

**Republic of Kenya**

**Ministry of Mining, Blue Economy and Maritime  
Affairs**

**Preparatory Survey on Cold Chain  
Development Project in the Republic  
of Kenya  
(PPP Infrastructure Project)  
Final Report**

**April 2023**

**Japan International Cooperation Agency (JICA)**

**Fujita Corporation**

<b>OS</b>
<b>JR (P)</b>
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\*Currency conversion rate: Japanese Yen JPY=1.2574 Kenyan shillings (as of the end of February 2023)

Map

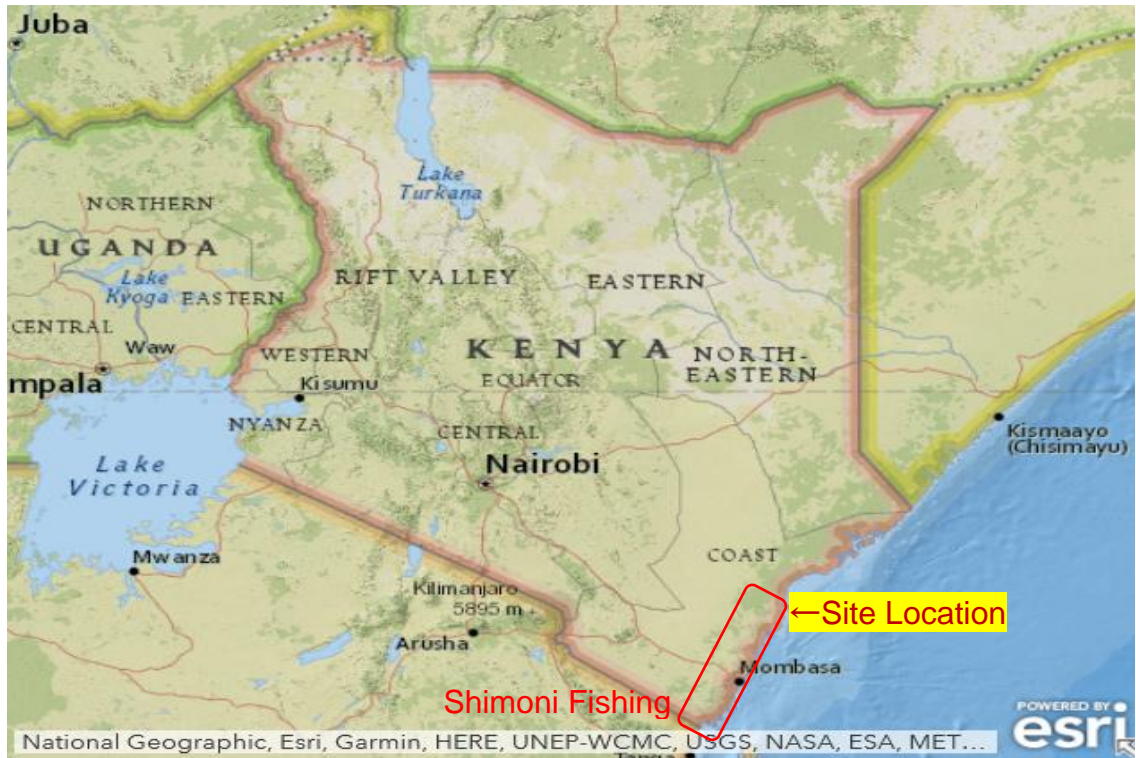


Figure 1: Project sites in target countries<sup>1</sup>



Figure 2 Liwatoni Port and proposed SEZ site in Mombasa City<sup>2</sup>

1 Prepared by our research team  
2 Prepared by our research team



Figure 3 Shimoni Fishing Port<sup>3</sup>

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<sup>3</sup> Prepared by our research team

List of abbreviations

Abbreviation	Formal name
AfDB	African Development Bank
Africa50	Infrastructure investment platform
BMU	Beach Management Unit
CWWCA	Coast Water Surveys Development Agency
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization of the United Nations
HACCP	Hazard Analysis and Critical Control Point
IFC	International Finance Corporation
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
JKUAT.	Jomo Kenyatta University of Agriculture and Technology
KFBD	Kenya Fishery & Blue Economy Directorate
KeFS	Kenya Fisheries Service
KeNHA	Kenya National Highways Authority
KFIC	Kenya Fishing Industries Corporation
KMFRI	Kenya Marine and Fisheries Research Institute
KRA	Kenya Revenue Authority
KPA	Kenya Port Authority
MALF	Ministry of Agriculture, Livestock, Fisheries and Cooperatives
MFK	Ministry of Finance of Kenya
MMBM	Ministry of Mining, Blue Economy and Maritime Affairs
MSY	Maximum Sustainable Yield
MTP III	Medium Term Plan III
ODA	Official Development Assistance
PIIP	Privately Initiated Investment Proposals
PIP	Privately Initiated Proposals
SDGs	Sustainable Development Goals
SEZ	Special Economic Zone
SPC	Special Purpose Company
TICAD	Tokyo International Conference on African Development

## Summary

### I. Business Summary

1. Case name	Preparatory Survey on Cold Chain Development Project in the Republic of Kenya (PPP Infrastructure Project)
2. Countries and regions covered	Kenya Mombasa City, Shimoni Kwalu County
3. Project Summary	<p>The purpose of the project is to establish a cold chain business with owned refrigeration and freezing facilities.</p> <p>The company will own facilities and add value with integrated functions from procurement of raw materials for fresh fish and fruits and vegetables to processing, refrigeration, and freezing, and will expand its operations domestically and to countries surrounding Kenya, in addition to exporting mainly to Europe, the United States, and Japan. Annual transaction volume is 700 to 1,120 tons.</p>
4. Outline of Proposed Product/Technology	Freezing and refrigeration equipment (F and FC class/3 temperature zones)/LED lighting and internal positive pressure systems/air shelters/mobile racks/utility equipment (backup generators, water supply equipment, etc.)/facilities for processing and sanitation control/forklifts/order management systems/security systems/vehicle berths, etc.
5. Assumed business model in the target country	A joint venture company (SPC) will be established in Kenya through joint investment by Japanese companies, local Kenyan companies, the Kenyan government, and Africa50 (an infrastructure fund under the African Development Bank) (Majority will be Japanese companies). The SPC will act as the operating entity for the project. The company will select and procure the construction of facilities (fishing port, buildings) and related equipment.
6. Contribution to target countries and regions through business development	<p>2. zero famine.</p> <p>[14. Let's protect the abundance of our oceans.</p>
7. Outline of the Project	
① Objective	The project will construct and operate refrigeration and

	freezing facilities and processing facilities at the port of Mombasa in eastern Kenya and surrounding fishing ports to procure raw materials such as fresh fish, vegetables, and fruits, process food products, and conduct cold storage and cold transport, thereby improving the country's cold chain and upgrading the agricultural and fishery sectors by distributing and selling domestically in addition to exporting abroad. It will appropriately complement Kenya's policy policies on the lack of refrigeration facilities to maintain the freshness of fresh fish and fruits and vegetables.
② Results	In this survey, we gained an understanding of the project background regarding development issues such as the current status of the blue economy industry and food loss in Kenya. In addition, we conducted a basic verification of the appropriateness of the PPP project which helped to foster a common understanding among the Kenyan counterpart government officials (MMBM and KeFS under the jurisdiction of MMBM) about the project as a PPP project.
③ Activities	<ol style="list-style-type: none"> <li>(1) Identification of Issues Related to Blue Economy Development</li> <li>(2) Research on plans, policies, laws, etc. for the development issue in question</li> <li>(3) Investigation of the investment environment</li> <li>(4) PPP development plan</li> <li>(5) Consensus building with implementing agencies</li> <li>(6) Environmental impact assessment</li> <li>(7) Risk Analysis</li> </ol>
④ Counterpart government agency	Ministry of Mining, Blue Economy and Maritime Affaires State
⑤ Project Implementation Structure	Proposing Company: Fujita Corporation
⑥ Period of performance	March 15, 2021 - May 31, 2023 (1 year and 9 months)

## II. Summary of Proposing Corporation

1. Name of Proposing Corporation	Fujita Corporation
2. Type of business of representative corporation	(5) Others (General construction industry)
3. Name of representative of representative corporation	Yoji Okumura
4. Address of head office of representative corporation	4-25-2 Sendagaya, Shibuya-ku, Tokyo
5. Date of incorporation of representative corporation (A.D.)	October 2002
6. Capital of representative corporation	14 billion yen
7. Number of employees of representative corporation	3,443 persons
8. Most recent annual sales (turnover) of the representative corporation	50,980,000,000 yen (April 2018 - March 2019)



## Chapter 1 Overview of Operations

The Kenya Cold Chain Project will construct and operate refrigeration and freezing facilities and processing facilities at the port of Mombasa and surrounding fishing ports in the eastern part of Kenya to procure raw materials such as fresh fish, vegetables, and fruits, process food products, and conduct cold storage and transportation, which will be distributed and sold domestically as well as exported internationally, thereby appropriately complementing the country's cold chain development and agro-fishery sector upgrading. It is concluded that the project will appropriately complement Kenya's challenges in maintaining the freshness of fresh fish and fruits and vegetables and its policy direction.

In this survey, we gained an understanding of the project background regarding development issues in Kenya, including the current status of the blue economy industry and food loss. We also examined PPP-related policies, laws and regulations, and past cases, and confirmed important preconditions for promoting this project, including project rights and acquisition of various permits and approvals.

In addition, we conducted a basic review of the appropriateness of the PPP project in terms of technology and profitability, and identified where the risks lie in the operation of the project. In addition, a basic review of the project scheme and financing scheme was conducted to identify the risks involved in the operation of the project, and to obtain the views of the Kenyan partners and counterpart government officials, especially MMBM to develop a common understanding of the project as a PPP project.

## Chapter 2 Methods of Conducting Business

### 1) Operations Basic Policy for Implementation

#### (1) Analysis of commercialization as PPP

This survey is expected to be concluded as a PPP project in the future. Therefore, risks associated with PPP projects (political and social risks, economic and market risks, etc.) should be fully investigated and examined, and countermeasures for each of the possible risks should be fully considered to enhance the feasibility of the project as a PPP project.

In particular, the Kenyan government does not have much experience in PPPs in the agriculture and fisheries sectors in Kenya, so the survey was conducted with an eye to whether there was a common understanding of the project and the process leading to the PPP project among KFBD, KeFS, the Kenyan Ministry of Finance, and other relevant domestic organizations, and whether the necessary liaison and coordination systems were sufficiently in place to ensure the project's commercialization. The survey was conducted with attention to whether there is a common understanding of the details of the project and the process leading to the PPP project among the relevant domestic agencies, including KFBD, KeFS, and the Ministry of Finance of Kenya.

In addition, we also referred carefully to past discussions on the application of non-competitive bidding methods (negotiated contracts, Swiss Challenge) in the project right bidding process, in addition to the legal analysis, and confirmed a realistic prospect for the application of such methods in this project. On the other hand, in relation to the consideration of JICA, the results of this survey will be used as materials for consideration when the client examines JICA's (Private Sector Investment Finance) for the project planned in this survey. Therefore, the client shall fully share and discuss the project plan, etc. compiled in this survey with the order (especially the Private Sector Cooperation Division and the Kenya Office) in the course of this survey. However, the ordering party shall not be bound by the contents of the discussions with the contractor during the survey process when conducting the screening of the contractor for the said paid financial cooperation.

In terms of environmental and social considerations, the project planned for this survey is expected to be classified under Environmental Category B in the "Guidelines for Environmental and Social Considerations of the Japan International Cooperation Agency" (published in January 2022) based on the information available at the present time. The contractor will take into consideration and observe the items specified in the Guidelines in assigning survey team members and setting the schedule in order to take measures in accordance with the Guidelines. The contractor has complied with the guidelines by giving due consideration to the matters stipulated in the guidelines when assigning survey team members and setting the schedule in order to respond in accordance with the guidelines. In addition, the contractor confirmed the procedures related to environmental and social considerations in the

partner country for future commercialization, and also confirmed the method and prospects for obtaining the necessary permits and approvals, etc. The contractor shall prepare a full-scale survey plan (hereinafter referred to as the "Full-scale Survey Plan") as stipulated in Article 8, Paragraph (6) of the Special Specifications of the Service Contract for this survey. In preparing the Full-Scale Survey Plan (hereinafter referred to as the "Full-Scale Survey Plan"), the contractor reviewed the classification of the environmental categories of the projects planned in the survey.

## 2) Survey performed Reporting

### (1) Issue-1: Organizing development issues

#### 2.1.1 Contribution to the Blue Economy

The Kenyan government has identified blue economy development as one of the key policies in the Kenya Vision 2030, the third medium-term plan (MTP III) , and has positioned the promotion of the marine sector (shipping and maritime, port infrastructure, tourism, and environmental conservation), including fisheries, as an important issue. The interviews with MALF and KFBD conducted for this survey also indicated that blue economy development is an extremely important area from the perspective of food security, and that the government would like to actively promote this policy. This project is in line with the Kenyan government's Blue Economy policy.

In addition, interviews with other donors and private companies (commercial fishing boat operators, fish processing companies, refrigeration/freezing facility operators, etc.) conducted in this survey revealed that the main problems related to marine resources in Kenya are lack of refrigeration/freezing facilities, lack of fishermen, lack of fishing ports, lack of electricity and water at fishing ports, lack of fishing boats, etc. The Kenyan government, other donors, and the Kenyan government have been involved in the project. Interviews with the Kenyan government, other donors, and private companies confirmed the reality that Kenya's domestic fishery resources are not fully utilizing their potential.

In addition, the results of the previous survey<sup>4</sup> showed that the lack of means of livelihood for coastal fishermen in particular was identified as a development problem for the saltwater fisheries that are the main target of this project. The majority of coastal residents, including young people, are dependent on the fishing industry, and the lack of diversity in occupations (livelihoods) is a problem. In addition, mama karanga, or the processing and selling of fried fish by women in coastal communities, is widely practiced as a means of livelihood, but it is still a small-scale economic activity carried out by individuals. This project is expected to contribute to the diversification of the livelihoods of coastal residents, including Mama Karanga, and to improve the social environment surrounding the blue economy. From the interviews with KFBD conducted during this survey, it is clear that the species of fish envisioned for this project (large fish caught by large fishing vessels operating off the EEZ) are different from those handled by Mama Karanga (small fish purchased from small coastal fishing vessels), so there is no possibility of competition in terms of economic activities. The fishery is not a competition for economic activities.

#### 2.1.2 Current status of post-harvest losses understanding

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<sup>4</sup> Information gathering and verification survey on the blue economy in Kenya (JICA, June 2018)

According to FAO statistics, the total post-harvest loss rate of food in Kenya is about 30%, and the post-harvest loss rate of fishery products is about the same as the total food loss rate. KFBD points out the following reasons for the high post-harvest loss rate of fishery products.

- Inadequate catch handling capacity on board and after landing.
- Lack of post-landing cold chain facilities (ice making and cold storage facilities).
- Unnecessary bycatch of fish species in the shrimp trawl fishery. (Bycatch of marine products other than shrimp is often not distributed for public consumption due to lack of technology and processing methods to convert them into stable and acceptable products, their small size and large bones make them unsuitable for processing, and they cannot be unloaded due to capacity limitations of storage facilities.)

Furthermore, the KFBD simultaneously points out that the high post-harvest loss rate volume of seafood products is hindering the expansion of the seafood market.

The National Marine Fisheries Policy<sup>5</sup>, developed in 2008, challenges the government to survey with other relevant agencies to develop and enforce treatment standards to minimize post-harvest losses of marine products; to actively encourage joint ventures between foreign investors and local companies to minimize post-harvest losses; to implement responsible treatment and conservation measures, and to promote revenue enhancement and economies of scale. It was found that government officials are aware of the crisis of post-harvest losses of fishery products and intend to address the issue with specific policies. From the interview results in this survey, the Kenya Marine Fisheries Research Institute (KMFRI) and KeFS found that a mixed method that includes both qualitative and quantitative data collection is desirable as a post-harvest loss aggregation method for fishery products, as follows.

- Qualitative data collection: targeted consultations, interviews, questionnaires (targeting government officials, commercial and artisanal fishermen, fish traders and processors, and other key industry players) to collect information on catch status, losses, conservation methods, etc.
- Quantitative data collection: harvest time and landing time, quantification of losses between primary and secondary markets, etc.

Previous studies<sup>6</sup> have indicated that the freshness of fish distributed in domestic markets in Kenya is generally not good, and that post-harvest loss rates are high during the distribution process from the landing site to the final point of sale. Post-harvest losses due to the distribution process of fish catch can be divided into four major categories: i) from the fishing grounds to the landing site, ii) from the landing site to the loading and shipping of transportation means (trucks, etc.), iii) during transportation from transportation means to retail locations and

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<sup>5</sup> Subsection 4.4: Fish quality assurance and value addition, National Oceans and Fisheries Policy, 2008 (Republic of Kenya, Ministry of Fisheries Development)

<sup>6</sup> Information gathering and verification survey on the blue economy in Kenya (JICA, June 2018)

processing plants, and iv) storage at retail locations, and in each process, the absence or lack of cold storage means causes post-harvest Losses occur during each of these processes due to the absence or lack of cold storage. In a previous survey<sup>5</sup>, it was estimated that among the above four distribution processes, losses are significant during the following stages: (ii) from the landing site to loading and shipping to the transportation vehicle (truck, etc.), and (iii) during transportation from the transportation vehicle to the retail location or processing plant. In addition, in the existing survey<sup>7</sup>, one of the issues of particular interest to KFBD administrators was "post-harvest loss improvement and value addition of fishery products".

Thus, maintaining freshness, reducing post-harvest losses, and adding value to marine products are the most important issues in the domestic fisheries sector in Kenya, and KFBD's administrative officials are aware of these issues. The introduction of Japanese cold storage and transport methods through this cold chain project is expected to make a significant contribution to improving the freshness of marine products, reducing post-harvest losses in the processing and distribution process, and adding value to marine products.

In addition, the existing technical cooperation project<sup>8</sup> mentioned that the amount of waste generated far exceeds the capacity of existing waste disposal sites, posing a major urban sanitation challenge. In coastal areas, it is assumed that a certain amount of post-harvest losses of agricultural, forestry, and fishery products account for a portion of the waste. It is expected that this project will improve the post-harvest loss rate of agricultural, forestry, and fishery products, thereby contributing to the reduction of the total amount of waste and the improvement of urban sanitation.

### 2.1.3 Illegal fishing and poaching by foreign vessels

According to interviews with the KFBD and the Fisheries Agency of Kenya, not only domestic fishing vessels licensed by the Kenyan government but also a certain number of foreign fishing vessels without a license are engaged in poaching and illegal fishing in the EEZ in Kenya. These illegal fishing vessels seem to catch mainly tuna and other large fish in offshore areas that are not well guarded by coastal patrols, and this fact is one of the major problems in that they are illegally handling Kenya's marine resources. Furthermore, at this point, there is no sufficient data on illegal fishing by foreign fishing vessels in the Kenyan EEZ, and the fact that only the actual situation has been confirmed and a quantitative assessment cannot be conducted is a major problem. In order to make the best use of the country's fishery resources, it is necessary for the Kenyan government to conduct surveys and accumulate data in the future.

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7 Advisor for Fisheries and Fisheries Development, Kenya (JICA, Jan. 2022)

8 Waste Management Capacity Building Project, Nairobi, Kenya (March 2016)

#### 2.1.4 Insufficient information on fisheries resources in coastal areas of Kenya

The Kenya Marine Fisheries Research Institute (KMFRI) conducts surveys using its own vessels, and the results are not disclosed to the government, but are made available to private companies for a fee. On the other hand, an interview with a commercial fishing company operating in Kenya's EEZ revealed that the lack of information and data on fisheries resources in Kenya's coastal areas and the inability to utilize this information and data for fisheries operations is a problem. It is assumed that there is a difference in perception between the government and private companies, and that the data is not being fully utilized. For the development of the blue economy in coastal areas, it is necessary to accumulate statistical information and data on fishery resources and promote their utilization widely, both among governments and private companies.

#### 2.1.5 Shortage of fishermen

In interviews with fishery-related personnel who purchase fish from small-scale fishermen for processing and sales, etc., a shortage of small-scale fishermen as well as a shortage of fishing techniques were cited as major issues. Fishing is a special occupation that requires knowledge, skills, and experience, and not everyone can do it right away. Therefore, it is necessary to change the way small-scale fishermen think about fishing by developing and training human resources in line with human resource development plans, starting from young people, and by sharing successful models to improve their livelihoods through fishing. One of the reasons for the lack of bearers is that the tourism industry is well developed in Mombasa and other coastal areas, and many local residents are engaged in the tourism industry because it is an industry that is less dangerous and provides higher income than fishing.

In order to improve these problems of lack of bearers and lack of skills among small-scale fishermen, the challenge is to create a successful model that enables even small-scale fishermen to earn a stable and large income and enrich their lives.

### (2) Issue-2: Plans, policies, laws, etc. for the development issue in question

#### 2.2.1 Plans, policies, laws, etc. for the development issue in question

To review policies, legislation, and organizations related to the Blue Economy, a scrutiny of the existing survey results<sup>9</sup> (Information Gathering and Verification Survey on the Blue Economy, Kenya; Detailed Design Survey for the Waste Management Capacity Building Project in Nairobi and the Mombasa Special Economic Zone Development Project) and interviews with the survey stakeholders (PPP Unit, Ministry of Finance, KFBD, KeFS) were interviewed. As a

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<sup>9</sup> Final Report on Information Collection and Confirmation Survey on the Blue Economy in Kenya (JICA, June 2018), p. 5-7, Figure 5.4.5.

result of the interviews, it was confirmed that the Government of Kenya has identified the Blue Economy as one of its major policies and positioned it as an important issue in the MTP III. The Fisheries KFBD identified six priorities for fisheries development (see below) in MTP III.

- Priority 1: Capacity building and technical assistance for shipping and fisheries
- Priority 2: Construction of fishing port and ancillary facilities
- Priority 3: Aquaculture Development (A: Construction of a center for the development of saltwater aquaculture; B: Development of seaweed processing technology; C: Construction of a biological and ecological research center in Nile Perch; D: Strengthening the capacity of the Aquaculture Development Research and Training Center in Sagana to become a national aquaculture center)  
 (A: Construct a center for the development of saltwater aquaculture; B: Develop seaweed processing technology; C: Construct a biological and ecological research center for Nile perch; D: Strengthen the capacity of the Aquaculture Development Research and Training Center in Sagana and make it a national aquaculture center).
- Priority 4: Strengthen the Lake Turkana Fisheries Research Center
- Priority 5: Promote fish diets and improve nutrition
- Priority 6: Collaborative Research Activities

This project is related to Priority 1 (capacity building and technical assistance for shipping and fisheries), Priority 2 (construction of fishing ports and ancillary facilities), and Priority 5 (fish diet promotion and nutritional improvement), and the implementation of this project is also consistent with the policy objectives set forth by the Fisheries KFBD.

In addition, a number of fisheries-related projects are planned for MTP III, as shown in the table below, and many of these projects are related to the contents of this project.

Table 1 Fisheries-related projects listed in MTP III<sup>10</sup> (excerpts)

Project	Summary
Flagship Programs and Projects	Establish implementing agencies for fisheries management development Development of offshore fisheries Fishery and maritime infrastructure development Increase in per capita consumption of fish
Other Programs and Projects	Monitoring of resources in inland and marine waters Certification of seafood processing and landing sites Quality assurance for aquaculture exports Diversification of export destinations for seafood

<sup>10</sup> Prepared by our research team



Blue Economy Research and Development	<p>Catch and effort assessment survey of major fish species and survey of current status of stock levels</p> <p>Economic evaluation of marine and coastal resources</p> <p>Reduction of harvest losses and development of value-added products</p>
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### 2.2.2 Legislation (Domestic Unloading of Fisheries Products Regulations)

For offshore fisheries in the EEZ, there is a provision<sup>11</sup> that all fishing vessels (Kenyan fishing vessels and foreign-flagged fishing vessels) licensed by the Government of Kenya to fish in the EEZ must unload the following percentage of their total annual catch in Kenya, depending on fishing vessel type, etc.

- ① Purse Seiners : 30%
- ② Long Liners : 30%
- ③ Shrimp Trawlers : 70% of bycatch, 5% of shrimp catch

In this regulation, the unloading location of fishery products is set as the location designated in the fishing permit or authorized by the Director, and at the designated unloading location, KeFS staff and others conduct monitoring of the unloading.

In addition, all fishing vessels licensed by the Kenyan government to fish are required to pre-report their catch at least 24 hours prior to calling a port of call at the landing site<sup>12</sup>, and it is illegal to under-report catch at the time of this report. When a vessel calls at a designated landing site, KeFS staff checks and measures all actual catches to ensure consistency with the pre-reporting of catches conducted 24 hours in advance. If the provisions for unloading or the pre-reporting of unloaded catch are violated, the penalty is a fine of up to 50 million Kenyan shillings or imprisonment for up to 5 years and the loss of the fishing license for 1 year after the violation.<sup>13</sup>

According to the results of interviews with KFBD, the number of fishing vessels that have been granted fishing licenses by the Kenyan government is a total of 14 vessels, all of which are Kenyan nationals, partly because there are no fishing ports and attached facilities that accept fishery catches in the Kenyan coastal areas. In addition, there were no landings from foreign fishing vessels on record, and it was found that data on the amount of marine products landed was not fully understood. The facilities attached to the fishing port, such as refrigeration and processing facilities, which are planned to be constructed under this project, are necessary for the proper operation of these regulations.

<sup>11</sup> Section 99 (1) (k) of the Fisheries Management and Development Act No. 35, Republic of Kenya, 2016

<sup>12</sup> Advance Request for Entry Port (AREP)

<sup>13</sup> Section 150 (1) and (2) of the Fisheries Management and Development Act No. 35, Republic of Kenya, 2016

### 2.2.3 Monitoring system for foreign fishing vessels

A multi-sectoral team consisting of police, military, and KeFS patrols surveillance vessels to conduct daily monitoring. Vessel Monitoring System (radar monitoring) has been in operation since 2014. Vessel Monitoring System (radar monitoring) has been in operation since 2014. In addition, although not all vessels are registered, each vessel is equipped with a GPS to monitor their operational status, and joint coastal patrols by KeFS and the Coast Guard are conducted at least once a week to strengthen surveillance. In addition, the Japanese government has already provided KeFS with two high-speed boats and four composite boats as illegal fishing surveillance vessels in 2022.

### 2.2.4 Organization

Fisheries administration in Kenya is handled by KFBD, a newly created organization created in 2016 when the Fisheries Department was reorganized and under the Ministry of Agriculture, Livestock and Fisheries during the former regime; in 2017, KeFS was formally organized and under the Fisheries and KFBD.

Subsequently, KFBD became an affiliate of MALF by presidential decree (issued in October 2022) under the new administration that took office in September 2022. As of January 2023, KFBD's organizational chart has not been made public, and only the following structure has been announced.

Table 2 Organizational Structure of KFBD (as of January 2023 )<sup>14</sup>

MINISTRY OF MINING, BLUE ECONOMY AND MARITIME AFFAIRS		
Location	Surveys Building Ngong Road P.O. Box 30009-00100 NAIROBI Telephone: 020-2723101	
Cabinet minister	CABINET SECRETARY:.	HON. SALIM MVURYA, E.G.H.
Department in charge	STATE DEPARTMENT FOR THE BLUE ECONOMY & FISHERIES PRINCIPAL SECRETARY:.	MS. BETSY M. NJAGI
Organizational Functions and Assignments	-Coordination of the development of national ocean and blue economy strategies and policies -Fisheries and Aquaculture Policy -Coordinate the development of policies, laws, regulations, and institutional surveys for fisheries and the blue economy	

<sup>14</sup> ORGANIZATION OF THE GOVERNMENT OF THE REPUBLIC OF KENYA Executive Order No. 1 of 2023 REPUBLIC

	<ul style="list-style-type: none"> <li>-Promoting sustainable transformation and diversification of the marine economy through the promotion of research and innovation</li> <li>-Increased local participation and blue economy investment through private sector involvement and partnerships</li> <li>- Fisheries Marketing Policy</li> <li>- fishing license</li> <li>- Development of the fishing industry</li> <li>- Promoting Fish Consumption</li> <li>- Fish Quality Assurance</li> <li>- Improvement of technical capabilities</li> <li>- Strengthen technical cooperation with partner countries</li> <li>- Management and licensing of domestic and foreign fishing trawls in Kenyan waters - Overall policy for the development of agriculture-based marine resources</li> <li>- Policies for the development of fishing ports and related infrastructure</li> <li>- Capacity building for sustainable development of marine resources based on agriculture</li> <li>- Protection of aquatic ecosystems</li> <li>- Promoting Kenya as a center of aquaculture</li> <li>- Economic development oriented fisheries research</li> </ul>
<p>Governing institution</p>	<ul style="list-style-type: none"> <li>- Kenya National Marine Fisheries Research Institute (Science, Technology and Innovation Act 2012 (Act No. 28 of 2012)</li> <li>- Kenya Fisheries Authority (Fisheries Management and Development Act No. 35 of 2016)</li> <li>- Fish Marketing Authority (Fisheries Management and Development Act No. 35 of 2016)</li> <li>- Kenya Fishing Industries Corporation</li> </ul>

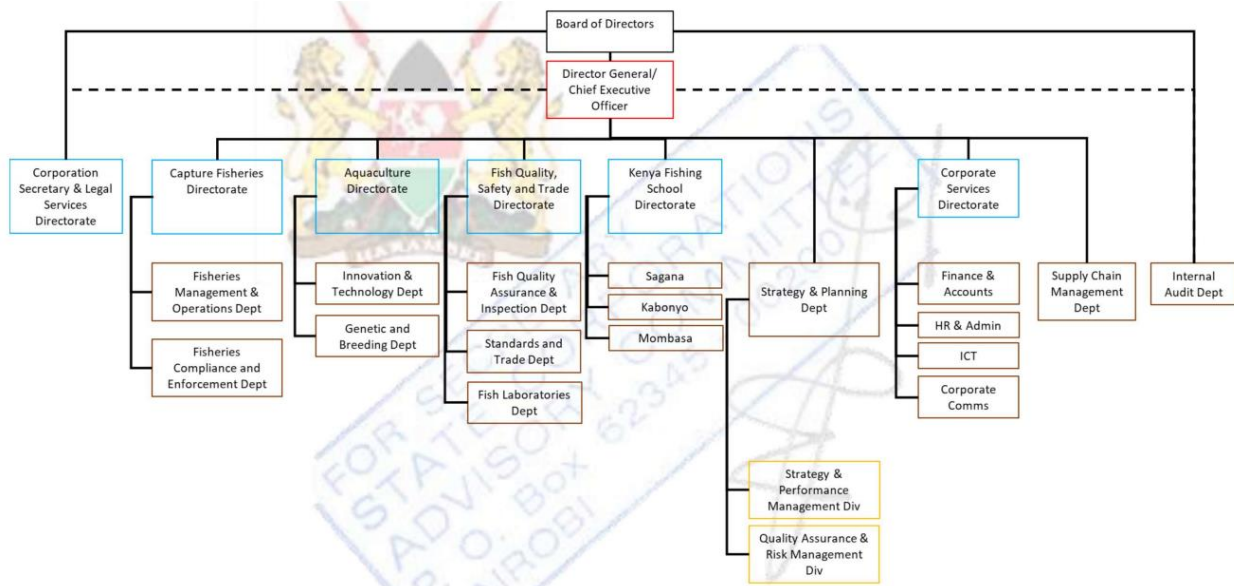


Figure 4: Kenya Fisheries Services Authority Organization Chart (as of June 2020)<sup>15</sup>

### 2.2.5 PPP Law Recent Policy and Legislative Surveys

Kenya's first legislation on PPPs was enacted in 2013 with The Public Private Partnership Act, 2013 (PPP Act), which was followed by the PPP Regulations, 2014 (PPP Implementation Regulations) in December 2014. Subsequently, legal improvements were made to facilitate, and a new PPP Law (The Public Private Partnership Act, 2021) was enacted on December 23, 2021, repealing the 2013 PPP Law. The new PPP Act provides for private sector participation in the financing, construction, development, operation, or maintenance of infrastructure or development projects through public-private partnerships, with the following objectives

- Define procedures for private sector participation in PPPs.
- Develop an institutional survey for the implementation of PPP projects.
- Enforce Article 227 of the Constitution on procurement related to PPP
- Streamline the regulatory, enforcement, and monitoring survey of relevant agencies.
- Encourage county government participation in PPP.

The main bodies established under the new PPP Act are the PPP Committee, the PPP Directorate, and the Petition Committee. In many cases, the government agency implementing the PPP project and the private sector operator employ their own transaction advisors to form the PPP project. In the case of this project, the contracting authority is KFBD when the project is implemented in the Liwatoni Fishing Port, and SEZ Authority when the project is implemented in the Dongokundu SEZ.

<sup>15</sup> Obtained from MINISTRY OF MINING, BLUE ECONOMY AND MARITIME AFFAIRS

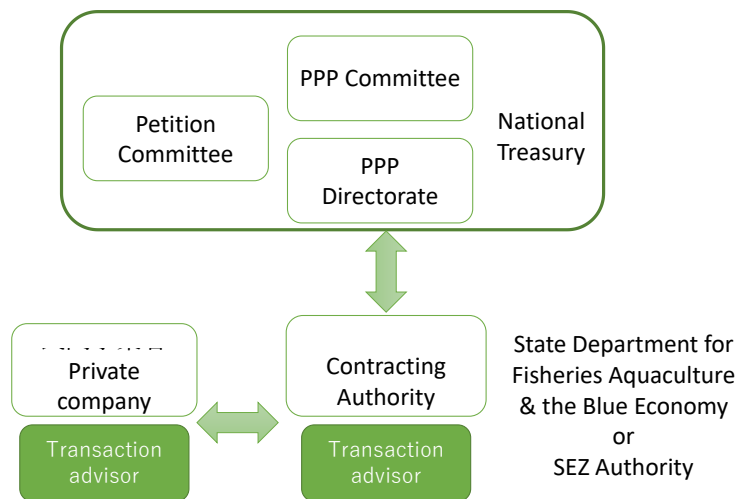


Figure 5 PPP Project Implementing Entities<sup>16</sup>

In Kenya, a project survey called Privately Initiated Investment Proposals (PIIP) has existed since the time of the former PPP Act, and if a proposed project met certain conditions, no general PPP bidding was conducted and the proposed company could implement the PPP project. (Generally, non-private investment proposals in business right bidding are not accepted. (This is generally the case with the non-competitive survey for bidding for project rights (voluntary contract, Swiss Challenge). The PPP projects proposed by the private sector, which were called PIIP in the former PPP Law, have been renamed "PIP: Privately Initiated Proposal" and continue to be stipulated in the new PPP Law.

The following are five requirements for proposals for PIP projects.

- ① It is in line with national infrastructure development priorities and meets social needs.
- ② It is worth the investment amount.
- ③ The contracting agency provides sufficient information for financial analysis and evaluation of potential debt implications.
- ④ They are offering fair market value.
- ⑤ The proposal meets the following
  - i. Detailed description of the proposed project, including reference designs, sketches, and layout drawings.
  - ii. Detailed project needs analysis, including a description of social benefits and alignment with government infrastructure plans.
  - iii. A description of the environmental and social characteristics of the proposed project.

<sup>16</sup> Prepared by our research team

- iv. Detailed technical description of the project.
- v. A detailed description of the financial viability of the project, including costs, revenues, preliminary financing, and financing plan.
- vi. Preliminary operational plan for the proposed project.
- vii. Description of the major risks of the project and risk allocation in the project
- viii. Disclosure of any government assistance measures that the project may require.
- ix. A description of the details of the government support measures required by the proposed project.
- x. A description of schedule of the government support measures required by the project.
- xi. Why the project is not suitable for public bidding.

In addition, there are 10 steps in the approval process for the implementation of PIP projects, as follows

- Phase 1 Proposal Submission and PPP Project Facilitation Payment
- Phase 2 Due Diligence
- Phase 3 Establishment of valuation criteria
- Phase 4 Evaluation of Proposals
- Phase 5 Detailed evaluation report preparation
- Phase 6 Evaluation of the transition to project development phase
- Phase 7 Recommendation for approval to the Committee
- Phase 8 Decisions of the Committee
- Phase 9 Feasibility survey and project documentation publication
- Phase 10 Direct negotiation with the contracting agency or competitive bidding

Points to note at each stage are as follows

Table 3: Points to Consider in the Approval Process<sup>17</sup>

No	Step	Description
1	Proposal Submission and PPP Project Facilitation Fund Payment	The private firm submits a proposal to the contracting agency, which submits it to the PPP Directorate for evaluation and approval. At that time, the private firm pays a non-refundable review fee of 0.5% of the project cost or USD 50,000, whichever is lower.

<sup>17</sup> Prepared by our research team

2	Due diligence	The PPP Directorate will survey with the contracting agency to perform due diligence on the private firm.
3	Establishment of Evaluation Criteria	The PPP Directorate will establish criteria for evaluating proposals, including (i) public benefit criteria, (ii) project feasibility criteria, (iii) PPP suitability criteria, and (iv) affordability criteria.
4	Proposal Evaluation	The PPP Directorate and the contracting agency, in consultation with the relevant government departments, will evaluate the proposal within 90 days from the date the proposal is submitted to the Directorate.
5	Detailed evaluation report	The PPP Directorate will prepare a detailed evaluation report of the proposals based on the evaluation criteria and make recommendations to the PPP Committee within five surveying days of the completion of the evaluation.
6	Assessment of transition to project development phase	<p>The PPP Committee will decide within 14 days of receipt of the above report whether to proceed with the project to the development phase. In making its decision, the Committee shall consider (i) the evaluation report submitted in 5 above, (ii) the Directorate's review and recommendations, and (iii) the results of any benchmarking or market testing.</p> <p>If the Committee approves a proposal, it will proceed to the project development phase, during which the private firm must prepare specific development activities prior to project approval.</p> <p>The development phase will include the following activities to enable the contracting agency and other appropriate decision-making bodies, under the guidance of the Directorate, to conduct a detailed evaluation of the proposed project prior to contracting</p> <ol style="list-style-type: none"> <li>1. details of the geographic, temporal, and functional scope of the project (e.g., rights of way, land acquisition, and personnel relocation plans, if necessary)</li> <li>2. technical F/S including technical design and technical specification schedule supported by investment amount and social and environmental impact assessment.</li> <li>3. financial F/S including detailed risk assessment, financial impact assessment, financing and financial planning</li> <li>4. legal F/S, including assessment of legal risks and uncertainties</li> <li>5. social and environmental impact assessment (if applicable)</li> <li>6. economic F/S</li> </ol>

		<p>7. PPP Suitability Assessment or Value for Money Assessment</p> <p>8. comprehensive risk matrix</p> <p>Preliminary PPP Structure</p> <p>10. plans for stakeholder outreach activities to ensure social acceptability of the project</p> <p>These development activities must take place within six months, unless the contracting agency applies to and is granted an extension of time by the Directorate.</p>
7	Recommendation for approval to the Committee	All documentation resulting from the Project Development Phase will be evaluated by the Contracting Agency based on the evaluation criteria set forth in 3. and the Directorate will make a recommendation for approval by the Committee within 20 surveying days of completion of the Project Development Phase.
8	Committee decision	<p>The Committee, based on the recommendations of the Contracting Authority and any independent review or advice that the Committee may seek in that regard, will make one of the following decisions within 14 days of receipt of the report in 7 above.</p> <ul style="list-style-type: none"> <li>• Grant approval for projects to be procured under the PPP method, provided the project meets the criteria of public benefit, PPP suitability, project feasibility, and reasonable price.</li> <li>• Provide guidance on alternative ways to implement the project because it does not meet the PPP suitability criteria.</li> <li>• This project does not meet any of the relevant criteria and should be abandoned.</li> </ul> <p>If the Committee determines that the project should be abandoned, the contracting agency may restructure the project to meet the evaluation criteria and resubmit the project to the Committee for a new determination.</p>
9	Publication of feasibility studies and project documents	The contracting agency must make publicly available the feasibility survey and project documents used to evaluate the project in accordance with applicable disclosure guidelines for PPPs in effect at that time.
10	Direct negotiation with contracting agencies	If a proposal is approved by the Committee as either (i) the proposal is determined not to be of market interest for competitive procurement, (ii) the proposal is supported by unique factors, or (iii) the public interest justifies direct negotiation on other grounds, the contracting



<p>or, competitive bidding (esp. for government contracts)</p>	<p>agency will with the assistance of the Directorate, negotiate the project proposal directly with the private firm.</p> <p>The contracting agency is required to establish a clear and realistic timeline for conducting direct negotiations on the project. However, these negotiations must not exceed six (6) months to finalize, and if not completed within six (6) months, the negotiations will be terminated.</p> <p>In addition, if the contracting agency determines that the project should be competitively procured, recognizing market interest and the existence of comparable alternative technologies that provide greater cost effectiveness to the government, the contracting agency may elect to put the project out to open competitive bidding under the PPP Act.</p> <p>In such cases, the contracting agency may, at any time (i) when the project is awarded to another bidder, (ii) when the project achieves financial close, (iii) when the development costs do not exceed 0.5% of the project cost, or (iv) when the development costs have been incurred by the successful bidder, determine whether the proposed firm development activity costs and may decide whether to reimburse the proposing firm for such costs.</p>
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#### 2.2.6 Analysis of PPP cases in the country concerned

According to the database of the Kenya PPP Platform<sup>18</sup>, as of June 2021, a total of 64 PPP projects have been applied for: 41 projects before procurement, 17 projects in the procurement process, and 6 projects already procured, with transportation and infrastructure projects accounting for the largest number of PPP applications by sector, at 21. Of the 64 PPP applications submitted, the largest number (21) were for transportation and infrastructure projects, while the largest number (3) of procured projects were for power generation projects.

Table 4: PPP Project Applications and Procurement Status by Sector<sup>19</sup>

Sector	Number of applications	Number of deals procured
Hygiene	6	0
Energy & Oil	5	3
Transportation & Infrastructure	21	2
Private initiative (other)	2	0

<sup>18</sup> <http://portal.pppunit.go.ke/>

<sup>19</sup>Prepared by our research team (interviewed by the Kenyan Ministry of Finance)

Agriculture, Livestock, Fisheries	1	0
education	14	1
Private initiative (transportation and infrastructure)	2	0
Water & Sanitation	10	0
Tourism, trade, industrialization	3	0
total amount	64	6

When the old PPP law was in effect, there were several issues that prevented some PPP projects from being implemented even if they were proposed. The following is a summary of how the old PPP issues were addressed in the new PPP Law.

Table 5: Comparison of issue responses of old and new PPP<sup>20</sup>

No	Issues under the former PPP law	Addressing Issues in the New PPP
1	Excessive burden on private operators, including F/S and EIA prior to project approval	In the PIIP, if a PPP project is awarded to another private firm despite being proposed by the private firm, the F/S, EIA, and other costs during the project development phase shall be paid by the winning private firm at closing. As for PIIP, F/S and EIA should be done after the project is approved.
2	Lack of capacity on the part of the government	Although not mentioned in the Act, the PPP Directorate has been actively sourcing Transaction Advisors from outside sources.
3	Lack of involvement of County representatives	It was stipulated that The PPP Directorate would include one County designee.
4	Approval procedures	The PPP Node was abolished and its role and authority were consolidated in the Directorate, thus improving the efficiency of the approval process. The timeline for each of the evaluations was presented. (No mention was made of penalties for missed deadlines, etc.)

<sup>20</sup> Prepared by our research team

5	Financial Close	The Financial Close is mentioned in more detail. However, there is no mention of procedures or timelines.
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In addition, interviews were conducted with Kenya National Highways Authority (KeNHA), which has experience implementing multiple PPP projects, and MALF, which has experience applying for PPP projects in the agricultural sector, to obtain the following findings.

#### 2.2.7 About Transaction Advisor

In the pre-F/S (feasibility survey, hereafter F/S), it is important to clearly identify the contracting agency and evaluate its familiarity with the PPP. The contracting authority's lack of familiarity with PPPs can be an obstacle to contract negotiations, delaying the entire process and leading to rejection of the PPP project itself if there is no understanding from any of the contracting authority's stakeholders. Therefore, to assist the government officials of the contracting authority in PPP project making, a Transaction Advisor should be hired with the contracting authority budget, if available, to provide appropriate advice throughout the PPP project making process. In KeNHA's case, for the first three PPP projects, Transaction Advisor<sup>21</sup> was hired for the first three PPP projects, but later, as the capacity within KeNHA grew, it is now able to implement PPP projects on its own instead of hiring a Transaction Advisor. Basically, the Transaction Advisor should be hired by the government, but to avoid unnecessary delays, the private company applying may hire a Transaction Advisor for the government. In addition, the risk of delays should be identified, evaluated, and appropriate countermeasures implemented to mitigate the risk, facilitate communication among the various parties involved, and prevent delays from occurring. In addition, clearly set performance standards for each person in charge and clarify responsibilities in the event of delays. Reduce the risk of delays by clearly defining the process plan, progress management, and response methods in the contract when delays occur.

#### 2.2.8 Feasibility Survey (F/S)

The F/S must be comprehensive, and because of the large amount of funds required, the government must allocate the budget within the government. The roles of the government and private sectors must be clearly defined in this arrangement. The F/S must also outline the benefits that the public will receive from the PPP project, including revenue, environmental, and socioeconomic benefits. In general, the proposal should balance the benefits to be gained by the private sector with those to be enjoyed by the public. While no explanation to stakeholders is required in the pre-F/S stage, the proponent should conduct a stakeholder briefing in the F/S stage.

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<sup>21</sup> Advisors who play a third-party role in PPP studies. The advisors are composed of Kenyan experts, lawyers, accountants, etc., for each individual project.

### 2.2.9 About EIA

The government will conduct a preliminary EIA during the due diligence phase prior to approval of the PPP project. Therefore, it is advisable for the proposal to clearly state the environmental issues that the project will or may have, and the mitigation measures to ensure that negative effects are managed and positive effects are achieved.

### 2.2.10 Other

KFBD may be pursuing its projects primarily for political purposes, and may miss important profitability and technical issues in PPPs. When considering a PPP, one should always seek advice from those in charge who have expertise in the field. In this case, it is imperative to contact other private companies involved in refrigeration facilities to understand the business from their perspective. Accurate knowledge of the status of refrigeration facility operations in Kenya should be obtained.

### 2.2.11 Factors in the Failure of PPP Projects

Prior companies and others in other sectors have applied for PIIPs but failed in the past but, mainly due to lack of understanding and capacity of the contracting authorities and the private companies implementing the project. In addition, the more parties involved, the more difficult it becomes to reach a consensus. For this reason, the agricultural PPP project was not a PPP project but a private sector outsourced project. This project could also be a general project in which the private sector acquires land and builds a cold chain facility. No competitors have been found so far in the case of an open competitive bidding instead of a PIIP.

### 2.2.12 Factors that lead to the non-execution of contracts after the PPP project has been approved

In Kenya, even after a PPP has been concluded as a project and a project proponent has been selected, there are cases where the contract negotiations take a long time or are not concluded. This is mainly due to the fact that the government side may require the private side to bear excessive risk or the government side may not be able to secure a budget for financial compensation when the risk is finally identified in detail and risk sharing is negotiated between the government and private side. It is necessary to encourage the government side to understand risk sharing from the initial stage.

## (3) Issue-3: Investigation of the investment environment

### 3.1.1 Local Adaptability of Proposed Business/Technology

As a result of interviews with commercial fishing companies and fish processing companies

operating in Mombasa, it was confirmed that post-harvest losses after landing of marine products are generally not occurring because relatively large companies have their own cold chain facilities, including refrigeration, freezing, and processing facilities on board their fishing vessels. Therefore, it was confirmed that post-harvest losses after landing of fishery products are not occurring.

On the other hand, many small-scale fishers and BMUs in coastal areas lack cold chain facilities, resulting in a large amount of harvest losses. This fact limits the catch of fishery products, increases post-harvest losses after landing, and ultimately threatens food security. In addition, the results of interviews with other donors and others confirmed that post-harvest losses of agricultural products are a major problem in Mombasa. The post-harvest loss rate for agricultural products is very high at 60-80%, confirming that the amount of agricultural product waste is high, as well as that of marine products. The amount of agricultural product waste is particularly high in Mombasa because agricultural products are gathered from all over the coastal area, and if they are not stored in refrigerated facilities, they spoil within a day or so. In light of this, the cold chain business planned for this project is considered to be very locally compatible.

According to the results of the interview with KeFS, there is a plan to develop a web-based statistical management database for fish species and catch data measured by BMUs at each fishing port, which is scheduled to be operational in 2023. The database is scheduled to be operational in 2023. Currently, there is a lack of statistical data on landings in coastal areas, so it is necessary to obtain and analyze accurate data on the number of vessels and catches in the offshore fishing industry when planning facility development.

According to the results of the existing survey<sup>22</sup>, the annual catch of the seawater surface fishery was calculated to be 23,287 and 22,407 tons in 2014 and 2015, respectively. The reliability of this statistical data is being debated within the KFBD. In order to consider the development of a sea surface fishery, it is first necessary to establish a system for accurate data compilation and analysis.

### 3.1.2 Development Effect

The following three points can be considered as the medium- to long-term development effects of the cold chain facilities to be installed by the proposed company in Kenya. The development benefits are the benefits to the surrounding environment associated with the implementation of the project, and are different from those of the project plan, which evaluates the profitability of the main project.

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22 Information Gathering and Confirmation Survey on the Blue Economy in Kenya (JICA, 2018) June).

- Increase in income and revenue of commercial fishing vessels, local fishermen, local residents, and export/logistics companies (quantitative evaluation) due to the increase in the volume of seafood handled as a result of the cold chain facilities.

Increase in income and revenue of commercial fishing vessels, local fishermen, local residents, and export/logistics companies as a result of the increased volume of seafood handled by the cold chain facilities (quantitative evaluation).

- Reduction of post-harvest losses on marine products (quantitative evaluation)

- Contribution to the Blue Economy (qualitative assessment)

The specifics of each item are shown below. The quantitative evaluation items were converted into yen by applying the following calculation conditions.

- Development Effectiveness Period of Evaluation (estimated for two cases): 10 years and 20 years.
- Currency for estimating development effects: Japanese yen (JPY)
- Exchange rate used to calculate the effect: middle price (TTM) at the end of December 2022 x 110%.
- The volume of marine products handled for the calculation of the effect: The standard value (base value) is set using "the value in the project plan" for effect (1) and "the value in the project plan x 30% (the result of the interview at the time of the field survey)" for effect (2).
- Unit price of marine products used in the effect calculation: The average of the unit price of the FOB unit price in the Annual Report issued by KeFS for the past five years is used.
- Three cases of effect amount estimation: base value, upper limit (base value x 110%), and lower limit (base value x 90%) are considered.

#### 3.1.2.1 Commercial fishing vessels associated with increased seafood handling with the development of cold chain facilities,

Increase in income and revenue for commercial fishing vessels, local fishermen, local residents, and export and logistics companies due to increased volume of seafood handled in the cold chain facilities

The development of cold chain facilities is expected to produce the following development effects in the medium to long term for commercial fishing vessels, local fishermen, local residents, and export and logistics companies.

① Benefit for commercial fishing vessels

By establishing cold chain facilities in this project, it will be possible to purchase marine products from commercial fishing vessels fishing in the Kenyan EEZ. This will lead to an expansion of the scale of the commercial fishing fleet, which has not been able to expand its catch due to insufficient capacity of post-landing refrigeration and freezing facilities, and is expected to generate development effects and benefits for the commercial fishing fleet.

② Benefit to local fishermen

The cold chain facility established under this project is planned to purchase a certain number of marine products from local fishermen as well. The marine products to be purchased from local fishermen are expected to include octopus and lobster, which are rarely caught by commercial fishing vessels and are not handled by Mama Karanga. The purchase of octopus and lobster landed by local fishermen at the cold chain facility is expected to have a development effect of improving the livelihoods and incomes of local fishermen.

③ Benefits to local residents

The cold chain facility will enable local residents to be employed as staff in the facility, which is expected to create employment opportunities for local residents and increase their income.

④ Benefits to export and logistics companies

The marine products processed and stored in the cold chain facility planned for this project will be distributed and sold mainly in export markets. Export and logistics companies are expected to be used for exports, etc., and development effects and benefits to export and logistics companies are expected from the development of the cold chain facilities.

⑤ Summary of development effects

The development effects and benefits to (1) commercial fishing boat operators in Kenya, (2) small-scale fishermen, (3) local residents, and (4) export and logistics companies from the development of the cold chain facilities planned in the project were surveyed. Based on these surveys, the project is expected to have a very large development impact on each stakeholder related to the blue economy, and we believe that this project will make a significant contribution to the continuous development of the blue economy in Kenya.

Table 6: Summary of Development Effects<sup>23</sup>

Period	Summary of development effect amount (yen)		
	base value	upper value	lower limit
10 years	1,415,746,743	1,557,321,421	1,274,172,073
20 years	7,908,328,981	8,699,161,879	7,117,496,086

### 3.1.2.2 Reduction of post-harvest losses on marine products

The development of cold chain facilities is expected to reduce post-harvest losses of marine products landed by small-scale fishermen, which is currently estimated to be about 30% of the total. The post-harvest loss of fishery products can now be exported to earn foreign currency, which is expected to have an economic impact on the development of the country.

#### ① Benefit from reduction of post-harvest losses of fishery products (Commercial Fishing Vessel Sector)

From the results of interviews with commercial fishing companies operating in Kenya (4 out of 5 companies), those companies that maintain commercial fishing vessels indicated that they have freezing and processing facilities on board their vessels and have obtained HACCP for each fishing vessel. The companies that operate commercial fishing vessels (4 out of 5 companies) indicated that they have freezing and processing facilities on board their vessels and that they have obtained HACCP for each vessel.

#### ② Benefit from reduction of post-harvest losses of fishery products (small-scale fishery sector)

Interviews during the field survey revealed that in the small-scale fishery sector, post-harvest losses of approximately 30% of the total catch of marine products occur due to insufficient quality control after landing by local fishermen and lack of refrigeration and freezing facilities during transportation. The cold chain facility to be constructed this time will procure approximately 30% of its capacity from local fishermen. This will eliminate post-harvest losses, which currently account for about 30% of the facility's capacity, and is expected to have a positive effect on the facility's performance. Candidates for marine products to be procured from local fishermen are expected to include octopus and lobster, which are caught in small quantities by commercial fishing vessels.

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<sup>23</sup> Prepared by our research team



③ Benefit from reduction of post-harvest losses other than fisheries products (small-scale fishery sector)

Interviews during the field survey revealed that in coastal areas such as Mombasa, post-harvest losses due to lack of refrigeration and freezing facilities are a major problem not only for marine products, but also for vegetables and fruits. The post-harvest loss of vegetables and fruits is higher than that of marine products, amounting to about 60%. The cold chain project planned for this project will also include vegetables and fruits in the future, and is expected to make a significant contribution to the reduction of post-harvest losses in coastal areas.

3.1.2.3 Contribution to the Blue Economy

The development of cold chain facilities is expected to produce the following development effects in the medium to long term for commercial fishing vessels, local fishermen, local residents, and logistics companies.

① Contribution to Blue Economy Development

In this survey, we visited and interviewed a wide range of organizations related to the blue economy, from government agencies such as KFBD and the Fisheries Agency to private companies such as commercial fishing boat operators, seafood processing and sales companies, refrigeration and freezing facility operators, and export and logistics companies. While all interviewees mentioned the future potential for blue economy development in Kenya, they also pointed out the fact that Kenya's domestic marine resources are not being effectively utilized. The cold chain facility to be developed under the project is expected to bring about significant development effects and benefits to multiple blue economy stakeholders, and is also expected to play an important role in terms of food security and post-harvest loss reduction. The project plan is in line with the government's Blue Economy Policy, and is expected to make a significant contribution to the development of the blue economy in Kenya.

② Coexistence and continued development with Mama Karanga

In the coastal areas of Kenya, there is a group of women called Mama Karanga who make their living processing and selling marine products. Mama Karanga buys mainly small fish from local fishermen, processes them on the spot, and sells them to local residents. The cold-chain facility to be built this time will purchase more than 70% of its volume from commercial fishing vessels, which is different from the species of fish targeted by Mama Karanga, so there will be no competition in economic activities. Interviews with existing fish processing companies and others revealed that both fish processing companies and Mama Karanga are still conducting their

business activities in a segregated manner. For example, one fish processing company buys all fish from local fishermen, but delivers fish not targeted by the processing plant to Mama Karanga, indicating that there is no competition in business activities. In addition, while Mama Karanga mainly targets local consumption, the cold-chain facility to be developed this time is mainly for the overseas market, and there is no possibility of competition between the two businesses.

### ③ Effectiveness against poachers and illegal fishing vessels of foreign registry

In Kenya's EEZ, not only domestic fishing vessels licensed by the Kenyan government but also a certain number of foreign fishing vessels without a license are engaged in poaching and illegal fishing. Based on the results of interviews, it appears that illegal fishing vessels mainly catch large fish such as tuna in pelagic areas where coastal patrols are inadequate. The cold chain facility plans to handle a certain amount of large fish such as tuna caught illegally by foreign fishing vessels, and the catch within Kenya's EEZ will be landed, processed, and exported to Kenya for the benefit of the country. Coastal fisheries in the EEZ, which have been outlawed, will be legalized and will benefit Kenya. It is also expected that this will contribute to food security and spread to neighboring countries as a good practice of using their own resources for their own benefit. At present, there is no sufficient data on illegal fishing by foreign fishing vessels in the Kenyan EEZ, and the actual situation has only been confirmed, so quantitative assessment is not possible. In order to make the best use of the country's fishery resources, it is necessary for the Kenyan Coast Guard and others to conduct surveys and accumulate data in the future.

## 3.2.1 Catch scrutiny and field confirmation

### 3.2.1.1 Composition of fish species caught

#### (i) Fish species and catch in the small-scale fishery sector

The catch of the small-scale fishing sector of Kenya's surface fisheries in 2020 was 24,000 tons with a catch value of 4,836 million Kenyan shillings (Table 17.) By category, bottom fish accounted for the largest catch at 56%, followed by floating fish (25%), octopus, sea cucumbers, shellfish, etc. (8%), shrimp and crab shellfish (7%), and sharks and rays (4%). Shrimp and crab crustaceans (7%), and sharks and rays (4%). By catch value, bottom fish (39%), floating fish (23%), shrimp, crabs, and other crustaceans (19%), octopus, sea cucumbers, shellfish, etc. (15%), and sharks and rays (4%). Unit prices for bottom fish are relatively low, while unit prices for octopus, sea cucumbers, shellfish, and crustaceans such as shrimp and crabs are relatively high.

The main species of bottom fish are sea bream, snappers, snappers and mullet, while the main species of floating fish are skipjack tuna, barracuda, sardines, etc. Crustaceans include lobsters, crabs, and shrimp. In addition, octopus, squid, sea cucumbers, and other mollusks are often caught.

Because small-scale fishermen spend only a few hours to a day at sea, the freshness of the catch is not bad at the time of landing at the beach. Most of the catch distributed in the local market near the landing sites is purchased directly by Mama Karanga from boaters, who process the gills and entrails on the beach, then deep-fry the fish at home and sell it around the market or on the street. Lobsters and prawns are transported to hotels and restaurants in the Mombasa area in ice storage. Seafood shipped to markets outside of the region is either stored in ice or placed overnight in a compact freezer owned by the BMU at the landing site, where it is then distributed as frozen fish. The actual landing takes place at small fishing ports in major counties (groups) such as Kilifi, Malindi, and Shimoni, and the fish is transported to nearby hotels and fish markets, Mombasa, and Nairobi. The port of Liwatoni is currently under renovation using the Kenyan presidential budget.

Table 7: Catch by species in the small-scale fishery sector (2020)<sup>24</sup>

Segmentation	Name	Amount of catching (ton)	Amount of money (KSh)
Bottom fishes	Rabbit fish	2,479	395,659,665
	Scavenger	1,984	276,776,202
	Snapper	1,196	142,614,173
	Parrot fish	1,937	222,498,644
	Rock cod	708	85,532,579
	Black skin/Grunters	1,009	158,546,106
	Mullet	683	155,638,022
	Surgeon fish/ Unicorn	790	72,909,471
	Goat fish	393	60,649,854
	Others	2,049	324,039,781
	Sub-total of bottom fishes	13,228	1,894,864,497
Floating fishes	Little mackerel/bonito/tuna	1,953	444,091,455
	Cavalla jacks/queen fish	820	174,893,737
	Barracuda	487	104,054,180
	Sardine	1,152	81,556,379
	Sail fish	123	31,235,920
	Sword fish	137	23,152,983
	Mixed pelagic	959	189,502,014
	Milkfish	154	34,188,389
	Dolphin fish	83	14,931,580
	Sub-total of floating fishes	5,866	1,097,606,638
Chondrichthyes	Shark & Rays	758	156,169,984
	Mixed species	278	60,919,815
	Sub-total of sharks and rays	1,037	217,089,799
Crustaceans	Lobsters	449	391,072,123
	Crab	667	289,376,857
	Prawn	475	238,317,048
	Sub-total of crustaceans	1,591	918,766,028
Mollusks	Octopus	962	186,793,946
Others	Squid	441	107,906,819
	Beach-de-mers	217	230,472,150
	Oysters	189	40,164,614
	Marine shells	117	142,046,429
	Sub-total of mollusks, others	1,925	707,383,958
	Grand total of fishes	23,647	4,835,710,918

<sup>24</sup> Prepared by our research team

(ii) Species and catch of fish in the commercial fisheries sector

As of 2021, there were 14 commercial fishing vessels of Kenyan registry engaged in surface fishing. These include 6 trawlers, 6 longliners, and 2 crab cage vessels. Table 18 shows the sea surface catch by commercial fishing vessels in 2020 as ascertained by the Kenya Fisheries Service.

The primary target species for trawlers are black tigers, bananas, and deep-sea shrimps<sup>25</sup> in the genus Crustacea. Bycatch species include barracuda and nibe. The main target species for longline vessels are yellowfin tuna, bigeye tuna, and swordfish, with bycatch sharks also landed as whole fish. The main target species for crab cage boats is *Chaceon fenneri* (hereafter referred to as "golden crab" for convenience), which is a member of the genus *Chaceon*, locally called "golden crab". This crab has an orange-colored shell, weighs about 1 kg each, and is caught in the waters off Kilifi Harbor at a depth of 400 to 700 m. The crab is also known as the "golden crab" because it is a member of the genus *Chaceon fenneri*.



Figure 6<sup>26</sup>

Table 8 Catch by Commercial Fishing Vessels by Vessel in 2020<sup>27</sup>

No	Name of vessel	Amount of catch of fishes (kg)							Total
		Shrimps	Fishes	Octopus	Squids	Cuttlefish	Lobsters	Crabs	
1	Alpha Challenger	35,620	191,782	40	1,204	40	47	20	228,753
2	Jackpot	31,628	178,719	0	1,847	1,000	856	128	214,178
3	Alpha Manyara	9,867	505,629	0	3,600	0	0	0	519,096
4	Roberto	26,543	33,825	0	1,444	442	24	0	62,278
5	Vega	25,662	39,753	0	1,315	601	6	0	67,337
6	Omega 1	965	5,095	8	19	12	24	36	6,159
7	Diamond Ace 1	0	0	0	0	0	0	66,023	66,023
8	Ahadi 001	0	0	0	0	0	0	0	0
9	Ahadi 002	0	0	0	0	0	0	43,723	43,723
10	Aknaton	0	0	0	0	0	0	0	0
11	Shan Jyi	0	148,527	0	0	0	0	0	148,527
12	Seamar II	0	129,964	0	0	0	0	0	129,964
13	New Foundland Alert	0	475,065	0	0	0	0	0	475,065
14	Ra-Horakhty	0	3,985	0	0	0	0	0	3,985
	Grand total	130,285	1,712,344	48	9,429	2,095	957	109,930	1,965,088

<sup>25</sup> *Penaeus aztecus* (♂195mm, ♀236mm), called deep see red prawn

<sup>26</sup> Photographed by our research team

<sup>27</sup> Prepared by our research team

### 3.2.1.2 Catch over time

#### (i) Change over time by category

Figure 7 shows the change in catch over time in the small-scale fishing sector over the nine-year period from 2012 to 2020. Total catch for the three years from 2012 to 2014 hovered around 9,000 tons, but jumped to the 22,000-ton level in 2015. For the six years after 2015, the total catch increased and decreased between 23,000 and 25,000 tons, with no significant upward trend observed.

By category of fishery products, bottom fish have been on an increasing trend from 10,000 to 13,000 tons since 2015, while floating fish have fluctuated widely from year to year, alternating between years of 8,000 to 9,000 tons and 5,000 to 6,000 tons. Sharks and rays show a similar trend. On the other hand, crustaceans such as shrimps and crabs are both on the increase, from 600 to 2,000 tons.

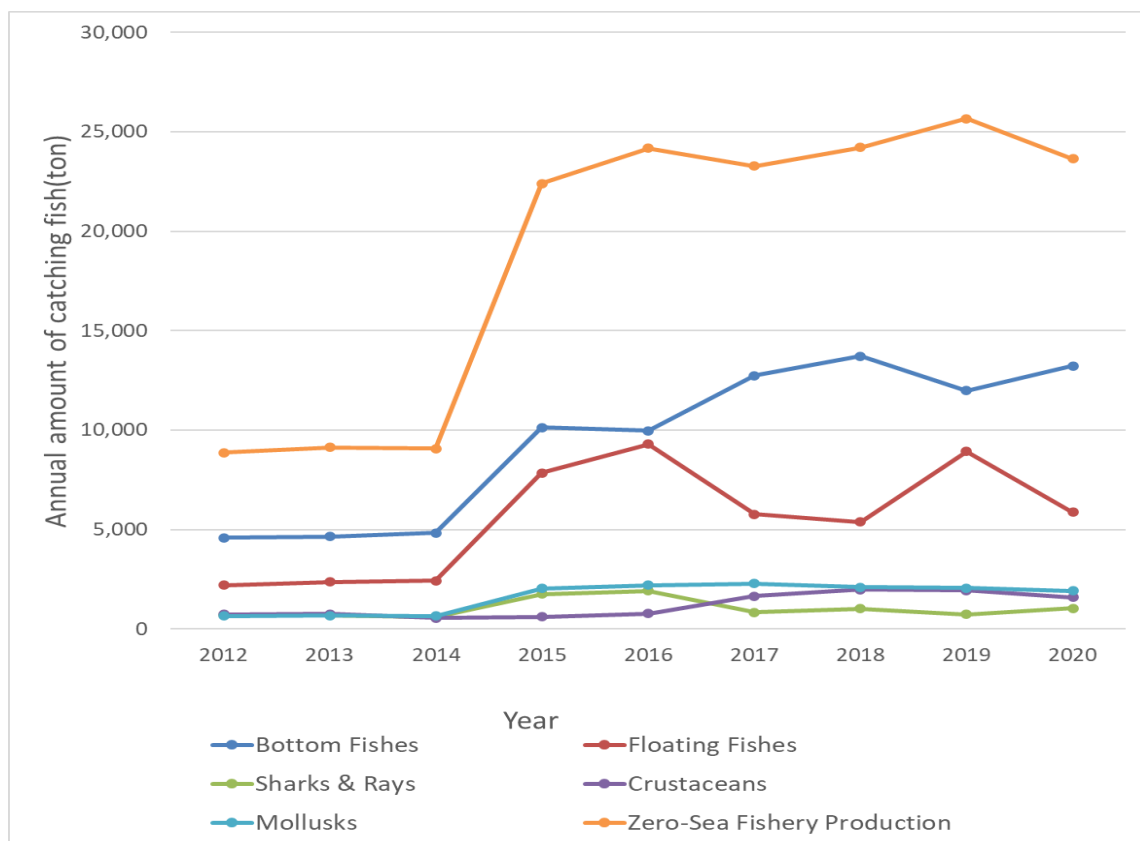


Figure 7: Change over time in catch in the small-scale fishery sector<sup>28</sup>

<sup>28</sup> Prepared by our research team

Table 9: Secular changes in catch by species in the small-scale fishery sector<sup>29</sup>

Segmentation	Name	Detail name	Amount of catching fish (ton)								
			2012	2013	2014	2015	2016	2017	2018	2019	2020
Bottom fish	Rabbit fish	Rabbit fish	645	794	722	1,488	2,294	1,985	2,006	1,859	2,479
	Scavenger	Scavenger	602	685	686	1,687	1,640	1,476	1,369	726	1,984
	Snapper	Snapper	432	347	319	1,247	1,368	1,912	1,959	1,849	1,196
	Parrot fish	Parrot fish	416	540	508	846	1,269	1,588	1,770	1,483	1,937
	Rock cod	Rock cod	248	199	160	694	483	608	631	479	708
	Black skin/Grunters	Black skin/Grunters	386	336	354	399	414	852	1,306	1,013	1,009
	Mullet	Mullet	292	220	312	454	376	489	624	698	683
	Surgeon fish/ Unicorn	Surgeon fish/ Unicorn	237	248	305	510	317	673	840	649	790
	Goat fish	Goat fish	125	115	117	182	269	321	329	280	393
	Others	Others	1,209	1,169	1,349	2,628	1,546	2,832	2,892	2,958	2,049
		Sub-total of bottom fishes	Sub-total of bottom fishes	4,592	4,653	4,832	10,135	9,976	12,736	13,726	11,994
			2012	2013	2014	2015	2016	2017	2018	2019	2020
Floating fish	Little mackerel/bonito/tuna	Little mackerel/bonito/tuna	530	620	641	1,215	1,798	2,077	1,894	2,737	1,953
	Cavalla jacks/queen fish	Cavalla jacks/queen fish	420	466	394	795	1,186	899	943	1,553	820
	Barracuda	Barracuda	260	317	301	729	709	729	610	1,187	487
	Sardine/Anchovy	Sardine/Anchovy	194	217	239	934	1,073	543	634	2,015	1,152
	Sail fish	Sail fish	142	140	176	402	235	200	176	201	123
	Sword fish	Sword fish	0	0	0	158	160	43	0	0	137
	Mixed pelagic	Mixed pelagic	512	521	555	3,611	4,143	772	610	756	959
	Milkfish	Milkfish	79	61	83	0	0	228	266	292	154
	Dolphin fish	Dolphin fish	61	17	44	0	0	287	248	191	83
	Sub-total of floating fishes	Sub-total of floating fishes	2,198	2,359	2,433	7,844	9,304	5,778	5,381	8,932	5,866
Cartilaginous fish	Shark & Rays	Shark & Rays	373	314	293	1,761	1,913	842	770	564	758
	Mixed species	Mixed species	313	377	314	0	0	0	253	179	278
		Sub-total of cartilaginous fishes	Sub-total of cartilaginous fishes	686	691	607	1,761	1,913	842	1,023	743
Crustaceans	Lobsters	Lobsters	96	123	107	263	390	300	424	347	449
	Crab	Crab	235	274	180	145	163	584	664	641	667
	Prawn	Prawn	408	365	269	213	220	763	899	946	475
		Sub-total of crustaceans	Sub-total of crustaceans	739	762	556	621	773	1,647	1,987	1,934
Mollusks Others	Octopus	Octopus	394	446	437	1,832	2,063	1,469	1,430	939	962
	Squid/cuttlefish	Squid/cuttlefish	144	143	151	194	134	661	554	614	441
	Beach-de-mers	Beach-de-mers	36	48	24	19	6	86	82	356	217
	Oysters	Oysters	74	32	35	0	0	41	36	155	189
	Marine shells	Marine shells	0	0	0	0	0	25	0	0	117
	Sub-total of mollusks	Sub-total of mollusks	648	669	647	2,045	2,203	2,282	2,102	2,064	1,925
	Grand total	Grand total	8,863	9,134	9,075	22,406	24,169	23,285	24,219	25,667	23,647

## (2) Age-related changes in bottom-feeding fishes

Figure 8 shows the change over time in catch by species of bottom fish in the small-scale fisheries sector from 2012-2020. The major species caught in the bottom fish category include: bigeye, scavenger, snapper, tiger perch, mullet, croaker, and sunfish. 2015-2020 catch trends show that bigeye went from 1,500 tons to 2,500 tons, while snapper went from 800 tons to 2,000 tons, Tiger perch is a species that shows an increasing trend from 400 tons to 1,000 tons.

<sup>29</sup> Prepared by our research team

In contrast, snapper increased from 1,200 to 2,000 tons and then began to decline, while scavenger decreased from 1,700 to 700 tons and then recovered to 2,000 tons. These fish species are preferred by Mama Karanga, which operates in Kenya's extensive coastal zone, to process them into fried fish for sale. Among these species, fried saffron cod is the most commonly processed and sold as fried fish in restaurants and markets in the coastal areas.

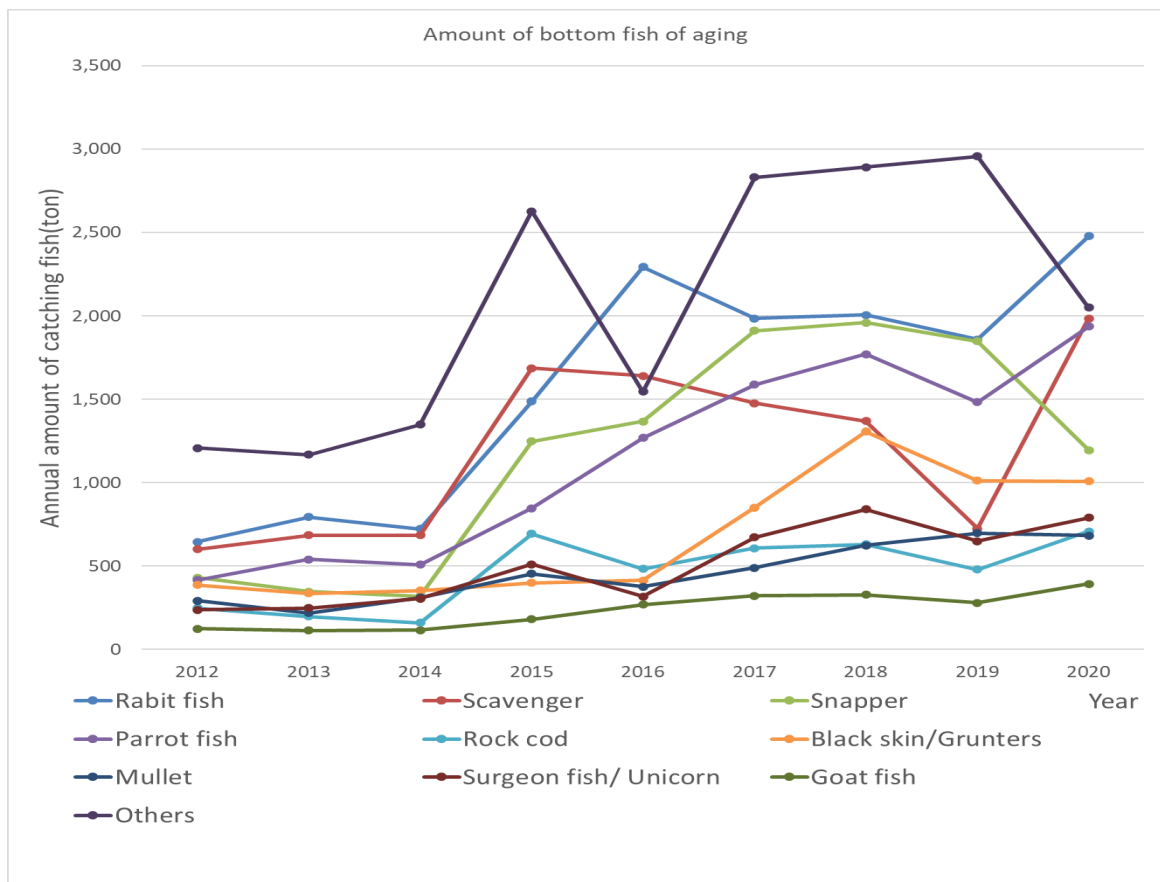


Figure 8: Secular change in bottom fish catches (2012-2020)<sup>30</sup>

## 2) Ageing of floating fishes

Figure 9 shows the change over time in catch by species of floating fish in the small-scale fishery sector from 2012 to 2020. The major species of floating fish caught include skipjack tuna, horse mackerel, barracuda, sapphire sardines, basking marlin, swordfish, milkfish, and dolphinfish. The catch of "other floating fish" in the figure increased in 2015 and 2016 because of the large catch of datsu during this period (2015: 2,300 tons; 2016: 2,800 tons); no datsu catch was recorded after 2017.

Looking at catch trends since 2015, while skipjack and tuna catches have shown an increasing trend from 1,200 to 2,700 tons, many other species of floating fish have repeatedly

<sup>30</sup> Prepared by our research team

increased and decreased, and stable production has not yet been secured. In addition, the catch of major floating fish in 2020 decreased compared to 2019. This is thought to be a manifestation of the limiting factor that fishermen are unable to move beyond the coastal fishing grounds due to the small scale of their operations and have to wait for floating fish species to migrate to the inshore areas.

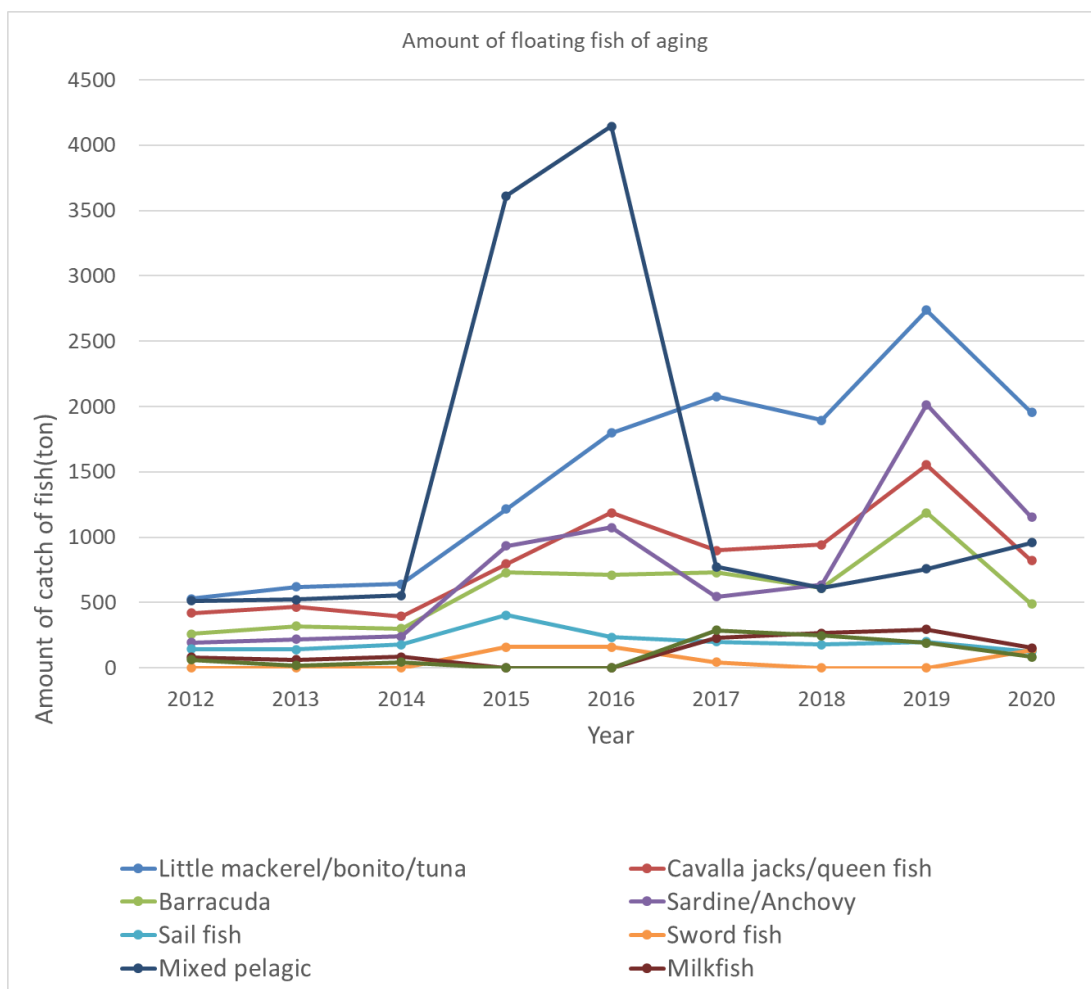


Figure 9: Secular change in catches of floating fish (2012-2020)<sup>31</sup>

### 3.2.2 Seasonal variations in catches and their Background

#### 3.2.2.1 Seasonal variation in the small-scale fishing sector

##### (1) Seasonal fluctuations of floating fishes

Figure 10 below shows the seasonal changes in catch in 2016 for the small-scale fishery sector. The year saw an increase in the catch of floating fish in July and August, which boosted the overall catch of marine products. Looking at the catch of floating fish at that time, the catch

<sup>31</sup> Prepared by our research team



of datsu increased sharply in July and August. This is because this was the year when datsu was caught in large quantities, and the catch was concentrated in July and August. On the other hand, no datsu catches were recorded after 2017, making this year a unique phenomenon. Additionally, the catch of sardines and sappers increased in July of 2016. Sardines and sappers are species that are caught every year, with catches exceeding 1,000 tons every few years.

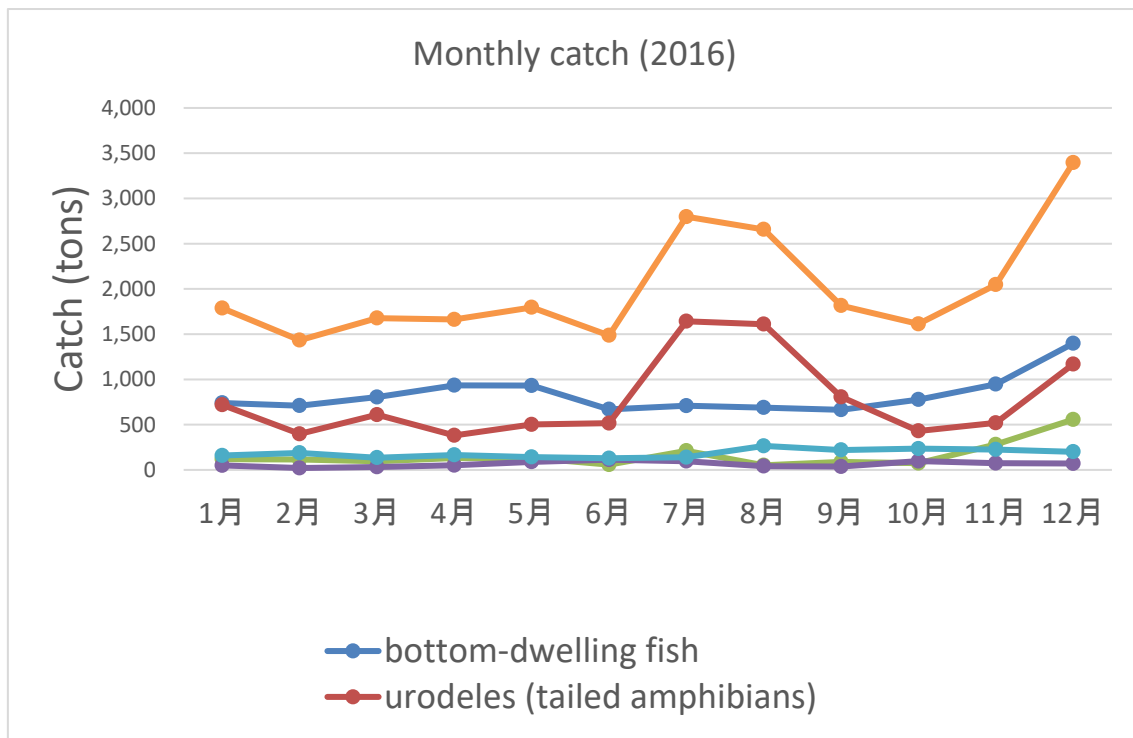


Figure 10: Seasonal changes in catches in the small-scale fishing sector (2016)<sup>32</sup>

## (2) Seasonal variation of bottom-dwelling fishes

In the case of bottom fish, there is a seasonal variation, albeit a gradual one. It shows a catch of 800 to 1,000 tons per month from March to May, then slumps to around 700 tons from June to October. This trend recovers after November and increases to 1,400 tons in December. It then declines again to the 700-ton level in January and February.

According to the results of the interviews, fishing activities by local residents are often limited by the monsoon because of the small scale of the fishery. In particular, during the southwest monsoon season (kusi) from May to September, when the sea is rough, it becomes difficult to go fishing with small canoes, and fishermen are forced to rely on fishing by throwing from the shore, which makes their lives difficult. As mentioned above, the low catch of bottom-dwelling fishes from June to October is due to the southwest monsoon, which causes stormy weather at sea and reduces the number of days available for fishing.

<sup>32</sup> Prepared by our research team

As mentioned above, most of the bottom-feeding fish species have a slumping catch period from June to October, followed by a recovery period around that time. Among these species, only one species, the sea eel, maintains strong catches even in July and August, when other species are in the doldrums. It is sold throughout the year as fried fish in restaurants in coastal areas, and is one of the most valuable fish species for which supply and demand match throughout the year.

### 3.2.2.2 Seasonal variations in the commercial fishing sector

#### (1) Seasonal variation in offshore trawl fishery

Fishing licenses were issued to five offshore trawlers in 2019. Of these, two vessels were engaged in offshore trawling throughout the year, while the other three vessels were engaged in offshore trawling only from November to March, when shallow water trawling is prohibited. Total catch in 2019 from the offshore trawl fishery was 625.8 metric tons, 47% of which was caught during the two months of November and December when five vessels were engaged. Of the total catch, 87% was fish, with shrimp, the main target of the offshore trawl fishery, accounting for about 10% of the total catch. Looking at the seasonal variation of shrimp, the catch peaked at 13,000 tons in March, and was generally around 5,000 tons in the other months, with no clear seasonal variation observed.

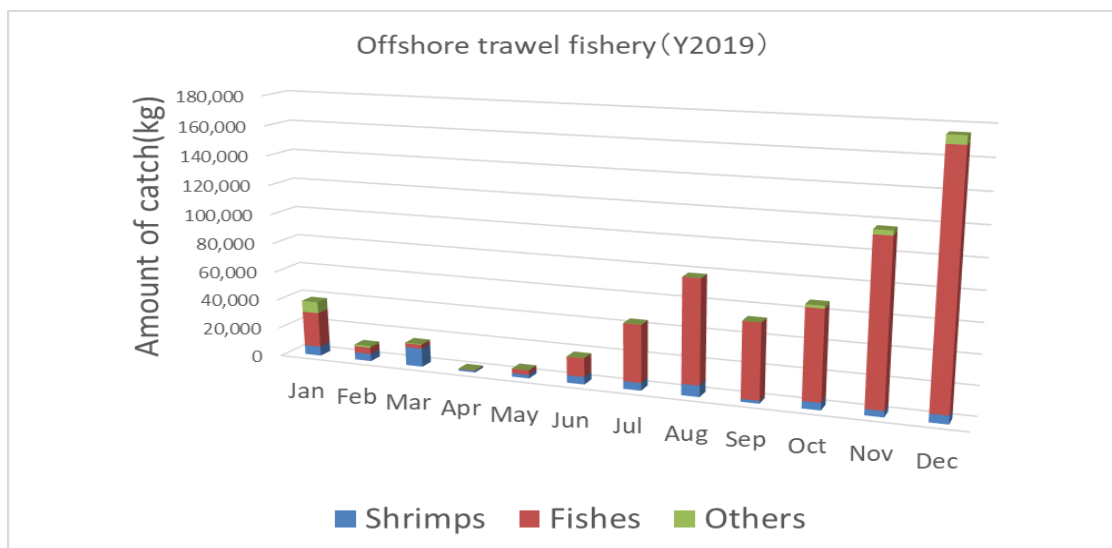


Figure 11: Seasonal variation in catch on offshore trawlers (2019)<sup>33</sup>

#### (2) Seasonal fluctuations in offshore crab cage fishery

In 2019, fishing licenses were issued to two offshore cage fishing vessels. These vessels will exclusively target the deep-sea giant red king crab. In 2019, 38.1 tons of this crab were caught

<sup>33</sup> Prepared by our research team

by two offshore cage vessels. Seasonal variation shows that the catch peaks in August and December, with a peak catch of 7-8 tons/month/2 vessels.

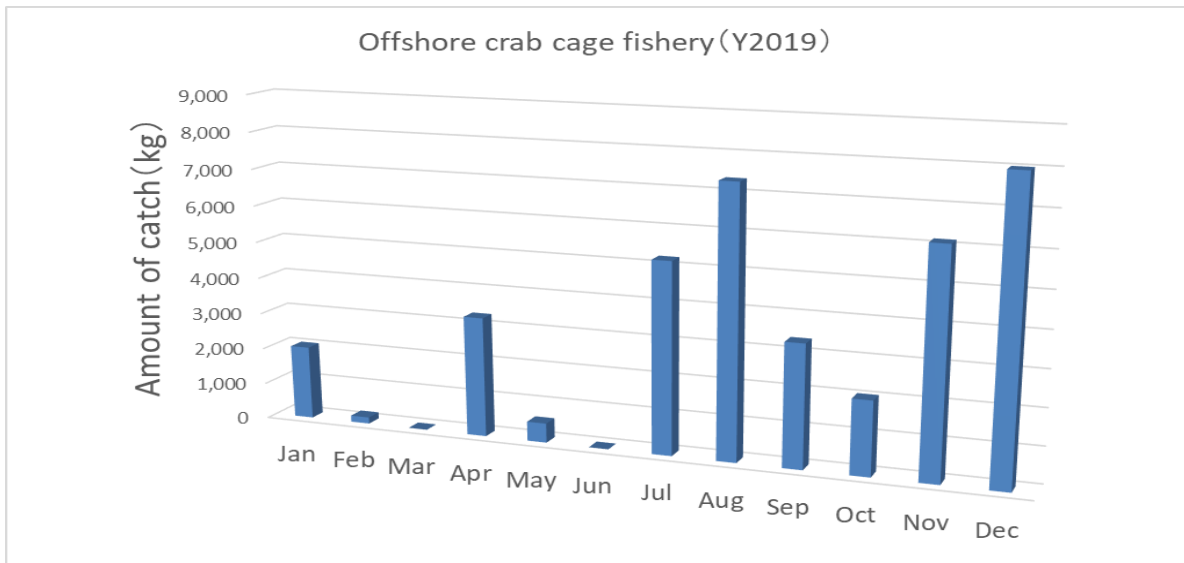


Figure 12: Seasonal changes in catch on offshore crab cage vessels (2019)<sup>34</sup>

### (3) Seasonal fluctuations in offshore longline fishery

In 2019, licenses were issued to three offshore longline vessels, and the three vessels caught 795 tons annually. By species, swordfish accounted for 49% of the total, followed by bigeye tuna (30%) and sharks (18%).

Seasonally, catches generally exceed 60 tons per month from April to December, with a peak in July. Swordfish and bigeye tuna, the two main species fished, show similar seasonal trends (Figure 13).

In the small-scale fishery sector, catches are sluggish from June to October, when the southwest monsoon prevails, because the number of fishing days is reduced due to stormy weather at sea. This may be due to the effect of the monsoon's prevailing currents, which bring migratory marlin and tuna to the waters around Kenya.

<sup>34</sup> Prepared by our research team

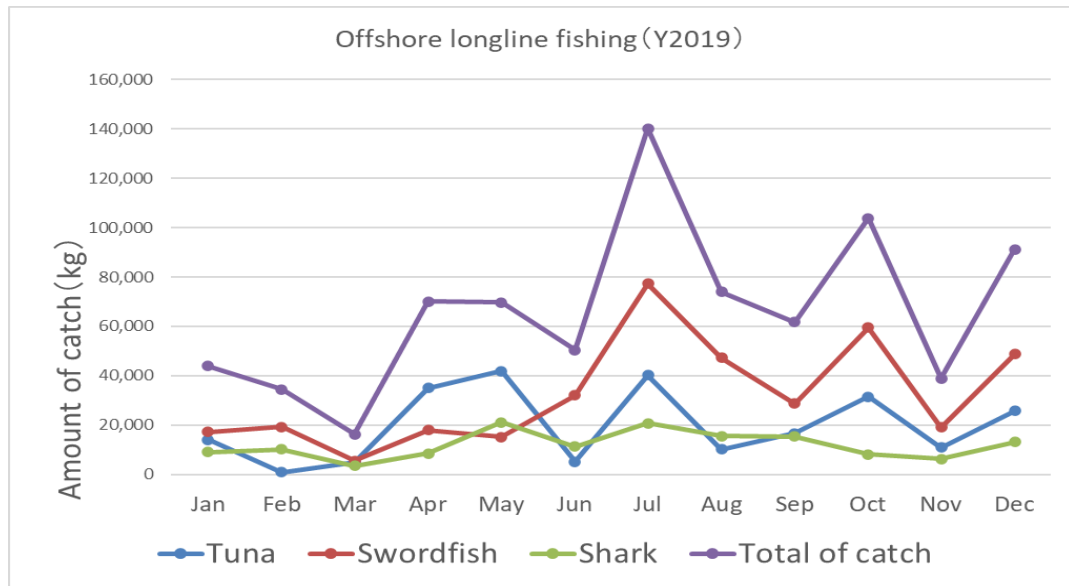


Figure 13: Seasonal variation in catch on offshore longline vessels (2019)<sup>35</sup>

### 3.2.2.3 Current Status and Prospects of Fish Resources

#### (1) Coastal bottom fish stocks

Fishing and related activities are an important livelihood for residents of Kenya's coastal communities. The BMUs are responsible for the registration of their member fishermen, and the County Fisheries Department is responsible for the licensing of fishing activities based on the registration. Even though the BMU is responsible for registration and the fishing permit system by the County Fisheries Department based on the registration, access to small-scale fisheries is practically open access, and it is difficult to say that proper coastal resource management is in place.

According to KMFRI's 2018 report<sup>36</sup>, a comparison of the average catch per fisherman and per operation between 2003/2004 and 2014/2015 shows a slight increase from 3.7 kg to 4.2 kg in gillnet fishing and from 4.4 kg to 4.6 kg in inshore basket fishing, but a significant decrease from 5.1 kg to 3.6 kg in handline fishing. The spear gun fishery saw a significant decrease from 6.1 kg to 4.0 kg, and the purse seine fishery saw a significant decrease from 7.9 kg to 2.5 kg.

According to the stock assessment of coastal bottom fish, the recent trend of increased fishing effort has had a negative impact on the stocks of major fish species, and as a result, fishermen have experienced a decrease in their catches. This is due to the socioeconomic situation of the local population, which has no other means of livelihood than fishing.

#### (2) Floating fish stocks

According to 2003 estimates, MSY in Kenya's sea fisheries was estimated at 150,000 tons, of

<sup>35</sup> Prepared by our research team

<sup>36</sup> Blue economy report (June 2018)

which small floating fish accounted for 18,000 to 20,000 tons (KMFRI, 2018).

Of the total catch in the small-scale fishery sector in 2020 (24,000 tons), the catch of floating fish will account for 29%. The target species are divided into two categories: small-sized floating fish such as sardines, mackerel, horse mackerel, and barracuda, and large-sized floating fish such as bonito, tuna, swordfish, and sharks. Of the total catch of floating fish (6,904 tons), large floating fish accounted for 47%, small floating fish 36%, and others 17%. Despite the fact that the operations of small-scale fishermen are restricted to the coastal fishing grounds, the catch of large-sized floating fish is characterized by a relatively high proportion of large-sized fish.

Estimates for 2003 put the abundance of small floating fish at 20,200 metric tons. This estimate includes the following small and medium-sized fish species. Anchovy (*Engraulis* sp., *Stolephorus* sp.), Japanese anchovy (*Etrumeus teres*), mizun (*Herklotsichthys* sp.), and sapper (*Sardinella sirm*, *S. jussieu*, *S. longiceps*), Kusayamoro (*Decapterus macrosoma*), Maru-aji (*Decapterus maruadsi*), bigeye jack (*Selar crumenophthalmus*), oniaji (*Megalaspis cordyla*), gorkha (*Rastrelliger kanagurta*), tamarisk (*Rastrelliger kanagurta*) and yellowtail (*Elagatis bipinnulatus*). Other medium-sized floating fish include smelt (*Euthynnus affinis*), ox mackerel (*Acanthocybium solandri*), dogtooth tuna (unicolor), flathead sole (*Auxis thazard*), hagfish (*Sarda orientalis*), Spanish mackerel (*Scomberomorus* spp.), barracuda (*Sphyrna* spp.), and hawksbill (*Caesio* spp., *Pterocaesio* spp., *Gymnocaesio* spp.).

Tuna catches in the Indian Ocean fishing grounds account for 20% of the global tuna catch, with the western Indian Ocean waters being one of the most important fishing grounds. The total catch of skipjack, yellowfin, bigeye, and albacore tuna landed in the Indian Ocean in 2016 was 992,000 tons, compared to a 2012-2016 The five-year average for the period 2012-2016 was 957,000 tons. The composition of the tuna catch was 38% skipjack, 26% yellowfin, 10% yellowfin, 9% bigeye, 3% bigeye, and 1% southern bluefin. It is assessed that southern bluefin and yellowfin tuna in the Indian Ocean are already overfished, while skipjack, bigeye, and albacore tuna are still in a surplus condition.

#### 3.2.2.4 Current Status and Outlook for Other Resources

##### (1) Shrimp resources

The most promising shrimp fishery along the Kenyan coast is the area from Malindi Bay to Ungwana Bay, a distance of approximately 250 km in a straight line. Other areas fished include mangrove creeks and estuarine deltas within Lamu, Kwale, and Mombasa counties.

Five species of shrimp are caught in Kenyan waters: white (Indian white prawn: *Fenneropenaeus indicus*), bull prawn (Giant tiger prawn: *Penaeus monodon*), Speckled shrimp (*Metapenaeus* (Speckled shrimp: *Metapenaeus monoceros*), bear shrimp (Green tiger prawn: *Penaeus semisulcatus*), and kuruma prawn (Kuruma prawn: *Marsupenaeus japonicus*). Among

these, bull prawns and whites are the main targets of the fishery. For example, trawling in the waters around the Tana River is dominated by whites, while trawling in the waters around the Sabaki River is dominated by kuma prawns. On the other hand, bullhead shrimp, kuruma shrimp, and Speckled shrimp (Japanese name unknown) are reported to occur in both of the above areas, depending on environmental conditions.

According to the shrimp stock assessment in the area from Malindi Bay to Ungwana Bay, the MSY is estimated to be 392-446 t. The results of a survey conducted in 2013 indicated that the total stock of the family Crustacea was 251 t in the southerly monsoon season and 74.5 t in the northerly monsoon season (KMFRI, 2018).

According to interviews with a trawler company based in Mombasa, in addition to the shrimp species mentioned above, *Penaeus aztecus* (♂195mm, ♀236mm), which is locally called deep see red prawn and belongs to the large prawn family, Penaeidae, was caught in the offshore fishing area. As of December 2021, only six commercial trawlers of Kenyan registry are thought to be catching this species, and it is considered to be a shrimp species with high potential for the future.

## (2) Crab resources

Because of its delicious taste and high market value, sawfish (mud crab: *Scylla* spp.) is an important economic activity in coastal areas of Kenya and an important means of livelihood for residents of coastal communities. The sawfish caught are exported and served to tourists in hotels along the East African coast.

Four species of sawflies have been identified worldwide, including the red-headed sawfly (*Scylla serrata*), which is found in Kenya. The *Scylla serrata* is a brackish-water species that inhabits muddy bottoms in the vicinity of mangrove forests. They are tolerant of ebb and flow and can remain out of the water for quite a long time when it is moist. After reaching maturity at one year, females migrate from their previous habitat of mangroves in brackish water to coastal waters to spawn. Females that descend to the sea are often found 10 to 30 km away from land in waters 20 to 30 m deep. Because of this life cycle, environmental changes in mangrove forests have a significant impact on sawfish abundance fluctuations.

In recent years, fishing intensity for sawfish has increased, raising concerns about the sustainability of sawfish stocks.

Meanwhile, interviews with a Mombasa-based crab cage fishing company indicate that as of 2021, two Kenyan-flagged crab cage fishing vessels are operating off the Kenyan coast in waters 400 to 700 meters deep. These vessels are fishing for the giant red king crab, locally known as golden crab. The golden crab lives at depths of 120 to 1,000 meters, and its distribution is centered in the reef zone at depths of 500 to 800 meters. It is a large crab with a good taste, and in the waters around Japan, its approximates are landed in Shizuoka, Aichi, Mie, and other areas. However, due to its small quantity, it is not generally distributed and is only

enjoyed around the area of production. Currently, only two vessels of Kenyan registry are thought to be fishing for the giant red king crab in Kenyan waters, and it is considered to be a species with high resource potential.

### (3) Octopus resources

Cephalopods such as squid and octopus congregate in shallow waters near the coast during the spawning season. It is known that octopus are caught in large numbers in the shallow coastal waters of Vanga and Shimoni in southern Kenya. The octopus spawning season in these regions is believed to be from June to August, and in Shimoni, women participate in collecting octopus in the reefs at low tide during the season. Three species of octopus are caught: *Octopus vulgaris*, *O. cyanea*, and *O. macropus*, with *O. vulgaris* being the most common.

Octopus production in Kenya has increased over the years: from 14 tons in 1982 to 460 tons in 1995, and doubled in a quarter of a century to 962 tons in 2020. For the entire west coast of the Indian Ocean region, an average of 3,224 tons of octopus were exported annually from 2008 to 2012. This represents 1.2% of the global octopus trade. Tanzania exported the most octopus at 1,500 tons per year, followed by Madagascar at 1,071 tons, Kenya, Mozambique, Mauritius, Reunion, and Seychelles. During this period, octopus exports from Kenya jumped from 79 tons (2008) to 394 tons (2012).

Little is known about the ecology and abundance of octopus in the tropical coastal areas of East Africa due to a lack of information. Among them, according to the results of a survey conducted in the southwestern Indian Ocean by a research vessel (RV Nansen<sup>37</sup>) and , the catch per unit of octopus was<sup>38</sup> 4.16-6.89 kg per fishing trip in 2008, with a peak catch in July and August. Subsequent surveys in 2014 reported 6.1 kg in the northeast monsoon season and 3.9 kg in the southeast monsoon season. While there is insufficient knowledge on the status of octopus stocks, there has been a steady intensification of fishing effort in recent years, and the observed reduction in catch length is likely to have had a negative impact on the stock.

According to interviews at the Kenya Port Authority, octopus caught by Tanzanian fishing vessels in the waters around Tanzania's islands, such as Pemba and Zanzibar, is stored in ice and arrives at the Port of Shimoni, where it is cleared for import and transported to fish processing companies in Mombasa. The octopus is then packed in ice and transported to the port of Shimoni, where it clears import customs and is then transferred to a fish processing company in Mombasa. The Port of Shimoni functions as a transit port connecting octopus and other marine products caught in the Tanzanian islands to cities along the Kenyan coast. By further expanding this marine product distribution function, it will be possible to incorporate marine products caught in Tanzania's island fisheries into the marine product value chain in Kenya, in addition to those caught within Kenya.

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<sup>37</sup> Name of Kenyan-flagged research vessel

<sup>38</sup> Expressed in kilograms (kg).

### 3.3.1 Survey of refrigerated and frozen cargo at Mombasa port and airport, food manufacturers and retailers

KPA is the only local port operator; KPA manages ports for conventional and bulk vessels in addition to container vessels. Currently, KPA has 24 berths and is running a solid business. KPA operates refrigerated refrigeration only using reefer containers, and does not have its own refrigerated refrigeration warehouse, but uses the refrigerated refrigeration warehouses of neighboring partner companies to store imported and exported goods. On the other hand, local food product manufacturers and retailers (including supermarkets) still face freshness issues. Although they have small refrigerated freezers in their own stores, they are not able to adequately store products at the proper temperature before delivery, resulting in deterioration of freshness of fishery products at fishing ports and food loss due to corrosion during transportation from production sites (corroded fishery products are also being sold at the Mombasa fish market). In the fishing port area, there are no ice machines, and although UN and EU donors have installed small and medium-sized ice box facilities, there are many places (especially in coastal counties) where they are no longer in use because they are damaged due to lack of maintenance. The UN has formed the Go Blue project team (UN, Italy, France, etc.) and plans to replace them with icebox facilities mainly in coastal areas (budget: 1 billion yen scale). On the other hand, the company has international airports in Nairobi and Mombasa, with routes to Europe, the U.S., and Asia. In particular, there are refrigerated warehouses in the suburbs of Nairobi that mainly handle imports, but sanitary management methods are still immature. There are only a limited number of refrigerated warehouses in the vicinity of Mombasa Airport, and further expansion of infrastructure facilities is required.

### 3.4. 1Installation equipment, processing capacity, layout survey, and peripheral infrastructure development

3.4.1.1 The status of major material handling equipment items such as racks, pallets, and forklifts are as follows.

Table 10: Major Equipment Items in Cold Freeze/Refrigerated Warehouses<sup>39</sup>

Item	Details
Rack	Steel racks can be procured locally. Many racks are made in China. The steel itself is imported and the racks are assembled locally. Usually 4-high or 6-high racks are available; 2-high racks can be supplied to suit any layout. 1 rack costs about 80,000 yen (2

<sup>39</sup> Prepared by our research team



	tons/height 3mx width 3mx depth 1.2mx mail).
Pallet	Wooden and plastic are available locally. Wooden is fumigated. Wooden parts may be damaged and are replaced each time. Approx. 10,000 yen (wooden)/piece. Width 1.2 mx length 1 m. Plastic: about 15,000 yen/piece.
Forklift	Electric forklifts can be procured locally. Many distributors are available and provide operational training as well. Approximately 1.5-1.7 million yen/unit (new) for Toyota electric forklift trucks.
Logistics Management System	Software is often employed by foreign companies. QR code and barcode management is common, utilizing European and American logistics software. The same system is also used to manage loading and unloading to reduce manpower.

On the other hand, the optimal layout will need to be studied in detail in the future when selecting candidate sites.

1) Ensuring three temperature zones (around -40°C, -10°C, 0°C, etc./FC class, C class, etc.), 2) Separation of loading/unloading lines, 3) Security system, 4) Backup power source (diesel generator, solar panels, etc.), 5) Cold air management at loading/unloading ports (shutter type), 6) Establishment of an operation system (24-hour system, establishment of processing and warehouse management training methods), 7) Acquisition of HACCP certification, 8) Thorough sanitation management (processing plant, etc.), and 9) Bonded management (if possible). Of the above, 1), 2), 7), and 8) must be in line with global logistics management when conducting international transactions, and should be taken into consideration when considering detailed specifications.

The above 4) is for Kenya. In addition, 4) above is a requirement to be taken into account when considering detailed specifications, since power outages have occurred many times in Kenya, including momentary power outages.

Therefore, a backup power supply will be necessary to maintain equipment and quality. If possible, multiple backup power sources are needed.

Backup power sources are needed, if possible. Layout images are as follows (left: building image, right: Layout image(left: building image, right: layout image ).



Figure 14: Building and layout<sup>40</sup>

#### 3.4.1.2 Interviews with local material handling contractors

Interviews with local material handling contractors were conducted during the field survey. Racks and pallets, major equipment such as forklifts are of global standard, and important. For the global standards, such as safety and operational standards, etc will be required and staff training will be important. Japanese, European, and U.S. global players.

### (4) Issue-4 PPP Development Plan

#### 4.1.1 Selection of potential sites, utility surveys (water and power)

##### 4.1.1.1 Mombasa Special Economic Zone (SEZ) / Dongo Kundu

Currently, the SEZ is a green field with only unpaved roads running through part of the area, but in the future, with the support of JICA, development survey, utility installation (power transmission and distribution, water supply), infrastructure improvement (port, substation facilities), and backbone road improvement are planned. After the utilities are installed, the probability of utility problems will be reduced by having a refrigerated freezer warehouse as a tenant on the same site. However, since electricity is the lifeline of the refrigerated/freezer warehouse, a backup plan in the event of power outages will need to be discussed with the SEZ Authority (e.g., securing backup power sources, renewable energy, etc.). Construction of the JICA-supported infrastructure will begin in late 2023 at the earliest, with all utilities expected to be in place by 2026 or later. On the other hand, outside of the JICA-supported parcels, the development process involves the investor submitting an Expression of Interest to the SEZ Authority, which, if approved and negotiations proceed, will allocate the parcel and allow development immediately after acceptance. However, there are no detailed plans for the construction of access roads or utilities such as water and electricity outside of the JICA-supported parcels, and this will be done through confirmation between the investor, the SEZ

<sup>40</sup> Prepared by our research team

Authority, and the Mombasa County departments.

In addition, wastewater treatment within the SEZ parcels is the responsibility of each investor, and must be included in the project plan.

We examined several parcels in the SEZ that have development potential (including the construction of a fishing port in Jetty) and narrowed them down to the following five locations. Further coordination with relevant Kenyan government agencies, including the SEZ Authority, will be required to select the development parcels. The characteristics and analysis results of each of the five candidate sites are shown below.

Candidate Parcel 1: Site for construction of former substation facility (substation facility is currently planned to be constructed elsewhere)

Candidate parcel 2: Near the cliff about 500m north of candidate parcel 1

Candidate Parcel 3: Proposed Utility Area

Candidate Parcel 4: Former site of Kipevu Oil Terminal temporary yard (currently cleared)

Candidate Parcel 5: In a free trade zone within the scope of a JICA project

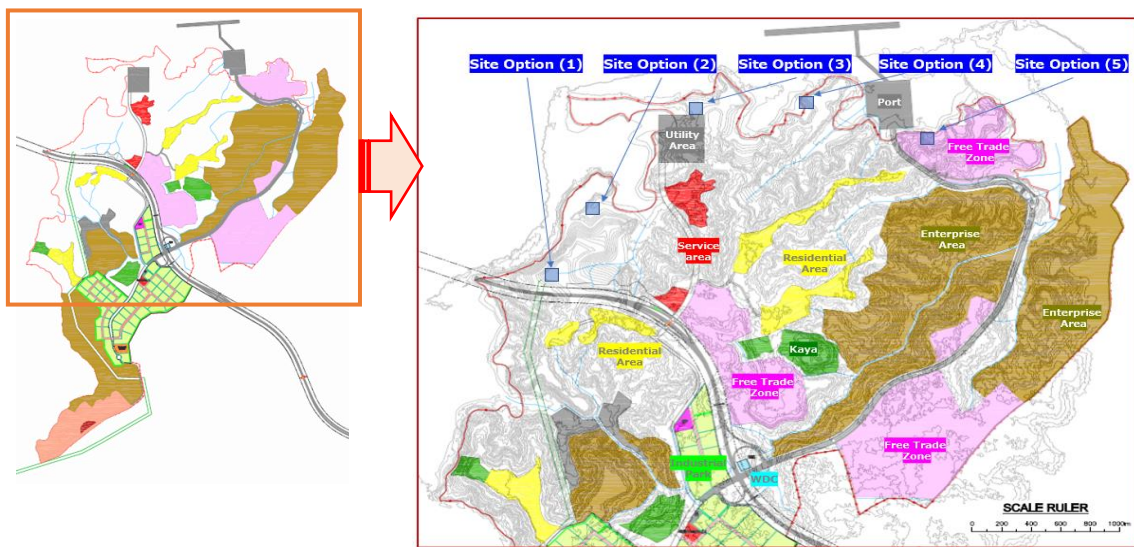


Figure 15 Potential site parcels in the SEZ<sup>41</sup>

<sup>41</sup> Prepared by our research team

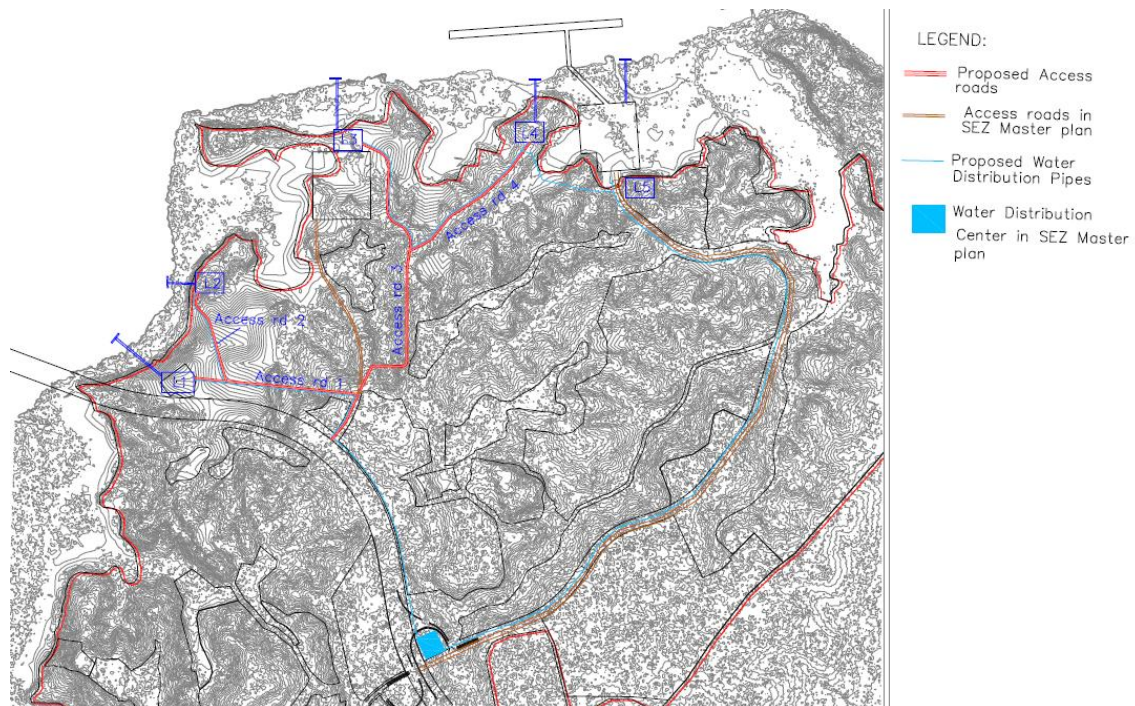


Figure 16: Proposed access road and utility installation in SEZ<sup>42</sup>

For water utilities in the SEZ, a Water Distribution Centre will be constructed in the center of the SEZ, as shown in the map above. According to the final report of the Development Project ( June 2019 )<sup>43</sup> , for the main roads and intersections in the SEZ, each road should have a space of 2.5 meters for laying utilities, which can be used for laying water pipes, communication cables, etc. For candidate parcels 1 and 2, water pipes can be laid along the southern bypass under construction, and can be installed from there along the access road to each parcel. Other candidate parcels 3 and 4 can be laid along the existing road in the SEZ, and candidate parcel 5 will be laid close to the parcel with JICA-supported project scoping.

For electricity, JICA-supported backbone transmission line (220 KV) is planned to be laid to the substation in the SEZ to be constructed , and distribution lines will be able to be connected from the substation to the SEZ.

There are already distribution lines along the existing roads in the SEZ. The existing access road in the SEZ that leads to candidate parcels 3 and 4 is an unpaved gravel road, but the road surface condition is good. The access road to the other candidate parcels has similar

<sup>42</sup> Prepared by our research team

<sup>43</sup> <https://www.bing.com/ck/a?!>

&&p=91a21aa53af2d307JmldtHM9MTY4MDA0ODAwMCZpZ3VpZD0zYmRiYWU3MC02NTk4LTZlZDktMza2Ni1hMGQxNjQ3MjZmMDImaW5zaWQ9NTQxMA&ptn=3&hsh=3&fclid=3bdbae70-6598-6ed9-3066-a0d164726f02&psq=Design+Mission+for+Mombasa+Special+Economic+Zone+Development+&uProject+&u=a1aHR0cHM6Ly9vcGVuamljYXJlcG9ydC5qaWNhLmdvLmpwL3BkZi8xMjI0NjY2Ni5wZGY&ntb=1

specifications and is expected to be paved. <sup>44</sup>



Photo 2 Road (gravel) in current



Photo 3 Drainage system for existing main road



Photo 4 : Near the junction  
(Near candidate sections 3 and 4)



Photo 1 Power grid laid on the road

The following is a comparative analysis of the SEZ candidate parcels, assuming the construction of facilities in the SEZ and the Jetty fishing port.

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<sup>44</sup> Photo taken by our research team

Table 11 List of candidate parcels in the SEZ (proposed)<sup>45</sup>

	Candidate Parcel 1	Candidate Parcel 2	Candidate Parcel 3	Candidate Parcel 4	Candidate Parcel 5
Water supply	Laying along the main road	laying (a road, a railroad, water pipes, etc.) No existing roads	Laying along the existing road	Laying along the existing road	JICA Support scope
Electric power	laying (a road, a railroad, water pipes, etc.)	laying (a road, a railroad, water pipes, etc.)	laying (a road, a railroad, water pipes, etc.)	laying (a road, a railroad, water pipes, etc.)	JICA Support scope
Reclamation	Elevation difference (high)	Elevation difference (low)	Elevation difference (low)	already built	JICA Support scope
Access road	necessary construction	necessary construction	existing (Unpaved)	existing (Unpaved)	JICA Support scope
Port berth Distance from	From DK1 Sufficient distance	From DK1 Sufficient distance	DK4 schedule berth	DK2, 3 projected berth	DK1 schedule berth
Depth of water	shallow	shallow	(item requiring) investigation (e.g. of a case)	(item requiring) investigation (e.g. of a case)	(item requiring) investigation (e.g. of a case)
House transfer	minority	minority	none	none	minority
Mangrove forest	dense	dense	dense	None Dense	dense

Through the above comparative analysis, candidate parcel 3 is the most suitable result among each candidate parcel. The reason for this is that there is an existing unpaved road, and utilities for water and electricity can be easily installed. The difference in elevation from the seashore is less than the other candidate parcels, making it easy to develop. There is a sufficient distance from the proposed Dongo Kundu(DK)1 berth site in the SEZ where large vessels stop, and if the Jetty

<sup>45</sup> Prepared by our research team

Fishing Port is constructed, there will be little influence from ocean currents. However, if DK2, DK3, and DK4 berths are planned to be constructed adjacent to DK1, there is a possibility that DK4 will have an impact in the future. Water depth needs to be investigated. There are no houses in the vicinity, so resettlement is unlikely to be a problem. As for the transplantation of mangrove forests, environmental measures need to be taken as in the other candidate parcels. The elevation difference from the facility construction site to the coastal area in candidate parcels 1 and 2 is high, which will create difficulties when the Jetty fishing port is connected to the site. Water depth is also an issue. In candidate parcels 4 and 5, there are concerns about the combination and impact of large vessel traffic on the DK1 berth.

#### 4.1.1.2 Liwatoni Fishing Port

Kenya Fishing Industries Corporation(KFIC)'s office is already located in Liwatoni, and utilities (water and electricity) have already been installed. Under the Kenyan government's rehabilitation plan for fishing port facilities, the first phase of construction has already started and utility facilities are being upgraded. However, due to the constraints of the existing area, it is necessary to continue to confirm whether the amount of drinking water is sufficient to manage marine products, based on the status of the construction survey. The backup power supply system in the event of a power outage also needs to be confirmed.



Figure 17: Access road map around the Liwatoni Fishing Port<sup>46</sup>

46 Prepared by our research team

The area around the Liwatoni Fishing Port is also an industrial area, and although access roads from the main road have been laid out, there are some areas where road surface improvements are necessary to facilitate the smooth passage of large vehicles to the fishing port facilities.

#### 4.1.1.3 Shimoni Fishing Port

At Shimoni Fishing Port, located about 80 km south of Mombasa SEZ (Dongo Kundu) and 50 km from the Tanzanian border, the general manager of operations of the fishing port provided an overview of the fishing port. Construction of the fishing port upgrade and fishery facilities was scheduled to start in January 2022 and be completed by the end of 2023, but is currently delayed due to Covid-19. As with other fishing ports except for the Liwatoni Fishing Port, the department in charge of construction is the Kenya Ports Authority (KPA). In addition, the Kenyan government believes that the cold chain development at Shimoni can be implemented as a PPP project, and the private sector will soon be considered.

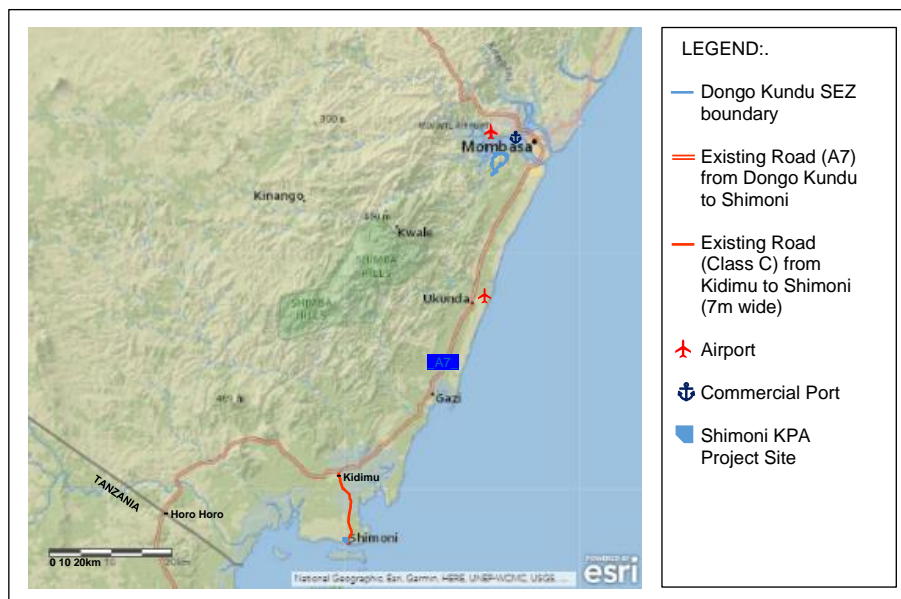


Figure 18: Access road map around Shimoni Fishing Port <sup>47</sup>

According to interviews with the Coast Water Surveys Development Agency (CWWDA), CWWDA has a regional office 20 km south of Mombasa, with a water tank nearby. However, the plan to build a water pipeline to Shimoni, about 60 km away from Mombasa, is not feasible from a cost standpoint and is not a priority due to the sparsely populated area. The power grid is connected as far as Shimoni.

<sup>47</sup> Prepared by our research team



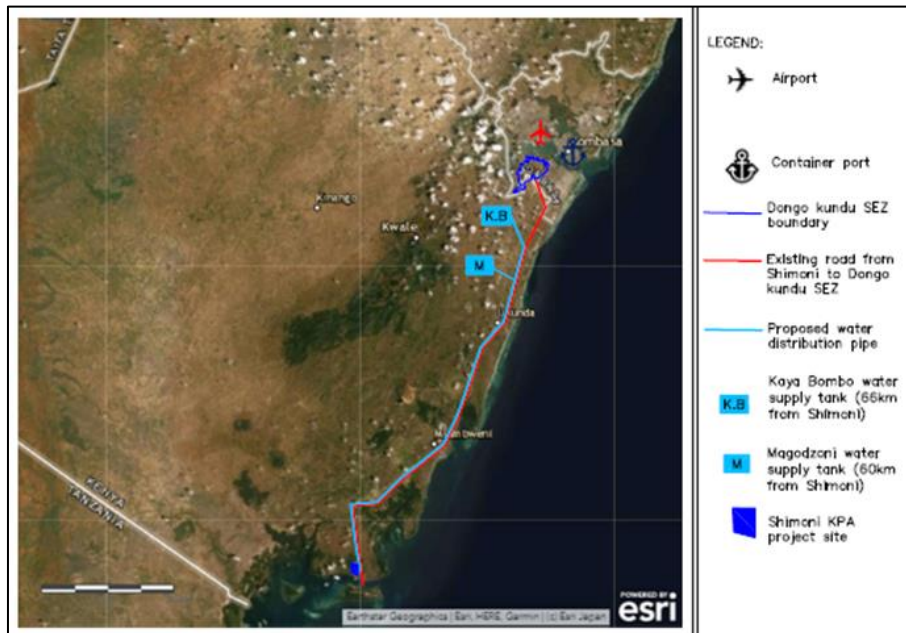


Figure 19: Main road to Shimoni fishing port (Mombasa to Shimoni)<sup>48</sup>

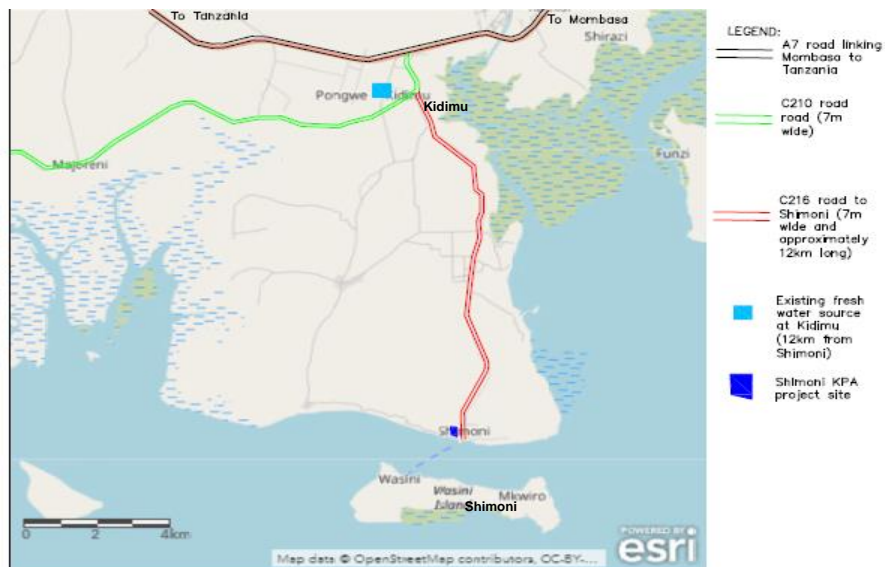


Figure 20: Access road from main road to Shimoni fishing port<sup>49</sup>

In the vicinity of Shimoni, a private company's water tanker trucks transport water from a well and storage facility in the Kidumu area, 12 km from Shimoni, to the Shimoni area. Restaurateurs purchase directly from the Kidumu facility.

48 Prepared by our research team

49 Prepared by our research team



Photo 5: Kidimu Water Supply Area



Photo6: Water truck at Kidimu

Residents in the area purchase water from water tanks after it is transported from Kidumu to Shimoni for drinking purposes. There are also groundwater wells in the area, but due to the salt content, they are avoided for drinking water and used mainly for washing clothes and other domestic purposes.<sup>50</sup>

Also, the access road situation to Shimoni is from Mombasa by Class A road (Route A7) and from Kidumu Junction by Class C paved road to Shimoni<sup>51</sup>.



Photo 7: Route A7



Photo 8: Junction at Kidimu

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<sup>50</sup> Photo taken by our research team

<sup>51</sup> Photo taken by our research team

The Kenyan government has implemented a F/S for the development of fishing ports and has designated Shimoni as a Semi-Industrial fishing port. In addition to the fishing port function, Shimoni is also serviced by cargo vessels from neighboring Tanzania (Pemba Island and others) on an irregular basis. The above-mentioned fishing port upgrade and construction of fishery facilities will include the construction of a new Jetty fishing port for fishing vessels (the existing Jetty fishing port will be used for cargo) and a new storage and processing facility.



Figure 21: Shimoni Fishing Port End Access Road Map<sup>52</sup>

In the above plan, the site entrance/exit is planned for the southwest corner of the site, and while small to medium size trucks can enter and exit the site, large vehicles, including container trailers, will have difficulty entering and exiting the site because there is not enough space for them. The southwestern portion of the site is also a cave and protected forest area, and the access road from the southwest will be closed. To the north of the site, a new road (Class G) with Cabro blocks will



Photo 9: New road (Shimoni)

<sup>52</sup> Prepared by our research team

be built <sup>53</sup>.

The Cabro block road (Class G) in the northern part of the site mentioned above is 4 km from the site.

A Chinese company has invested in a sardine processing company, which was shut down due to COVID-19, but is scheduled to reopen around March 2023. The company has contracted with fishing vessels to accept sardines.

A vessel monitoring system (radar monitoring) has been in operation since 2014, and although not all registered fishing vessels are equipped with GPS, each vessel's operational status is monitored. Joint coastal patrols by the Fisheries Agency and the Kenyan Coast Guard are conducted at least once a week to strengthen surveillance. To strengthen surveillance, commercial fishing vessels are licensed and required to make advance declarations (vessel size, fishing plan (duration), itinerary, etc.). The maximum catch is determined by the size of the fishing vessel, and 30% of the catch is determined based on the size of the vessel.

On the other hand, no data on harvest loss is currently available; the BMU measures fish species, catch, etc. daily at 49 fishing ports, and data from each port is centralized in Mombasa, where catch data for the past 20 years is available. A World Bank project is currently developing a web-based database to manage catch and other statistical data, which is scheduled to be operational in 2023. In addition, as previously mentioned, Mama Karanda purchases relatively small fish from and small fishing vessels that fish in shallow waters and not larger species (which cannot be cooked or processed). Since the species of fish handled by this project are those caught by medium and large fishing vessels operating off the EEZ, and unlike the target species handled by Mama Karanda, the potential for competition is low, and thus coexistence is possible. However, it is necessary to conduct a socioeconomic survey before starting a PPP project. For example, it is possible to divide the EEZ into three zones, including shallow water, coastal, and offshore (EEZ), and regulate the fishing vessels that can operate in each zone.

#### 4.2.1 Logistics Survey (fishing ports, airports, roads, transport vehicles, etc.)

##### 4.2.1.1 Candidate Project Site

Mombasa, the proposed project site, is positioned as a gateway to East Africa, with an international airport and container terminal established with the contribution of donors from various countries. In the future, infrastructure development is planned to improve the competitiveness of logistics infrastructure, including bypass roads, special economic zones (SEZs), and gate bridges. Meanwhile, the main arterial road connecting Mombasa to the coastal areas (Shimoni, Malindi, Kilifi, etc.) has also been established. The road is paved with one lane in each direction (two lanes in some areas), and from the results of actual

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53 Photo taken by our research team

driving in the area, it is expected that there will be no problems with transportation by passenger cars and large trucks.

#### 4.2.1.2 Local transport trucks (cold storage vehicles)

In truck transportation in the cold chain, the use of refrigerated trucks is fundamental. Isuzu Motors already has a knockdown plant locally (in Nairobi), where cold storage vehicles based on ELF are manufactured locally (joint venture with ITOCHU Corporation). Automobile parts are imported from Thailand, Isuzu's main plant, and the specifications of the refrigerated vehicles themselves are equivalent to those in Japan, with negative temperature settings and GPS functions. The price is approximately 4-6 million yen per vehicle (excluding tax and insurance). In addition to Isuzu, Toyota-Nissan, Mitsubishi Motors, MAN, Volvo, Mercedes, and The U.S., Hyundai, KIA, and a number of Chinese firms have also entered the market on an import basis.

#### 4.3.1 Market analysis (sales channel analysis, fish species selection, estimated investment amount/estimate, etc.)

##### 4.3.1.1 Overseas sales channels

As a matter of fact, more than 30% of the world's fisheries and aquaculture production is exported, and trade in marine products is on the rise against the backdrop of advances in transportation technology, the relocation of marine product processing bases to developing countries with lower labor costs, and trade liberalization. Similarly, 14% of meat production is exported (beef 12.3%, pork 13%, and chicken 12.6%), indicating that marine products are more actively exported than meat products, even though they are the same protein source. Looking at the world trade in marine products, developed countries and regions such as Japan, the United States, and the European Union are in excess of imports. As of 2017, China, Norway, Vietnam, India, the United States, Chile, Thailand, the Netherlands, Canada, and Denmark were the world's top seafood exporters. China was an early exporter of seafood, surpassing Norway in 2004 to become the world's largest exporter. 106 g of seafood per person per day is a high level of domestic demand, but the country has a thriving aquaculture industry, which provides a large export capacity. Norway was the world's largest exporter of marine products as of 1976 (the earliest record available from the Fisheries Agency). It has since been surpassed by countries such as the United States and Chile, but has maintained a consistently high level and remains the world's leading exporter of marine products. Norway's population is approximately 5.37 million (2019), making it a small country in terms of domestic consumption. Norway's fishing industry developed early on due to the existence of good offshore fishing grounds with well-developed tidal channels and shallow sediments, as well as fjords in the western part of the country, which facilitated the construction of

fishing ports that take advantage of the natural topography. Norway's daily per capita consumption of fish and shellfish is 141g, which is large even by global standards, but the country's small population and low domestic consumption are considered to have a very large export capacity.

#### 4.3.1.2 Global Seafood Demand

The United States, Japan, China, Spain, France, Italy, Germany, South Korea, Sweden, and the Netherlands were the top countries in terms of global seafood imports in 2017. With the opportunity of Kenya's future Blue Economy development, fisheries in the offshore Indian Ocean (Kenya EEZ) have more than enough plans to be sold as a strategic overseas export commodity, especially to Japan, Europe, and the United States. In view of the foreign currency payment (yen, dollar, euro, etc.), long term contracts, quantitative purchasing power, and existing sales channels, B to B transactions are desirable for Japanese, European, and U.S. customers, with seafood wholesalers, general and specialized trading companies, seafood processing companies, and major supermarket chains being the leading customers.

#### 4.3.1.3 Marine Ecosystems

The marine ecosystem is also changing with environmental changes, but the Indian Ocean has great potential, with fresh fish (Indian Ocean tuna, swordfish, lobster, crab, snapper, octopus, squid, sardines, etc.) with high added value in overseas markets. In order to maintain the great potential of the Indian Ocean in the future, supervision of foreign fishing vessels in the EEZ and compliance with unloading (30% rule) must be implemented with the cooperation of Kenya C/P and donors from other countries.

#### 4.3.1.4 International Seafood Trade

The majority of international seafood trade requires certification for food safety control. HACCP stands for Hazard, Analysis, Critical, and Control. The first half of the term is a hygiene management method derived from the first letters of five words: "management" and "point". The first two words together are called "Hazard Factor Analysis" and the latter three are called "Critical Control Points". These two perspectives are essential to providing safe food to consumers. Hazards and Risk Factors

In the case of agricultural products, for example, the factor analysis is the analysis of the microstructure of food products from the stage of purchasing raw materials to the time of shipment by farmers. Risk factors such as contamination of organisms and foreign substances are identified and controlled. On the other hand, the critical control points are food safety.

It means a process that needs to be controlled in a particularly critical manner with clear control criteria to ensure.

HACCP is a risk management system to prevent hazardous substances from entering products by organizing, analyzing, and controlling survey processes. It is a process control system that is necessary to protect the sanitary standards of the products. In addition, it is a method to reduce. HACCP is a food standards committee jointly operated by the World Health Organization (WHO) and the Food and Agriculture Organization of the United Nations (FAO). The certification is published by the International Certification Committee (ICRC) and is internationally recognized.

#### 4.3.1.5 HACCP Acquisition Process

Although there is a public third-party organization in Kenya, it does not provide consultative assistance, and in many cases, consulting companies specializing in international certification support are used to obtain this certification (e.g., SGS). It takes at least 6 months to a year to become certified, as a "gap analysis" needs to be conducted after the actual start of business operations. The timeline is similar in Japan. If a company does not have staff with certification experience, the procedures are complicated, so in many cases in Japan, certification is obtained by requesting a specialized certification support consultant to provide total support, including staff training, application procedures, planning, and documentation. In Kenya, there are several specialized consultants, and it is necessary to cooperate with related organizations that have knowledge in this field.

#### 4.4.1 Business plan (to get a sense of the market in Kenya for planning purposes)

##### 4.4.1.1 Strategy

In addition to fishery products, it was decided that it was important to adopt a portfolio strategy that included vegetables and fruits. The recent situation in Russia, rising prices, and population growth have intensified competition for marine resources, and from the perspective of supply chain diversification, global players centered on Japan, Europe, and the U.S. are paying attention to procurement from the Kenyan market. In addition, demand for marine products is growing by more than 40% in Japan, Europe, and the U.S., especially in emerging countries<sup>54</sup>, and we expect sales growth of 30% per year, based on our assumption of capturing increased demand from target countries where population growth is expected.

Through this survey to date, we believe that a more elaborate examination of the project is necessary to maintain business profitability. Qualitatively, the business potential of Kenya is apparent, as the country's potential can contribute to the need for supply chain diversification on a global basis in light of the international situation due to the situation in Ukraine, population growth, and other factors. On the other hand, quantitatively, the company expects to incur a loss of approximately 3.5 billion yen due to high capital expenditure on materials and equipment, but

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<sup>54</sup> Ministry of Agriculture, Forestry and Fisheries Food Supply and Demand Chart

will review capital expenditure (including maintenance and management) and increase sales by expanding product volume and sales channels through future studies, aiming for early return to profitability. In addition, it is necessary to minimize geopolitical risks by utilizing a PPP scheme, and to continue and improve the business from a medium- to long-term perspective.

#### 4.5.1 Entry form, partner selection, and income/expense planning

##### 4.5.1.1 Entry form

The most promising option is a PPP scheme (PIIP-type), which is considered to be a shortcut to early business monetization. In order to realize the PPP scheme, it is necessary to consider a joint venture with a partner company in addition to the proposing company. The partner company should have the following capabilities: 1) international sales channel development, 2) acquisition of HACCP and other related certifications, 3) sanitation management, 4) operational know-how, and 5) local staff training.

##### 4.5.1.2 Potential Partners

In addition to Japanese companies, there are global players in the cold chain business in third countries, and it is necessary to compare and analyze the following potential partners to determine the optimal partner.

#### 4.6.1 Tax related

##### 4.6.1.1 Taxation

The main Kenyan taxation systems and tariffs are listed below, with room for future tax exemptions and special measures through the use of PPP schemes. Major taxation items in Kenya include corporate income tax, personal income tax, value-added tax, excise tax, and withholding tax.

Table 12: Tax-Related Items in Kenya<sup>55</sup>

Item	Contents
Corporation tax	(1) Kenyan corporations (including subsidiaries of foreign corporations): 25%. (2) Other companies (including branches of foreign corporations): 37.5%. (3) The corporate tax rate for new companies listed on the Nairobi Securities Exchange (NSE) is reduced to 25% for the first five years after listing. In the Special Economic Zone, a special tax rate of 10% for the first

<sup>55</sup> Prepared by our research team



	10 years and 15% for the following 10 years is applied to companies operating in the Special Economic Zone as an Enterprise, Developer, or Operator.
Personal income tax	10-30% (progressive taxation)
Value-added tax	16% in principle; only certain items designated by the Kenyan government are exempt from taxation.
Tariff (import tax)	It consists of the intra-regional and common external tariffs of the East African Community (EAC). Within the EAC: duty-free (items recognized as originating within the EAC) Outside EAC: EAC common external tariff (0% for raw materials, 10% for intermediate goods, 25% for final goods) *However, for sensitive items set by the EAC, tariffs exceeding 25% are applied. Changes in tariff rates are announced in the Official Gazette.
Taxation of interest remittance to Japan	Maximum tax rate 15
Dividend remittance taxation to Japan	Residents: 5%; Non-residents: 10%.

4.7. Interviews with companies participating in PPP projects (confirm issues related to institutional and operational aspects)

#### 4.7.1.1 PPP Institutional Changes

As described in issues 2.2.5 above, new and old PPP institutional changes were implemented during this preliminary survey period. A case survey of PPP implementation is the electric power sector. In this sector, PPP and PIIP (Privately Initiated Investment Proposals) are many examples. Other Sectors like the case of the "Roads, Water Resources, etc" category, there were about 3 cases. Even for projects that have been implemented, the number of projects that were implemented before the decision to implement, it took around between 5 and 7 years to complete the project.

The government is also considering other investments in addition to the land donation.

One of the advantages of PPP is that, in addition to the provision of land by the government, the project will also benefit from tax exemptions and other government support.

#### 4.7.1.2 Need for PPP

The following reasons were assumed for the Kenyan government's desire to implement

the project under a PPP Government finances. To close the deficit (balance sheet deficit), expecting private funds to implement the project

The company also wants to transfer the risk during the implementation of the construction project to the private sector. They also want to transfer risk to the private sector during the implementation of the construction project. Furthermore, we assume that the Exclusive Bidding terms will ultimately depend on the approval of the Ministry of Finance.

#### 4.7.1.3 Potential Utilization of the Liwatoni Fishing Port for Existing Assets

In the case of rehabilitating the Liwatoni Fishing Port, a government project has been partially implemented, but the same. We expect that it is possible for the private sector to implement a portion of the project within the same project. In addition, it is expected that the private sector will be able to implement a part of the project within the same project. We studied a case survey of a project by VINCI, a major general contractor in Switzerland, for which a PPP contract was awarded this year. PPP contract signed, but financing not closed.

It took about three years to close the financing, and it is expected to take more time to close the financing. The Company will continue to take a risk-free approach to its business. In view of geopolitical risks, we will ensure medium- to long-term business development and minimize business risks. In this regard, PPP is an effective scheme.

### (5) Issue - 5: Reaching consensus with implementing agencies

5.1.1. Organize review points for PPP approval, collect relevant information, and establish a cooperative survey with relevant ministries and agencies.

#### 5.1.1.1 Organizing Points for PPP Permit Review and Gathering Relevant Information

As described in Issue 2, Kenya is still in a situation where the PPP system is still being promoted hand-in-hand with the changes in the old and new PPP systems. The process will proceed based on the details of the changes in the old and new systems, and the review points we interviewed with Ministry of Finance of Kenya (MFK) were as follows.

In the PIIP, it is important that no other similar project is considered as a PPP, and approval from the relevant ministries and agencies is required.

The project review process takes a minimum of 6 months if the application documents are prepared. If the application is incomplete or questionable, it will take more time, so consideration must be given to the project schedule. Therefore, consideration must be given to the project schedule. For PIIP formations, the MFK cannot support the team in the interest of impartiality.

However, when a concept paper for a PPP project is formally submitted, the PPP Unit will

comment accordingly.

#### 5.1.1.2 Installation of cooperation with relevant ministries and agencies

Although there was a change in personnel due to the change of the old and new ministers, we agreed with the C/P to continue to cooperate in the promotion of this project, including the new PS (Principal Secretary). In addition to cooperation on concept papers, etc., we confirmed our stance to ask for cooperation in collaboration with related ministries and agencies.

#### 5.2.1 Consultation with counterparts (C/P) and other relevant organizations

##### 5.2.1.1 Discussions with C/P

C/P introduced the project to the PS under the former current president, who endorsed the formation of the project using the PPP scheme, and held discussions with the surveying level. C/P will continue to cooperate in PPP applications as one of the core projects of the Blue Economy Strategy that Japan, Kenya, and Canada are surveying on in the wake of TICAD. The current C/P is MMBF, which will be the collaborating organization for the concept paper required for the PPP process.

#### (6) Issue-6 Environmental Impact Assessment

##### 6.1.1 Verification of Permits and Environmental Impact of Facility Construction

###### 6.1.1.1 Licensing

Kenya has continuously improved its ranking in the World Bank's Business Environment Index over the past six years. In the most recent "Ease of Doing Business 2020" report, Kenya was ranked 3rd in the Africa region. Foreigners/companies are not allowed to own land in Kenya, but can sign 99-year land leases. Foreign ownership in the Construction & Telecom sector is capped at 70%. Although the business environment itself is improving, it is taking time to obtain 1) construction permits and 2) real estate registrations, which requires attention from the perspective of process and business investment. The process is institutionalized and can be proceeded in a clerical manner. However, the administrative speed within the relevant authorities is slow, causing delays in some projects.

###### 6.1.1.2 Confirmation of Environmental Impact

Currently, the proposed site for the cold storage warehouse is being considered as either the SEZ in Mombasa or the Liwatoni fishing port.

###### (1) SEZ

The land has already been expropriated in stages as an industrial park, and the project is being promoted as a joint project between Japan and Kenya. Land along the main trunk line in the SEZ

or the site of a former power plant on the sea side is under consideration. A multi-berth for unloading fishing boats is also required for construction in the SEZ, and discussions are underway with the SEZ Authority and KP. As the site faces a harbor, KPA's approval will be required in the future, but the SEZ Authority and the KPA have agreed to proceed with the project. The project was explained to them and they agreed to proceed with the project.

On the other hand, since the project will be constructed in a mangrove area, it is expected that transplanting and other measures will be necessary. Fujita has already started to develop the SEZ and has already completed a bypass project (currently in progress) that will serve as an access road to the SEZ.

Fujita is already implementing a bypass project (currently underway) that will serve as an access road to the SEZ. The classification of the environmental category will need to be determined during the future project review. In the future, we will narrow down the construction sites. The classification of the environmental category will need to be determined during the future project review, and will need to be confirmed through further investigation after the construction site is narrowed down.

## (2) Liwatoni

Rehabilitation survey (phase I) is already underway under the direction of former President Kenyatta. Existing unloading berths are being rehabilitated and the aging refrigeration and freezing facilities are being upgraded, and environmental permits have been obtained. Currently, Liwatoni is owned by KEFIC (100% Kenya Government Corporation). There are plans to expand Liwatoni in the future, but this is likely to require an environmental permit. This will need to be confirmed through future surveys based on the status of the renovation survey currently being carried out.

## (7) Issue-7 Risk Analysis

### 7.1.1 Identification of possible business risks in the operation of the operating company

#### 7.1.1.1 Identification of locally specific risks

Based on interviews and field surveys of cold logistics facilities in Kenya, there are four major business concerns: 1) stable supply of electricity and water, 2) strengthening of fishing vessel and fishery monitoring, 3) development of fishing ports, and 4) assurance of stable catches. The specific risks and measures for each of these are as follows. Details will need to be surveyed out in the process of further project scrutiny.

Table 13: Concerns and measures to address them<sup>56</sup>

<b>Item</b>	<b>Location of Risks</b>	<b>Countermeasure</b>
i) Stable supply of electricity and water	Stable power and water supply required for refrigerated and frozen warehouses	In terms of electricity, in addition to backup generators (diesel type), solar panels, storage batteries, etc. are secured on site, and backup supply is provided within the SEZ area.
ii) Strengthening of fishing vessel and fishery surveillance	Failure to comply with the 30% rule for unloading fish caught in the EEZ area and omission of control and supervision of foreign fishing vessels.	Ensure stable catch and systematic unloading in cooperation with C/P and coast guard (consider fishing vessels, etc., and charter vessels)
iii) Fishing port development	Room for utilization of the former fishing port of Liwatoni. The Kenyan government has not yet decided on the management policy and timing of utilization of the facility.	In addition to Liwatoni, freshness will be maintained by developing fishing ports and installing ice making facilities in SEZ and coastal cities (e.g. Shimoni), in coordination with UN's Go Blue project plan to install facilities.
iv) Guarantee of stable catches	Ensure stable catches in pelagic fisheries and EEZ areas	Elaboration of fish species and conclusion of annual catch contracts and planning and implementation of unloading plans

## 7.2.1 Contents of field interviews

### 7.2.1.1 Current Status of Refrigerated Freezing Businesses in Kenya

In considering where the risks lie and how to respond to them, the current situation of refrigeration and freezing-related businesses in Kenya initiatives were confirmed.

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<sup>56</sup> Prepared by our research team

3) Survey Plan

The team conducted the survey based on the following survey plan

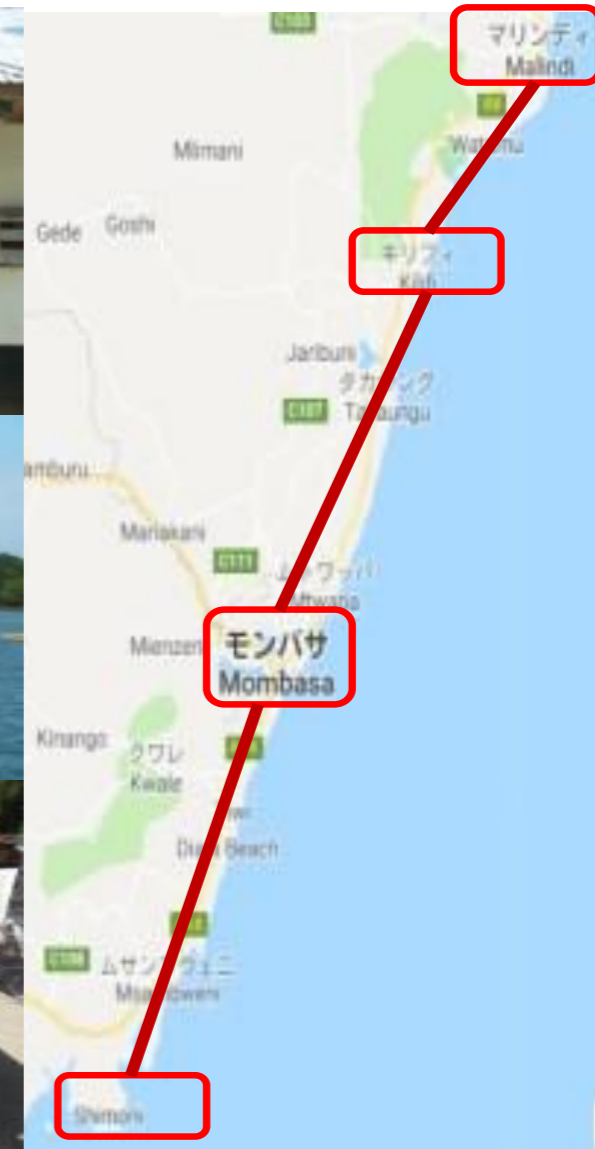
Table 14: Survey Plan Survey Schedule<sup>57</sup>

		2021												2022												2023					Total	Remarks
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5		
Action Plan	Site survey/Survey in Japan (planned)											Survey	Survey		Survey									Survey								
	Submission of reports																															
Evidence of local survey	Car arrangement(Nairobi) (day)											3	2		5									5							15	
	Car arrangement(Mombasa) (day)											3	2		5									5							15	
	Car arrangement(KLM) (day)											3	2		5																10	
	Locale(Translator) (day)																														0	
	Local(Hotel for translator) (day)																														0	
	Local(flight for translator) (time)																														0	
Local flight(Nairobi-Mombasa-Nairobi) (time)												4	8		10									8							28	
																															0	

<sup>57</sup> Prepared by our research team

# Site reference

The existing location sites



### Chapter 3: Implementation Structure of the Contractor

The implementation structure of this survey is as follows.

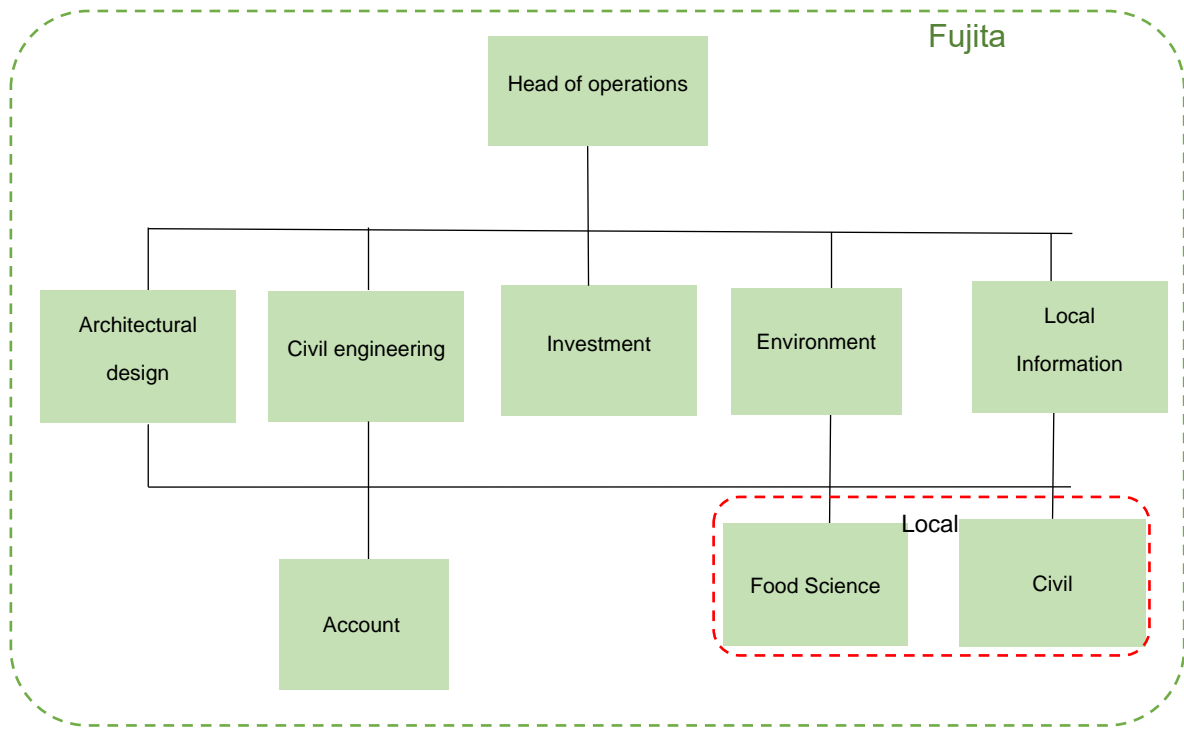


Figure 22: Organization of our survey team<sup>58</sup>

<sup>58</sup> Prepared by our research team



## Chapter 4: Information on Government Agencies (Counterpart Agencies) of Project Implementing Countries

### (1) Name of counterpart institution

Name, title and contact information of the person in charge:

Ms. Lucy A. Obungu

Acting Director General, Ministry of Mining, Blue Economy and Maritime Affairs

P.O. Box 58187-00200 Nairobi, Kenya

### (2) Basic Information

Related Ministries:

Ministry of Mining, Blue Economy and Maritime Affairs

Kenya Fishery & Blue Economy Directorate

Kenya Fisheries Service Kenya Fisheries Service

### (3) Roles and burdens of counterpart institutions

As the counterpart agency on the Kenyan government side, MMBM will coordinate among the relevant departments in view of the reorganization of ministries as of April 2023. In particular, MMBM will coordinate with the PPP Unit of the Kenyan Ministry of Finance, the Ministry of Agriculture, Livestock, Fisheries and Cooperatives, and relevant county governments to share the progress of the survey team and PPP project formulation. In this regard, a contact person will be appointed within MMBM.

In addition, the Government of Kenya, in cooperation with the relevant government agencies, shall, at its own expense, provide the survey team with the following items.

- Safety information, and means to ensure the safety of the survey team when necessary
- Data and information related to feasibility studies
- Entry permits required for field survey of the survey team
- Provide support and coordination as needed to ensure smooth implementation of the feasibility survey
- Collaboration with the research team on environmental and social considerations in accordance with JICA's "Guidelines for Environmental and Social Considerations"

(END)