya Marine Fisheries and Socio-Economic Development

The fishery data information management system is in place.[8] However, gaps on the target for marine fishery plans though the identified priority fisheries include small-scale purse seine (ringnet), North Kenya Banks snapper fishery, coral reef aquarium fish, octopus, the inshore/creek basket trap fisheries, small-scale line-caught tuna (World Bank, 2019). Five management plans are in place, including Small and Medium Pelagic Fishery Strategy (2013); Prawn Fishery Management Plan of 2010; Ring Net Fishery Management Plan; Kenya Tuna Fisheries Development and Management Strategy 2013-2018; and Malindi-Ungwana Bay Fishery Co-management Area Plan 2016-2021. However, there are only four management plans for priority fisheries. While the government has made significant strides to develop structures and governance tools for priority fisheries, a monitoring and implementation mechanism is lacking.

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[6] Average for both inland and marine.

[7] (20*2.3billion)/100. This is based on the ratio of contribution of both marine and inland fishing subsectors, 20:80.

[8] https://nationalmarinefisheriesis.co.ke/#.

Table 5.5: Kenya marine fisheries and socio-economic development

Programme/ pillar	Initiative	Parameter/ dimension	Target	Achieve- ment	Percent	Remark
Kenya Marine Fisheries and Socio-Econom- ic Development	A functional Fishery Infor- mation System will be devel- oped	Fishery Infor- mation System developed	1	1	100	Excellent
	Fisheries management plans for priority fisheries opera- tionalized	No. of fisheries management plans for prior- ity fisheries operationalized	6	4	66.7	Very good
Average					83.35	Excellent

5.6   Monitoring, Control and Surveillance

Monitoring, control and surveillance supports fisheries management ensuring detection, deterrence and prevention of IUU fishing and overfishing. It requires collection of data for evidence (catch assessment, catch statistics, fisheries frame surveys). The MTP III requires a catch assessment to be conducted quarterly. Among others, the MoALF is tasked with monitoring the performance of fisheries by leveraging fisheries statistics programmes such as administrative data sources, sample-based surveys and frame surveys. The mandate of Kenya Marine and Fisheries Research Institute (KMFRI) is to conduct research in marine and freshwater fisheries, environmental and ecological studies, aquaculture, and marine research, including physical and chemical oceanography to provide scientific evidence for sustainable development of the Blue Economy.

The State Department of Fisheries and Blue Economy normally releases fisheries annual statistical bulletins, and the most recent one is for 2016. KMFRI has a 2020/2021 book of abstracts on catch assessment studies. The book compiles all the work that KMFRI Scientists undertook in 2020/2021 financial year under the Marine and Coastal Systems and Mariculture divisions, including: county-level (Lamu, Kilifi, Mombasa, Kwale and Tana River) catch assessment studies; status and ecology of marine fisheries such as sardines, North Kenya Banks, longline fishery, tuna fishery targeting Kawakawa and Skipjack, Western Indian Ocean Anguillid eels, billfish species.

Monitoring Control and Surveillance (MCS) was incorporated in the Fisheries Management and Development Act (2016) through the establishment of the Kenya Oceans and Fisheries Advisory Council to promote synergy and coordination in implementation of MCS activities among agencies. Monitoring takes place at sea and landing sites. There are Standard Operating Procedures (SOPs) in place for carrying out catch assessment surveys. Development partners have continued to support MCS capacity in Kenya through projects such as Kenya Coastal Development Project (KCDP), and Kenya Marine Fisheries and Socio-Economic Development (KEMFSED). The initiatives supported by KCDP to strengthen

MCS capacity include the installation of vessel monitoring systems (VMS), establishment of a MCS centre in Mombasa, and creation of an inter-agency committee for implementation of national and regional MCS obligations. As of 2021, the VMS run by Collecte Localization Satellites, a French company was not in operation due to inadequate financing. A 54M long offshore patrol vessel (MV Doria) used by Kenya Coast Guard Service (KCGS) was commissioned to undertake MCS activities within Kenya's EEZ, and support the sustainable development of the deep-sea fisheries. In 2018, the Kenya Coast Guard Service Bill was enacted to establish the Kenya Coast Guard Service which, among others, has a mandate to provide maritime security. They have a mandate to halt, board, inspect any structure, aircraft or vessel suspected to be trespassing Kenyan waters.

Table 5.6: Monitoring, control and surveillance

Programme/ pillar	Initiative	Parameter/ dimension	Target	Achievement	Percent	Status
Monitoring, Control and Surveillance Programme	Monitoring, control and surveillance in the EEZ	No. of surveillance initiatives in place	-	MCS envisaged in Fisheries Act, VMS installation, MCS centre, inter-agency committee	-	-
	Quarterly catch assessment surveys	Quarterly catch assessment surveys	12	4	33.3	Good

5.7   Development of a Fish Quality Laboratory

This pillar was to be implemented in two phases. The first phase was installation of electricity and water supply; construction of sewerage line; paving and landscaping; burglar proofing of laboratories and provision of CCTV's; construction of concrete perimeter walls; and provision of water storage tanks and harvesting gutters for three laboratories already completed in Mombasa, Kisumu and Nairobi. The second phase was meant to be operationalization and accreditation of the laboratories. As of 2021, a fish quality control laboratory at South C was completed. Further, 29 laboratory staff in the three cities were trained, in addition to construction of access parking and storm water in Nairobi.

5.8   Cooperation and Implementation of Regional/International Frameworks and Standards Programme

The Indian Ocean Rim Association (IORA) was originally formed in 1995 but was relaunched in 1997. It is an inter-governmental association of 21 member States and 7 dialogue partners whose aim is to promote sustainable growth and

balanced development; ensure economic cooperation in areas that yield maximum opportunities for development, mutual benefits and shared interests; and promote liberalization to ease flow of goods, services, technology and investments within the Indian Ocean Rim. The focus areas to achieve the objectives are: fisheries management trade and investment facilitation, disaster risk reduction, academic and scientific cooperation, maritime security and tourism promotion and cultural exchange.

Article 14 of the AU Constitutive Act provides for the constitution of Specialized Technical Committees (STCs) including: agriculture, rural development, water and environment; and trade, industry and minerals. Blue Economy is an African Union Commission (AUC) directorate under the Department of Agriculture, Rural Development, Blue Economy and Sustainable Environment (ARBE), which is responsible for developing continental policies, facilitating domestication, monitoring and and reporting. Established in 2021, the Blue Economy division aims to implement the African Blue Economy strategy adopted in 2019 and contribute to the AU Agenda 2063, whose themes include, among others: fisheries, conservation, and sustainable aquatic systems; trade, shipping, maritime security and safety; and policies, institutions and governance.[9] The 2014-2023 targets in the AU agenda 2063 intend to have value addition in the fisheries sector increase by at least 50 per cent. Some of the initiatives to achieve this goal are implementation of the African Integrated Maritime Strategy, institute policies to prevent exploitation of fishing beds such as advocacy and compensation measures against illegal fishing revenue losses, and develop and support the implementation of integrated adaptive oceans policy or governance and marine spatial planning for EEZs. KMFRI's 2018-2022 strategy is guided by the African Union Agenda 2063, United Nations Sustainable Development Goals, and other government policy documents (JICA, 2018). Kenya has not ratified the African Charter On Maritime Security and Safety and development in Africa (Lome Charter) that was signed on 15th October 2016.[10] The average actualization of this pillar is 33.3 per cent.

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[9] https://au.int/en/directorates/sustainable-environment

[10] https://au.int/sites/default/files/treaties/37286-sl-AFRICAN_CHARTER_ON_MARITIME_ SECURITY_AND_SAFETY_AND_DEVELOPMENT_IN_AFRICA_LOME_CHARTER.pdf

Table 5.7: Cooperation and implementation of regional/ international frameworks and standards programme

Programme/ pillar	Initiative	Parameter	Target	Achievement	Percent	Remarks
Cooperation and Implementation of Regional/International Frameworks and Standards Programme	Implementation of the Indian Ocean Rim Association (IORA) processes	Implemented IORA processes in Kenya	1	0	0	Poor
	Implementation of the work of the African Union Commission's Specialized Technical Committees (STC) of Trade, Industry and Economic Development	Implemented AU's STC work in Kenya	1	1	100	Excellent
	Ratification and domestication of the Lomé Charter upon the completion and adoption of the draft Annexes	One Ratification and domestication of the Lome Charter	1	0	0	Poor
Average					33.3	Good

5.9   Policy, Legal and Institutional Reforms

The Coast Guard Services Act of 2018 sets out the following mandates, among others, of the Coast Guard: protect maritime resources including fisheries; search and rescue; enforce marine (port and coastal) security and safety; and prosecute maritime offenders. It provides for the establishment of the Kenya Coast Guard Service and outlines its mandate of administration and internal organization. In addition, it also establishes a council and technical committee of the Kenya Coast Guard Service.

The Fisheries Management and Development Act 2016 is the core legal instrument overseeing control and development of the national fisheries sector. The management procedure encompasses gear limitation, fishing zones, licensing, size limitation, seasons and closed areas. Several regulations have been developed to operationalize the implementation of the Fisheries Management and Development Act 2016, including: Fisheries Management and Development (Recreational) Regulations, 2020; Fisheries Management and Development (Marine) Regulations, 2020; Fisheries Management and Development (General Provisions) Regulations; Marine Fisheries (Access and Development) Regulations 2022; and Fisheries Management and Development (Inland) Regulations, 2020.

While progress has been made, the fish marketing strategy and a policy on incentives for materials used in boats and fishing gears and fish processing have not been put in place. However, the Kenya Fish Marketing Authority (KFMA) was

established following the enactment of Fisheries Management and Development Act (FMDA), 2016. The Fisheries (Safety of Fish, Fishery Products and Fish Feed) (Amendment) Regulations 2007 were amended in the Eleventh Schedule by replacing the expression "1,000" in paragraph 4 with expression "1,500" in 2009. Fisheries Beach Management Units (BMUs) Regulations 2007 have not been reviewed. BMUs are a co-management approach to include fishers, boat owners, fish processors, fish traders, and other beach stakeholders, besides the government, in ocean governance. The Fisheries (Beach Management Units) Regulations of 2007 (Cap. 378) require all landing sites to have a BMU. Further, they are mandated to promote high quality standards, mitigate user conflict, buttress aquatic resource management, monitor fishers not landing at designated ports, and collect the price and volume of all fish landed at specified sites. BMUs face financial and human resource constraints that hinder them from effectively executing the operations (KMFRI, 2018). The Integrated Coastal Zone Management (ICZM) is still a draft policy framework developed in 2013 to enhance sustainable development in the coastal zone, in harmony with the objectives of the Kenya Vision 2030 and the new constitution. The level of achievement for this is 50 per cent.

Table 5.8: Policy, legal and institutional reforms

Pro-gramme/ pillar	Initiative	Param-eter/di-mension	Target	Achieve-ment	Percent	Remark
Policy, Legal and Institution-al Reforms	Finalize the Integrated Ocean De-velopment Policy	Integrated Ocean Develop-ment Policy finalized	1	0	0	Poor
	Develop a Fish Marketing Strategy	Fish marketing strategy developed	1	0	0	Poor
	Develop policy on incentives for materi-als used in boats and fishing gears, fish process-ing, among others	Developed policy on incentives for materi-als used in boats, fish-ing gears and fish processing	1	0	0	Poor

	Review of the Fisheries (Safety of Fish, Fishery Products and Fish Feed) Regulations 2007	2007 Fisheries regulations reviewed	1	1	100	Excellent
	Review of Fisheries Beach Management Units (BMUs) Regulations 2007	2007 BMU regulations reviewed	1	0	0	Poor
	Develop the Marine and Inland Fisheries Regulations	Marine fisheries regulations developed	1	1	100	Excellent
	Enact the Coast Guard Bill, 2017	2017 Coast Guard Bill enacted	1	1	100	Excellent
	Implement the Fisheries Management and Development Act, 2016	2016 Fisheries Management and Development Act implemented	1	1	100	Excellent
Average rating					50	Good

5.10   2018 Global Sustainable Blue Economy Conference

The Fisheries Management and Development (Marine) Regulations, 2020 sets out to: define the criteria for allowing access to Kenya's marine resources, whether for recreational own consumption, or commercial; establish modalities for management and conservation of marine fisheries; provide levies to promote artisanal fishers; and to buttress monitoring, control and surveillance to suppress

IUU fishing in Kenyan waters. On fishing gears, the marine regulations prohibit the use of trawl nets or ring nets within five nautical miles, any spear guns to catch any fish within Kenya's marine fishery waters, drift nets longer than 2.5 kms and small-scale purse seine net attached to either an artisanal or semi-industrial fishing vessel not unless the fishing aligns with the provisions of a beach management unit co-management plan or a fisheries management plan or as may be prescribed by the Director General from time to time. The proposed Marine Fisheries (Access and Development) Regulations 2022 also delineate modalities to assign fishing and access rights, total allowable catch based on scientific evidence of stock status of each commercial marine fishery species for sustainable purposes, levies payable, monitoring, control and surveillance and landing requirements.

Despite prohibitions following the 2001 Kenya Gazette Notice No. 7565, spearguns, beach seines and monofilament gill nets are prevalently used. Beach seines are one of the most destructive gears that capture a lot of and reduce coral cover. They are used in Lamu County and Kwale County, constituting 49 per cent and 29 per cent, respectively, of the total number of recorded gears. Spear guns are mainly used in Kilifi (54%) and Kwale (45%). Lastly, monofilament gillnets are largely used in Kilifi (43%) and Lamu (41%). There has been a remarkable decline in beach seines by 32 per cent from 193 in 2014 to 131 in 2016. For monofilament nets, there was an increase in the use in 2012 followed by a slight decline in 2014, which was almost constant in 2016 (KMFRI, 2018).

A stock assessment study in 2014 finds that gears determine the sizes of fish caught. For example, basket traps catch some juveniles, with most fish being between 18cm and 30cm. Beach seines catch more juveniles, with a large portion of the fish ranging from 10cm to 20cm. Compared to beach seines, monofilaments catch smaller fish. Gillnets captured more mature fish with sizes of over 20cm (Van Hoof and Steins, 2017). The 2020/2021 book of abstracts by KMFRI finds that beach seines in Lamu County was at 79.23 per cent after scoop net and harpoon at 88.79 per cent, from a study of 450 fishing trips in 1,385 fisher days. Therefore, beach seines are commonly used to date.

In addition to the Fisheries Management and Development (Marine) Regulations 2020 prohibiting the use of ring nets within five nautical miles, there is a Ring Net Fishery Management Plan to strengthen management. However, the nets are used in the coastal waters while also catching demersal species (Van Hoof and Steins, 2017). This is an indication of weak implementation of the management plan.

Table 5.9: 2018 global sustainable Blue Economy conference

Pro-gramme/ pillar	Initiative	Param-eter	Target	Achieve-ment	Percent	Remark
2018 Global Sustain-able Blue Economy conference	Counter illegal and unreported fishing and put in place initiatives to enhance security and safety of collective waters	No. of surveillance initiatives in place	-	MCS envis-aged in Fisheries Act, VMS installation, MCS cen-tre, inter-agency committee	-	-
	Ensure sustainable fishing to conserve high value stocks and endangered species	Level of en-forcement of fishing regulations	-	-	-	-
	Facili-tate fish processing and storage capacities	No. of fish process-ing plants established with cold storage	3	0	0	Poor
	Establish a Blue econ-omy bank for blue economy growth and develop-ment in Kenya	Blue Econo-my bank established	1	0	0	Poor

6.   Conclusion and Policy Recommendations

6.1   Conclusion

The study identified nine pillars for the purposes of finding out if each pillar in MTP III for Blue Economy was achieved as planned. The analysis computed percentages for six of the pillars where data on potential/targets vis a vis achievements was available. The ratings and percentages were: development of Blue Economy (5.7%); fisheries infrastructure development (12.7%); exploitation of living resources under Blue Economy (12.9%); KEMFSED (83.35%); policy, legal and institutional reforms (50%), and Cooperation and Implementation of Regional/International Frameworks and Standards (33.3%).

Key challenges and gaps

The gaps in the implementation of the programmes were as follows:

Blue Economy masterplan, Blue Book to guide the entire Blue Economy was not in place.

Pillar 1: Inadequate capacity building for BMUs and fishermen at National and County level are some of the challenges facing the development of the Blue Economy pillar. The BMUs require fishermen to contribute financially, but because they are having trouble, the board finds it challenging to enforce the requirement. The voluntary nature of the board position impacts dedication and may also lead to board members not accepting responsibility or just exiting.

Takaungu fish port and two fish markets are currently under construction. Only 9 out of 197 landing sites have cold storage facilities. For the fisheries infrastructure and development, there are inadequate monitoring and assessment systems. There is need to purchase effective fishing equipment, such as powered boats and ice for storage of fish catch in the country. Inadequate financial support towards the sector as a result of the industry's low economic contribution results in inadequate empowerment of fishermen, and weak fishing organizations.

Pillar 2: The identified reasons for post-harvest losses varied among the sites. The major cause of the issue in Shimoni, Gazi, and Mkunguni was the insufficient or inconsistent supply of ice for fishermen to preserve fish during fishing, and in transportation. Another issue was poor handling at the landing places. Most of the fresh fish utilized in the chain of fried fish restaurants in Gazi, Mukunguni, and Shimoni was of low quality. Inadequate cold storage infrastructure also contributed to post-harvest losses along the fish value chain. The occasional amount of fish loss was lowest in Shimoni and largest in Gazi. According to projected estimates, 14 per cent of the fish is sold at a lower price in a landing of 27,484 kg on average. In comparison to low quality fish, which was often sold for Ksh 150/kg, good grade fish had an average selling price of around Ksh 250/kg.

The COVID-19 pandemic slowed down project implementation and therefore fish markets were not completed as planned in the Kenya Vision 2030 under the Blue Economy. Fish supplies are falling because of overfishing, environmental

damage, illegal and unreported fishing, significant post-harvest losses because of insufficient fish handling and processing facilities, and climate change.

Pillar 3: Kenya is yet to acquire a nationally owned fleet operating in the EEZ, suggesting that most of industrial fishing will still not be accounted for in national GDP. Inadequate fishing fleets leads to overfishing. Consequently, the country is not able to track and regulate fishing in the EEZ. Kenya has not been able to achieve the national fish per capita consumption, fish production and export targets.

Pillar 4: Weak fishing businesses are unable to create value through activities, including fish processing, packaging, net manufacturing, boat construction, and restaurant operations. Fishermen require government-provided commercial fishing vessels so that they can manage and store catch efficiently throughout the year.

Pillar 5: KEMFSED had the highest score (83.35%) followed by policy, legal and institutional reforms (50%). This is an indication that most fishery management regulations, plans and policies are in place, although the BMU Regulations 2007 have not been reviewed. It is important to note that the Integrated Ocean Development Policy is still a draft.

Pillar 6: Technology uptake and innovation transfer in Blue Economy is still low in Kenya.

Pillar 7: Monitoring, control and surveillance initiatives are in place and county level catch assessment studies were conducted in the 2020/2021 financial year. However, these initiatives and assessment studies are sub-optimal. The development of a fish quality laboratory only took place in Nairobi. Kenya has neither implemented the IORA process nor ratified the Lome Charter.

Weak implementation is costly in efforts to conserve while optimizing gains from marine fisheries. This results to inadequate capacity building for BMUs and fishermen at National and County level; inadequate monitoring and assessment systems to prevent projects from moving too quickly in reporting and execution; prohibited gears such as beach seines in use; constraints in purchasing effective fishing equipment, such as powered boats and ice for the storage of their catch; postharvest losses (physical and quality) estimated at (50-60%) from poor handling and insufficient cold chain facilities; and sub-optimal monitoring studies.

Pillar 8: Regular rehabilitation, accreditation and operationalization of the Mombasa fish quality laboratory is critical.

Pillar 9: The prevailing use of harmful gears such as beach seines stems from ineffective enforcement of fisheries regulations and laws. The policy framework is fragmented, since the Blue Economy combines players from diverse institutions with varied policies that are not harmonized. Kenya is yet to achieve efficient management of fisheries due to weak enforcement of existing fisheries regulations.

6.2   Recommendations

Pillar 1: There is need for capacity building for fish farmers to increase their capacity and skills. This will include planned training sessions and field outreach to address farmers' requirements to promote growth and the overall development of aquaculture in the area. There is need to build and increase capacity of fishermen in fish handling, preservation, and value-adding techniques for improved product quality.

Pillar 2: There is need to develop sustainable fisheries infrastructure guided by clear information on the situation, possibilities, and difficulties.

Pillar 3: The government may establish reefer cool containers and flake ice cold chains at landing sites. To reduce operating expenses in the long-run, all the facilities should consider solar and wind energy power.

Pillar 4: Targeted investment in fishing fleet is important in regulating fishing and increasing fish production in the country. Thus, there is need for government-provided commercial fishing vessels to fishermen so that they can manage and store their catch efficiently throughout the year.

Pillar 5: To advance in actualizing Kenya Marine Fisheries and Socio-Economic Development (KEMFSED) programme, the State Department of Fisheries needs to establish a Monitoring, Control and Surveillance (MCS) strategy to enhance enforcement towards eradicating the use of restricted fishing gears (beach seines, spearguns and monofilament gillnets).

Pillar 6: A fish marketing strategy, Blue Economy Masterplan, Blue Book, Blue Economy Database and a policy to incentivize fisherfolk along the coast needs to be developed.

Pillar 7: Strengthening of monitoring and assessment systems are important in ensuring timely execution and reporting of projects. Thus, there is need for targeted investments towards monitoring and assessment by government and development partners through public private partnerships.

Pillar 8: Regular rehabilitation, accreditation and operationalization of the Mombasa fish quality laboratory is important, including maintaining the fish quality control laboratory at South C, which was completed in 2021. Continued staff training in addition to the training of the 29 laboratory staff in the three cities is required.

Pillar 9: There is need to strengthen enforcement of regulations by supporting inter-ministerial coordination and partnerships. Such collaboration would provide an enabling environment for the Blue Economy blueprints, such as the Blue Book, Masterplan and Database.

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