



FEDERAL REPUBLIC OF SOMALIA

Terms of Reference

For

**ASSESSMENT FOR ESTABLISHING A LIVESTOCK IDENTIFICATION AND
TRACEABILITY SYSTEM IN SOMALIA**

March 2023

A. Background

The Ministry of Livestock, Forestry and Range is responsible for improving livestock health conditions, access to suitable good quality fodder, suitable markets, and qualified workers. To have enough pasture, the ministry is responsible for protecting the land from degradation and deforestation. The Ministry is mandated to enhance human resource capacity building and institutional strengthening, animal health and disease control, improving animal production, rangeland development, and livestock marketing and trade facilitation.

Under the Horn of Africa Initiative, the World Bank is funding the De-Risking, Inclusion and Value Enhancement of Pastoral Economies Project (DRIVE) and the Ministry is one of project beneficiaries. DRIVE aims to protect pastoralists against drought shocks, using a package of financial services including drought insurance, payment, savings, and possibly credit, and to connect pastoralists better to markets by upgrading the livestock value chains and facilitating the regional livestock trade. This project is regional, and Djibouti, Ethiopia, Kenya, and Somalia are participating countries. The development objective is to enhance de-risking, financial inclusion, and value addition of pastoral economies in the HoA.

B. Rationale for Conducting a Rapid Assessment on the Requirements & Specifications for the development of Livestock Identification and Traceability System (LITS)

A livestock identification and traceability system (LITS) enable unique tagging/identification of livestock within specified value chains and jurisdictions in Somalia, providing information on livestock including a database containing; identification, ownership, source (village), and the site of recruitment (primary market).

Identification of livestock aids in supporting animal production, trade, and public health interventions. The LITS supports animal identification by using unique identifiers and registration systems to identify animals individually or collectively by their epidemiologic units and provide livestock traceability by providing users the ability to follow an animal or group of animals during all stages of its life.

Somalia lacks an efficient and sustainable system for animal identification required to achieve farm-to-fork traceability and secure livestock assets. Therefore, it is deemed necessary to develop a LITS that will link identification initiatives to traceability thus contributing to disease surveillance and food safety, thus satisfying domestic and international consumer requirements on the safety and quality of animals and animal products originating from Somalia.

In the process of, developing LITS, the Ministry of Livestock, Forestry, and Range of the Federal Government of Somalia seeks to hire a qualified and highly professional consultancy firm (hereinafter referred to as “the Consultant”) with experience and skills in areas of Livestock Identification and Traceability Systems to conduct an assessment on identifying LITS specifications based on government’s needs and requirement.

The Consultant shall closely be working with the Ministry of Livestock and other relevant government institutions and key stakeholders to ensure the identification of the required LITS technical specifications in terms of the system software, hardware, functional modules, business

processes, and user requirements with specific focus to ensure the system is seamlessly interoperable with other systems used in the livestock sector.

The external technical consultancy with experience in system development, database management and multi-sectorial integration system shall be required to build capacity of the ICT personnel unit of the Ministry of Livestock by imparting knowledge, skill, and experience during the assessment exercises.

In close collaboration with the Ministry of Livestock and other key relevant stakeholders, the Consultant will be expected to roll out the specific objectives of this assignment with deliverables as explained in the following sections. The Ministry of Livestock shall support and provide all the necessary information required by the Consultant for this assignment.

The Consultant will be required to provide a detailed methodology in its technical implementation proposal for the assignment.

C. Objectives and Scope of the Assignment

The overall objective of the assignment is to assess, develop and provide a system design for a Livestock Identification and Traceability Systems (LITS) that will be used to identify and track livestock to boost efficiency in public health, food safety, disease control and reporting of infectious diseases, trade in live animals and livestock products for local and export markets that meets the business needs of Federal Government of Somalia by delivering comprehensive LITS to support traceability and certification across the livestock sector by identifying, tracing, and certifying livestock in pastoral production systems in Somalia.

The FGS is seeking to hire a qualified Consultant to closely work with the Ministry of Livestock to undertake a rapid assessment of the Livestock Identification and Traceability Systems. In close collaboration with key relevant departments within the Ministry of Livestock, the Consultant firm will generate the LITS requirements and specifications suitable for the government and key stakeholders' needs. The Consultant's assessment is required to focus on and identify the following areas:

- Existing ICT infrastructure and systems of the Ministry of Livestock;
- The Architecture of the required system;
- The LITS system software and hardware requirements,
- The LITS functional modules and specifications based on the government needs;
- Control protocols and users of the required LITS system;
- Requirements for the National Animal ID system
- Security of the required LITS system;
- Assess ICT capacities of the Ministry of Livestock; and
- The implementation roadmap or plan for the identified and proposed LITS systems for the government including Server Hosting.

The outputs for this assignment will build into the next phase of the LITS development and deployment, installation of the system, change management, training for ICT personnel at the Ministry of Livestock, system testing, and post-installation maintenance which shall be contracted under a separate engagement. Upon successful LITS assessment, The Consultant may be asked to be available to provide advice on the LITS implementation. The Consultant will be required to provide detailed methodology in its technical implementation proposal for the assignment as well as an inception report with clear timelines.

The Consultant will review all the existing policies, procedures, and guidelines in the livestock sector that will provide advice on the rollout of the LITS to all key players and stakeholders including international experiences. The assessment is expected to be comprehensive to at least include but not be limited to the following high-level aspects of the LITS functions.

Anticipated functionality and features of the LITS

- **Premise registration:** The LITS should be able to allow for registration of geographic locations (i.e., the farm or ranch) where the livestock or poultry were raised, housed, or boarded. It should be able to collect and maintain at a minimum the following pieces of information; premises identification number (PIN), contact person for the premises, mailing address or latitude/longitude coordinates of the premises, contact phone number, operation type, date activated, date retired, and the reason retired (to determine whether animals still exist at the location); and alternative phone numbers. The PIN, a unique seven-digit number permanently assigned to a location, will not change following a change of ownership. A producer or owner can have multiple PINs based on the nature and type of operations (e.g., if a single producer had distinctly different animal production activities taking place at different locations).
- **Notification and compliance enforcement:** Premises information will ensure that producers are notified quickly when a disease outbreak or other animal health event might harm their operations. In an emergency, animal health officials will be able to quickly locate at-risk animals and take precise actions to address the situation, minimize hardships, and speed disease eradication efforts as much as possible.
- **Animal identification:** The system should enable producers to assign each individual animal or each specific group of animals a unique number from a uniform numbering system. A group ID is best suited for animals, such as poultry, that are raised in confined lots and move through the production chain as one group. An animal identification number (AIN) is a unique, 15-digit number, where the first three numbers will be the country code and the following 12 digits will be the animal's unique identifying number. Tags, radio frequency identification devices, and other ID devices will be required to comply with the 15-digit AIN numbering system and will be obtained from representatives of authorized manufacturers.

- **Support AIN devices:** The LITS is expected to support AIN devices which will include the traditional visual ear-tag or tattoos that are read by physical viewing, or the radio frequency identification (RFID) tags as well as injectable transponders, which may be read electronically from a moderate distance and without direct line of sight.
- **Support group identification numbers (GIN):** The LITS is expected to support use of GIN for animals that typically move through the production chain as a group of animals of the same species and can be identified by group/lot identification numbers (GINs), rather than individual numbers. The GIN is expected to be a 15-character number consisting of the seven-character PIN; the six-digit date (MMDDYY) that the group or lot of animals was assembled; and a two-digit number (01 to 99) to reflect the count of groups assembled at the same premises on the same day.
- **Animal tracing:** The LITS is expected to provide access to timely, accurate animal movement records to quickly locate at-risk animals in the event of a disease outbreak, and to limit the disease to a clearly defined region or compartment. A producer should select one of the FGS compliant animal tracking databases (ATDs) maintained by the Ministry of Livestock to which the producer can report the movement of animals shipped from or moved into their premises. Under the LITS, only the minimum, standardized tracing information will be necessary for participation. The minimum traceback information will include the national premises identification number (PIN), the animal ID number (AIN) or group ID number (GIN), the date of the event, and the event itself (e.g., move-in to new premises or move-out of the current premises).
 - **The analytics module:** Enables the coupling of the LITS with other management platforms.
 - **Generate periodic reports:** Weekly, monthly, quarterly, bi-annual, annual or adhoc as needed).
 - **Configurable Security Levels:** which users can see certain information or perform tasks.
 - **Audit Trails:** the system must Track changes made to the premise, and livestock data fields while retaining previous data.

D. Specific objectives of the assignment

- (i) **System Requirements Specifications (SRS):** Review and identify key LITS business functional process, carry out analysis of existing livestock identification and traceability policies and practices “as is” to identify gaps and areas of operational business process re-engineering, identify user requirements, identify existing gaps in the existing processes and areas of business process re-engineering, information business process flows and control workflows, help key stakeholders to agree on needed business and user functionalities for the proposed LITS. The specifications will outline the high-level and detailed modular based system functional and user requirements, system conceptual framework, system and database architecture, and requirements for key system/ modules registries and databases.

- (ii) **Technical and ICT infrastructure assessment:** The review will undertake focused sample-based review of the enabling ICT technical infrastructure and hardware assessment necessary to support deployment of LITS at the Ministry of Livestock. The assessment will evaluate the existing ICT infrastructure and connectivity, hardware and software assets currently available under other public sector systems, hardware and software requirements, existing data hosting arrangements, interoperability framework with other select public and private sector system. The assessment will outline practical ICT infrastructure and data hosting options and potential costing required to effectively support the LITS deployment.
- (iii) **LITS Implementation Road Map:** The assessment will provide actionable LITS implementation road-map necessary to support deployment of the system. The assessment road map is expected to cover key aspects on livestock identification and traceability current data readiness, LITS institutional and Governance arrangements, change management and sustainability arrangements, LITS implementation/ deployment arrangements, design LITS bidding, procurement documentation, system development documentation including source code management.
- (iv) **LITS uptake and integration into livestock trade business inside and outside the Federal Republic of Somalia:** The assessment will assess the potential of integrating LITS into the routine livestock trade markets and portals across the Federal Republic of Somalia and for export-bound livestock. The integration will involve the local livestock markets, livestock holding facilities, quarantine centres, and abattoirs in the Federal Republic of Somalia. To successfully protect public health, and food safety, and contain or respond to an outbreak of an infectious animal disease, a system for identifying and tracking animals is a pre-requisite. To be effective, a LITS system requires two basic components: an identification system and a system that tracks an animal, or group of animals, along a route to the destination. It is only when these components are all put together that a LITS system becomes functional.
- (v) **Pastoralists uptake of LITS;** To have an effective and functional LITS, a credible database is critical for animal identification and movement monitoring of an animal or a group of animals along the value chain to the destination. The livestock industry, and especially pastoralists, will support a LITS system if it can clearly demonstrate that there is a direct benefit to their livelihood. For example, if it can be demonstrated that a LITS will boost intra and inter-regional livestock trade within the Federal Member states, mitigate cattle rustling and theft, and facilitate and support vaccination programmes, the potential added financial value accrued per animal will encourage the pastoralists to appreciate the significant role of a LITS.

E. Specific tasks

- Study and propose a LITS conceptual framework and design including but not limited to development of the following modules: Premise registration, notification and compliance enforcement, animal identification, support for AIN devices, support for GIN, and animal tracing.
- Prepare implementation/ action plan for selection of best database software, security, cost and time estimation

- Undertake an in-depth analysis and identify different options on secure technology, requirements gathering, requirements analysis, business process mapping analysis and the related process flows- including high-level conceptual framework and detailed processes for each of the modules, technical requirements, software design and development schemas, functionality usage, maintenance procedures, implementation phase, processes, network functionality and hosting mechanism.
- Undertake a literature review of all existing animal identification and traceability arrangements and practices including data collection, data entry, data update, identification methods used and identify gaps and propose measures to reorganize the processes in the context of automation.
- Review and propose LITS high-level and detailed business process mapping and tools for each of the LITS functional areas
- Identify, and recommend best hardware and software technical specification requirements, related upgrades, and purchase for LITS infrastructure. These shall include data hosting and coordination arrangements, ICT hardware cost estimates.
- Propose LITS conceptual design, interoperability framework, key system attributes, logical data entities and relationships between logical data entities to design physical and logical data modules for the LITS.
- Review and provide practical recommendations for the LITS implementation roadmap outlining the required Governance and institutional arrangements, change management, training and communication strategy.

F. Team Composition, Qualifications, and Experience

- a. The Consultancy firm should have proven experience in developing advanced data management systems.
- b. A consultancy firm with a team member holding a master's degree or equivalent in IT and animal breeding or animal health or Veterinary Sciences with relevant experience in the development and management of database software used for LITS application/implementation, livestock trade, and with desired experience in public and private partnership is a must-have. Ph.D. by the Lead consultant will be an added advantage.
- c. The IT expert in the team will have at least 6 years of applicable experience in database development, All Team members must have strong analytical skills and excellent communication skills with fluency in English. Previous experience of working in the Horn of Africa Countries would be important work exposure for the team.
- d. The Consultancy firm should demonstrate core competence and experience in systems development with a bias in livestock management technology and should demonstrate

the following capacities/skills within its team of key staff of their multi-disciplinary team:

Team Leader/ Livestock Specialist (1):

Responsibilities/Duties:

- Lead the assessment and the implementation of the contractor's assignment work plan, to be responsible for meeting the deliverables in the TOR, reporting on the progress of the assignment, and providing effective coordination between the Consultant's team and the client team.
- Lead the management and capture of accurate stakeholder information and benchmarking; provide quality assurance of analytical work, options, and solutions; ensure appropriate documentation of findings and lessons learned from the assignment.
- The team leader/Livestock specialist will be responsible for the overall transfer of knowledge to the counterparts.
- Assess the Ministry of Livestock's needs and strategic goals and establish initial set of LITS requirements.
- Establish the system functionalities and design software specifications and requirements for the LITS system
- Lead the research on all possible LITS based on specifications and calculate capital and operational expenditures.
- Document all relevant livestock identification and traceability business processes
- Design and develop a functional LITS based on specifications that would meet the Ministry of Livestock needs and requirements with the least cost and maximum benefit
- To establish and recommend the most appropriate livestock identification methods suitable based in country context including traditional methods such as ear notching, hot iron branding, and conventional ear tag, and electronic identification systems such as the radio-frequency identification (RFID) boluses and RFID ear tags.

Qualification Requirements:

- The lead consultant should be a Ph.D. holder or Master's degree holder in Range Management (Livestock management), Livestock production, Veterinary Medicine (Sciences), Animal health or a relevant field.
- A minimum of **ten (10) years of** proven experience in a similar role.
- Strong knowledge of livestock production and pastoral production systems.
- Good understanding of rangeland management, ASALs Livestock production systems, and management
- Outstanding verbal and written communication skills.
- Solid problem-solving and team management abilities.

LITS Business Analyst (1)

Responsibilities/Duties:

- Defines application problem by conferring with clients, evaluating procedures and processes.
- Develops solution by preparing and evaluating alternative workflow solutions.
- Establishes specifications; coordinate production with programmers.
- Provides reference by writing documentation for the system.

Qualification Requirements:

- A Master's degree in computer science, information technology, management information systems or engineering or a related field.
- A minimum **six (6)** years of proven experience in the field with proven testimonies of: software development process requirements, design and software architecture;
- Software Documentation, Software Testing, Software Maintenance,
- Teamwork and general consulting skills,
- Business Administration skills.

System Designer Specialist (1)**Responsibilities/Duties:**

- Analyze user requirements and convert requirements to design documents, including high-level and low-level design specifications for the software application being developed;
- Define product specifications, performances and qualification tests, developing algorithms and flowcharts to communicate with developers;
- Qualify, specify and integrate software, computer, network or communication components for the application;
- Develop the mechanism to identify any imminent technical problems related to the proposed system architecture and apply remedies as necessary;
- Prepare configuration and installation procedures for software application and hardware components to be used by the LITS;
- Develop technical support framework required for the application and its infrastructure platform in providing the best support organization for high availability and minimal disruption upon deployment;
- Transition knowledge to local support team and put in place the necessary mechanism for highly reliable software solution.

Qualification Requirements:

- Master's degree in Computer Science or Software Engineering or System Engineering or a related field;
- A minimum **eight (8) years** of proven experience in system designing and/or related field
- Solid experience in software system design field, working as a solution designer or as a solution architect;

- Good knowledge software design tools and the ability to map requirements into working solutions;
- Excellent knowledge of system installation and configurations, deployments of OS platforms, Active Directory Domain, Group Policy setting, Virtualizations, Patch Management, knowledge of computer networks (e.g. Cisco CCNA) including network security;
- Excellent communication skills in high standard writing skills and fluency in the English language.

System Database Administrator (1)

Responsibilities/Duties:

- Develop software technologies and develop, test and deploy new software systems;
- Carry out a low-level design and development of database software systems, preferably from major industry leaders;
- Map and translate complex technical design issues into workable solution;
- Identify and facilitate root causes of analysis of system issues;
- Make good technical decisions that offers solutions to business challenges;
- Provide comprehensive technical support internal to the department, achieve resolutions to outstanding technical issues and problems;
- Develop comprehensive and accurate documentation and or reports as requested.

Qualification Requirements:

- Master's degree in Computer Science or Software Engineering or System Engineering or a related field;
- Preferably with a Post-Grad Degree in ICT (in Software Engineering, Telecoms etc.);
- A minimum **five (5) years** of proven experience in software engineering, software development and/or related field;
- Solid experience in software development in multiple technologies, particularly in leading software development tools from industry leaders;
- Excellent knowledge in Database architecture designs, User Interface (GUI), Back-end Workflow processes;
- Practical experience in the integration of software applications by developing workable API tools (with or with 3rd party applications);
- Excellent communication skills to express issues effectively with both technical and non-technical teams alike;
- Demonstrable ability to multi-task and change from task to another without loss of efficiency or composure.

Software Engineer / Database Administrator (1)

Responsibilities/Duties:

- Design and develop, review requirements, specifications and technical design documents to provide timely and meaningful feedback;

- Create detailed, comprehensive and well-structured test plans and test cases;
- Estimate, prioritize, plan and coordinate testing activities;
- Design, develop and execute automation scripts using multiple tools including open-source tools;
- Identify, record, document thoroughly and track bugs;
- Perform thorough regression testing when bugs are resolved;
- Develop and apply testing processes for new and existing products to meet client needs;
- Liaise with internal teams (e.g. developers and product managers) to identify system requirements;

Qualification Requirements:

- Bachelor's degree in Computer Science or Software Engineering or System Engineering or a related field;
- Preferably with a Post-Grad Degree in ICT (in Software Engineering, Database Administration etc.);
- A minimum **six (6) years** of proven experience in quality assurance and/or similar field.

G. Timeframes

The estimated timeframe for the assignment **4 months**

H. Reporting Arrangements/Structures

The consultancy firm will work under the direct supervision of the Director General Ministry of Livestock, Forestry and Range and shall provide weekly basis progress reports summarizing progress; challenges and presenting any issues that require action from the DRIVE Project

There shall be an inaugural meeting of the subject matter experts between the consultants and MoLFR experts and relevant stakeholders to derive a working theme. Bi-weekly review sessions and consultations shall be routinely conducted within the assessment period.

Sharing of Work progress updates, stakeholder meetings, and workshops shall be conducted within the agreed timelines by the parties and the final validation workshop shall be stakeholder sensitive, consultative and inclusive. The validation workshop shall be the final consultative opportunity by the stakeholders as the LITS development process progresses to the next level.

I. Deliverables and Timelines of the Assignment

- 1) **Work plan and inception report** within two weeks upon mobilization and commencement of the assignment approved by the client (Ministry of Livestock), FGS.

- 2) **Systems Specifications Requirements (SRS).** High level and detailed Livestock identification and traceability system (LITS) functional and user specifications requirements which will be approved by the client (Ministry of Livestock), FGS.
- 3) **Technical Specification document.** ICT Infrastructure assessment report on technical specifications document which will be approved by the client (Ministry of Livestock), FGS.
- 4) **LITS Implementation Road- Map.** Endorsed by the Ministry of Livestock along with other key stakeholders such as: Trader Associations, Livestock Traders Marketing Societies, farmers associations and other private sector players.
- 5) Validation workshop report
- 6) Validated national LITS assessment report for Somalia