**MINISTRY OF INFORMATION AND COMMUNICATIONS**

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**REPUBLIC OF SIERRA LEONE**

**SIERRA LEONE DIGITAL TRANSFORMATION PROJECT**

**IDA- E1130-SL**

**Terms of Reference**

**TECHNICAL ASSESSMENT OF INFORMATION FLOW AND DATA MANAGEMENT ON EARLY WARNING SYSTEMS IN SIERRA LEONE**

**Procurement Number: SL-MOFED-420992-CS-QCBS**

**June 2024**

1. **INTRODUCTION**

The Government of Sierra Leone (GoSL) has committed to transforming its economy based on a more inclusive and human-centric digital growth and development approach. A high-level vision for the digital economy is articulated in the new National Digital Development Policy (NDDP), which was approved by the Cabinet in December 2021 setting the GoSL’s vision to transform Sierra Leone into an inclusive digital economy and society and to leverage digital technology to support the GoSL to deliver on its national development plan effectively and efficiently. The Sierra Leone Digital Transformation Project (SLDTP) aims to expand access to broadband internet, increase digital skills and improve government capacity to deliver public services digitally. The project will support the development of a strong enabling environment for the nation’s digital transformation and digital development agenda as articulated in the National Digital Development Strategy.

1. **PROJECT DESCRIPTION**

The Sierra Leone Digital Transformation Project (SLDTP) is a five-year International Development Association (IDA)-funded project supported with a US$50 million grant. The project’s main implementing agency is the Ministry of Communication, Technology and Innovation (MoCTI). The proposed Project Development Objective (PDO) is to expand access to broadband internet, enhance digital skills and improve government capacity to deliver public services digitally.

The SLDTP proposes four integrated and mutually reinforcing components, with a fifth component dedicated to contingent response to future emergencies (*Contingent Emergency Response Component*, *CERC)*.

* Component One – Expanding Digital Access and Increasing Resilience of the Digital Environment;
* Component Two – Digital Skills Development and Innovation
* Component Three - Laying Key Foundations for Digital Government Services and Systems
* Component Four – Project Management and Implementation Support; and
* Component Five - Contingency Emergency Response Component (CERC).

The SLDTP proposes four integrated and mutually reinforcing components, witha fifth component dedicated to contingent response to future emergencies. Project activity will finance to enable data-driven climate adaptation measures at various stages of the climate early-warning communication value chain, focusing on early warning system (EWS) communication infrastructure deployment, early warning information generation, and last-mile information dissemination. The activity will strengthen digital communication systems across the climate information value chain underlying Emergency Operations Center (EOC). For climate early warning information generation, the project will finance multistakeholder-based capacity development workshops for government offices, Mobile Network Operators, and nongovernmental organizations (NGOs) to adopt the Common Alerting Protocol (CAP) standard. And for effective last-mile information dissemination, the project will finance the inclusion of weather information as one of the services to be available under the Government Service Platform (GSP). The Project is being implemented by a Project Coordination Unit (PCU) in the Ministry of Communication, Technology and Innovation

The National Disaster Management Agency (NDMA) is an Agency established by an Act of Parliament to manage disasters and similar emergencies throughout Sierra Leone. Its vision is to create a safe and resilient nation in which the communities, the economy and the environment are better protected from negative impacts of hazards, through appropriate and comprehensive Disaster Reduction strategies.

The NDMA has developed and implemented a multi-agency Sierra Leone Incident Management System (SLIMS), which includes field operations and an Emergency Operations Centre (EOC), as an essential component of the Incident Management System, with the purpose of effectively managing major emergency or disaster incidents.

. Currently, the NDMA headquarters is in Aberdeen, Freetown. The building serves its purpose with space and offices but does not have any communications equipment or a suitable location for an Emergency Operations Centre (EOC). A temporary EOC has been established in a secondary meeting room. A separate World Bank project is assisting the development of a new EOC which is an important consideration for the assignment.

The Directorate of Risk Reduction and Preparedness manages and coordinates community early warning in parallel with Sierra Leone Meteorology Agency and the National Water Resources Management Agency. It is the desire of NDMA to collaborate with other institutions to build and institutionalize a robust early warning and response system to effectively respond to disasters through reinforced governance and management architecture for national disaster related issues. This will lead to the establishment of an integrated early warning and related data management system to support the agency and partners.

A fundamental precondition for national disaster risk reduction is availability of well-functioning early warning systems that deliver accurate, reliable, and understandable warnings, in a timely manner, to authorities, operational disaster managers and populations at risk, to enable early actions to reduce the impacts of potential disasters. To achieve this, the NDMA in collaboration with other institutions is determined to establish an early warning mechanism that will provide timely and effective information, through identified institutions, that allows individuals exposed to hazard to take action to avoid or reduce their risk and prepare for effective response. Such systems must fulfill the four components of Early Warning System as prescribed by the Sendai Framework for Disaster Risk Reduction [[1]](#footnote-1)(2015-2030) and rely on commitment, collaboration, coordination, and information sharing among different stakeholders, at different levels (international, regional, national, local).

Currently, while many institutions and partners are involved in setting up early warning systems to support Sierra Leone’s disaster response mechanism, disaster related data and information collection and processing is largely fragmented and uncoordinated. The Sierra Leone Digital Transformation Project resources under component 1.4. Increasing Resilience of Digital Environment—Climate Resilience will be used to develop data-driven climate adaptation measures at various stages of the climate early-warning communication value chain, focusing on key digital infrastructure deployment for EWS communication, early warning information generation, and last-mile information dissemination. The activity will strengthen digital communication systems across the climate information value chain underlying Emergency Operations Center (EOC). It will be housed within the National Disaster Management Agency (NDMA) to facilitate the EWS for reliable information delivery and communication with other government offices, local councils, and citizens.

The project will finance multistakeholder-based capacity development workshops for government offices, Mobile Network Operators, and nongovernmental organizations (NGOs) to adopt the Common Alerting Protocol (CAP) standard. And for effective last-mile information dissemination, the project will finance the inclusion of weather information as one of the services to be available under the Government Service Platform (GSP). Weather information from the meteorological system will be interfaced with the GSP and formatted to be available as user-friendly messages sent to citizens through text messages (for example, Unstructured Supplementary Service Data [USSD]), voice-based services (such as Interactive Voice Response (IVR)), and mobile and Web-based interfaces like WhatsApp and Facebook Messenger.

1. **GENERAL OBJECTIVES**

In order to address the above challenges, NDMA is seeking to hire a consulting firm to carry out a study to (1) assess the key digital infrastructure needs for enabling core communication functions (e.g., internet connectivity, servers for data storage and sharing, software) of early warning systems and (2) analyze, map, and assess information flow and data management related to early warning systems in Sierra Leone. The objective of the consultancy is to review the current digital infrastructure and information flow and data management related to early warning systems in Sierra Leone, analyse the business requirements, and design a resilient, fit-for-purpose modern collaborative early warning system for NDMA and partners.

The Consultant is expected to develop the Terms of Reference for the procurement of such an early warning system development service, which includes detailed system requirements specifications. Following the award of the contract, the Consultant will be expected to support the NDMA as a business analyst/product owner with the designated implementation team supporting the development of the proposed Early Warning System in an iterative and incremental software development process over the period of assignment. The consultant will be required to map all stakeholders, systems, resources, and current data management and information pathways. A technical assessment of the current state and recommendations based on findings and needs will be required.

Specifically, the selected Consultant is expected to perform the following tasks, under this consultancy:

* Review the current information management system to assess the efficiency, accuracy, and timeliness of information flow between institutions within the Early Warning ecosystem (what is included in this ecosystem, ideally, all involved institutions should be specified) as well as other digital platforms and infrastructures supporting them to determine gaps and a detailed framework on how to address the gaps and challenges.
* Develop Terms of Reference with System Requirements Specification for the procurement of the identified key ICT equipment, appropriate early warning system software development service and necessary ICT hosting infrastructure including the data management practices in place, including data collection, storage, analysis, and security measures.
* To assess the efficiency, accuracy, and timeliness of information flow between institutions within the Early Warning ecosystem at the local, national, regional, and international levels.
* To identify existing challenges and gaps in data sharing and data security policies and agreements among the institutions.
* To assess the level of interoperability between different systems and institutions for seamless data exchange.
* To examine the effectiveness of information dissemination to the public and awareness-building initiatives.
* To identify opportunities for capacity building and training to enhance technical capabilities within the EWS.
* **Support the early warning system software development process.**Following the selection of software development service provider, the consultant from this assignment, will serve as a business analyst assting NDMA team in the management of product during the software development phase. Key activities to be performed during the iterative software development process are:
* Communicating clarifications of the established system requirements, as required by the software development team and other project stakeholders, to make sure the vision and goals are clear throughout the product development process, as well as ensure full alignment with the business objectives identified in the ToR document. The business analyst will provide answers and clarifications regarding the product feature, in a timely manner, and make sure there is a buy-in from NDMA and its partners on all decisions in the process,
* Facilitate collaboration among all stakeholders (users and sponsors representatives, software development team) throughout the software development process,
* Provide Quality assurance to the process through testing of product features during the development process so that the solution progress to the final product, which delivers highest possible value to all stakeholders, through iterative process, until its full setting in function.
* The consultant will be required to map all stakeholders, systems, resources, and current data management and information pathways. A technical assessment of the current state and recommendations based on findings and needs will be required.

1. **Scope of Assignment**

The consultancy will work with NDMA and will regularly engage with the key stakeholders including the Sierra Leone Meteorological Agency. The consultant will be required to develop a project work plan to achieve the deliverables accurately and within the allotted period. The scope of work includes the following:

**Technical Assessment**

* Comprehensive Assessment:
  + Review existing ICT equipment and software and identify digital infrastructure needs of EOC for enabling core functions of early warning systems
  + Review existing early warning information and data flow processes, documentation, and decision-making workflows.
  + Analyze the current digital platform and technological infrastructure and identify gaps.
  + Consult with NDMA and relevant government officials to understand their needs and expectations.
  + Undertake a desk review of the current environment to identify existing and planned EWS activities in Sierra Leone. (CIDMEWS, Flood Anticipation Tool,) consult to deep dive into existing EWS in country
  + Review the existing EWS guidelines, framework, and protocols at all levels (National, State, and local) to identify gaps, challenges, and opportunities for improvement.
  + Review, gather& analyze the information on past, current and planned projects related to the EWS including disaster risk management and risk reduction activities.
  + Review policies, rules and regulations for mainstreaming early warning information to assess and identify gaps and challenges in mainstreaming early warning information into public and private decision-making.

**Technology Recommendations:**

* Propose appropriate hardware and software solutions for the early warning system.
* Recommend appropriate data security levels required and cybersecurity measures to ensure data integrity and privacy.

**Technical Specification and Design:**

* Prepare a detailed technical specification document outlining the system's features, functionalities, and interfaces.
* Define a system design workflow of the current state (AS IS) and the desired future state (TO BE) for the proposed EW platform

**Roadmap and Implementation Plan:**

* Engage with both public and private institutions to determine the current state of the EWS, including equipment, telecommunications, databases, forecasting and monitoring products, advisories, and communication of EWS information.
* Key stakeholder identification (general/area-specific) for both EWS; Stakeholder role and responsibilities matrix. The role and function of each identified EWS and RS, what the general workflow is from start to finish (documented in diagram is useful);
* identify any existing Standard Operating Procedures (SOPs).
* Conduct consultations to determine how an EWS for multi-hazards shocks are impacting the region could be integrated and mainstreamed into existing National EWS protocol. Similarly, determine how a state level RS could be integrated and mainstreamed into existing National IRS (Incident Response System) protocols.
* Identifying the role and responsibilities of the State agencies as they relate to communication with EWS& RS owners in the face of an emergency or impending event, to communication of warnings to communities at risk, and to manage the risk through RS.
* Review the capacities available at various public and private institutions, and identify capacities needed to support the institutions for long term monitoring and data management.
* Identify the sources (IMD, Satellite Imagery etc.) that provide different early warning alerts to citizens showing how these warning alerts are disseminated to the public to identify gaps and potentials for improvement.

1. **Reporting, Time Schedules, and Payment Schedule**

The consulting firm will be responsible for delivering the following:

1. An inception report within two (2) weeks after the contract is signed. The report should provide a clear picture of how the consulting firm understands the TOR and intends to achieve the expected tasks. It should propose a methodology for the assignment, including specific questions that will be researched, key stakeholders to be consulted and policies/regulatory frameworks that will be reviewed to carry out the required assessments. The report should also include a work plan with timelines for all the tasks that the consulting firm will undertake during the assignment.
2. A comprehensive early warning blueprint document within eight (8) weeks after the inception report. The early warning system blueprint document will provide a comprehensive outline of the design, architecture, functionalities, and implementation plan for the system. It will serve as a roadmap for the successful development and deployment of the EWS.
3. The roadmap and implementation plan for the early warning system within ten (10) weeks outlining the various phases, activities, milestones, and timelines required to successfully develop, deploy, and operationalize the system. This plan serves as a guide for project management and helps ensure the project progresses in a structured and organized manner.
4. A technical specifications and design documents for the early warning system within twelve (12) weeks, the document will provide detailed information about the system's architecture, functionalities, user interfaces, and technical requirements. These documents serve as a blueprint for the development and implementation of fit-for-purpose early warning system.
5. A full comprehensive report will be submitted within fourteen (14) weeks of the commencement of the assignment. The report will detail the complete design, architecture, functionalities, and implementation plan for the EWS. A detailed technical specifications design, training materials and best practices.

The Consultant is expected to complete the assignment in full within 14 weeks, The Consultant will regularly report to the Directors of Communications and the director of Disaster Risk Reduction and Preparedness at the NDMA or staff designated by the Director, on all aspects of the agreed activities and report to the SLDTP Project Coordinator.

The deliverables comprise the following:

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| **No** | **Deliverable** | **Timeline** | **Indicative payment schedule** |
| **1.** | **Inception report**, detailing how the assignment will be delivered | Commencement + 2 weeks | 10% |
| **2.** | A comprehensive early warning blueprint document | Commencement + 8 weeks | 30% |
| **3.** | The roadmap and implementation plan | Commencement + 10 weeks | 15% |
| **4.** | A technical specifications and design documents | Commencement +12 weeks | 15% |
| **5.** | **Final report** | Commencement + 14 weeks | 30% |

* 1. **Qualification and Experience of Consulting Firm**

The consulting firm must meet the following requirements:

1. Technical Experience: Must have at least ten (5) years of expertise in designing and implementing digital solutions, including early warning systems. Knowledge of Disaster management processes and decision-making workflows. Experience in working with relevant information and communication technologies.
2. An understanding of government structures, early warning workflows, and decision-making processes is crucial for developing an effective early warning blueprint. The firm should have technical expertise in software development, database management, information security, and other relevant technologies required for early warning systems.
3. The firm should possess UX design skills to ensure user satisfaction. Previous experience in delivering successful early warning projects for other clients demonstrates the firm's capability and reliability
4. Reputation and Excellent Standing: Provide reviews, testimonials, or references from previous clients in the execution of at least one (1) similar assignment in the past ten (10) years, to gauge the consulting firm’s professionalism, quality of work, and ability to deliver results.
5. Must have relevant experience working in Africa.

The assignment calls for a team of at least 3 persons who will possess the following qualifications, skills and experience:

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| **Key Position** | **Experience** | **Qualifications** |
| (1) **Team Lead (Project Manager)** | * Min. 5 years’ experience in data-driven early warning systems * Regional experience * Experience in facilitating interagency cooperation and dealing with local communities * Experience with similar projects including information, communication, and technology in EWS * Fluency in English, oral and written * must have demonstrated experience in managing at least one (1) project of similar nature in the past five (5) years. * Communication and Collaboration Skills: * Must have relevant experience working in Africa. | Master's degree in environmental studies, climate adaptation, and disaster management.  Relevant technical qualifications in data and information management relating to the project are desirable. |
| (1) **Technical Expert-1 (Network Infrastructure & System Architecture)** | Must have at least eight (8) years of post-experience with strong technical background in network infrastructure and systems architecture. | Must hold a master’s degree in Information Technology, Computer Science or a related post-graduate qualification or professional IT certification in areas such as Network Interconnection, Internet Infrastructure, IT Service Management, Cybersecurity. System Architecture, Project Management is advantageous.  The expert must have demonstrated experience working on at least one (1) similar assignment in the past five (5) years. |
| (1) **Technical Expert-2 (Business Analyst)** | Must hold a Master’s Degree in Business Administration, Finance, Economics, or a related post-graduate qualification. In addition, certifications or training in areas such as Finance or Business Analytics.  The expert must have demonstrated experience working on at least one (1) similar assignment in the past five (5) years. | Must have at least eight (8) years of post-experience in the business, with strong knowledge in business planning and feasibility studies and systems requirement analysis in the ICT sector. |

* 1. **Facilities Data and Information to Be Provided by Client**

The NDMA shall provide office space for the successful consulting firm to facilitate the smooth implementation of the assignment. The following shall be provided to the Consultant by the Employer:

1. facilitate the provision of access to relevant documents and data available which may be supportive to the Consultant, and
2. prepare a letter introducing the consulting firm to operators in the telecommunications sector and other relevant institutions, wherever required in performing the assignment.

The firm shall provide all the administrative, technical professional and support staff needed to carry out the assignment efficiently. The Consultants shall also be responsible for providing all other necessary facilities and logistical support for its staff/teams, including accommodation, vehicles/transportation, office equipment, field survey and investigation equipment, laboratory testing, communications, utilities, office supplies and other miscellaneous requirements wherever applicable to render their services. The firm shall nominate and make available a contact person for regular meetings with the Project Coordination Unit and House of Parliament teams.

* 1. **Working Language**

The working language for the consultancy service shall be English.

* 1. **Conflict of Interest**

The successful consulting firm shall declare any conflict of interest, especially if any or all of the consultants is/are currently carrying out consultancy work for other stakeholders including licensed operators or service providers in the telecommunications sector in Sierra Leone.

* 1. **Confidentiality of Information**

The firm shall protect the confidentiality of the data or information received to conduct this assignment and shall sign a confidentiality agreement with the NDMA. No data, information, or deliverables from this assignment will be released to third parties without a written approval of the NDMA. The Consultant shall surrender all data and other materials to the House of Parliament and shall not retain any information or materials after closure of the assignment.

1. https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030 [↑](#footnote-ref-1)