MINISTRY OF AGRICULTURE, LIVESTOCK, FISHERIES AND COOPERATIVES (MoALFC)

State Department of Fisheries, Aquaculture and Blue Economy (SDFA&BE)

Republic of Kenya

Kenya Marine Fisheries Socioeconomic Development

(KEMFSED)Project

P.O. Box 58187-00200

NAIROBI

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

TERMS OF REFERENCES

FISHERIES INFORMATION MANAGEMENT SYSTEM (FIMS) TECHNICAL EXPERT FOR CONSULTANCY SERVICES TO PROVIDE TECHNICAL BACK-STOPPING FOR DEVELOPMENT AND UPGRADING THE FISHERIES INFORMATION MANAGEMENT SYSTEM AT NATIONAL AND COUNTY HEADQUARTERS

CONSULTANCY SERVICES – INDIVIDUAL SELECTION

Contract No. KE-MOALF-C1-2021-013-ICS

1. Background

The GoK, through the State Department for Fisheries, Aquaculture, and Blue Economy (SDFA&BE) 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.

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 km^2 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.

2.0 Rationale for the consultancy

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 for Fisheries, Aquaculture and the Blue Economy (SDFA&BE) 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 rate (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 technical expert with fisheries experience who will work collaboratively with the FIMS IT expert to operationalise the FIMS. This operationalisation will be at National Level with upscaling to the 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 consultant will be expected to provide technical /expert advice to the database developers to improve design of the FIMS Database and integrate CAS with the frame by incorporating a fisheries statistical verification process to assess data quality. This is to be achieved through the provision of clear and concise instructions to the database developer who will make the actual changes in the database.

3. Objectives 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.

4. Scope of the Assignment

The consultant will work closely with the database developer to upgrade and develop further the current fishery information management system and procedures and to support implementation of the system for

effective operation at both National and County levels. FIMS should be designed in such a way to focus on the principle calculation method using the boat-gear combination data analysis approach.

The FIMS 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 scope of work under 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) Assess the raising procedures and statistical methodology for the estimation of total catch by species for consistency with the suggested FAO sample-based data collection;

iv) Provide clear and concise instruction to the database developer on the changes in CAS module of the FIMS database 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;

v) Provide technical advice to the integration with the Frame Surveys and or data collection design;

vi) Provide 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);

vii) In full collaboration with the officer in charge of statistics, 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

viii) 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;

ix) Provide technical instructions to Database developer to import the mobile collected data from the clouds to CAS Database;

x) Personalization of statistical reports for marine catch/effort, aquaculture, compliance and other relevant modules;

xi) Overseeing the FIMS progressive expansion, improvement and pilot survey implementation;
xii) Provide 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;

xiii) 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;

xiv) Provide technical support to the database developer to develop an interface that allows automatic remittance of the fish catch data to FAO and IOTC in collaboration with the FAO and IOTC;

xv) 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);

xvi) Prepare training material and field guides and sampling simulators and setting up sampling protocols linked to CAS during the operationalization of FIMS;

xvii) Training of staff involved in data and statistics and KMFRI scientists, on the implementation FIMS functions, processes and any other associated services;

xviii) Provide a training manual of the operation and maintenance of the CAS database;

xix) Provide technical advice on the design and implementation on economic and socio economic surveys;

xx) Conduct training on the use of GIS analysis and the appropriate presentation of fisheries data;

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

5.0 Expected Outputs/ Products

The consultant is expected to deliver the following:

1) 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 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

6.0 Timing and Reporting

The consultancy will be implemented over **2 years** of KEMFSED project with three months (90 days) per year, totalling to 180 days spread throughout the project period. Each year depending of the performance the contract will be renewed. Deliverables for each milestone will be as follows:

i. Milestone 1: An inception report with strategy and work plan to be submitted two weeks after signing of contract

ii. Milestone 2: Provide technical specifications and the scope of work to be undertaken by the IT database developer

iii. Milestone 3: Technical report on created database

iv. Milestone 4: Functional FIMS at National level developed

v. Milestone 5: Operationalise FIMS at the five Counties

vi.   Milestone 6: Provide adequate and impregnable security levels and checks to the database

vii.   Milestone 6: Train National and County database, statistical and data officers

viii. Milestone 7: Final technical report that includes all processes undertaken to develop and operationalize the FIMs platform and trainings undertaken.

7.0 Supervision and responsibility

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

ii) The client (GoK) will supervise the consultant's performance and will be responsible for review and acceptance of all deliverables prior to submission to the World Bank for final approval.

iii) The consultant will submit three (3) copies of the technical report, plus an electronic version in MS Word (the report should be clear and concise and of about 15 pages or less).

iv) The contents and scope of the training manual will be agreed with the Project KEMFSED team

v)   Any other relevant information should be contained in annexes to the report. Originals or photocopies of any relevant documents collected and reviewed as part of the consultancy.

vi) The client will provide the consultant with all necessary available report, documents relating to the current FIMS database

8.0 Qualifications

The consultant to support the development and operationalization of FIMS should have the following qualifications;

a) A Master's Degree or equivalent in a discipline related to fisheries management or fisheries statistics;

b) A Degree or equivalent in a discipline related to fisheries management or fisheries statistics;

c) Biostatistician with at least 10 year experience in sample based data collection for small scale fisheries;

d) Working experience in the MsAccess database development including use of reputable software products such as PhP-MySQL, Java, etc. in mobile phone and GIS applications.

e) Profound knowledge of FAO recommendation for small scale fisheries statistics and data collection;

f) At least 10 years of demonstrable experience working in a fisheries and/or natural resources, small scale sample based fisheries data collection. Experience specifically in the development of Fisheries Information Systems will be an added advantage;

g) Wide experience and interaction with regional and international projects as well as good networks in fisheries data collection;

h) Ability to communicate effectively in English both orally and in writing;

i) Strong report writing and analytical skills are required.

8.0 Payments Schedule

A total of about 6 months (180 days) is estimated for this consultancy.

1. First instalment upon submission, acceptance and approval of the inception report, (10%)
2. Second instalment of 20% of professional fees upon submission, acceptance and approval of technical specifications and technical report on the database

3. Third instalment of 40% upon development of functional database at national and County level with impregnable security
4. Fourth instalment of 30% upon training of the staff, operation manuals and provision, submission, acceptance and approval of final technical report

The time taken by the consultant to review the reports are not counted in the time for this consultancy. The expert should also provide technical support for a period of two years after the contract as need arises at no extra cost

9.0 Project information.

The consultant selected for interviews should become familiar before with the project relevant information and objectives, area of intervention and relevant stakeholders. Relevant information of the project can be found: **www.kemfsed.org**