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WORLD BANK/IFAD PROGRAM IMPLEMENTATION UNIT
MINISTRY OF AGRICULTURE, REPUBLIC OF LIBERIA
Rural Economic Transformation Project (RETRAP)
1st Floor LIBSUCO Building Japan Freeway (Formerly Somalia Drive),
Gardnersville – Monrovia, Liberia

LOAN #: P175263; IDA: 69000

REQUEST FOR EXPRESSION OF INTEREST

(CONSULTING SERVICES – FIRMS SELECTION)

Assignment Title: Consultancy Services for the Development of a Digital Tracking and Management System for Agricultural Machinery and Service Centers

REOI Reference No: LR-PMU-MOA-551322-CS-QCBS

1. Background and Rationale

Agricultural mechanization is a cornerstone for transforming Liberia's farming systems, enabling smallholder farmers to increase productivity and efficiency. However, the sector faces challenges including low equipment utilization, weak monitoring, and high fuel consumption. To address these, the Ministry of Agriculture (MoA), with World Bank support under the Rural Economic Transformation Project (RETRAP), is establishing Agricultural Mechanization Service Centers (AMSCs).

This assignment involves the development of a Mechanization Management and Tracking System (MMTS) and Standard Operating Procedures (SOPs). The system is intended to function as a management and accountability platform, integrating with the RETRAP reporting database and the National Farmer Registry to ensure traceability, transparency, and economic sustainability of mechanization services delivered to smallholder farmers across Liberia.

2. Objectives Primary Objective: To implement a nationally scalable mechanization management and accountability system that improves equipment utilization, performance tracking, cost recovery, and service delivery to smallholder farmers, thereby enhancing agricultural productivity and climate resilience.

Specific Objectives

- Digitally register all mechanization equipment and operators with unique identifiers.
- Track granular service metrics including hectares covered, GPS location, and fuel efficiency.
- Enable demand aggregation by geography and season to drive efficient AMSC scheduling.
- Integrate mechanization data with the National Farmer Registry and RETRAP databases.
- Establish standardized operational workflows and protocols (SOPs) for all AMSC activities.

3. Scope of Work: The Consultant will:

- Conduct stakeholder consultations and a National Farmer Registry Readiness Assessment.
- Design a vendor-neutral system architecture and comprehensive data models for equipment and financial transactions.
- Develop the full MMTS platform, including mobile field modules with offline synchronization capabilities.
- Deploy and pilot the system in up to five (5) selected AMSCs and produce a Pilot Learning Report.
- Develop a multi-tiered supervision hierarchy and real-time performance dashboards.
- Deliver a "Train the Trainer" program and finalize user manuals/SOPs for national rollout.
- Ensure full transfer of all source code, data, and technical documentation to MoA and RETRAP.

The shortlisting criteria are:

(a) Core Business and Number of Years in Business: The firm must have at least ten (10) years of proven experience in software development and ICT consultancy.

(b) Technical and Managerial Organization of the Firm: Evidence of technical capacity in cloud-based solutions, secure data management, and mobile application development.

(c) Description of Similar Assignments: A minimum of seven (7) years of specialized experience in the design and deployment of fleet tracking solutions, management information systems (MIS), or similar national-level agricultural digital platforms.

(d) Experience in Similar Conditions: Demonstrated experience deploying digital systems in rural environments with limited connectivity, preferably in West Africa.

(e) Availability of Appropriate Skills among Staff (Project Manager, System Architect, Mechanization Specialist, Data Governance Expert, and GIS Analyst).

Note: Key Experts will not be evaluated at the shortlisting stage.

The detailed Terms of Reference (TOR) for the assignment can be found at the following websites: a) www.moa.gov.lr b) **Alternatively, it can be directly requested via email from dkulah@moa.gov.lr.**

The attention of interested firms is drawn to Section III, paragraphs 3.14, 3.16, and 3.17 of the World Bank's "Procurement Regulations for IPF Borrowers," Seventh Edition, September 2025, setting forth the World Bank's policy on conflict of interest. In addition, please refer to paragraph 3.17 of the Procurement Regulations on unfair competitive advantage related to this assignment. The Regulations are available on the Bank's website at www.worldbank.org/procurement. A Consultant will be selected in accordance with the Quality and Cost-based Selection (QCBS) method set out in the Procurement Regulations.

Expressions of interest must be submitted electronically in a format that cannot be altered (PDF format is preferred) to the email address below by **1st June 2026 @ 5:00 pm local time.**

Note: All expressions of interest MUST be submitted to the email address below:

Galah Toto National Project Coordinator
Project Implementation Unit (PIU),
Ministry of Agriculture Rural Economic Transformation Project (RETRAP)
2nd Floor LIBSUCO Building, Japanese Freeway (Formerly Somalia Drive), Gardnersville –
Monrovia, Liberia Tel: +231-777576980 Email: retrapbids@moa.gov.lr with a copy to Email:
gtoto@moa.gov.lr

TERMS OF REFERENCE

Design, Development, and Implementation of the
Agricultural Mechanization Tracking System (MMTS)
Standard Operating Procedures and Operator Capacity Building Program

Ministry of Agriculture | Rural Economic Transformation Project (RETRAP)

Republic of Liberia

February 2026

1. Background

Agricultural mechanization is a cornerstone for transforming Liberia's farming systems, enabling smallholder farmers and agri-enterprises to increase productivity, reduce reliance on manual labor, and improve efficiency across land preparation, cultivation, harvesting, and post-harvest operations. Despite its potential, mechanization in Liberia continues to face persistent challenges, including low equipment utilization, weak monitoring and supervision, high fuel consumption, poor maintenance tracking, and limited visibility of service delivery performance. These operational gaps are compounded by weak institutional capacity, resulting in fragmented oversight, inconsistent service standards, and limited accountability. Without strong governance structures, mechanization services risk becoming unreliable, unsustainable, and inaccessible to the farmers who need them most.

To address these constraints, the Ministry of Agriculture (MoA), with technical and financial support from the World Bank under the Rural Economic Transformation Project (RETRAP), is establishing Agricultural Mechanization Service Centers (AMSCs). These centers will serve as centralized hubs providing modern mechanization services that enhance agricultural productivity, improve rural livelihoods, and promote sustainable farming practices. By aggregating demand and supply, AMSCs reduce costs, foster private sector participation, and ensure long-term sustainability of mechanization solutions. However, for these centers to succeed, institutional strengthening and organizational capacity building are essential to ensure that management systems, supervision frameworks, and accountability mechanisms are robust and responsive.

The economic sustainability of each AMSC depends on a sound operational business model. This means that mechanization services must be priced to recover costs, service utilization rates must meet realistic targets, and maintenance reserves must be adequately funded. Beyond tracking equipment use, an effective management platform must help assess utilization rates against targets, calculate cost per hectare serviced, monitor fuel efficiency by equipment type and operator, measure revenue recovery against operational expenditure, and evaluate affordability for smallholder farmers. Without this economic visibility, there is a real risk that AMSCs become operational liabilities rather than sustainable service hubs. The Mechanization Management and Tracking System (MMTS) must therefore be designed not merely as an equipment register but as a management and accountability platform that improves the economic efficiency, sustainability, and transparency of mechanization services delivered to smallholder farmers across Liberia.

The proposed MMTS, supported by standardized Standard Operating Procedures (SOPs) and a structured supervision framework, is designed to directly address these institutional weaknesses. By embedding transparency, accountability, and evidence-based management into mechanization services, the MMTS will strengthen organizational oversight and harmonize national mechanization data. Building on proven digital agriculture infrastructure, the system will integrate with the RETRAP reporting database to ensure farmer linkage, traceability, and comprehensive monitoring of mechanization services. This intervention directly contributes to RETRAP's broader objectives of increasing productivity and market access for smallholder farmers and agri-enterprises, while advancing climate-smart agriculture, agribusiness development, and workforce training. Ultimately, the initiative seeks to reduce food insecurity, promote economic transformation, and build resilience in Liberia's rural communities.

2. Purpose of the Assignment

The purpose of this assignment is to procure a qualified firm to design, develop, and deploy a nationally scalable Mechanization Management and Tracking System, along with a comprehensive operational framework for the AMSCs. The work will proceed in clearly defined phases, with each phase subject to review and acceptance before the next phase begins. Specifically, the assignment seeks to:

- Design and deploy a digital MMTS that functions as a management and accountability platform, not merely a tracking tool.
- Develop standardized SOPs for mechanization center operations across equipment deployment, service delivery, maintenance, data collection, and financial reconciliation.
- Establish a supervision and performance monitoring framework that gives MoA and RETRAP real-time visibility into service delivery quality, economic performance, and accountability across all AMSCs.
- Build the capacity of mechanization center operators, supervisors, and MoA technical staff to manage, use, and sustain the system independently.
- Establish clear arrangements for intellectual property, data ownership, technology transferability, and long-term government control of all digital assets created under this contract.

3. Overall Objective

To implement a nationally scalable mechanization management and accountability system that improves equipment utilization, performance tracking, cost recovery, and service delivery to smallholder farmers, thereby enhancing agricultural productivity, economic efficiency, and climate resilience. The system must be fully owned and operable by the Government of Liberia upon handover, with no dependency on proprietary vendor platforms or ongoing vendor licensing.

4. Specific Objectives

- Digitally register all mechanization equipment and operators with unique identifiers and maintain an accurate, current registry.
- Track granular service delivery metrics including hectares covered, precise geographical location via GPS, service duration, fuel consumption per operation, type of service rendered, and the farmer served.
- Monitor equipment performance, maintenance schedules, and repair history in real time.
- Enable demand aggregation by geography and season so that AMSC scheduling is driven by verified farmer requests rather than ad hoc operations.
- Track and assess private provider performance using measurable indicators including service completion rates, average response time, and farmer satisfaction scores.
- Integrate mechanization services data with the National Farmer Registry, subject to a confirmed readiness assessment and a documented go-or-no-go decision before system architecture is finalized.
- Assess economic performance of each AMSC by tracking cost per hectare, fuel efficiency, revenue recovery, and utilization against operational targets.
- Establish standardized operational workflows and protocols for all AMSC activities, covering equipment deployment, service delivery, data collection, maintenance, and reporting.
- Train operators and supervisors on system use, data entry, reporting, and sustainable mechanization practices, and transfer full operational knowledge to MoA and RETRAP.

5. Value Chain Linkages

Liberia's priority agricultural value chains each have distinct mechanization needs. The MMTS must be designed to collect data that is relevant and useful for each value chain, without gathering information that has no practical application. The table below provides an indicative mapping of value chains to the mechanization services and system indicators that apply. The role of mechanization for poultry and piggery should be clarified with MoA during the inception phase, and excluded from system scope if it does not involve field mechanization relevant to the MMTS.

Value Chain	Primary Mechanization Services	Key MMTS Indicators
Rice	Land clearing, ploughing, harrowing, transplanting, harvesting, threshing	Hectares prepared, turnaround time per hectare, fuel per hectare, farmer satisfaction
Cassava	Land preparation, ridging, mechanized harvesting	Hectares serviced, implement type used, service completion rate
Rubber	Land clearing, mechanized tapping support, transport logistics	Equipment deployment frequency, area cleared, maintenance history
Poultry and Piggery	To be clarified or excluded during inception	To be determined in consultation with MoA during Stage 1

6. Farmer Service Journey

The MMTS must support and document the complete service journey from the moment a farmer requests assistance to the point of payment reconciliation and feedback collection. The system must be designed around this workflow, not as a separate afterthought. The standard service journey consists of the following steps:

1. Request: A farmer or Farmer Based Organization (FBO) submits a service request through the MMTS, either via a mobile application, SMS, or through a registered AMSC agent.
2. Demand Aggregation: Requests are aggregated by location, crop type, and season. The system assists AMSC managers in prioritizing and batching service delivery to reduce travel time and operational cost.
3. Scheduling: The AMSC manager assigns equipment and an operator to the service request and the schedule is confirmed in the system with an estimated service date.
4. Service Delivery: The operator records the actual service event in the field using the MMTS mobile module, capturing GPS location, duration, fuel consumed, implement used, and any issues encountered.
5. Farmer Confirmation: Upon service completion, the farmer receives an SMS notification and is prompted to confirm that the service was delivered. This lightweight confirmation mechanism improves data integrity and provides an independent accountability check on operator records.
6. Payment and Reconciliation: Any fee collected is recorded in the system against the service event and linked to the farmer and the AMSC revenue account. The system supports tracking of subsidized, full-cost, and waived payments.

7. Feedback: The farmer is given an opportunity to rate the service and submit any concerns. This feedback is visible to AMSC managers and MoA supervisors through the monitoring dashboard.

7. Scope of Work

The assignment is organized into four implementation phases. Each phase concludes with a defined deliverable and a formal review by the Project Implementation Unit (PIU). The next phase will only commence upon written acceptance of the preceding phase deliverables. This phased structure is essential to manage the inherent complexity of integrating a national tracking system, to allow learning from the pilot before committing to full national rollout, and to protect the Government's investment.

Phase 1: Design and Readiness

Estimated Duration: 10 to 14 weeks

Stage 1: Stakeholder Consultations and Requirements Gathering (Estimated 4 weeks)

- Conduct in-depth consultations with MoA, RETRAP, farmer cooperatives, AMSC managers, county agricultural officers, and relevant government IT departments to validate system requirements and functional specifications.
- Map the existing RETRAP reporting database structure in detail, including database schema, API documentation, and data formats, to identify integration requirements, gaps, and risks.
- Conduct a National Farmer Registry Readiness Assessment to evaluate the completeness, deduplication status, georeferencing quality, and technical accessibility of the registry. This assessment is a mandatory deliverable of Stage 1. Based on its findings, the PIU will make a documented go-or-no-go decision on registry integration before Stage 2 begins. If the registry is found to be insufficiently ready, the Stage 2 system architecture will be designed for future integration rather than immediate connection.
- Consult with MoA to clarify the role of poultry and piggery within the MMTS scope, and document the agreed value chain coverage as part of the Stage 1 report.
- Document the farmer service journey in each pilot AMSC context and confirm the demand aggregation and scheduling workflow to be supported by the system.
- Clarify device availability: whether field devices will be government-furnished or procured under this contract. If devices fall within scope, the Consultant shall recommend minimum technical specifications (a minimum of Android 10, 4GB RAM, and IP54-rated for dust and water resistance given field conditions in Liberia). If devices are government-furnished, the Consultant shall document minimum compatibility requirements.

Stage 2: System Architecture and Data Design (Estimated 6 to 10 weeks)

Given the complexity of the required integrations, the offline functionality requirements, the multi-role user management, and the open API specifications, the architecture and data design stage requires dedicated time and must not be compressed. This stage may run concurrently with the final weeks of stakeholder consultations to avoid unnecessary delays.

- Define comprehensive data models for equipment, operators, services, farmer linkages, and financial transactions.
- Design system architecture in accordance with the technology neutrality requirements set out in Section 10, ensuring that no proprietary frameworks are used that would create vendor lock-in.

- Specify the hosting arrangement, confirming whether the system will be hosted under a dedicated government subdomain such as mmts.moa.gov.lr or equivalent, and defining who will manage hosting infrastructure and associated costs after handover.
- Design open API specifications for integration with the RETRAP reporting database, the National Farmer Registry (subject to the go-or-no-go decision from Stage 1), and future interoperability with GIS platforms and digital payment systems.
- Design the farmer-facing SMS confirmation mechanism as a core system component.
- Establish data governance protocols covering data ownership, access control, role-based permissions, audit trails, data backup and recovery, and incident response procedures.
- Prepare a Data Protection Compliance Plan covering encryption standards for data at rest and in transit, data minimization principles, farmer notice requirements, and the conditions under which a Data Protection Impact Assessment (DPIA) may be required.
- Define minimum security standards including role-based access control, multi-factor authentication for system administrators, and explicit data residency requirements.
- Submit and obtain PIU written approval of the architecture design before proceeding to Stage 3.

Phase 2: Development, Testing, and Pilot

Estimated Duration: 5 to 7 months

Stage 3: System Development and User Acceptance Testing (Estimated 3 to 4 months)

- Develop the full MMTS in accordance with the approved architecture, including all modules for equipment and operator registration, service delivery tracking, demand aggregation, scheduling, farmer confirmation, payment reconciliation, performance dashboards, and supervisory reporting.
- Develop mobile field modules for Android and iOS with GPS tracking, real-time service capture, farmer confirmation, and offline data capture with secure synchronization when connectivity is restored.
- Build and configure a staging environment that mirrors the production system. All testing must occur in this environment before any deployment to live use.
- Prepare a formal User Acceptance Testing manual covering all system modules, user roles, and expected workflows.
- Conduct structured UAT sessions with representatives from MoA, RETRAP, AMSC managers, and selected operators. All critical issues identified during UAT must be resolved and retested before deployment.
- Obtain written sign-off from the PIU on UAT completion and system acceptance before proceeding to live pilot deployment. No live pilot deployment may occur without this sign-off.
- Configure supervision dashboards for MoA oversight, including indicators for service completion rates, private provider performance, revenue recovery, cost per hectare, fuel efficiency, and farmer satisfaction.
- Implement exception and risk monitoring mechanisms to detect operational irregularities, equipment underperformance, fuel misuse, and potential fraud.

Stage 4: Pilot Deployment and Learning (Estimated 2 to 3 months)

The pilot is a learning phase. Its purpose is to test the operational model, validate data quality under field conditions, assess user adoption, and evaluate cost recovery before any commitment to national scale-up. Scale-up will not proceed unless the pilot meets clearly defined acceptance criteria.

- Deploy the MMTS in a maximum of five selected AMSCs. Pilot sites should be selected according to documented criteria covering geographic spread across distinct agro-ecological zones, varying levels of network connectivity, and different stages of AMSC operational maturity. The selection process and criteria must be transparent and recorded.
- Test all modules and workflows under real field conditions, including demand aggregation, farmer confirmation via SMS, offline data capture and synchronization, and supervisory dashboard use.
- Collect structured feedback from operators, AMSC managers, farmers, and MoA supervisors at regular intervals throughout the pilot.
- Monitor system performance against pre-defined pilot acceptance criteria agreed with the PIU at the start of the pilot. These criteria must cover data completeness rates, farmer confirmation response rates, operator adoption levels, system uptime, and at least one measure of economic performance such as cost recovery or cost per hectare.
- Prepare a Pilot Learning Report at the end of the pilot phase. This report must assess whether acceptance criteria have been met, document lessons learned, recommend system refinements, and present a go-or-no-go recommendation for national scale-up.
- National scale-up will only commence after the PIU formally accepts the Pilot Learning Report and issues written authorization to proceed.

Phase 3: Capacity Building and Institutionalization

Estimated Duration: 2 months, overlapping with the later stages of Phase 2

Stage 5: SOP Finalization and Capacity Building

- Validate and refine all drafted SOPs based on feedback and lessons learned from the pilot phase, ensuring they are practical, comprehensive, and suitable for use across diverse literacy levels in rural AMSC settings.
- Develop a comprehensive training curriculum and deliver structured training programs for AMSC operators, center managers, county agricultural officers, and farmer cooperative representatives, targeting an estimated 50 to 100 individuals across multiple sessions and locations.
- Produce a Knowledge Transfer and Transition Plan as a standalone deliverable. This plan must include as a minimum: a full system operations manual, a system administrator guide, a troubleshooting guide, documentation of all Train the Trainer sessions with attendance records, and a schedule for at least two post-handover technical support visits. It must also specify the minimum number of MoA and RETRAP staff trained and certified in each functional category.
- Implement a Train the Trainer program targeting 10 to 15 key MoA and RETRAP technical and extension staff to ensure internal capacity for ongoing training, support, and system maintenance after the contract ends.
- Develop clear, concise user manuals, visual field job aids, and climate-smart mechanization modules adapted for diverse literacy levels.

Stage 6: Supervision and Performance Framework (Finalized during Phase 3)

- Establish a multi-tiered supervision hierarchy and protocols for AMSC operations at center, county, and national levels, clearly documenting the roles, responsibilities, and escalation pathways for each level.
- Configure automated dashboards providing real-time monitoring of KPIs by level as specified in Section 8, with user-defined filters and visual data representations.

- Deliver specialized training to MoA and RETRAP staff on system administration, data analytics, compliance monitoring, and audit trail review.
- Document the governance mechanism for managing future system updates, change requests, and bug fixes after contract close, including who has authority to approve changes and how updates will be deployed.

Phase 4: National Scale-Up and Sustainability

Estimated Duration: Concurrent with Phase 3 planning; rollout commences only after formal PIU acceptance of the Pilot Learning Report

Stage 7: National Rollout Planning and Execution

- Produce a comprehensive national rollout plan detailing strategies for expansion to all target AMSCs, estimated at 20 to 30 facilities nationally, including infrastructure requirements covering hardware, network connectivity, and hosting, as well as human resource requirements at each level.
- Develop financing and cost-recovery strategies for AMSC operations and clear guidelines for integrating private sector participation models such as equipment leasing and public-private partnership frameworks into the MMTS.
- Ensure interoperability with other relevant government systems by documenting all API specifications and data exchange standards in formats that are accessible to government technical staff.
- Develop and agree a Service Level Agreement (SLA) covering a minimum 12-month warranty and post-handover support period. The SLA must define differentiated response time commitments for critical versus non-critical issues and specify the governance mechanism for managing system updates and change requests after contract close.
- Transfer all source code, data models, technical documentation, database schemas, API specifications, user manuals, and administrator guides to MoA and RETRAP at handover, in formats that allow independent government operation and maintenance without any reliance on vendor systems or proprietary licenses.

8. Indicator Framework

To support meaningful performance monitoring and avoid data overload, MMTS indicators are organized into four levels. Activity and output indicators inform operational management. Efficiency and outcome indicators inform strategic decision-making and program evaluation. The system must generate reports at each level for different user roles.

Indicator Level	Examples
Activity	Number of machines registered, number of operators trained and certified, number of service requests received, number of farmer confirmations sent
Output	Hectares serviced per AMSC per month, number of farmers served, number of services completed by private providers, percentage of requests fulfilled within scheduled timeframe

Efficiency	Cost per hectare serviced, fuel consumed per hectare by equipment type, revenue recovery rate as a percentage of operational cost, equipment utilization rate against target
Outcome	Reduction in average land preparation time compared to baseline, increase in cultivated area in target zones, farmer satisfaction score, percentage of smallholder farmers with access to mechanization services within a defined distance

9. Technology, Intellectual Property, and Data Governance Requirements

9.1 Technology Neutrality and Government Transferability

The MMTS must be built on open-source or vendor-neutral foundations. The use of proprietary frameworks that create ongoing licensing obligations, restrict government access to the source code, or prevent independent operation and maintenance is not permitted. Specifically:

- All source code, data models, database schemas, API specifications, configuration files, and technical documentation developed under this contract must be transferred to MoA and RETRAP in full upon handover.
- The system must operate without requiring any proprietary licensing fees after the contract closes. Any third-party libraries or frameworks used must be open-source or carry licenses that permit government use without ongoing cost.
- The Consultant must document all dependencies and confirm that no component of the system creates a dependency on the vendor or any vendor-affiliated service after handover.
- Open API standards must be used throughout so that MoA and RETRAP can independently connect additional systems or migrate to alternative platforms in the future.

9.2 Intellectual Property

All digital assets developed under this contract are the sole property of the Government of Liberia, represented by MoA and RETRAP, from the moment of their creation. This includes but is not limited to source code, databases, application interfaces, training materials, SOPs, design documents, and any other outputs produced during the performance of this contract. The Consultant retains no ownership rights over any deliverable. Any pre-existing intellectual property incorporated into the system must be disclosed at contract inception, and its use must not impose restrictions on government ownership or operation of the system.

9.3 Data Protection and Privacy

The MMTS will hold personal data including farmer identity records, GPS location data, transaction history, and operator information. The Consultant must submit a Data Protection Compliance Plan as part of the inception report. This plan must cover:

- Encryption standards for all data at rest and in transit, specifying the protocols and key management arrangements.

- Role-based access control ensuring that each user category accesses only the data necessary for their function.
- Multi-factor authentication for all system administrator accounts.
- Explicit data residency requirements, confirming where data will be stored and under what jurisdictional framework.
- Data minimization principles, collecting only what is necessary for the stated system purposes.
- Farmer notice arrangements, ensuring that farmers whose data is collected are informed in plain language about how their information will be used.
- Conditions under which a Data Protection Impact Assessment would be required, and a commitment to conduct one if those conditions are met.

9.4 Agricultural Data Governance

All farmer data, service data, equipment data, and operational data generated or held within the MMTS is the property of MoA and RETRAP. The Consultant may not use, analyze, monetize, share, or retain any data generated under this contract for any purpose beyond the performance of the contract itself. The system must support data portability, allowing MoA and RETRAP to export all data in open formats including at minimum CSV and JSON. Data classification and governance arrangements must be documented and agreed with MoA as part of the system design stage.

9.5 Hosting Environment

The Consultant must propose a hosting arrangement that supports long-term government ownership. A dedicated subdomain under the Ministry's official web domain, such as mmts.moa.gov.lr or an equivalent, is the preferred arrangement. The Consultant will be responsible for initial setup of the hosting environment. Long-term hosting costs and infrastructure management will be the responsibility of the Government of Liberia after handover. The Consultant must document all hosting configuration details and transfer them to MoA technical staff as part of the handover package.

10. Duration of the Assignment

The estimated duration of the full assignment is 14 to 16 months from contract signing, depending on the complexity of the registry integration findings and the pace of stakeholder consultations. A more compressed timeline carries significant risk given the scope of integration requirements, the offline functionality demands, the registry readiness uncertainties, and the learning objectives of the pilot. The Consultant will present a detailed implementation plan in the Inception Report, which must be approved by the PIU before work begins.

The indicative phasing is as follows:

Phase	Stages	Indicative Duration
Phase 1: Design and Readiness	Stages 1 and 2	10 to 14 weeks

Phase 2: Development, Testing, and Pilot	Stages 3 and 4	5 to 7 months
Phase 3: Capacity Building and Institutionalization	Stages 5 and 6	2 months (overlapping with Phase 2)
Phase 4: National Scale-Up and Sustainability	Stage 7	Commences after Pilot Learning Report acceptance

11. Firm Qualification Requirements, Required Expertise, and Key Staff Skills

The firm must demonstrate strong expertise in both general ICT services and specialized agricultural digital systems. It should have at least ten years of proven experience in software development, ICT consultancy, or digital transformation projects, reflecting its capacity to design and deliver complex technology solutions across diverse sectors. In addition, the firm must possess a minimum of seven years of specialized experience in digital technologies, particularly in the design and deployment of management information systems, fleet tracking solutions, or similar national-level agricultural platforms. This combination of broad ICT experience and focused agricultural digital expertise ensures that the selected firm is well positioned to develop and operationalize a robust MMTS tailored to Liberia's national mechanization needs.

11.1 Minimum Criteria

Digital Platform Development and Integration

- Proven experience designing and deploying national-level agri-digital platforms such as track and trace systems and fleet monitoring solutions, with demonstrated technical capacity in cloud-based solutions, secure data management, mobile application development for Android and iOS, and robust API development.
- Expertise in integrating mechanization tracking within farmer registry systems and government reporting databases, including experience with various database technologies and data exchange protocols.
- Experience with GPS-enabled mobile field modules, equipment registry systems, and performance tracking dashboards for agricultural machinery and farmer services.
- Strong background in data governance, digital identity verification, and interoperability with payment systems, adhering to international data privacy standards and cybersecurity best practices.
- Demonstrated use of open-source or vendor-neutral technology stacks, with evidence that prior systems were fully transferred to government ownership.

Geospatial and Data Analytics

- Experience in geospatial mapping of farms, mechanization service zones, and asset tracking.
- Integration of mechanization services with GIS-enabled agricultural platforms.
- Spatial analytics for service coverage, land preparation mapping, and climate-smart agriculture indicators.
- Data harmonization with RETRAP reporting structures.

Agricultural Mechanization Operations

- Extensive practical experience in large-scale farm mechanization, equipment deployment, repair, and maintenance, with a minimum of 8,000 hectares of operational experience.
- Expertise in tractor operations, implements calibration, post-harvest machinery, and logistics coordination.
- Development of operational workflows, maintenance protocols, and equipment lifecycle management.
- Experience in managing and tracking agro-equipment concessions and technical service delivery.

Training and Capacity Building

- Proven track record in delivering mechanization and agribusiness training programs.
- Development of structured operator certification programs.
- Experience implementing Train the Trainer models for sustainability, targeting technical and extension staff.
- Design of user manuals, field job aids, SOP documentation, and digital literacy training modules adapted for diverse literacy levels in rural environments.

Field Implementation and Stakeholder Engagement

- Experience deploying digital agriculture systems in rural environments with limited connectivity.
- Farmer mobilization, cooperative engagement, and stakeholder coordination experience.
- Operationalization of service request mechanisms including mobile, SMS, and hotline channels.
- On-ground supervision of pilot sites and workflow validation experience.

11.2 Key Staff Skills Required

The personnel fielded by the selected firm must meet the following standards. Their roles, academic qualifications, and minimum experience are outlined below:

Role	Academic Qualification	Minimum Experience	Responsibilities
Project Manager and Team Leader	Master's in Agricultural Engineering, ICT for Development, or Project Management	10 or more years in agri-digital projects, mechanization service delivery, and institutional strengthening, with at least 5 years in a leadership role.	Overall project coordination, strategic guidance, stakeholder consultations, system design validation, quality assurance, and reporting to RETRAP and MoA.
System Architect and ICT Specialist	Bachelor's or Master's in Computer Science, Information	7 or more years in national-level agri-digital platforms, API	Design, develop, and deploy the MMTS; ensure robust integration with RETRAP

	Systems, or Software Engineering	integration, GPS-enabled mobile modules, cloud infrastructure, and cybersecurity principles.	database and MoA systems; manage technical infrastructure and open-source framework compliance.
Mechanization Specialist	Bachelor's or Master's in Agricultural Engineering or Mechanical Engineering	8 or more years in tractor operations, implements calibration, post-harvest machinery, and mechanization services.	Develop equipment registry, operational workflows, maintenance protocols, and lifecycle management; provide technical input for system functionality related to mechanization.
Training and Capacity Building Specialist	Bachelor's in Education, Agricultural Extension, or HR Development	5 or more years in operator training, Train the Trainer programs, and SOP documentation, preferably in rural agricultural settings.	Develop comprehensive training materials, user manuals, and job aids; deliver training programs; certify operators and supervisors; establish Train the Trainer program; and coordinate Knowledge Transfer and Transition Plan.
Data Governance and Monitoring Expert	Master's in Data Science, Statistics, or Public Administration with ICT specialization	7 or more years in data governance, digital identity verification, dashboard development, data analytics, and data privacy regulations.	Configure dashboards and reporting tools; establish the supervision framework; ensure data quality, compliance, and risk monitoring; develop data classification and usage guidelines.
GIS and Spatial Analyst	Bachelor's or Master's in Geospatial Science, Agriculture, or Environmental Studies	5 or more years in GIS-enabled agricultural platforms, spatial analytics, farm mapping, remote sensing, and spatial database management.	Lead geospatial mapping of farms and service zones; integrate climate-smart agriculture indicators; provide spatial data analysis for service coverage and impact reporting.

12. Reporting Requirements

- Inception Report: Due within 3 weeks of contract signing. Must include the refined work plan, system design specifications, technical architecture, National Farmer Registry Readiness Assessment findings and go-or-no-go recommendation, Data Protection Compliance Plan, and clarification of device procurement arrangements.

- Monthly Progress Reports: Covering technical progress, environmental, social, health and safety status, financial status, and any emerging risks.
- UAT Completion Report: Documenting test results, issues resolved, and formal PIU sign-off on system readiness for pilot deployment.
- Pilot Learning Report: Issued at the end of the pilot phase. Must assess performance against agreed acceptance criteria, document lessons learned, recommend system refinements, and make a go-or-no-go recommendation for national scale-up.
- Training Completion Report: Issued after all training sessions are complete, including attendance records and certification status.
- Final Implementation Report: A comprehensive overview of project execution, outcomes, system performance, lessons learned, and recommendations for ongoing governance and future development.

13. Key Deliverables

No.	Deliverable	Description
1	Inception Report with Registry Readiness Assessment	Refined work plan, system design specifications, architecture overview, Registry Readiness Assessment with go-or-no-go decision, Data Protection Compliance Plan, and device procurement clarification.
2	Approved System Architecture and Data Design	Full architecture documentation, data models, hosting plan, API specifications, security design, and governance protocols, accepted in writing by the PIU before development begins.
3	MMTS Developed and UAT-Certified	Fully functional system including all modules, dashboards, mobile field tools, farmer confirmation SMS mechanism, and staging environment. Accompanied by UAT manual, test results, and written PIU sign-off.
4	Pilot Deployment and Learning Report	Live system operation in up to five AMSCs, with structured feedback, performance data, and a Pilot Learning Report containing a go-or-no-go recommendation for scale-up.
5	SOP Manual	Finalized, validated, and user-friendly manual for all mechanization center operations, refined based on pilot learning.
6	Supervision and Performance Management Framework	Fully configured dashboards, supervisory reporting tools, risk and exception monitoring, and a documented governance mechanism for ongoing system management.
7	Knowledge Transfer and Transition Plan	Operations manual, system administrator guide, troubleshooting guide, Train the Trainer session records, certified staff list by category, and post-handover support schedule.

8	National Rollout Plan	Strategic plan for expanding MMTS to all target AMSCs, including infrastructure, human resource, and financing requirements.
9	Service Level Agreement	Agreed SLA covering a minimum 12-month post-handover support period with differentiated response commitments for critical and non-critical issues.
10	Final Implementation and Performance Report	Comprehensive report on project execution, system performance, outcomes, challenges, and recommendations.

14. Payment Schedule

The payment structure has been streamlined to four clearly defined milestones, each linked to specific deliverables and subject to formal PIU acceptance. Acceptance criteria for each milestone will be documented in the contract and agreed before signing. The following schedule applies:

Milestone	Deliverable Basis	Payment
Milestone 1: Inception and Architecture	Acceptance of the Inception Report including the Registry Readiness Assessment and the approved System Architecture and Data Design.	15%
Milestone 2: System Development and UAT	PIU written sign-off on UAT completion and system readiness for live pilot deployment.	30%
Milestone 3: Pilot Completion, Capacity Building, and SOP	Acceptance of the Pilot Learning Report, SOP Manual, Training Completion Report, and Knowledge Transfer and Transition Plan.	35%
Milestone 4: National Rollout and Final Handover	Acceptance of the National Rollout Plan, National Scale-Up execution, Final Implementation Report, Service Level Agreement, and full transfer of all source code and documentation to MoA and RETRAP.	20%

Payments will only be made upon formal written acceptance of the relevant milestone deliverables by the PIU. The PIU will review and respond to submitted deliverables within 15 working days of receipt. Where deliverables do not meet agreed acceptance criteria, the Consultant will be given a defined period to revise and resubmit before payment is released.

15. Submission Requirements

Interested firms are invited to submit detailed information demonstrating their qualifications and relevant experience to deliver the required services. Submissions should include evidence of the firm's track record, technical expertise, equipment inventory, and understanding of the assignment, along with the proposed methodology and curriculum vitae of key staff to be engaged. Firms must also provide proof of demonstrable experience in developing monitoring and management systems that enhance equipment utilization, performance tracking, and service delivery to farmers through mechanization.

The assignment will be procured using the Quality and Cost-Based Selection (QCBS) method in accordance with World Bank Procurement Regulations. Only firms meeting the minimum criteria outlined in Section 11 will be considered for evaluation.

For further information, interested firms may contact:

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Ministry of Agriculture, Republic of Liberia

Rural Economic Transformation Project (RETRAP) Coordination Unit

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