Building Sierra Leone's Environmental Future:

Formative Workshop Report on Launching the Centre for Environmental Data and Statistics (CEDAS)

EPA-SL
ENVIRONMENT PROTECTION AGENCY



EXECUTIVE SUMMARY

The CEDAS formative workshop marked a critical step toward establishing Sierra Leone's Centre for Environmental Data and Statistics (CEDAS), envisioned as the national hub for environmental data management. The workshop's primary goals were to map existing environmental datasets, identify critical gaps and data needs, and collaboratively develop a practical roadmap for CEDAS's operationalisation.

A diverse group of stakeholders participated, representing research and academic institutions, civil society organisations, government ministries and agencies, NGOs, and environmental consultants. Key institutions included the Environment Protection Agency, Ministry of Environment and Climate Change, National Water Regulatory Management Agency, Njala University, Sierra Leone Research Institute, and others. Their collective input laid the foundation for a comprehensive environmental data inventory, a detailed gap registry, and a clear strategic framework for CEDAS.

The inventory highlighted a broad spectrum of available data covering water quality, plastic pollution, sea level rise, land and air use, biodiversity, soil characteristics, spatial planning GIS data, land tenure systems, and more. However, significant challenges were identified: limited spatial and temporal coverage of water quality data; inadequate GIS tools for mapping and analysis; a shortage of monitoring stations; inconsistent, outdated, and fragmented datasets; poor spatial resolution especially for land use and surface temperature; data security concerns; and weak inter-institutional collaboration.

Regarding governance, the majority (75%) supported situating CEDAS within the Environment Protection Agency, leveraging its technical expertise and mandate, while establishing a multi-stakeholder technical committee to guide data standards, quality assurance, and infrastructure development. A minority proposed that the Ministry of Environment and Climate Change, in partnership with the Directorate of Science, Technology, and Innovation, should host the centre to foster cross-sectoral integration. Across the board, participants endorsed the creation of a cloud-based data repository to centralise access, ensure interoperability, and enable secure data sharing aligned with national ICT policies.

To sustain momentum, the workshop recommended stakeholder mapping exercises and the formation of sector-specific technical working groups tasked with ongoing oversight, capacity building, and the establishment of harmonised data sharing protocols. This collaborative, well-structured approach is vital to transform Sierra Leone's environmental data landscape, supporting evidence-based policy, improved environmental governance, and compliance with international environmental commitments. It marks a pivotal opportunity to move beyond fragmented, project-based efforts toward a unified, digital-first national system that embeds environmental data into development planning, disaster risk reduction, and climate action.

LIST OF ABBREVIATIONS

CEDAS.....Center for Environmental Data and Statistics

NGO.....Non-Governmental Organization

ICT..... Information Communication and Technology

GIS..... Geographic Information System

SDGs.....Sustainable Development Goals

EPA..... Environment Protection Agency

MEAs.....Multilateral Environmental Agreements

RPI..... Research Policy and Innovation

MDAs..... Ministries, Departments and Agencies

CSOs.....Civil Society Organizations

IUCN..... International Union for the Conservation of Nature

GHGs.....Greenhouse Gases

CBD.....Convention on Biological Diversity

NBSAP.....National Biodiversity Strategic Action Plan

WHO.....World Health Organization

UNFCCC..... United National Framework Convention on Climate Change

UNCCD.....The United Nations Convention to Combat Desertification

EIA..... Environmental Impact Assessment

NDC..... ..Nationally Determined Contributions

NWRMA.....National Water Resource Management Agency

NAPHA.....National Public Health Agency

PICREF..... Presidential Initiative for Climate Change, Renewable Energy and Food Security

NPAA..... National Protected Area Authority

MoECC.....Ministry of Environment and Climate Change

NLC.....National Land Commission

OGC..... ...Open Geospatial Consortium

ETU..... Eastern Technical University

MoCTI.....Ministry of Communication, Technology and Innovation

DSTI.....Directorate of Science Technology and Innovation

SLURC..... Sierra Leone Urban Research Center

ISO.....International Standard Organization

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1 INTRODUCTION

The vision for the Centre for Environmental Data and Statistics (CEDAS) in Sierra Leone emerged from a pressing need identified through a comprehensive situational analysis conducted by the Environment Protection Agency (EPA) in 2024. This review highlighted critical deficiencies in the nation's environmental data landscape most notably, the absence of a centralised, accessible, and integrated repository for environmental information. These gaps have significantly impeded the formulation of robust environmental policies and undermined effective governance across sectors.

Recognising these challenges, the EPA spearheaded the creation of CEDAS as a strategic solution to bridge the information divide. To ensure a structured and impactful launch, a detailed three-year operationalisation strategy was developed. The EPA also recognised that for CEDAS to be functional and sustainable, the perspectives of both data producers and end-users had to be central in its design - ranging from ministries to research institutions and community-based organisations. The strategy outlines a phased approach to establishing CEDAS as the principal hub for the collection, processing, analysis, and dissemination of accurate and harmonised environmental data. Positioned within the EPA's Research, Policy, and Innovation (RPI) Directorate, CEDAS is intended not only to serve the Agency, but also to support cross-governmental agencies by providing reliable environmental intelligence critical for evidence-based decision-making, policy formulation, and strategic planning.

Beyond its technical mandate, CEDAS is envisioned as a catalyst for building national capacity and fostering continuous learning among government institutions. By standardising data protocols and promoting inter-agency collaboration, the centre will strengthen Sierra Leone's ability to meet national priorities and fulfil international obligations under frameworks such as the Sustainable Development Goals (SDGs), Multilateral Environmental Agreements (MEAs), and the Paris Agreement.

To advance these ambitions, a formative workshop was convened, bringing together stakeholders from various sectors to align on CEDAS's objectives, operational modalities, and collaborative mechanisms. This workshop was essential to ensure that CEDAS's role as a cross-government resource is clearly understood, and that its implementation strategy reflects the needs and inputs of all relevant actors.

This report captures the proceedings of that workshop. It outlines the current state of environmental data in Sierra Leone, presents findings from pilot research activities, and summarises the collective feedback provided through interactive sessions utilising a customised Kobo Toolbox platform. The insights gathered here lay the groundwork for CEDAS's operationalisation, highlighting key priorities, challenges, and pathways to establish a transparent, efficient, and inclusive environmental data management system that will underpin Sierra Leone's sustainable development trajectory.

1.1 Objectives of the Workshop

The formative workshop was centred around three key objectives aimed at strengthening Sierra Leone's environmental data management system. The first objective was to conduct comprehensive data mapping and compile a resource inventory. This involved identifying and documenting the existing environmental datasets across various sectors, along with pinpointing the custodians responsible for managing these

datasets. Establishing this baseline was essential to understand what data currently exists and where, laying the groundwork for better coordination.

The second objective focused on gathering stakeholder perspectives to assess data needs. Participants from government agencies, research institutions, and other relevant organisations contributed insights into who uses environmental data, the current gaps in available information, and the priority data requirements specific to different sectors. This process helped ensure that future data initiatives would be relevant and responsive to the actual needs of users.

The third objective was the collaborative development of a roadmap for environmental data collection, analysis, and governance. Workshop participants worked together to design a national action plan that outlines strategic steps and includes pilot initiatives to test and refine data management approaches. This roadmap is intended to guide the phased operationalisation of CEDAS and strengthen Sierra Leone's environmental data infrastructure.

1.2 Outcomes of the Workshop

The workshop yielded several important outcomes that will serve as a foundation for advancing environmental data management in Sierra Leone. Firstly, a consolidated Environmental Data Inventory was produced, bringing together datasets from multiple sectors and institutions into a unified reference resource. This inventory clarifies existing data holdings and their custodians, facilitating greater data sharing and integration.

Secondly, the workshop developed a comprehensive data gap register, which identifies both immediate and long-term gaps in environmental data. This register highlights priority areas where new data collection and capacity building are most urgently needed, guiding future investments and interventions.

Thirdly, participants validated a detailed Roadmap and Action Plan aimed at coordinating environmental data collection and governance across government and partner agencies. This plan defines roles, responsibilities, and timelines for establishing an effective data ecosystem under the leadership of CEDAS.

Finally, the workshop marked the launch of pilot initiatives focused on developing Sierra Leone's first Environmental Atlas a flagship product under CEDAS. This project aims to map key ecosystems, biodiversity hotspots, and areas vulnerable to climate change impacts. The atlas is designed to enhance environmental monitoring and support evidence-based policy and planning across the country. The development of the Environmental Atlas and the Environmental Compendium received strong support from participants.

2 FINDINGS

The formative workshop engaged a broad spectrum of stakeholders in a highly participatory process, generating critical insights into Sierra Leone's environmental data landscape. These findings reveal both the richness of existing data resources and the significant challenges that hinder effective environmental governance. The workshop outcomes offer a roadmap for strengthening data infrastructure, addressing gaps, and advancing cross-sector collaboration.

2.1 Participant characterisation

The workshop saw strong participation from government entities, particularly Ministries, Departments, and Agencies, which made up the majority of attendees. However, involvement from development partners, private sector representatives, non-governmental organizations, and environmental consultants was notably limited. This imbalance highlights an opportunity to engage a broader range of stakeholders in future activities. Expanding participation across sectors will be vital to tapping into diverse expertise, fostering collaboration, and mobilising additional resources for environmental data management and governance.

Below is a summary table showing the distribution of stakeholder categories represented at the workshop:

Table 2.1 Stakeholder's Category

Stakeholder Category	Number of Participants
Government Ministries, Departments, Agencies (MDAs)	16
Academic Institutions	4
Civil Society Organizations (CSOs)	5
Private Sector	1
Non-Governmental Organizations (NGOs)	1
Environmental Consultants	1
Research Organisations	3
Development Partners	1

2.2 Environmental Data Inventory

The workshop successfully consolidated a comprehensive inventory of existing environmental datasets held across diverse institutions. Stakeholders systematically identified a wide range of thematic data types, reflecting the multi-dimensional nature of Sierra Leone's environmental management needs. These datasets span hydrological metrics such as water quality, supply, and bodies; pollution indicators including plastic pollution and air quality; climate variables like rainfall, land surface temperature, and weather parameters; and ecological data encompassing biodiversity, forest cover, flora, fauna, and land use change.

Table 2.2 Summary Inventory of Key Environmental Dataset by Sectors and Institution

SECTOR	DATASET/ INDICATOR	CUSTODIAN INSTITUTION	DATA FORMAT	COLLECTION FREQUENCY	CURRENT ACCESSIBILITY	NOTES/ REMARKS
Water Resources	Water Quality (chemical, biological)	Ministry of Water Resources, NWRMA	Digital, Field reports	Monthly	Restricted	Limited spatial coverage
Pollution	Plastic Pollution Levels	EPA, MoH	Digital, GIS layers	Quarterly	Public	Inconsistent monitoring in rural areas
Climate & Meteorology	Rainfall, Temperature, Humidity	Meteorological Department	Digital, Remote sensing	Daily	Public	Data gaps in some regions
Biodiversity	Forest Cover and Land Use Change	Forestry Department	Satellite imagery	Annual	Restricted	Some data outdated
Land Use Planning	Zoning and Land Ownership	Ministry of Lands and Country Planning, NLC	GIS layers	Irregular	Restricted	Fragmented datasets
Infrastructure	Road Networks and Public Facilities	Ministry of Transport and Ministry of Works	Digital maps	Annual	Public	Missing data in informal settlements
Socio-economic	Population Demographics	Statistics Sierra Leone	Census databases	Every 10 years	Public	No recent updates
Public Health	Environmental Health Indicators	Ministry of Health, NAPHA	Reports, Digital data	Quarterly	Restricted	Data integration challenges
Extractive Industries	Mining Impact Assessments	National Minerals Agency	Reports			

Participants highlighted the formats and periodicity of data collection, noting heterogeneity in standards and storage methods. The inventory underscores the sectoral depth, from spatial and physical planning data including GIS layers for zoning, land ownership, and flood plains, to infrastructure-related datasets covering electricity, sewage, transportation, and settlements. Social and economic datasets related to sustainable development goals, public health, and the impacts of extractive industries further illustrate the integrated approach required for environmental governance.

Table 2.3 Examples of Environmental Data Use Cases and Reporting Obligations

ENVIRONMENTAL DATA TYPE	USE CASE/ PURPOSE	REPORTING REQUIREMENT/ FRAMEWORK	RESPONSIBLE INSTITUTION(S)
Water Quality and Quantity	Monitor river health, ensure safe drinking water supply	National Water Quality Report; SDG 6 (Clean Water)	Ministry of Water Resources; EPA
Air Quality Data	Assess pollution hotspots, public health risk analysis	WHO Air Quality Guidelines; National Environment Report	EPA; Ministry of Health
Biodiversity and Forest Cover	Track habitat changes, guide conservation strategies	National Biodiversity Strategy and Action Plan (NBSAP); CBD Reporting	Forestry Division; EPA, Research and Academic Institutions
Climate Variables (Rainfall, Temp)	Support climate resilience planning, disaster risk reduction	National Climate Change Policy; UNFCCC NDCs	Meteorological Department; EPA
Land Use and Land Cover	Urban planning, land degradation assessment	National Land Use Policy; UNCCD Reports	Ministry of Lands and Country Planning
Mining and Extractive Industry Impacts	Environmental and social impact assessments, conflict mitigation	Environmental Impact Assessment (EIA) Reports; Mining Regulations	National Minerals Agency; EPA
Waste Management Data	Waste collection optimization, pollution control	National Waste Management Strategy; Basel Convention	EPA; Local Government Authorities
Soil Quality and Erosion Rates	Agricultural productivity, soil conservation planning	National Soil Conservation Plans	Ministry of Agriculture and Forestry, Research and Academic Institutions
Protected Areas and Ecosystems	Protected area management, ecological monitoring	IUCN Guidelines; Ramsar Convention Reports	Forestry Division; EPA NPAA, NGO(Gola Forest)
Energy Use and Emissions	Track greenhouse gas emissions, support climate mitigation	National GHG Inventory; Paris Agreement Reporting	EPA; Ministry of Energy, SLMET

The richness of this dataset inventory demonstrates Sierra Leone's capacity for environmental data production. However, table 2.3 illustrates that despite multiple institutions generating relevant data, challenges in technical and financial support limit optimal data utilisation. This uneven support underscores the need for coordinated efforts to harmonise and standardise data across custodians.

Table 2.4 Technical and Financial Support Capacity of Environmental Data Custodians

STAKEHOLDER CATEGORY	TECHNICAL CAPACITY (HIGH / MEDIUM / LOW)	FINANCIAL CAPACITY (HIGH / MEDIUM / LOW)	KEY CHALLENGES	OPPORTUNITIES FOR SUPPORT
Government Ministries, Departments, Agencies (MDAs)	Medium	Medium	Limited advanced data tools; bureaucratic delays	Capacity building; improved funding mechanisms
Academic Institutions	High	Low	Limited funding for fieldwork and data systems	Research partnerships; grant opportunities
Civil Society Organizations (CSOs)	Medium	Low	Technical skill gaps; resource constraints	Training programs; collaborative projects
Private Sector	Medium	Medium	Limited engagement; unclear incentives	Public-private partnerships; data sharing
Non-Governmental Organizations (NGOs)	Medium	Low	Fragmented efforts; small-scale operations	Networking; technical assistance
Environmental Consultants	High	Low	Project-based funding; limited continuity	Long-term contracts; capacity strengthening
Research Organisations	High	Medium	Funding uncertainty; access to comprehensive data	Collaborative research; funding support
Development Partners	High	High	Coordination with local bodies; sustainability	Strategic investment; capacity enhancement

2.3. Data Gaps Register

Despite the breadth of existing data, the workshop identified significant and pressing gaps that must be addressed to enable robust environmental management. Key deficiencies include limited spatial coverage and temporal depth within water quality datasets, absence of adequate GIS tools for mapping water bodies, and insufficient monitoring infrastructure. This compromises the ability to track trends and respond proactively to environmental risks.

Participants also noted inconsistent data formats, poor data quality assurance, fragmentation, and outdated information, especially relating to land use change and surface temperature monitoring. The lack of high spatial resolution in soil and meteorological data further impedes detailed environmental analysis. Sector-specific gaps were identified in agricultural value chains such as cocoa, cassava, palm oil, and vegetables, highlighting the need for comprehensive cross-sectoral data.

Other critical concerns include insufficient ground-truthing of datasets, weak enforcement of data-related policies, and gaps in monitoring plastic pollution and environmental impact assessment data. The limited scope and reliability of these datasets restrict evidence-based decision-making and hinder Sierra Leone's ability to meet its environmental commitments.

Table 2.5 Key Data Gaps in Sierra Leone's Environmental Data Landscape

ENVIRONMENTAL DATA TYPE	SPECIFIC GAP DESCRIPTION	IMPLICATIONS FOR ENVIRONMENTAL MANAGEMENT	PRIORITY LEVEL (HIGH/MEDIUM/LOW)
Water Quality and Quantity	Limited spatial coverage and temporal depth; insufficient monitoring stations	Compromises water resource planning and pollution control	High
Air Quality Data	Sparse monitoring network and inconsistent data quality	Limits understanding of pollution trends and health impacts	High
Biodiversity and Forest Cover	Fragmented, outdated, and incomplete datasets	Weakens conservation efforts and habitat protection	High
Climate Variables (Rainfall, Temp)	Low resolution spatial data and lack of historic records	Hampers climate adaptation and disaster risk reduction	High
Land Use and Land Cover	Inconsistent formats and outdated land cover classification	Affects urban planning, agriculture, and ecosystem monitoring	High
Mining and Extractive Industry Impacts	Inadequate data on environmental and social impacts of mining	Restricts sustainable resource management and community protection	High
Waste Management Data	Inadequate data on waste generation, disposal, and pollution	Hinders development of effective waste management strategies	Medium
Soil Quality and Erosion Rates	Poor spatial resolution and lack of regular monitoring	Limits soil conservation and sustainable land management	Medium
Protected Areas and Ecosystems	Insufficient mapping and monitoring of protected sites	Undermines biodiversity protection and ecosystem services	High
Energy Use and Emissions	Limited data on emissions from various energy sources	Affects climate mitigation planning and policy development	High

2.3.1. Underlying Causes of Data Gaps

Stakeholders identified several root causes behind these data deficiencies. Insufficient funding emerged as a primary constraint, compounded by inadequate equipment and technical expertise. Institutional challenges, including weak collaboration and absence of standardised data management protocols, also contribute to data fragmentation and inconsistency. Furthermore, limited geographic coverage and low capacity in modern geospatial technologies restrict comprehensive data collection and analysis.

Table 2.6 summarises these underlying causes, emphasising that technical, financial, and institutional bottlenecks must be simultaneously addressed to bridge the environmental data gaps effectively.

Table 2.6 Causes of Data Gaps Identified by Stakeholders

CAUSE	DESCRIPTION	IMPACT ON DATA QUALITY AND AVAILABILITY
Limited Funding	Insufficient budget allocation for data collection	Limits equipment, staffing, and maintenance
Technical Skill Gaps	Very limited trained personnel for data management	Leads to poor data collection, processing, and analysis
Inadequate Equipment	Outdated or insufficient monitoring and GIS tools	Restricts data accuracy and spatial coverage
Fragmented Institutional Collaboration	Poor coordination between agencies and sectors	Causes duplication and data silos
Lack of Standard Procedures	Absence of harmonised data protocols	Results in inconsistent data formats and quality
Weak Policy Enforcement	Inadequate implementation of environmental data policies	Leads to poor compliance and data gaps
Limited Ground-Truthing	Insufficient field verification of data	Reduces data validation and confidence

2.4 Data Needs Assessment

The workshop elicited clear priorities regarding essential environmental datasets that require development or enhancement. These include updated and comprehensive forest cover data, seismic activity information, and detailed climatic variables such as temperature, rainfall, and relative humidity. Stakeholders also stressed the need for national-scale air, water, and soil quality data to support monitoring and policy compliance.

Data related to mining rehabilitated sites, land degradation, and urban planning were highlighted as critical for balancing development with environmental sustainability. The call for detailed hydrological data such as water flow, inland valley swamp conditions, and groundwater levels reflects growing awareness of water resource vulnerability. Additional requirements include digitized comprehensive fertilizer usage, land use and land cover maps, digital elevation models, greenhouse gas inventories, biodiversity records, and emissions data for hydrofluorocarbons.

Table 2.7 Priority Data Needs to Strengthen Environmental Management

ENVIRONMENTAL DATA TYPE	PROPOSED ACTIONS	EXPECTED IMPACT	RESPONSIBLE ENTITIES
Water Quality and Quantity	Expand monitoring stations; improve GIS mapping; standardize data collection protocols	Enhanced water resource management and pollution tracking	EPA, Ministry of Water Resources, NWRMA, Research Institutions,
Air Quality Data	Establish additional air quality monitoring sites; implement quality assurance and calibration	Better pollution control and public health protection	EPA, Ministry of Health, Local Councils, Research and Academic Institutions
Biodiversity and Forest Cover	Develop updated species inventories; integrate satellite and field data; improve data sharing	Strengthened conservation planning and habitat management	EPA, Forestry Department-MOECC, NPAA, NGOs, Research and Academic Institutions
Climate Variables (Rainfall, Temp)	Improve spatial resolution of climate data; digitize historical records; install additional weather stations	Improved climate adaptation and disaster preparedness	Meteorological Agency, EPA, Academic and Research Institutions
Land Use and Land Cover	Conduct regular land cover classification updates using remote sensing; harmonize data formats	Better land planning and environmental impact assessments	Ministry of Lands, EPA, Planning Authorities (NLC et al)
Mining and Extractive Industry Impacts	Establish environmental and social impact monitoring frameworks; involve communities in data collection	Sustainable mining practices and enhanced community protection	Ministry of Mines, NMA, EPA, Local Communities
Waste Management Data	Develop standardized waste data collection systems; implement regular waste audits	Improved waste management policies and pollution control	EPA, Local Councils, Waste Management Agencies

Soil Quality and Erosion Rates	Expand soil monitoring networks; apply remote sensing for erosion mapping; promote data validation	Enhanced soil conservation and sustainable agriculture	Ministry of Agriculture, EPA, Academic and Research Institutions
Protected Areas and Ecosystems	Update protected area boundaries with high-resolution mapping; establish regular biodiversity monitoring	Improved ecosystem protection and biodiversity conservation	EPA, NPAA, NGOs
Energy Use and Emissions	Develop national greenhouse gas inventories; monitor emissions from key sectors	Strengthened climate change mitigation and policy compliance	EPA, Ministry of Energy, EPA, PI-CREF

2.4.1. Causes Driving the Need for Improved Data

The demand for enhanced environmental data stems from several systemic challenges. These include a lack of advanced geospatial skills, software tools, and modern equipment within institutions. The absence of a centralised national data centre hampers data sharing and integration. Complex administrative structures, weak inter-agency collaboration, and questions about data credibility further restrict effective data use.

Inadequate technical capacity, chronic funding shortages, and limited commitment to scientific data collection and analysis were also cited as major barriers. Collectively, these factors limit Sierra Leone's ability to generate and maintain high-quality, real-time environmental data necessary for responsive governance.

2.4.2 Recommendations for Addressing Data Needs/Gaps

To fill the identified gaps, stakeholders proposed a set of practical, actionable recommendations. Key among these is the periodic updating of datasets to maintain relevance and accuracy over time. Reliable and sustained funding coupled with effective inter-agency collaboration are essential to support continuous data collection and management.

Capacity building through regular technical training programmes is critical to equip personnel with the skills needed for advanced data handling and analysis. Developing bankable project proposals can attract investment for data infrastructure and technology acquisition. Ensuring access to modern tools and equipment will improve data quality and scope.

Moreover, allocating resources for research in a timely and strategic manner alongside identifying diverse funding sources and mobilising sufficient human capital will reinforce Sierra Leone's capacity to establish a robust environmental data system capable of meeting national and international reporting obligations.

Table 2.8 Strategic Actions to Address the Causes of Environmental Data Gaps in Sierra Leone

CAUSE OF DATA GAP	PROPOSED ACTIONS/RECOMMENDATIONS
Limited Funding	Secure diversified funding sources; develop bankable proposals; increase resource allocation
Technical Skill Gaps	Provide regular capacity-building and technical training; partner with academic and research institutions
Inadequate Equipment	Invest in advanced monitoring instruments and software; upgrade GIS infrastructure
Fragmented Institutional Collaboration	Establish formal inter-agency coordination mechanisms; create sector-specific technical working groups
Lack of Standard Procedures	Develop and enforce standardized data collection protocols, metadata standards, and quality assurance frameworks
Weak Policy Enforcement	Strengthen regulatory frameworks; improve compliance monitoring; increase policy awareness
Limited Ground-Truthing	Promote community involvement in data collection; implement periodic field validation campaigns

3. ROADMAP AND ACTION PLAN FOR OPERATIONALISING CEDAS

During the workshop, stakeholders collaboratively developed a comprehensive roadmap to guide the centre's establishment and operationalisation. This roadmap addresses critical dimensions including governance, data infrastructure, institutional coordination, data standards, and pilot initiatives, laying a strong foundation for a functional and sustainable environmental data system in Sierra Leone.

Annex 7C of this report contains a comprehensive and detailed work plan that outlines specific activities, timelines, responsible parties, and performance indicators. This annex acts as an operational blueprint to systematically address the priority data gaps identified, carry out pilot projects, and expand CEDAS's functions over the first two years. It provides a framework for accountability and tracks measurable progress toward important milestones, such as producing the Environmental Atlas/Statistics Compendium within 18 months and publishing the State of the Environment Report by the end of the third year.

3.1. Governance Structure

A clear consensus emerged around the governance framework for CEDAS. Approximately 75 percent of participants advocated for the centre to be institutionally embedded within the Environment Protection Agency (EPA). This placement would leverage the EPA's existing mandate, technical expertise, and regulatory authority in environmental governance. However, while the majority leaned toward EPA hosting CEDAS, stakeholders - particularly from academia and civil society, emphasized the importance of maintaining institutional neutrality and ensuring inclusive oversight. To this end, it was proposed that a dedicated Technical Steering Committee be constituted, comprising representatives from key stakeholder institutions across government, academia, civil society, and the private sector. This committee would be tasked with developing operational standards, setting data quality controls, and overseeing the centre's strategic direction and day-to-day management to ensure transparency, accountability, and responsiveness.

Conversely, a minority (around 25 percent) suggested positioning CEDAS within the Ministry of Environment and Climate Change, working in close collaboration with the Directorate of Science, Technology and Innovation (DSTI). This alternative structure emphasizes a broader cross-sectoral mandate, facilitating stronger integration of environmental data with national science and innovation agendas. Regardless of the hosting arrangement, there was broad agreement on the necessity for an inter-institutional governance model that fosters coordination, shared ownership among stakeholders, and long-term credibility of CEDAS.

Table 3.1 Proposed Governance Structures and Stakeholder Preferences for CEDAS

Governance Model	Stakeholder Support (%)	Key Features	Advantages	Potential Challenges
Hosted within Environment Protection Agency (EPA)	75	Embedded in EPA mandate; Technical Steering Committee with multi-sector representation; Operational standards and oversight	Leverages existing authority; clear environmental mandate	Possible limited cross-sector integration
Hosted within Ministry of Environment and Climate Change (MoECC)	25	Collaboration with Directorate of Science, Technology and Innovation (DSTI); Broad cross-sector mandate	Enhances integration with national science and innovation agenda	Requires strong coordination mechanisms and enhanced capacity building
Inter-institutional Governance Model	100	Multi-agency coordination; shared ownership and responsibility	Encourages collaboration and transparency	Complexity in decision-making

3.1 Data Infrastructure Development

Stakeholders proposed the development of a modern, cloud-based digital platform to serve as the central repository for all environmental data. This platform is envisioned as a user-friendly portal facilitating seamless access, data upload, and retrieval by both producers and consumers of environmental information. Critical functionalities identified include real-time data updates, metadata cataloguing, data visualization tools, and advanced search capabilities. The platform should support interoperability with existing sectoral databases and conform to international standards for data security and privacy, ensuring robust protection of sensitive information while promoting openness.

This infrastructure will not only enhance data accessibility but also improve data integration, enabling more comprehensive analysis across environmental themes and sectors. Moreover, by harnessing cloud computing, the platform can provide scalable storage and processing capacity to accommodate Sierra Leone's growing environmental data needs.

Table 3.2 Core Functionalities and Technical Specifications for CEDAS Data Infrastructure

FEATURE	DESCRIPTION	BENEFIT	NOTES/STANDARDS
Cloud-Based Central Repository	Secure, scalable platform for environmental data storage	Accommodates growing data volume; facilitates remote access	Must comply with national data security policies
Real-Time Data Updates	Ability to upload and refresh data continuously	Ensures timeliness and relevance of datasets	Requires reliable connectivity
Metadata Cataloguing	Comprehensive documentation of data origin, format, and quality	Enhances discoverability and usability	Aligns with international metadata standards (e.g., ISO 19115)
Data Visualization Tools	Interactive dashboards and maps for data interpretation	Facilitates analysis and communication	Customizable for different user needs
Advanced Search Capabilities	Robust search functions to locate specific datasets or indicators	Improves data accessibility	Supports multiple query parameters
Interoperability	Integration with sectoral databases and national ICT systems	Enables cross-sectoral data analysis and policy coherence	Compliance with national ICT standards
Data Security and Privacy	User authentication, access control, and encryption	Protects sensitive information	In line with Ministry of Communication, Technology and Innovation guidelines

3.2 Institutional Coordination and Technical Working Groups

To promote continuous engagement and cross-sector collaboration, it was recommended that sector-specific Technical Working Groups (TWGs) be established. These groups, representing domains such as water resources, biodiversity, climate change, pollution control, and land use planning, would meet periodically to review data collection methodologies, address emerging data challenges, and harmonize reporting frameworks.

Regular workshops and capacity-building sessions facilitated by the TWGs would foster knowledge exchange, enhance data quality standards, and ensure alignment with national priorities and international obligations. This dynamic institutional coordination mechanism is essential to break down silos and embed a culture of data-driven decision-making throughout Sierra Leone's environmental governance landscape.

Table 3.3 Institutional Coordination Mechanisms and Technical Working Groups (TWGs)

TWG FOCUS AREA	MAIN RESPONSIBILITIES	FREQUENCY OF MEETINGS	EXPECTED OUTPUTS	KEY STAKEHOLDERS INVOLVED
Water Resources	Review water data collection; harmonize reporting	Quarterly	Standardized methodologies; gap analysis	EPA, Ministry of Water Resources, NWRMA, Academia
Biodiversity and Forests	Monitor biodiversity data; develop conservation indicators	Quarterly	Updated species data; conservation reports	Forestry Department, NGOs, Research Institutions, EPA, MoECC, NPAA
Climate Change	Coordinate climate data integration and adaptation metrics	Bi-monthly	Climate vulnerability maps; emissions data	Meteorological Agency, EPA, Universities, CSOs
Pollution Control	Standardize pollution data; assess air and waste quality	Quarterly	Pollution reports; data quality guidelines	EPA, Local Authorities, Ministry of Health, NAPHA
Land Use Planning	Harmonize land use and land cover data; spatial planning	Quarterly	Land use change reports; zoning compliance	Ministry of Lands, Urban Planning Agencies, EPA

3.3 Data Sharing Standards and Interoperability Protocols

A key pillar of the roadmap is the development of comprehensive data sharing protocols to govern the flow of information within and beyond CEDAS. The TWGs will be mandated to formulate and enforce standardized procedures covering data collection methodologies, quality assurance, data formatting, and metadata documentation. This harmonization is crucial to ensure data comparability, reduce redundancy, and enhance usability across diverse environmental sectors.

Furthermore, the protocols must address data security concerns, establishing clear guidelines on access levels, confidentiality, and user authentication, aligning with standards set by the Ministry of Communication, Technology and Innovation. Ensuring interoperability with national ICT infrastructure will facilitate seamless integration with broader government data ecosystems, supporting multi-sectoral analysis and policy coherence.

Table 3.4 Standards and Protocols for data sharing and Interoperability

PROTOCOL ELEMENT	DESCRIPTION	PURPOSE	COMPLIANCE / REFERENCE STANDARD
Data Collection Methodology	Standard procedures for consistent data gathering	Ensure data comparability and reliability	National Environmental Data Standards (TBD)
Quality Assurance	Procedures for verifying accuracy and completeness	Maintain high data integrity	ISO 9001 / ISO 19157 (Data Quality)
Data Formatting	Harmonized file formats and metadata documentation	Facilitate interoperability	ISO 19115 (Metadata)
Data Security	Access control, user authentication, and encryption	Protect sensitive information	TBD
Data Access Levels	Defined permissions for users and stakeholders	Balance transparency and confidentiality	Ministry of Communication, Technology & Innovation Guidelines
Interoperability	Compatibility with national ICT infrastructure and sectoral databases	Enable integrated analysis across sectors	Open Geospatial Consortium (OGC) Standards

4. PILOT INITIATIVES

To operationalise CEDAS and demonstrate its value proposition, the workshop participants identified priority pilot projects spanning critical environmental issues. These pilots are designed not only to test technical workflows and provide actionable insights but also to demonstrate how improved data transparency can strengthen enforcement, reduce duplication, build institutional capacity, and inform integrated resource planning.

Table 4.1 Overview of Pilot Projects for Environmental Data System Development

Project Title	Scope and Activities	Expected Outcomes
National Fuel Quality and Impact Assessment	Systematic evaluation of fuel storage conditions at key facilities; assessment of compliance with fuel quality standards; pollutant monitoring for air quality impacts; quantification of public health risks from fuel-related emissions; analysis of environmental contamination (soil, water); review of transportation logistics and safety along fuel supply chains; integration of social safeguards addressing community exposure and risk mitigation.	Establishes critical baseline data to guide regulatory enforcement, environmental health policies, and infrastructure planning.
Integrated Environmental Statistics for the Western Area	Compilation and harmonization of multi-sectoral environmental data focusing on pollution (air, water, soil), climate change indicators (temperature, precipitation trends), and biodiversity status; synthesis of data streams to develop a comprehensive statistical profile of the Western Area.	Supports evidence-based environmental management, targeted interventions, and enhanced cross-sector collaboration in a key region.
National Water Quality Monitoring Programme	Nationwide survey of major river systems using standardized physical, chemical, and biological water quality parameters; baseline establishment; identification of pollution hotspots; temporal monitoring of water quality changes.	Informs sustainable water resource management, pollution control strategies, and aquatic ecosystem conservation aligned with health goals.
Historical Rainfall Data Reconstruction and Analysis	Reconstruction of high-resolution sub-national rainfall records using meteorological data, remote sensing, and historical archives; statistical analysis of spatial and temporal rainfall trends, variability, and extreme weather events.	Provides vital data for climate adaptation planning, disaster risk reduction, and agricultural policy to enhance community resilience.

5. CONCLUSION

The workshop marked a crucial milestone in the journey toward establishing CEDAS. It brought together key stakeholders from across government, academia, and the environmental sector to collectively identify existing gaps in Sierra Leone's environmental data landscape. By agreeing on a clear roadmap and prioritising pilot projects, the workshop created a solid foundation for building a centralised, accessible, and reliable environmental data system. This system will enable more effective monitoring and management of natural resources, support evidence-based decision-making, and provide a strong basis for crafting sound environmental policies and strategies that address both national priorities and international commitments.

Looking ahead, the success of CEDAS depends on sustained collaboration among all involved parties. Continued engagement will be necessary to ensure that data collection, sharing, and analysis processes are harmonized, transparent, and aligned with sectoral needs. Capacity building and resource mobilization will also play vital roles in operationalizing the centre and scaling its impact. With the commitment of government agencies, development partners, and other stakeholders, CEDAS has the potential to transform environmental governance in Sierra Leone, empowering decision-makers with the information they need to safeguard the environment, promote sustainable development, and enhance resilience to climate change.

6. ANNEXES

A. Photos from the event



Executive Chairman EPA



Chief Director EPA



Director SLURC



Manager RPI



DSTI, ETU & EPA Regional Manager



SEORPI & Participants



Director EHS EPA



Consultant EPA & EO EPA Southern region



Manager CC & EO RPI EPA



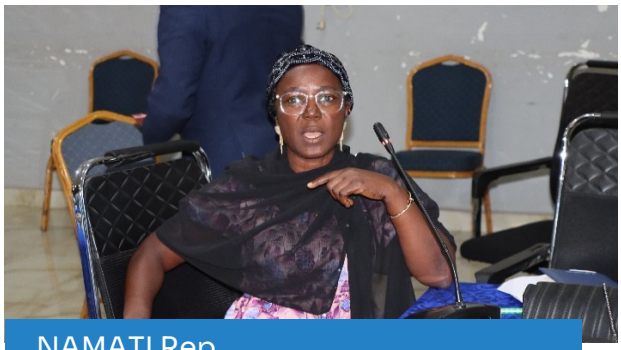
NPAA GIS officer



Director CC EPA



Land Com., NaMED& EPA Manager



NAMATI Rep



CD EPA & SLURC Rep.



DD/RPI-EPA



Manager, PDP EPA



Director, PDP EPA



DD/ERA-EPA



Manager, EHS-EPA



Board Member EPA-NMA



Env. Consultant-CEMMATS



EPA Regional Managers Makeni & Kono



Group Session



Group Session



Group Session



NWRMA GIS Officer



ETU-Dr Saffa



Executive Director, NaMED

B. Agenda

Day One

TIME	SESSION	DESCRIPTION	LEAD / FACILITATOR
Registration	Welcome Coffee	Participant check-in and informal networking	RPI
Opening	Opening Ceremony	Welcome, introductions, prayers, and opening statement on CEDAS vision and strategic value	Moderator / Dr. Abu-Bakar Massaquoi
Keynote	Policy Address	Environmental governance and data accountability; national perspective on data systems	Minister of Environment and Climate Change
-	Group Photo	Official photograph	All Participants / ERA Team
Break	**Networking Tea Break**		
Session 1	Landscape of Environmental Data	Presentation on current data sources, custodians, and reporting obligations (EIA, climate, biodiversity, pollution, land use)	Joseph S M Gbassa
Session 2	Technical Deep Dive – Data Mapping	Group work identifying existing data types, formats, and frequency of collection by sector	Facilitator-led Breakout / Chief Director EPA
Lunch	Networking Lunch		
Session 3	Identifying Data Gaps and Overlaps	Facilitated exercise on missing data, inconsistencies, duplications; introduction of draft Data Gaps Register	Facilitator-led Breakout / Chief Director EPA
Session 4	Towards Data Standards and Interoperability	Discussion on metadata standards, quality protocols, and national data taxonomy for environmental datasets	TBD / BMK SLRUC
Closing	Reflections and Summary of Day 1	Recap of key insights and preview of Day 2 objectives	DDRPI / Valentine Sualley

Day Two

TIME	SESSION	DESCRIPTION	LEAD / FACILITATOR
Arrival	Arrival and Coffee	Informal networking	RPI
Opening	Recap of Day 1 & Framing Day 2	Key takeaways and transition to stakeholder focus	DDRPI / Solomon George
Session 5	Stakeholder Mapping and Role Clarification	Presentation and discussion on who generates, manages, and uses environmental data in Sierra Leone; identifying key actors and mandates	Lovetta Juanah
Session 6	Understanding Stakeholder Data Needs	Group work on sector-specific data demands (policy, enforcement, research, community use) and barriers to access/use	Facilitator-led Breakout / Lovetta Juanah
Session 7	Innovations in Data Collection and Analysis	Demonstration of technologies and methods improving timeliness, accuracy, and transparency of environmental data; includes Hazard Analysis of Fuel Depots	Joseph S M Gbassa
Lunch	Networking Lunch		
Session 8	Co-Designing the CEDAS Roadmap	Presentation of roadmap outline: institutional roles, data governance, infrastructure, capacity building, and pilot priorities	Joseph S M Gbassa
Session 9	Pilot Project Planning and Mobilization	Interactive planning for pilot initiatives: baseline data collection, EDMP development, stakeholder on boarding	Facilitator-led Breakout / Emmanuel Tamba Nyaka, Alfred Jondee, Joseph S Turay
Session 10	Endorsement and Commitments	Validation of roadmap direction, stakeholder feedback, and identification of next steps	All Participants
Closing	Closing Remarks and Workshop Close	Summary, acknowledgments, and way forward	Dr. Abu-Bakar Massaquoi

C. Summary Workplan for Operationalising CEDAS

Activity/Objective	Key Tasks/Actions	Timeline	Responsible Entity	Performance Indicators	Resources Required	Notes/Dependencies
Governance Establishment	Constitute Technical Steering Committee; Define operational standards	Months 1–3	EPA, Stakeholder Representatives	Committee formed; Operational guidelines approved	Meeting facilities, admin	Requires stakeholder engagement
Data Infrastructure Development	Develop cloud-based platform; Integrate sectoral databases	Months 1–9	EPA, MoCTI, DSTI, MoECC	Platform deployed; Data upload and access functional	IT infrastructure, software	Requires data standards in place
Institutional Coordination Setup	Establish sector-specific Technical Working Groups (TWGs)	Months 1–6	EPA, Sector Agencies	TWGs operational; Regular meetings conducted	Facilitation support	Coordination with all stakeholders
Data Sharing Protocols Development	Draft and approve data collection, quality, and security standards	Months 4–10	TWGs	Approved protocols published; Compliance monitoring begun	Expert consultants	Alignment with national ICT policies
Pilot Project Implementation	Launch pilot projects in fuel quality, water quality, rainfall data, and environmental statistics	Months 6–18	Project Leads, EPA, Sector Agencies	Pilot reports completed; Data quality benchmarks met	Field equipment, funding	Dependent on infrastructure readiness
Capacity Building and Training	Conduct training workshops on data management and analysis	Ongoing	EPA, Academic Partners, Development Partners	Number of trainings delivered; Participant feedback scores	Training materials, venues	Linked to pilot project activities
Development of Environmental Atlas or Environmental Statistics Compendium	Compile, analyse and visualise spatial environmental data	Months 12–18	EPA, Research Partners	Atlas draft completed; Stakeholder validation held	GIS software, data access	Requires completed data integration
Preparation of State of Environment Report	Collect data, draft report, stakeholder review and publication	Months 24–36	EPA, TWGs, External Consultants	Report finalized and published; Dissemination events held	Editorial support, printing	Based on accumulated data and analyses

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