UNIVERSITY OF LIBERIA

Soil Testing, Plant and Water Analysis Laboratory

Technical Report II

Liberia Land and Soil Resources Knowledge project (Soils4Liberia)

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Executive Summary

The University of Liberia (UL) is a national implementing partner under the Liberia Land and Soil Resources Knowledge Project (Soils4Liberia), funded by the European Union through the P2P Programme and led by the International Institute of Tropical Agriculture (IITA). Under this subgrant, UL is mandated to operationalize and host soil preparation and analysis as a national analytical hub, supporting standardized physical and chemical testing of approximately 3,000 soil samples from agricultural and environmentally sensitive areas across Liberia.

During the October–December 2025 reporting period, the University concentrated on institutional preparedness and laboratory capacity enhancement. Following the signing of the subgrant agreement in June–July 2025, the first tranche of funds was received into a dedicated laboratory account. IITA also procured and delivered an Atomic Absorption Spectrophotometer (AAS), which was installed and calibrated from February 2–9, 2026.

Key progress included laboratory annex renovation, AAS installation and calibration, maintenance of essential laboratory equipment, technical and quality control training for UL and partner staff, and initial procurement (7–10%) of reagents and apparatus.

As the project advances to full-scale sampling and analysis, UL prioritizes the procurement of remaining reagents, apparatus, and consumables critical for effective implementation..

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1. Introduction

Liberia has not conducted a comprehensive national soil survey in decades. Existing soil and land data largely derive from fragmented assessments, including the Mano River Union Land Resources Survey (1980), the FAO Liberia Land Resources Assessment for Land Use Planning (1987), and the Liberia Soil Information System (LibSIS, 2023). While valuable, these efforts were constrained by limited sampling, methodological inconsistencies, and disruptions from civil conflict.

To address this gap, the Government of Liberia, through the Ministry of Agriculture, prioritized the development of a modern, nationally representative soil information system to guide agricultural planning, land-use policy, food security, and environmental sustainability.

The Liberia Land and Soil Resources Knowledge Project (Soils4Liberia), funded by the European Union under the P2P initiative, aims to deliver high-quality, policy-relevant soil data through nationwide surveys, land suitability mapping (including irrigation potential), agro-ecological zoning aligned with conservation and EU Deforestation Regulation requirements, and strengthened land information systems.

Led by the International Institute of Tropical Agriculture (IITA) with ISRIC, MATE, CARI, and the University of Liberia as partners, the project designates the University of Liberia Soil Testing, Plant and Water Analysis Laboratory as an implementing hub responsible for laboratory readiness, analysis, quality assurance, and sustainability planning.

2. Technical Capacity Building and Quality control Training Workshops for Laboratory Technicians

2.1 Training Overview

The technical training workshop focused on the hands-on training, targeted lab technicians from UL, CARI, and MOA. The training participants exceeded the initially planned twenty persons due to the growing interest and the national needs, especially from local implementing partners. The main activities covered includes hands-on training on laboratory soil analysis (pH, EC, TDS, Available Phosphorus (Bray I), Organic Carbon (Colorimetric and Walkley and Black), Nitrogen, Exchangeable Acidity, Cation Exchange Capacity (CEC); Installation and Calibration of AAS, and Several lectures on Lab Quality Control, Health and Safety, Lab Data management, and Lab Equipment Maintenance and Troubleshooting, see training agenda, Appendix I. There were five (5) trainers from IITA Analytical Laboratory Services who conducted the hands-on training on different laboratory analysis.

The training was declared open on February 2, 2026 by the University of Liberia president, who welcomed the training participants, IITA country staff and the trainers. She thanked the IITA for choosing the university and guaranteed the institution's supports to ensure the successful implementation of the project. The training was climaxed on February 9, 2026 at the University of Liberia's Soil Lab where the Deputy Minister for technical Services, Ministry of Agriculture Mr. Hedd Williams served as the keynote's speaker. He later dedicated the AAS and launched the lab officially opened for the project.

Figure 1: Technical Capacity Building and Quality Control Training For Laboratory Technicians

3. Renovation of Laboratory Annex

The Soil Testing, Plant and Water Analysis Laboratory at the University has three main salles for laboratory analysis including the Wet Chemistry Lab, The Microbiology/Water Lab, and the Student Practical/General Lab. The other sections include offices, a mini nonchemical store room, and the physical property lab. The physical property lab is also used for sample reception, processing (drying), preparation, and storage. A section of the physical property is used for the storage reagents/chemicals. The physical property lab has inadequate space to hosting these different facilities and activities; hence it exposes lab technicians to some health risk. Similarly, the closed proximity of the sample preparation/storage room to the lab reagents storage room is recipe for sample contamination, which compromises quality control and assurance of the lab.

Against this background, the lab considered the renovation of the Lab Annex building to provide separate and adequate spacing for physical property lab, sample storage, and additional offices including for the IITA. The renovation started since November 2025 and is gradually progressing as anticipated. The renovation is about 85% complete; it is expected to be finalized in a few weeks, Figure 2.

Figure 2: Renovation of UL Lab Annex

Appendices:

Appendix I: Training Workshop Agenda

Liberia Land and Soil Resources Knowledge Project (Soils4Liberia)

Training for Laboratory Technicians

Dates: Feb 2 to 9 2026

Venue: University of Liberia

DAY 1: Monday, February 2, 2026, Soils and plant analysis

Time	Session	Details
10:00 – 11:00	Registration & Pre-Training brirfing.	• Welcome • Objectives of the training • Overview of the UL lab and IITA
11:00 – 12:30	Session 1: Soil Sampling	• Preparation storage sub sampling and Archiving of samples.
12:30 – 13:30	Session 2: Preparation of standard solutions	• Normal solutions • Molar solutions • Dilution / consecration of samples
13:30 – 14:30	Lunch	—
14:30 – 16:30	Session 3: Lab session	• Calibration use and maintenance of pH maters
16:30 – 17:00	Coffee, Recap & Q&A	—

DAY 2: Tuesday, February 3, 2026, UV' visible Spectrophotometer Sessions

Time	Session	Details
09:00 – 10:30	Session 4: General equipment's maintenance	• General Troubleshooting • Instillation and calibration • Calibration of hands-on Ph meter

		• Calibration of hands-on Uv-VIS spectrophotometer
10:30 – 10:45	Break	—
11:15 – 14:15	Session 5: Lab Sessions (3-Groups)	Group 1: Instillation of AAS Group 2: pH and EC Group 3: Bray phosphorus
14:15 – 15:15	Lunch	—
15:15 – 17:15	Lab Sessions (3-Groups)	Group 1: Installation of AAS Group 3: pH and EC Group 2: Bray phosphorus

DAY 3: Wednesday, February 4, 2026, General equipment's maintenance and instillation AAS

Time	Session	Details
09:00 – 10:30	Session 8: General Session	• Lab health and safety training
10:30 – 10:45	Coffee Break	—
10:45 – 13:45	Lab Sessions	Group 1: Calibration of AAS Group 2: Soil Organic Carbon Group 3: total Nitrogen
13:45 – 14:45	Lunch	
14:45 – 17:45	Lab Sessions	Group 1: Calibration of AAS Group 3: Soil Organic Carbon Group 2: Total Nitrogen

DAY 4: Thursday, February 5, 2026, General equipment's maintenance and instillation AAS

Time	Session	Details
09:00 – 10:30	General Session	•Laboratory Quality Control and Assurance
10:30 – 10:45	Coffee Break	—
10:45 – 13:45	Lab Sessions	Group 1: Preparation of Standards for AAS Group 2: Soil Organic Carbon Group 3: Total Nitrogen
13:45 – 14:45	Lunch	—
14:45 – 16:00	Lab	Group 1: Extraction for exchangeable Cations for AAS Groups 2 and 3: Calculation of Lab results
16:00 – 16:300	Recap and Q &A	

DAY 5: Thursday, February 6, 2026, General equipment's maintenance and instillation AAS

Time	Session	Details
09:00 – 10:30	General Session	• Troubleshooting for Lab Equipment
10:30 – 10:45	Coffee Break	—
11:45 – 13:45	Lab Sessions	Group 1: Hands-on Training for AAS Groups 2&3: Exchangeable Acidity
13:45– 14:45	Lunch	—
14:45 – 16:30	Lab Sessions	Group 1: Hands-on Training for AAS Groups 2&3: Calibration and troubleshooting of UV-Vis Spectrophotometer
16:30 – 17:00	Recap, Wrap-Up	

DAY 6: Thursday, February 7, 2026, General equipment's maintenance and instillation AAS

Time	Session	Details
10:30 – 13:30	Lab Session	Group 1: Hands-on Training on AAS
13:30 – 14:30	Lunch	—
14:30 – 16:30	Cont.....	Group 1: Hands-on Training on AAS

DAY 7: Monday, February 9, 2026, General equipment's maintenance and instillation AAS

Time	Session	Details
09:00 – 10:30	General Session	• Laboratory Water Quality • Lectures on Soil spectroscopy
10:30 – 10:45	Coffee Break	—
11:45 – 13:45	Lab Sessions	Group 1: Hands-on Training for AAS Groups 2&3: hand-on training for Lab Analysis
13:45– 14:45	Lunch	—
14:45 – 16:30	Lab Sessions	Closing