MINISTRY OF MINING, BLUE ECONOMY AND MARITIME AFFAIRS

State Department of Blue Economy and Fisheries (SDBE&F)

Kenya Marine Fisheries and Socio-Economic Development Project (KEMFSED)

Credit No: 65400-KE: Project ID. No. 163980

CONSULTING SERVICES – INDIVIDUAL SELECTION

Contract No. KE-MOMBEMA-C1-2023-018-IDV

CONSULTING SERVICES FOR DEVELOPMENT AND UPGRADING THE FISHERIES INFORMATION MANAGEMENT SYSTEM (FIMS) AT NATIONAL AND COUNTY HEADQUARTERS

TERMS OF REFERENCE (TORs)

1. BACKGROUND

The GoK, through the State Department for Blue Economy and Fisheries (SDBE&F) and with support from the World Bank, is implementing the Kenya Marine Fisheries and Socio-Economic Development (KEMFSED) project, which aims at supporting the country in its efforts to leverage emerging opportunities in the Blue Economy. The development project's overall goal is to improve management of priority fisheries and mariculture and increase access to complementary livelihood activities in coastal communities. The KEMFSED project, which will be implemented in Kenya's coastal counties including Kwale, Mombasa, Kilifi, Tana River, and Lamu, will strengthen the management of fisheries that are priority to coastal livelihoods, thereby securing stocks at sustainable levels of harvesting. At the same time, the project will strengthen coastal households' access to complementary livelihood activities toward diversifying sources of household income to reduce dependence on capture fisheries. By better managing and conserving marine and inland water resources, reducing illegal fishing activity, and enhancing the value of the fish products in the value chains, the sector is expected to enhance its contribution to the overall economy.

The project comprises of the following three components:

a) **Component 1: Governance and Management of Marine Fisheries** will focus on improving the management of marine fisheries in Kenyan waters. Fisheries governance interventions will be promoted through strengthened co-management

of near shore fisheries, and infrastructure development to support the management of fisheries at both the national and county level.

b) **Component 2: Coastal Community Empowerment and Livelihoods** will contribute to the Project Development Objective (PDO) by strengthening livelihoods in coastal communities through a combination of technical and financial support for the implementation of livelihood, social welfare, and environmental subprojects; provision of scholarship grants and complementary capacity-building and mentoring of beneficiaries.

c) **Component 3: Project Management** will finance support for project management at both national and county levels to ensure coordinated and timely execution of project activities.

1.1 Fisheries sector context

Broadly fisheries in Kenya may be categorized into wild capture and aquaculture fisheries. Capture fisheries include those in freshwater (lakes, rivers and dams), coastal impoundments and marine fisheries (Indian Ocean). Aquaculture may include those that are entirely freshwater, marine (mariculture) or a combination of both. In addition to the inland freshwater systems Kenya has a jurisdiction of a coastline of approximately 640 Km on the Western Indian Ocean that includes an Exclusive Economic Zone (EEZ) out to 200 nautical miles and territorial waters (12nm). The EEZ area approximates 230,000 km² with significant economic potential for development and attraction of investors. The marine and freshwater fisheries are therefore important social and economic activities that generate a variety of benefits, including nutrition, food security, employment and trade. Fisheries also contribute to the development of the maritime trade sector through value addition and exports providing foreign currency. In total, fisheries contribute about 0.5% to the country's Gross Domestic Product (GDP). This contribution to GDP of marine waters of the Indian Ocean as a whole is considered proportionately low given the extent of the Kenyan coastline and EEZ Underpinning fisheries is their management   which aims for optimal exploitation while simultaneously conserving fish stocks and maintaining their long-term sustainability.

1.2. Rationale of the consulting services

KEMFSED is designed to strengthen the sustainable management of fisheries resources, and aquaculture in Kenya. This will be done through activities that, amongst others, focus on information gathering such as is currently done through the Catch Assessment System and Frame Surveys, fishery measures such as the development of management plans and regulations, and compliance including fishery patrols and other forms of surveillance. These fishery management activities, to be effective, require good coordination with traceable and verifiable recording systems, and which are in line with regional and international best practices.

The State Department the Blue Economy and Fisheries (SDBE&F) together with Kenya Fisheries Service (KeFS) manages various types of fisheries statistics which includes: Frame Survey (fishing capacity data), Catch Assessment Survey (CAS), Import, Export, Inspections, Licensing, Aquaculture/Mariculture, Beach Management Units under Co-management, quality control and Marketing and vessel tracking through the vessel monitoring system (VMS) among other datasets. A simple robust user friendly Fisheries

Information and Management System (FIMS) was developed in 2016, but it lacks an adequate statistical module capable of providing pertinent fisheries statistics from the raw data inputs. Such reporting is critical as it is used to support fisheries management decisions, social and economic assessments and also forms the basis for the scientific stock assessments needed for the management of priority fisheries. requires upgrading to improve on reporting and data sharing.

The database has a Web-based front-end to allow data entry simultaneously through the internet from several computers/locations and a mobile application. The mobile application runs well, it is easy to use and can be used offline while in the field to record data. The system has so far been used to conduct 2020 Marine frame survey using an online mobile application. Similarly, Catch Assessment Survey data is also being collected using the mobile application. However, there are challenges in getting reports from the system which include;

i) Lack of automatic calculation of total catch, Catch Per Unit Effort (CPUE), total catch by species by spatial and temporal based on FAO procedures

ii) There is no statistical quality check on the data such as the estimation of error of the different estimated parameters;

iii) International 3 alpha code for species are not including in the database;

iv) Standard reports for the national fisheries statistical reporting are not included as a reporting output;

v) Further, there are no outputs based on catch assessment and frame survey data and statistics that guide fisheries managers to support decision-making;

vi) the mobile data platform lacks dropdown tables, control totals which may compromise the quality of data.

vii) The database infrastructure and use is limited to Mombasa, hence the need to expand the infrastructure and access to other users at the coastal county fisheries offices and KeFS head office.

In addition, there is also need to create linkage with other databases at the Ministry of Agriculture, Livestock, Fisheries and Cooperative level such as:
- Kenya Integrated Agriculture Management Information System (KIAMIS),
- Kenya Agriculture Marketing Information System (KAMIS),
- Kenya Trade Network (KenTrade),
- the Vessel Monitoring System (VMS) among others.

This linkage will facilitate data and information sharing and reporting at different levels. A similar linkage is required to enable data sharing and reporting with FAO and IOTC. The integrations of various variables using boat gear combination data and mobile application will follow the recommended FAO standard operating procedures (SOP) for sample based Catch Assessment Survey. He will also be expected to provide training to officers in counties.

The Government of Kenya through KEMFSED project intends to procure a fisheries technical expert with fisheries experience who will guide the FIMS IT expert to develop and operationalise the FIMS. FAO has developed a fisheries information management system called Calipseo; a platform that is already functional and deployed in different

countries. It includes management of registries (administrative data), fisheries dependent data (stratified sampling and logbook data) and reporting/dashboard. This is a web application built in the following stack: Java Spring boot, hibernate, thymeleaf, MySQL, R, R Shiny. However, the Calipseo platform does not cover all the FMIS needs as it is limited to the Java/MySQL component of the Calipseo application, for data management. Kenya Fisheries Service will adopt the Calipseo database and built in the rest of the modules with support of a fisheries expert and an IT firm. The operationalisation at National Level with be upscaled to the 5 Coastal Counties to ensure harmonisation of data capture, procedures needed and training of national and county staff responsible for fisheries data collection and management of the FIMS in their respective jurisdictions.

The Fisheries expert will be expected to provide technical advice to the IT firm to improve design of the FIMS Database building on calipseo to fully functional information and management system for Kenya.

2.0 OBJECTIVE OF THE ASSIGNMENT

The overall objective of the consultancy is to establish a fully functional Fisheries Information management system (FIMS) that integrates all data including catch/effort, prices, licensing, market and value and permitting, research data, fisheries compliance, as well as mobile data application integration, statistical applications and reporting.

3.0 SCOPE OF THE ASSIGNMENT

The Consultancy services will include providing technical advice, guidance, and recommendations related to the design, development, and integration of the Fisheries Information Management System. This includes suggesting improvements and solutions aligned with management best practices.

The FIMs Fisheries technical expert will work closely with the IT firm to upgrade and fully develop the fishery information management system and procedures and to support implementation of the system for effective operation at both National and County levels.

The FIMS once developed should be compatible, in particular sampling procedures should be consistent and facilitate ease of interpretation, particularly related to indices, species and priority fisheries

The specific tasks for this assignment will be to;

i.   Provide technical advice on the design of a fully integrated Fisheries Information Management System (FIMS), with all the modules (co-management, licensing, inspections, aquaculture-mariculture etc.) including the dashboards for each module for key information such as fishing effort (boat-gears), main species, total production and value etc. at both county and National levels

ii. Provide technical support to link the fisheries database to a fully integrated Fisheries Information System, with output routines for different users and a dashboard for the priority fisheries at county and HQs in Nairobi;

iii. Provide clear and concise instruction to the database developer on the changes in CAS module of the FIMS database or Calipseo to ensure that the estimation process is coherent with FAO recommendation for sample based fisheries data collection; The designed statistical methodology including indicators should show data variability and reliability relating to sampling frequency and sample size. This is the implementation of computation of raised statistics for small scale fisheries (SSF) which requires integration of Calipseo R shiny App. This will include;

a) Assessmentof the raising procedures and statistical methodology for the estimation of total catch by species for consistency with the suggested FAO sample-based data collection;

b) Technical advice to the integration with the Frame Surveys and or data collection design;

c) Clear and concise instructions to the database developer to generate the required data to support the stock assessments including the use of indicators in standard fisheries models e.g. surplus production models (total annual fishing days and daily CPUE by fishing unit and fish species);

d) Clear and concise instruction to the data base developer how to calculate the relative error at 90% probability level and to consider the accuracy of the estimated monthly average CPUE and the estimated monthly total catch at landing site, ward, sub-county and county levels;

iv. In full collaboration with the officer in charge of statistics and the KEMFSED database team, list the reporting requirements on marine fisheries statistics and provide guidance to the database developer to develop a user's friendly front end module for data analyses and reporting with clear format and content of the required reports and output formats

v. Provide a list of the 3 Alpha codes for the species covered in the database and provide clear and advice on the changes to be made by the database developer and on how to include them in the species reference table of the database and the different outputs of the database;

vi. Provide technical instructions to Database developer to import the mobile collected data from the clouds to CAS Database;

vii. Provide technical guidance on statistical reports for marine catch and effort, aquaculture, compliance, co-management and all other modules;

viii. Oversee the FIMS progressive expansion, improvement and pilot survey implementation;

ix. In collaboration with the database developer set-up of linkages and interfaces related to the FIMS across applications to operationalise and optimise the fisheries data collection process, including catch/effort, Geo-spatial elements (GIS), NAMIS, KAMIS,

Vessel Monitoring Systems, Monitoring, Control and Surveillance elements and others that may be identified to optimise the FIMS;

x. Provide technical support to the database developer to develop an interface that allows remittance of the fish catch data to Food and Agriculture Organization (FAO) and Indian Ocean Tuna Commission (IOTC) in collaboration with the FAO and IOTC;

xi. Provide clear instructions to the database developer to link with the anticipated "Vessel Monitoring System" database to monitor industrial fishing vessels in the Kenyan fishing zone (EEZ);

xii. Prepare training material and field guides and sampling simulators and setting up sampling protocols linked to CAS during the operationalization of FIMS, Geographical information system (GIS) analysis, Social economic surveys and train staff involved in data and statistics and KMFRI scientists, on the implementation FIMS functions, processes and any other associated services; The training manual to include the operation and maintenance of the FIMs database;

xiii. Document all the above in a final technical report and manuals in English.

4.0   DURATION OF THE ASSIGNMENT

The duration of the assignment is **15 calendar months** from the date of contract commencement.

5,0 REPORTING REQUIREMENTS AND TIMELINES FOR DELIVERABLES

The consultant is expected to provide technical support and guidance to deliver the following:

1) A Fully functional modular fisheries information and management system (FIMS) with CAS, MCS, Co-management, quality control, aquaculture, compliance, licensing modules developed and operational at Beach Management Unit, county and national fisheries offices;

2) Statistical, GIS applications developed and operational and mobile data application integrated into the FIMS;

3) A fully operational Catch Assessment survey integrated with the frame surveys

4) A fully operational Fisheries Information System modules incorporating a fisheries statistical verification process to assess data quality

5) Technical documents and manuals in English; a brief and simple User/ Training Manual as an annex to the Consultancy Report.

6) Technical specifications or information provided to the database developer of the FIMS

7) Provide adequate and impregnable security levels and checks to the database

8) Improved capacity of fisheries staff in sample based fisheries data collection and statistics

The consultancy will be implemented over a period of 15Months of KEMFSED project and Deliverables for each task will be as follows:

Table 1: Deliverables and reporting and submission format

No.	Deliverables/Reports Tasks	Timelines after contract commencement	Format of submission
		Number of days	English
1	Inception report with methodology and clear workplan for the assignment	0.5 Months	3 hard copies and a soft copy in MSWord and PDF format
2	a) An assessment report of the FIMs (including the following; i. design proposals on how to integrate other modules to FIMs ii. the overall architecture of the system- how to link to different components, how to address missing components if any iii. reference data definition (list of species, gear, fishing units etc…)	1 month	2 hard copies and soft copy in MSWord and PDF format
3	Draft specifications for missing features/modules in FIMs (MCS, co-management, import/export	1.5 months	soft copy in MSWord and PDF format
4	FIMs prepared and ready with reference data template for upload into Fish catch, industrial effort modules.	2.5 months	soft copy in MSWord and PDF format
5	Technical report: Integrate historical data into FIMs Database (FIMs ready with either historical data or test datasets)	3 months	Soft copy in MSWord and PDF format
6	Technical report: Integrate MCS, Co-management, Import/export, aquaculture and social-economic modules)	5 months	Soft copy in MSWord and PDF format
7	Technical report: Fully functional FIMS with all necessary documentation (including adaptation and reporting/dashboard component (R/R shiny) and testing and validation	7 months	3 hard copies and a soft copy in MSWord and PDF format
	Technical report: Fully functional FIMS at counties	8 months	

8	Training Manual and technical training report: Training course material and onsite training conducted: (training of staff on statistics and stratified sampling, on the use of GIS analysis and the appropriate presentation of fisheries data)	10 months	8 hard copies and soft copies in MSWord and PDF format
9	Training manual: Training manual of the operation and maintenance of FIMs;	12 months	8 hard copies and a soft copy in MSWord and PDF format
10	Final Technical report: Document all the above in a final technical report and manuals and to include implementation (pilot and reporting)	15 months	3 hard copies and a sofy copy in MSWord and PDF format

The contents and scope of the training manual will be agreed with the Project KEMFSED team and implemented based on the training needs by the IT firm

6.0 PAYMENT SCHEDULE

The consultancy assignment is lumpsum with payment of deliverables as follows:

Table 2: Proposed payment schedule

No.	Deliverables/Reports Tasks	Timelines after contract commencement	Percentage of the contract amount
1	Inception report with methodology and clear workplan for the assignment	0.5 Months	10%
2	An assessment report of the FIMs (including the following; iv. design proposals on how to integrate other modules to FIMs v. the overall architecture of the system- how to link to different components, how to address missing components if any vi. reference data definition (list of species, gear, fishing units etc...)	1 month	20%
3	Draft specifications for missing features/modules in FIMs (MCS, co-management, import/export	1.5 months	10%
4	FIMs prepared and ready with reference data template for upload into Fish catch, industrial effort modules.	2.5 months	10%
5	Technical report: Integrate historical data into FIMs Database	3 months	10%

	(FIMs ready with either historical data or test datasets)		
6	Technical report: Integrate MCS, Co-management, Import/export, aquaculture and social-economic modules)	5 months	
7	Technical report: Fully functional FIMS with all necessary documentation (including adaptation and reporting/dashboard component (R/R shiny) and testing and validation	7 months	20%
	Technical report: Fully functional FIMS at counties	8 months	
8	Training Manual and technical training report: Training course material and onsite training conducted: (training of staff on statistics and stratified sampling, on the use of GIS analysis and the appropriate presentation of fisheries data)	10 months	10%
9	Training manual: Training manual of the operation and maintenance of FIMs;	12 months	
10	Final Technical report: Document all the above in a final technical report and manuals and to include implementation (pilot and reporting)	15 months	10%

7.0 . MINIMUM QUALIFICATIONS & EXPERIENCE REQUIREMENTS

The Consultant should have the following minimum qualifications and experience:

a) A Master's Degree or equivalent in a discipline related to fisheries management or fisheries statistics, Computer Science, or a related discipline.

b) At least 10 years of professional experience in fisheries information management, database development, and related fields

c) Demonstrated experience working on international projects, preferably with organizations such as FAO or similar international development agencies in fisheries information management

d) Proven expertise in fisheries data management, statistical analysis, and information system development within the context of fisheries management and small-scale fisheries and in designing, developing, and implementing fisheries management information systems and databases.

e) Strong project management skills, with a track record of successfully managing complex projects from inception to completion.

f) Demonstrated ability to provide training and capacity-building support to stakeholders in fisheries data management and statistics.

g) Excellent communication skills, including the ability to effectively present technical information to non-technical stakeholders.

h) Proficiency in English, both written and spoken. Additional languages, especially relevant to the project's context, would be a plus.

8,0 MANAGEMENT AND ACCOUNTABILITY OF THE ASSIGNMENT

The State Department Blue Economy and Fisheries is the Client for these services.

The Principal Secretary, State Department Blue Economy and Fisheries has appointed a National Project Coordinator (for KEMFSED) to whom the Consultant will report on all contractual matters. In addition, a database management team has been appointed to support and oversee the development of the FIMs.

The consultant will work under the overall supervision of the National Project Coordinator. The Project coordinator will assign a focal point for the consultant to work together in this assignment.

9.0 CONSULTANT'S OBLIGATIONS:

The Consultant shall be responsible for the provision of own computer, with requisite software to perform the assigned duties.

The Consultant shall be responsible for submitting regular progress reports, documenting activities, and maintaining clear records of project-related developments, challenges, and successes. This documentation aids in tracking project milestones and provides a historical record.

The Consultant shall provide training sessions to project staff, stakeholders, and users as needed. Effective knowledge transfer ensures that the enhanced Fisheries Information Management System can be efficiently operated and maintained by relevant personnel.

10.0 CLIENT'S OBLIGATIONS:

The Client will provide the following support to the Consultant:

a)Office space, office equipment (shared printer, copier, scanner), stationery, internet access, and transport services for official use in delivery of the services.

b) All available relevant documentation to the consultant, such as the Project Appraisal Document, Periodic reports, Implementation Manual, etc.

c) Contacts of key stakeholders.

d) Introductory letters to key stakeholders to facilitate communication.

e) Facilitate review and dissemination meetings with key stakeholders; and

f) Facilitate liaison with other program implementing partners.

11.0 OWNERSHIP OF DATA AND, THIRD-PARTY USAGE

The confidentiality and proprietary rights of the Client, including all data, reports, and information developed or acquired during the course of the consultancy, are of paramount importance to the success and integrity of the project. To ensure the protection of sensitive information and the preservation of proprietary rights, the following terms shall apply:

11.1. Ownership of Reports and Information:

All reports, data, and information generated, collected, or obtained from the implementing agencies, the Client, and other institutions during the consultancy shall be the exclusive property of the Client. No unauthorized use, reproduction, distribution, or disclosure of these materials shall be made by the Consultant.

11.2. Written Authorization Requirement:

The Consultant shall not use, disclose, or make any form of utilization of the reports, data, and information without obtaining prior written authorization from the Client. This includes any sharing, dissemination, or utilization of the materials for purposes other than those explicitly agreed upon in the consultancy arrangement.

11.3 Relinquishing of Materials:

Upon the completion of the consultancy services, the Consultant is obligated to relinquish all data, manuals, reports, and information, including any databases, codes, and related documentation, to the Client. The Consultant shall not retain or use any of these materials for any other assignment or purpose without obtaining explicit written authority from the Client.

11.4. Non-Compete and Non-Disclosure:

The Consultant shall commit to a non-compete and non-disclosure arrangement regarding any proprietary information, trade secrets, or sensitive data acquired during the course of the consultancy. This obligation extends beyond the conclusion of the

consultancy and prohibits the Consultant from engaging in activities that may compromise the Client's interests.

11.5. Security Measures:

During the consultancy, the Consultant shall implement appropriate security measures to protect the confidentiality of the Client's information. This includes safeguarding against unauthorized access, loss, theft, or unauthorized dissemination of any proprietary materials.