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TECHNICAL REPORT -SOILS4LIBERIA INCEPTION REPORT

Project Title: Liberia Land and Soil Resources Knowledge Project

A nation-wide soil inventory and land suitability mapping: Component of the EU Delegation to Liberia action “From productivity to product, linking Peers to Peers” (P2P).

Acronyms and Abbreviations

AAS	Atomic Absorption Spectrophotometer
AfDB	African Development Bank
CARI	Central Agricultural Research Institute
DTS	Department of Technical Services (MoA)
ECOWAS	Economic Community of West African States
EPA	Environmental Protection Agency (Liberia)
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FDAO	Forest Development Authority (Liberia)
GSSL	Global Soil Spectral Library
IITA	International Institute of Tropical Agriculture
ILSA	Investing in Livelihood Resilience and Soil Health
ISRIC	International Soil Reference and Information Centre (World Soil Information)
IT	Information Technology
LiNSIC	Liberia National Soil Information Centre
LiNSIS	Liberia National Soil Information System
LISGIS	Liberia Institute of Statistics and Geo-Information Services
LSIS	Land and Soil Information System
MoA	Ministry of Agriculture
NADP	National Agricultural Development Plan
P2P	From productivity to product, linking peers to peers
UL	University of Liberia

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1. Executive Summary

Liberia's agricultural sector is constrained by a lack of reliable soil data, which hampers effective land management, climate adaptation, and sustainable resource use. Without comprehensive information on soil types, fertility, and suitability for different crops, policymakers, farmers, and development partners face challenges in making informed decisions. This gap has contributed to low agricultural productivity, inefficiencies in land use, and difficulties in supporting value chains and agro-ecological practices critical for food security and economic growth. Addressing this data deficiency is essential for evidence-based planning and sustainable agricultural transformation in Liberia.

The Soils4Liberia project builds directly on the achievements and lessons of the Soils4Africa initiative, which developed a continent-wide, standardised soil information system to support evidence-based decision-making. The workflows and tools developed under Soils4Africa, such as standardised sampling and lab analytical procedures and digital soil mapping techniques, are being adapted and localised for Liberia. This ensures that the soil data collected under Soils4Liberia are not only locally relevant but also meet global scientific standards and integrate seamlessly with Africa-wide soil health platforms.

Leveraging Soils4Africa, Soils4Liberia avoids duplicating efforts and instead accelerates progress toward a comprehensive Land and Soil Information System (LSIS) tailored to Liberia's needs. The project is adopting best practices in laboratory upgrading, data management, and digital mapping, while simultaneously building the capacity of national institutions such as the Ministry of Agriculture, the University of Liberia, and CARI to sustain these systems. The project is fully aligned and contributes to the National Agricultural Development Plan (NADP) of Liberia 2024 – 2030. Moreover, the partnership ensures that Liberia's soil data contributes to regional and global databases, strengthening its role in continental agricultural planning and climate resilience strategies. This approach not only addresses Liberia's critical soil data gaps but also aligns the country with broader African and international soil health and sustainable agriculture initiatives.

The project commenced on August 1, 2024, and has successfully completed its first year. During this initial phase, the activities primarily centered around establishing the project office in Monrovia, managing financial and legal aspects, outfitting and equipping the offices, as well as recruiting and onboarding staff. Other key tasks included conducting an inception meeting, setting up the project coordination structure, developing a data management plan, and developing communication and stakeholder strategies. The recruitment process was prolonged due to limited human resource capacity and high salary expectations in Liberia due to the high cost of living. For example, hiring the project manager took almost a year, even at the international level. However, many professionals are unwilling to come to Liberia, given the country's past socio-economic and security challenges. On a national level, there is a significant shortage of skilled individuals in technical fields such as data management and geospatial analysis.

As of the end of the first year, the project's major achievements include the successful recruitment and onboarding of nine project staff members, finalization and signing of the consortium agreement, completion of third-party agreements, assessment of the University of Liberia's lab, procurement of a major lab equipment (AAS), delivery of project vehicles, and training and capacity building for project staff. In the coming year, the project will focus on technical designs, further capacity building, and implementing a field campaign.

2. Project Overview

The EU action "From productivity to product, linking peers to peers (P2P)" contributes to the Team Europe Initiative on Safe and Sustainable Food Systems (TEI SSFSs) in Liberia, providing the Framework for the Soils4Liberia project. The project focuses on improving land and market knowledge for planning and decision-making, with an emphasis on soil resources. Key activities include a nationwide soil survey and mapping, land suitability and agro-ecological zoning, and optimization of land information for research, extension, and business development. The project also seeks to align land use practices with the EU Deforestation Regulation while adopting a gender lens and ensuring relevance to ecosystem services, agricultural productivity, and biodiversity conservation. Liberia's lack of comprehensive soil data and standardized information systems has been a major constraint, and the project aims to address this gap by building on existing efforts like the FAO's pilot Liberia Soil Information System (LibSIS) to create a full-fledged national soil information system.

The project targets a diverse range of stakeholders, with the Ministry of Agriculture (MoA), the Central for Agricultural Research Institute, and the University of Liberia as third parties for policy development, planning, and extension services. Other government entities-including the Liberia Land Authority, Liberia Agriculture Commodity Regulatory Authority, Environment Protection Agency, Forest Development Authority, and National Fisheries and Aquaculture Authority- will benefit from improved soil and land use information, although many cannot currently process and interpret these data effectively. The initiative will also support development partners and donor-funded projects requiring reliable soil information, ensuring that interventions in agriculture and forestry are better informed and targeted.

Capacity building is a core component of the project, aiming to strengthen human and institutional capacity in soil surveying, analysis, data management, and interpretation. The Liberia National Soil Information Centre (LiNSIC) will be established within the Ministry of Agriculture to host the Land and Soil Information System, providing a sustainable platform for data and information services. Academic institutions such as the University of Liberia and Central Agricultural Research Institute (CARI) will benefit through staff training, internships, and research opportunities, fostering local expertise in soil science. Consultations with prospective stakeholders during a scoping mission in May 2023 confirmed strong interest and support for the initiative, highlighting its potential to transform agricultural planning and sustainable land management in Liberia.

3. Project Objective and Alignment

The primary objective is to improve the management and use of land and soil resources for conservation, sustainable agricultural intensification, and enhanced climate resilience. This will be achieved by providing policymakers and stakeholders with accurate soil and land data to inform agricultural planning, prioritize value chains such as rice, and support climate-smart agriculture practices. The project aligns directly with EU priorities on sustainable agriculture, climate resilience, and food security, as well as with Liberia's national strategies to modernize agriculture and combat land degradation.

The project aims to achieve the following specific objectives:

i. **Develop a comprehensive Land and Soil Information System (LSIS):** Create a fully operational system that houses accurate, up-to-date primary soil and land data, enabling effective management of information and the generation of tailored data products to meet the needs of diverse users.

ii. **Enhance stakeholder knowledge and capacity:** Increase awareness among stakeholders about the importance of land and soil information and equip them with the skills to use this data in decision-making processes. This will support improved land and soil management, strengthen ecosystem services, boost agricultural productivity, enhance climate resilience, and ensure sustainable protection of land and soil resources.

iii. **Establish a sustainable national soil information centre:** Set up a functional Liberia National Soil Information Centre (LiNSIC) to generate, manage, and disseminate reliable data on Liberia's land and soil resources. The centre will support evidence-based policy development, planning, and implementation of agricultural and environmental interventions, while building national capacity to conduct autonomous soil surveys and land use inventories.

4. Project Governance, Stakeholder Mapping, and Institutional Roles

The Soils4Liberia project will be implemented through a collaborative governance structure led by the International Institute of Tropical Agriculture (IITA), which serves as the primary implementing institution responsible for overall coordination, technical supervision, and delivery of project outputs. IITA will ensure that the nationwide soil and land surveys, data analysis, and development of the Land and Soil Information System (LSIS) adhere to international best practices. ISRIC - World Soil Information - will provide specialized technical expertise, including guidance on soil mapping, data standardization, and digital soil information management, ensuring that the project's outputs meet global scientific and quality standards. The Ministry of Agriculture (MoA) will act as the primary national counterpart, integrating project activities into national agricultural policies, coordinating with regional and local authorities, and ensuring sustainability through institutional ownership of the Liberia National Soil Information Centre (LiNSIC).

The Central Agricultural Research Institute (CARI) will play a pivotal role in coordinating field surveys, raising awareness, providing laboratory facilities for soil analysis, and supporting the technical aspects of data collection and processing. Strong capacity building is, however, needed for CARI to be able to assume this role. Academic institutions, particularly the University of Liberia and other colleges offering soil science programs, will contribute to capacity building through training, internships, and research collaborations. Students and staff will gain hands-on experience in soil survey methodologies, data interpretation, and use case development, helping to foster a new generation of soil science experts in Liberia. These academic partnerships will also strengthen the country's research base and promote innovation in sustainable land management practices.

International partners and development organizations, including the European Union Delegation to Liberia, will provide oversight, strategic guidance, and technical support to ensure alignment with regional and global priorities. Stakeholder mapping has identified a broad network of government agencies, private sector actors, and civil society organizations that will benefit from and contribute to the project. Key beneficiaries include the MoA departments responsible for extension and advisory services, Liberia Land Authority, Liberia Agriculture Commodity Regulatory Authority, Environment Protection Agency, Forest Development Authority, and National Fisheries and Aquaculture Authority. Additionally,

development partners and donor-funded initiatives focused on agriculture, forestry, and soil health will rely on the LiNSIS outputs for planning, targeting, and monitoring interventions, thereby amplifying the project's impact across multiple sectors.

5. Overview of Stakeholder Engagement

The success of Soils4Liberia relies on the active involvement and coordination of various stakeholders. These include Government agencies, research institutions, academia, international organizations, private sector participants, and local communities. A participatory stakeholder mapping exercise took place during the Inception Workshop in Monrovia in August 2024 and August 2025. This helped identify key actors, assess their interests and skills, and define their roles in implementing the project. See below the mapping of key stakeholders and their expected contributions.

Table 1: Key Institutions and Their Roles

Stakeholder	***Responsibility / Role***
European Union Delegation to Liberia (EU)	Donor and strategic partner providing funding, policy alignment, and oversight to ensure the project meets EU priorities on sustainable agriculture, climate resilience, and food security.
International Institute of Tropical Agriculture (IITA)	Project lead and implementing agency, responsible for overall coordination, technical delivery, capacity building, monitoring, and reporting of project activities.
ISRIC - World Soil Information	Technical partner providing expertise in soil data standards, digital soil mapping, and development of the Land and Soil Information System (LSIS).
Ministry of Agriculture (MoA)	Administrative partner for policy guidance, use case development, coordination with county level offices and other partners in Liberia and integrates with national agricultural programmes
Central Agricultural Research Institute (CARI)	Technical partner for the field campaign, serves as a center for training and demonstration, and provides oversight for the smooth running of the laboratories.
University of Liberia (UL), College of Agriculture and Forestry	Hosts the national soil laboratory, which has been strengthened for sample analysis and technical capacity, supports training of technicians and researchers, and serves as the backbone for national soil data processing.
Regional Hub	Provides technical support (regional expertise) on soil health and fertilizer systems, policy guidance, and support in aligning Liberia's soil data with ECOWAS regional initiatives.
Liberia Agriculture Commodity Regulatory Authority (LACRA)	Ensures soil data informs crop standards, certification, and regulation of agricultural commodities for domestic and export markets.
Liberia Land Authority (LLA)	Guides land tenure, land use planning, and integration of soil data into national land management systems.
Environmental Protection Agency (EPA)	Ensures soil data contributes to environmental monitoring, land degradation assessments, and climate change adaptation strategies.

Forestry Development Authority (FDA)	Uses soil and land data for sustainable forest management, biodiversity conservation, and land use planning in forested areas.
National Concessions Bureau (NCB)	Integrates soil and land information into concession agreements, ensuring responsible land use by private investors.
National Investment Commission (NIC)	Promotes responsible agricultural investment by providing investors with accurate land and soil data to support sustainable agribusiness initiatives.

6. Activities Implemented in Year One

6.1. Operational Setup and Human Resource Management

In its inaugural year, the IITA office in Liberia laid the operational groundwork for the Soils4Liberia project. Key achievements included securing office space in Congo Town, installing branded signage for increased visibility, and completing business registration, tax setup, and financial systems. The recruitment and onboarding of essential staff progressed well, including positions for a Project Administrator, Accounts Assistant, Drivers, data management officer, Stakeholder and Communication Engagement Officer. However, the recruitment for the Geospatial Officer role faced challenges due to gaps in technical expertise and salary expectations. To address this, plans are in place to seek a secondment arrangement with LISGIS for one of their technical staff members.

Staff recruitment posed significant challenges due to a limited talent pool, insufficient infrastructure development, and high salary expectations driven by the cost of living and other socio-economic factors. Consequently, multiple interviews were conducted for most advertised positions, often due to the lack of qualified or trainable candidates..

Figure 1: Front View of IITA – Liberia Office and Staff in Office

6.2. Partnerships and Institutional Collaboration

Strategic partnerships have been initiated and formalized to enhance technical capacity and promote local ownership. A contractual agreement with the University of Liberia has been finalized, assigning the university responsibility for soil laboratory analysis. Ongoing collaborations are taking place with institutions such as Mohammed VI Polytechnic University (UM6P), the University of Ibadan, and other universities across West Africa to create graduate training opportunities. Additionally, discussions have progressed with the Smallholder

Agriculture Transformation and Agribusiness Revitalization Project (STAR-P) to explore collaboration under the EU-funded Investing in Livelihood Resilience and Soil Health (ILSA) project. This partnership aims to focus on digital soil mapping, nutrient management, and laboratory support across Liberia, prioritising key value chains.

7. Stakeholder Engagement and Roadmap Development

A major highlight of year one was the Soil Information System (SIS) Roadmap Development Workshop, held in Monrovia from August 5 - 7, 2025. Organized by IITA in collaboration with the Regional Hub, the workshop convened 28 participants from government, academia, development partners, and farmer organizations. It addressed Liberia's soil data gaps through a participatory review of the ISRIC SIS framework used in Zambia, Ghana, Kenya, and Togo. Sessions focused on technical design, institutional hosting, governance, financing models, and operational requirements. Hands-on training was delivered on digital tools such as the Open Data Kit (ODK), and ONA Dashboard. The workshop concluded with consensus on capacity-building priorities, institutional roles, and timelines, marking a critical milestone in modernizing Liberia's soil data ecosystem.

8. Implementation, Workplan, and Timeline

8.1. Project Implementation Approach

The Soils4Liberia project has four main implementation phases spread over four years, from August 2024 to July 2028. Each phase has specific deliverables, involves stakeholder engagement, and focuses on capacity-building efforts. The implementation will be flexible and open to allow for adjustments based on monitoring results and feedback from stakeholders. The project implementation phases will include:

1. Phase 1: Inception and Planning (Aug 2024 – Jan 2026)

This phase focused on laying the foundation for the project. Activities include finalising stakeholder agreements and conducting the Inception Workshop to align expectations. Existing laboratories and facilities were assessed, along with IT infrastructure and data processing methodologies, to identify strengths and gaps. Detailed field and laboratory protocols were developed, and a pilot sampling framework will be introduced. The key outputs of this phase will be to clarify stakeholder roles, a validated inception report, laboratory and IT assessment reports, and protocol manuals to guide subsequent phases.

2. Phase 2: Pilot Implementation and Laboratory Upgrades (Feb – Dec 2026)

During this phase, the project will transition into practical implementation. Laboratory upgrades are expected to begin at the University of Liberia to strengthen national capacity. Soil surveys will be conducted in five pilot counties, while field and laboratory teams receive comprehensive training to ensure high-quality data collection and analysis. Pilot datasets will be uploaded to the LibSIS platform to test system functionality and integration. The outputs of this phase included an upgraded and fully operational laboratory, survey data from the pilot counties, a trained team of over 40 staff, and evaluated pilot datasets accessible through the LibSIS online platform.

3. Phase 3: National Expansion and Mapping (Jan 2026 – Dec 2027)

Building on the pilot phase, the project will expand its activities nationwide. Field surveys are expected to be conducted across all 15 counties, with collected samples analyzed in upgraded laboratories. This phase also focused on generating national soil fertility and suitability maps, critical for informed agricultural planning and policy development. Stakeholder trainings and policy dialogues continued to strengthen collaboration and ensure national ownership of the project's outputs. Deliverables included a midterm evaluation, county-specific reports, the establishment of a national soil database, and the production of detailed soil maps for Liberia.

4. Phase 4: Consolidation, Policy Support, and Handover (Jan – May 2027)

The final phase will emphasize sustainability and long-term impact. Activities are centered on conducting policy knowledge-sharing sessions, finalizing and submitting LibSIS user manuals and tools, and developing a sustainability plan and strategy to ensure continuity beyond the project's lifetime. The main outputs of this phase include policy recommendations, final reports, and the official handover of the project, marking the transition of ownership to national stakeholders and institutions.

Soils4Liberia Project Task Gantt Chart

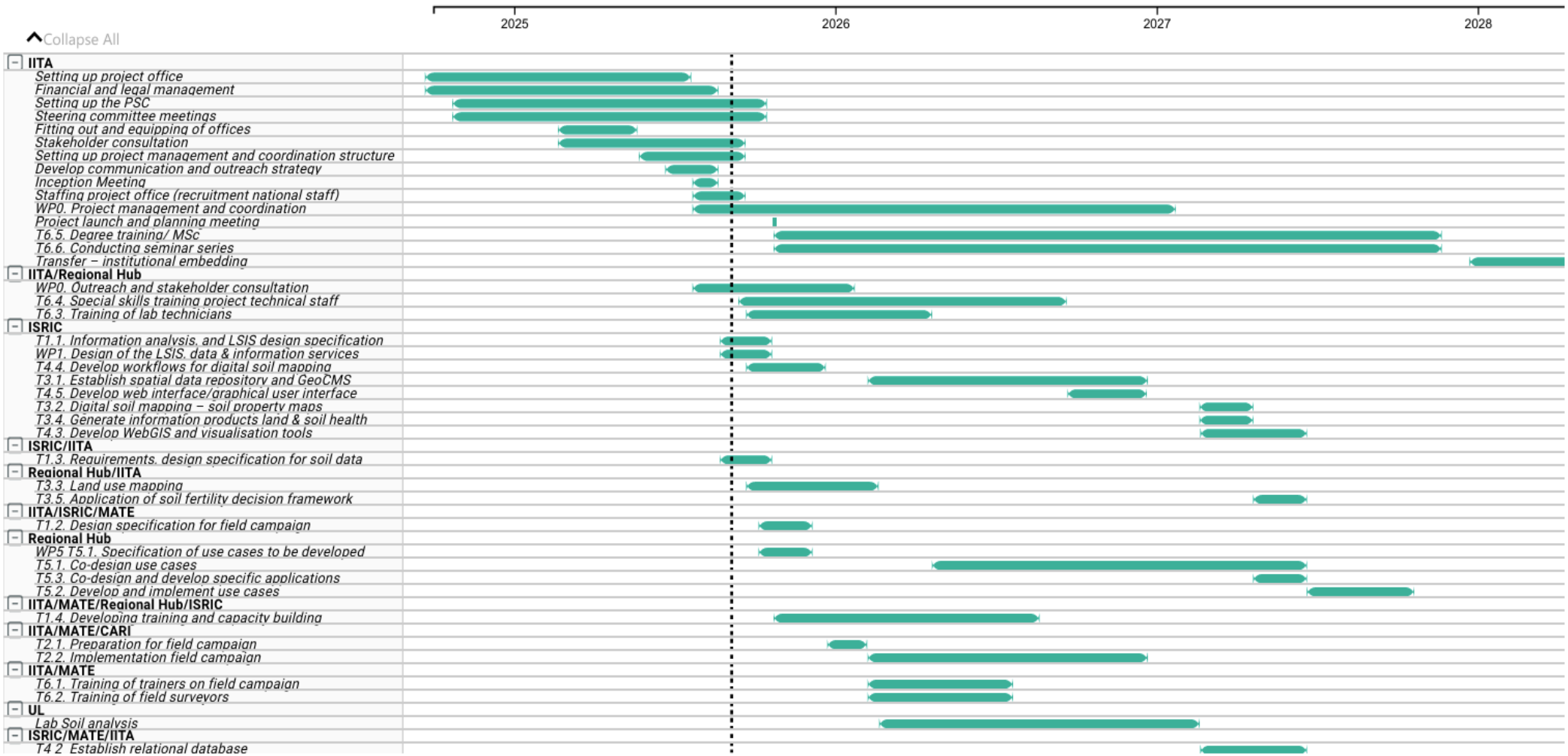

Figure 2: Activity Gantt Chart Summary

9. Risk Mitigation Plan

Table 2 presents the key potential risks, along with detailed descriptions and robust mitigation plans to effectively address each risk.

Table 2: Potential risks and proposed mitigation plans

Risk Name	Risk Type	Description	Mitigation Plan
1. Limited technical capacity within the national institutions	Technical	There is limited technical capacity within national institutions, including the Ministry of Agriculture, the Central Agriculture Research Institute, and the University of Liberia, in the advancement of soil data systems, digital mapping, and lab operations.	Conduct intensive training with government staff, researchers, and students. Also, it is important to include capacity building within project activities. The need for exchange programs and continuous professional development is also important. It is important to use the national soil science curriculum in collaboration with the University of Liberia
2. Potential future delays in procurement	Operational	Delays in early procurement activities.	Engage local vendors as early as possible
3. Challenges in securing sustainable financing after the project	Financial	Challenge in securing financing after project closure, which may affect the continuity of the LiNCIS and ongoing data management	Advocate for government budgetary allocation to sustain LiNSIC. Establish cost-recovery mechanisms (e.g., paid data services for the private sector). Build long-term partnerships with development agencies and regional hubs for co-financing Integrate LiNSIC into existing national agricultural and land management frameworks.
4. Inadequate Stakeholder Engagement	Stakeholder	Partners (relevant government institutions) and local communities are not fully engaged in awareness.	Conduct pre-survey stakeholder and community briefings; use local languages; engage county-level Farmers, CARI, and MoA staff.
5. Staff Turnover	Human Resources	Trained lab/field staff leaving mid-project	Offer contracts with retention incentives; create training manuals for continuity.

6. Data Ownership & Accessibility Conflicts	Governance / Legal	Disagreements over who controls and accesses LSIS data	Establish data governance policy early; involve UL, CARI, MoA legal unit, and IITA
7. Delays in EU Fund Disbursement	Financial	Late disbursement of tranches may delay procurement and the field campaign	Submit quarterly financial reports on time; build a 2-month cash buffer in work plans
8. Climate or Access Barriers to Field Sites	Environmental	Poor roads or remote terrain are delaying sample collection	Time surveys during the dry season; use offline interactive base maps to support inaccessible zones