REPUBLIC OF KENYA

STATE DEPARTMENT FOR AGRICULTURE

MINISTRY OF AGRICULTURE AND LIVESTOCK DEVELOPMENT

TERMS OF REFERENCE

(TOR)

FOR

DATA SCIENCE EXPERT

(Individual Consultant)

Contract No: KE-MOALF-569688-CS-INDV- DATA EXPERT 1

Client:

State Department for Agriculture

Ministry of Agriculture and Livestock Development

Kilimo House, Cathedral Road

P.O Box 30028 -00100

Nairobi , Kenya

Email: info@kilimo.go.ke

AUGUST 2026

1.0 BACKGROUND

1.1 Introduction

The Food Systems Resilience Project (FSRP) is a Government of Kenya project with co-funding from the World Bank and the National Government. The project will be implemented in 13 counties targeting to increase preparedness against food insecurity and improve the resilience of food systems in targeted project areas of Kenya. The project will be implemented over 6 years commencing September 2023 to August 2029. The FSRP will build on the strong foundation laid by National Agriculture and Rural Inclusive Growth Project (NARIGP), Kenya Climate Smart Agriculture Project (KCSAP) and Emergency Locust Response Project (ELRP). The project will broaden and deepen investments in existing interventions through a multiphase programmatic approach (MPA). The five MPA program pillars of FSRP are: (1) Responding to a deteriorating food security situation, (2) (Re-)building resilient agricultural production capacity, (3) Supporting the sustainable development of natural resources for resilient agricultural landscapes, (4) Getting to market, and (5) Promoting a greater focus on food systems resilience in Policymaking.

1.2 Project Development Objectives and Indicators

The FSRP project development objective (PDO) is to increase preparedness against food insecurity and improve the resilience of food systems in targeted project areas of Kenya. In order to realize this objective, project activities will be implemented through five components namely (i) (Re-) Building Resilient Agricultural Production Capacity; (ii) Supporting the Sustainable Development of Natural Resources for Resilient Agricultural Landscapes; (iii) Regional and domestic markets for food security; (iv) Promoting a Greater Focus on Food Systems Resilience in National and Regional Policy making; (v) Contingency Emergency Response (vi) Project Coordination and Management.

Progress towards the realization of the PDO will be measured through the following five (Outcome) indicators:

i). Percentage reduction of food insecure people in project-targeted areas
ii). Number of farmers adopting resilience-enhancing technologies and practices: of which female (percentage); of which, climate-resilient (percentage)
iii). Hectares of land area under integrated land management practices
iv). Percentage increase in volume of agricultural production sold on domestic and regional markets
v). Number of policy products related to agriculture, natural resources management, and food systems resilience adopted with project's support.

2.0 Objective of the assignment

The overall objective of the assignment is to strengthen the Agricultural Information Resource Centre (AIRC) capacity as it transforms into the Kenya Agricultural Digital Information Centre (KADIC) to generate, manage, analyze, and translate agricultural data into timely, reliable, and actionable information that supports evidence-based decision-making, digital agricultural services, and improved agricultural productivity.

The consultant will be responsible for the following key objectives:

1. To develop and deploy advanced statistical, analytical, artificial intelligence and machine learning models that generate actionable insights from agricultural datasets.
2. To analyse large and complex structured and unstructured datasets covering crop and livestock production, irrigation, fisheries, soil health, climate, geospatial information, agricultural inputs, supply chains and markets.
3. To develop predictive and prescriptive analytics solutions to support agricultural planning, including crop yield forecasting, climate risk assessment, irrigation management, market intelligence, credit access, pest and disease monitoring and resource allocation.
4. To strengthen the use of data-driven evidence in agricultural policy development, food security planning, climate resilience strategies and improvement of farm-level productivity.
5. To support the development and implementation of the National Agricultural Data Stack and Digital Public Infrastructure (DPI) through interoperable data architectures, shared digital services and secure consent mechanisms for agricultural data exchange.
6. To improve the quality, accessibility, interoperability and usability of agricultural data and to strengthen processes for monitoring data accuracy and analytical model performance.
7. To translate complex analytical findings into clear, accessible and actionable information for technical and non-technical stakeholders within the Ministry and across the agricultural sector.
8. To strengthen AIRC capacity to develop data products, visualizations, dashboards, reports and other knowledge products that communicate agricultural trends and insights to farmers, policymakers, researchers, private-sector actors and other stakeholders.

3.0 SCOPE OF SERVICES AND SPECIFIC TASKS

3.1 Scope of service

The Agricultural Information Resource Center (AIRC), a directorate under the State Department for Agriculture, Ministry of Agriculture and Livestock Development, is implementing strategic initiatives to strengthen the Ministry's digital presence and enhance agricultural information and service delivery. These initiatives are aligned with AIRC's transition into KADIC to coordinate data and digital agriculture in providing timely, relevant, and accessible agricultural information to farmers, policymakers, researchers, private-sector actors, and other stakeholders.

Over the years, AIRC has accumulated substantial data, information and knowledge across diverse agricultural thematic areas. The Centre is progressively digitising these resources and transforming them into digital products and services to improve their accessibility, usability and uptake. Key initiatives include the National Farmer Registry, which contains records of approximately 7.3 million farmers and supports the implementation of agricultural programmes, including the issuance of e-vouchers under the Fertilizer Subsidy Programme.

As the Centre advances its data and digital roadmap, there is a need to strengthen its internal technical capacity in advancing data analytics. The engagement of the Data Science consultant will therefore provide the specialized expertise required to analyse and derive actionable insights from agricultural data, while supporting the development of data-driven solutions for improved planning, policy formulation and service delivery.

The Data Science consultant will work with agricultural datasets from diverse sources, including field surveys, remote sensing systems, IoT-enabled technologies, meteorological stations, agricultural databases and market platforms. The work will encompass statistical analysis, data mining, artificial intelligence, machine learning, data visualization and data engineering, with a focus on improving data quality, interoperability and the use of predictive and prescriptive analytics.

The consultant will collaborate with Ministry technical teams, agronomists, application developers, policy teams, partners and other relevant stakeholders to translate complex agricultural data into reliable analytical products and actionable insights that support agricultural planning, food security, climate resilience and sector governance.

3.2 Specific tasks

1. Agricultural Data Analysis and Modelling

- Compile, clean, process and analyse large institutional agricultural datasets from different sources and systems.
- Apply appropriate statistical, data mining, artificial intelligence and machine learning techniques to identify patterns, trends, relationships and anomalies within agricultural datasets.
- Develop, test, validate and deploy statistical and machine learning models for agricultural decision-making.

- Develop analytical models for crop yield forecasting, climate risk assessment, irrigation management, market intelligence, credit access, pest and disease monitoring and resource allocation.
- Assess the quality, completeness, reliability and usefulness of new data sources and data-gathering approaches.
- Establish appropriate processes and tools for monitoring data accuracy and model performance.

2. Predictive and Prescriptive Analytics

- Develop predictive analytics solutions to support seasonal agricultural planning and food security decision-making.
- Apply advanced analytical techniques to identify emerging agricultural risks and opportunities.
- Develop models and analytical frameworks that support evidence-based resource allocation and agricultural programme planning.
- Collaborate with relevant technical teams and partners to operationalize analytical models and monitor their outcomes.
- Support the transition towards predictive and prescriptive analytics for smarter agricultural services and sector governance.

3. Data Integration, Interoperability and the National Agricultural Data Stack

- Support the design and implementation of the National Agricultural Data Stack and Digital Public Infrastructure (DPI).
- Develop and support interoperable data architectures that facilitate secure and seamless exchange of agricultural information.
- Contribute to the development and improvement of shared digital services, including farmer registries, traceability systems and other agricultural data products.
- Work with application developers and technical teams to define data requirements and support integration of analytical models into digital applications and services.
- Support the development and use of secure APIs and other mechanisms for data exchange across agricultural institutions and stakeholders.

4. Data Mining and Knowledge Discovery

- Mine and analyze agricultural databases to generate insights that improve agricultural data products and services.
- Analyse data from crop and livestock production, irrigation, soil health, climate, geospatial systems, agricultural inputs, supply chains and markets.
- Integrate and analyse data from field surveys, remote sensing systems, IoT-enabled technologies, meteorological stations and market platforms.
- Identify hidden patterns, trends and relationships that can inform agricultural policy, programming and service delivery.

5. Data Visualization and Communication of Insights

- Develop clear and visually engaging data products, dashboards and other analytical outputs for different stakeholder groups.
- Use appropriate data visualization tools and techniques to effectively communicate complex agricultural information.
- Produce analytical reports, policy briefs, county profiles and other knowledge products based on agricultural data and evidence.
- Translate complex technical and analytical findings into clear, actionable insights for technical and non-technical stakeholders.
- Support the dissemination of agricultural data insights through AIRC platforms, including the website, dashboard and relevant reporting portals.

6. Data Governance, Quality and Security

- Support the establishment and strengthening of data quality standards and processes for agricultural digital systems.
- Promote data accuracy, consistency, interoperability and appropriate use across agricultural information systems.
- Contribute to strengthening data privacy, cybersecurity, scalability and resilience of agricultural digital systems.
- Ensure that analytical approaches and data products are aligned with applicable national digital strategies and institutional requirements.

7. Decision Support and Policy Analysis

- Provide analytical evidence to support agricultural policy dialogue and decision-making.
- Collect, synthesize and analyse information required to support the Ministry's policy and programme objectives.
- Develop evidence-based insights to support food security planning, climate resilience, agricultural productivity and market stabilization.
- Collaborate with Ministry stakeholders to identify opportunities for leveraging organizational data to address agricultural sector challenges.

8. Collaboration, Knowledge Sharing and Capacity Support

- Work closely with application developers, agronomists, policy teams, Ministry departments, partners and other functional teams in implementing analytical solutions.
- Coordinate with relevant stakeholders to validate analytical outputs and assess their practical application.
- Share knowledge, analytical approaches and lessons learned with relevant AIRC and Ministry teams.
- Undertake any other related duties assigned by the Director, Data and Digital Agriculture.

4.0 DURATION AND LOCATION OF THE ASSIGNMENT

This is a two (2) years contract with the possibility of extension based on performance and the availability of funds. The Consultant will be stationed at the Agricultural Information Resource Centre Office, Nairobi.

5.0 REPORTING REQUIREMENTS AND TIMELINES FOR DELIVERABLES

The work is expected to commence within 5 days after the Contract is signed. The Data Science Consultant will report to the Director, Data and Digital Agriculture and will work closely with the Information and Knowledge Management department to facilitate the effective and successful implementation of the assignment.

5.1 Key Deliverables

The Data Science Consultant will be expected to deliver the following outputs:

No	Deliverable	Timeline of each deliverable from contract commencement
1	A comprehensive Data Science work plan outlining priority datasets, analytical requirements, methodologies, activities and implementation timelines	Within 30 Days after commencement of the Contract
2	Validated statistical, predictive and machine learning models developed for priority agricultural use cases	Quarterly
3	Regularly updated agricultural data analysis reports highlighting key trends, patterns, insights and opportunities for improved decision-making	Monthly
4	Data pipelines and analytical frameworks developed for the processing, integration and analysis of agricultural datasets from multiple sources	Within 60 days from the date of contract commencement
5	Data visualization products, dashboards and analytical outputs developed to support agricultural planning, policy formulation and decision-making	Quarterly
6	Technical inputs and data science solutions supporting the implementation of the National Agricultural Data Stack and Digital Public Infrastructure (DPI)	Throughout the assignment period
7	Periodic reports on data quality and model performance, including identified gaps, accuracy assessments, corrective actions and recommendations	Quarterly
8	Documented analytical insights, lessons learned and recommendations on the	Within the assignment period

	application of data science, predictive analytics and machine learning in agriculture	

All reports shall be submitted in both hard and soft copies and addressed to:

Principal Secretary,
State Department for Agriculture
Ministry of Agriculture and Livestock Development
Cathedral Road, Nairobi
P.O Box 30028-00100,
Nairobi- Kenya

6.0 PAYMENT SCHEDULE/REMUNERATION

The Data Science consultant shall be remunerated based on a monthly rate (a consolidated amount inclusive of all costs with clearly identified applicable taxes), which will be negotiated with the successful candidate during Negotiations.
Payment shall be monthly upon submission and approval of the monthly reports.

7.0 CONSULTANT'S QUALIFICATION AND EXPERIENCE REQUIREMENTS

The consultant shall possess the following qualifications and experience:

a) A minimum of a Master's degree in Data Science, Statistics, Mathematics, Economics, Computer Science, or another relevant quantitative field from a recognized institution.
b) At least five (5) years of demonstrable general professional experience in managing and analysing large institutional datasets, developing statistical models, and applying statistical analysis and data-mining techniques.
c) At least three (3) years of demonstrable specific professional experience in the use of statistical and data-mining tools and techniques, database querying and management, Geographic Information Systems (GIS), distributed data-processing systems, and High-Performance Computing (HPC) environments.

8.0 MANAGEMENT AND ACCOUNTABILITY OF THE ASSIGNMENT

The Ministry of Agriculture and Livestock Development (MoALD), State Department for Agriculture is the Client for these services. The Data Science consultant will report to the Director, Data and Digital Agriculture at AIRC.

9.0 OBLIGATIONS OF THE CLIENT

The Client will provide:

a) Suitable furnished office space
b) Telecommunication
c) Transport to field assignments as and when required

10.0 OBLIGATIONS OF THE DATA SCIENCE CONSULTANT

The Data Science Consultant shall perform and carry out the services with all due diligence, efficiency and economy in accordance with generally accepted professional standards and practices and shall observe sound management practices. The consultant shall always act with respect to any matter relating to this Contract or the Services and shall at all times support and safeguard the Ministry's legitimate interests in any dealings with the third parties.

11.0 CONFIDENTIALITY, PROPRIETARY RIGHTS OF CLIENT IN REPORTS AND RECORDS.

i. All the reports, data, information, products and services developed, collected, or obtained from the implementing agencies etc., Client, and other Institutions during this exercise shall belong to the Client. No use shall be made of them without prior written authorization from the Client.
ii. At the end of the Services, the Data Science consultant shall relinquish all data, products and services, manuals, reports and information (including the database, codes, and related documentation) to the Client and shall make no use of them in any other assignment without prior written authority from the Client.