National Determined Contributions (NDC3.0): 2025 -2030

Adaptation Measures

October 2025

Contents

LIST OF ABBREVIATIONS AND ACRONYMS

A4P	Agenda for Prosperity
AFOLU	Agriculture, Forestry and Other Land Uses
BUR	Biennial Update Report
CCP	Climate Change Project
CCS	Climate Change Secretariat
CCSAP	Climate Change Strategy and Action Plan
CO2	Carbon Dioxide
CEF	Carbon Emission Factors
CFC	Chloro Fluorocarbon
CH4	Methane
CMB	Coastal Management Board
CO	Carbon Monoxide
COP	Conference of Parties
ECOWAS	Economic Community of West African State
EF	Emission Factor
EI	Energy Industries
EJ	Exajoule
EPA-SL	Environment Protection Agency – Sierra Leone
FAO	Food and Agricultural Organization
FBC	Fourah Bay College
GDP	Gross Domestic Product
GEF	Global Environmental Facility
Gg	Gigagrams
GHG	Greenhouse Gas
HCFC	Hydro-Chlorofluorocarbon
HFO	Heavy Energy Oil
IPCC	Intergovernmental Panel on Climate Change
ICZM	Integrated Coastal Zone Management
IMBO	Institute of Marine Biology and Oceanography
INC	Initial National Communication
IPCC	Inter-governmental Panel on Climate Change
IPPU	Industrial Processes and Product Use
ISIC	International Standard Industrial Classification
MASSADA	A Waste Management Company in Freetown
MAFFS	Ministry of Agriculture, Forestry and Food Security
MBSE	Ministry of Basic and Secondary Education
MCI	Manufacturing and Construction Industries
MoEnv	Ministry of the Environment
MOE	Ministry of Energy
MRU	Mano River Union
MTA	Ministry of Transport and Aviation
MT	Million Tonnes

MTNDP	Medium-Term National Development Plan
MP	Metal Production
NOx	Nitrogen Oxide
N2O	Nitrous Oxide
NC	National Communication
ND	"New Direction" (Sierra Leone National Development Plan 2019/24)
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organization
NMVOC	Non-Methane Volatile Organic Compound
NCCS	National Climate Change Secretariat
NCSP	National Communications Support Programme
NPPA	National Protected Area Authority
PA	Paris Agreement
PRSP	Poverty Reduction Strategy Paper
SLS	Sierra Leone Statistics
SLSB	Sierra Leone Standard Bureau
SNC	Second National Communications
SSL	Statistics Sierra Leone
SO2	Sulphur Dioxide
SF6	Sulphur Hexafluoride
SWDS	Solid Wastes Disposal Sites
TNC	Third National Communications
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNITAR	United Nations Institute for Training and Research
USL	University of Sierra Leone
VMT	Vehicle Miles Traveled
WONES	A women's Empowerment Association

Agriculture & Food Security

1 Climate Resilient Agriculture (Agroecology and Climate Smart Agriculture)

1.1 Detailed Description:

This measure connects explicitly to ongoing CSA work under the National Agricultural Transformation Programme (Feed Salone), the Climate-Smart Agriculture Investment Plan (CSAIP, 2021), and FAO's GCF-funded CSA scaling projects.

Scale national adoption of CSA practices—including integration of climate information agricultural practices, promote the production of nutrition sensitive staples, fruit and vegetable crops including indigenous varieties, conservation tillage, mulching, crop rotation, intercropping with legumes/other vegetable or fruit crops, drought- and flood-tolerant rice, cassava and maize varieties including bio-fortified varieties, and soil moisture conservation—through a strengthened extension system.

Promote climate smart food production and processing to increase the availability of nutritious and sustainable foods (targeting mainly MSME's). Scaling up the availability of climate smart processing technologies and/or energy sources (solar / mini grids etc.)

Update food standards and guidelines including strengthening food safety initiatives and capacity in the country.

The programme could create district CSA hubs outreach sites where pilot models already exist (e.g., MAFFS/FAO's demonstration plots in Bombali and Bo), develop localized agronomic calendars using seasonal climate forecasts, and establish 200 demonstration plots with farmer field schools. Digital advisory (SMS/IVR: Short Message Service/Interactive Voice Response, i.e., automated phone calls with recorded menus) will deliver actionable guidance timed to local planting windows.

1.2 Vulnerability Addressed

High exposure of rain-fed smallholders to rainfall variability, dry spells, and floods; low adaptive capacity due to limited access to climate-informed extension and inputs.

1.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** 60% of smallholder farmer households practice diversification in food production; of which 30,000 households have adopted Agroecology practices and increased annual farming outputs by 15%.
- **2035:** 80% adoption in target districts; 60,000 households have adopted Agroecology practices and increased annual farming outputs by 20%; reduced seasonal yield volatility.
- **2035:** 60% coverage of agrometeorological weather stations in agricultural zone
- **Key Indicators:** Number of households adopting Food System Transformation practices; hectares under Agroecology; yield per hectare (farming outputs); % of advisories delivered on-time; farmer satisfaction rates.

1.4 Financial Needs

The total envelope of USD 132 million reflects the scale of national adoption over a decade. Component 1 (Extension Workforce and Field Schools, USD 36 million): recruitment and training of around 300 extension officers and 30 supervisors concentrated in high-risk districts, with an average fully loaded annual cost of USD 12,000 over nine active years (2027–2035), complemented by operating budgets for farmer field schools and mobility.

- **Component 2 (Demonstration Plots and Agroecology Trials, USD 3 million):** 200 district-level demo plots at USD 15,000 each to de-risk adoption of conservation tillage, intercropping, and moisture conservation.
- **Component 3 (Digital Advisory Platform, USD 10 million):** build and operate SMS/IVR advisories, seasonal forecast integration, multilingual content, and a helpdesk; includes connectivity and analytics.
- **Component 4 (Seed and Input Access, USD 20 million):** Installations of 30 agrometeorological weather stations, targeted seed vouchers and group procurement for stress-tolerant varieties and soil amendments to catalyze first-cycle adoption.
- **Component 5 (Training, Partnerships and Research, USD 18 million):** curriculum development and continuous capacity building for district agronomists.
- **Component 6 (Monitoring, Evaluation & Learning, USD 6 million):** outcome surveys, yield monitoring, and independent verifications.
- **Component 7 (O&M, Safeguards and Contingencies, USD 27 million):** environmental and social safeguards, grievance redress, gender-responsive outreach, and a 10–15% contingency to manage climate and market volatility.

1.5 Implementation Agency

- **The Ministry of Agriculture and Food Security (MoAFS)** and **SLARI** and **Scaling up Nutrition Secretary (SUN)** and the **Sierra Leone Meteorological Agency (SLMet)** will lead through a small Program Management Unit (PMU) embedded in the Extension Directorate.
- **SLMet** will lead the climate information generaration and dissemination
- **Njala University** will co-lead on Agroecology research, training-of-trainers, and data quality assurance.
- District Agricultural Officers will anchor delivery, while farmer-based organizations including National Farmers Federation of SL implement field schools.
- Private mobile operators will provide SMS/IVR channels under performance-based contracts.
- A National Steering Committee (MoAFS, MoECC, SLMet, Directorate of Food and Nutrition, Agroecology Plattform/Network of SL, EPA-SL, Statistics SL, farmer unions, and development partners) will meet semi-annually to approve work plans and review indicators.
- Funds will be channelled via MoAFS with output-based grant windows for farmer groups to preserve local ownership and accountability.

1.6 Implementation Schedule

- **2025–2026:** Selection of 200 demo sites.
- **2027–2030:** Phase I scale-up across priority chiefdom clusters, with two full agricultural seasons per year aligned to local calendars; mid-term review in 2029.
- **2031–2035:** Phase II nationwide expansion and consolidation, with graduation pathways for farmer groups, integration into routine extension budgets, and an endline evaluation in 2035.

2 Irrigation and Water Harvesting

2.1 Detailed Description

This measure is highly relevant given Sierra Leone's vulnerability to erratic rainfall. It will build upon solar-pumping programmes under the Smallholder Commercialisation and Agribusiness Development Project (SCADeP) and the Feed Salone irrigation roadmap.

It will focus on expanding community-managed schemes, strengthening Water User Associations, and linking solar-pumping to renewable energy initiatives under the Ministry of Energy.

Deploy community-managed irrigation on 45,000 hectares including motorized solar pumps, gravity-fed schemes, and water harvesting structures (micro-dams, contour bunds, farm ponds). Establish water user associations, integrated landscape management approach, maintenance funds, and technician training. Integrate soil moisture monitoring and deficit irrigation scheduling to maximize water-use efficiency.

The measure will strenghten maintenance models and cost recovery, which have been weak points in past irrigation projects.

2.2 Vulnerability Addressed

Increasing intra-seasonal dry spells and erratic rainfall reduce crop establishment and yields; limited irrigation coverage constrains dry-season production.

2.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** 30,000 hectares brought under supplemental irrigation; dry-season vegetable production doubled in target districts; water-use efficiency improved by 20%.
- **2035:** 60,000 hectares equipped; climate-resilient double-cropping common in irrigated clusters; 30% increase in smallholder incomes in beneficiary communities.
- **Key Indicators:** Hectares irrigated; number of functional solar pump systems; cropping intensity; water productivity (kg/m^3); % systems with maintenance plans funded.

2.4 Financial Needs

USD 180 million reflects capex for irrigation assets and durable governance/O&M.

- **Component 1 (Solar Pumping Kits and Distribution, ~USD 60 million):** ~5,000 kits (average 5 ha/kit) at ~USD 12,000 including storage tanks and control systems.
- **Component 2 (Micro-dams, Farm Ponds, and Contour Bunds, ~USD 55 million):** **earthworks** and lining to stabilize supply and attenuate peak flows.
- **Component 3 (On-farm Piping and Water-use Efficiency, ~USD 20 million):** low-pressure conveyance, valves, and metering to support deficit irrigation scheduling.
- **Component 4 (Water User Associations and O&M Funds, ~USD 15 million):** establishment, training, legal bylaws, and initial capitalization of maintenance funds.
- **Component 5 (Technician Training, Spares and Service Networks, ~USD 10 million):** district-level service hubs and spare parts inventories.
- **Component 6 (Design, Supervision, M&E and Contingency, ~USD 20 million):** engineering, safeguards, remote monitoring, and ~10% contingency.

2.5 Implementation Agency

- Co-leads are MoAFS and the Ministry of Water Resources.
- Water User Associations (WUAs) will own and operate schemes under bylaws approved by local councils. Private suppliers will install systems using framework agreements and performance warranties.
- Assigned officers will coordinate abstraction permits to avoid cumulative impacts.
- A technical working group (MoAFS, Water Resources, NWRMA, SLMet, EPA-SL, local councils, and WUA representatives, Ministry of Energy) will arbitrate site selection and oversee compliance.
- National Water Resources Management Agency (NWRMA).

2.6 Implementation Schedule

- **2025–2026:** engineering designs, watershed screening, and WUA formation.
- **2027–2032:** clustered rollouts by agro-ecological zone, beginning with drought-prone districts; post-construction audits after each dry season.
- **2033–2035:** expansion to late-adopter communities, reinforcement of O&M funds, and asset condition surveys in 2034–2035.

3 Seed Transformation Systems, Post-Harvestand Storage

3.1 Detailed Description

This measure builds upon the National Seed Policy (2021) and ongoing ECOWAS Rice Observatory-supported seed hubs and the Post-Harvest Loss Reduction Strategy (MAFFS, 2022)

Establish a national climate-resilient seed system with certified seed multiplication for stress-tolerant varieties, farmer managed community and regional seed banks and regional knowledge HUBs, and quality assurance. Complement with post-harvest loss reduction—hermetic storage, improved drying floors, and cold chain pilots for perishables—to stabilize availability and prices.

3.2 Vulnerability Addressed

Seed insecurity after climate shocks and high post-harvest losses (pests, mold, aflatoxin) undermine food security and incomes.

3.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** Four regional seed hubs operational; 80,000 households access certified seed annually; post-harvest losses for rice and maize reduced to 15% in target districts. Baseline 2025: 35% losses.
- **2035:** At least 75 community seed banks will be operational, conserving and distributing at least 100 climate-resilient local varieties, with 40% of seed accessed via farmer –managed systems. National coverage of certified climate-resilient seed; post-harvest losses reduced to 15%; cut by 30% moist content in monitored value chains.
- **Key Indicators:** Tonnes of certified seed produced; households served; % moisture at storage; post-harvest loss rates; aflatoxin test pass rates.

3.4 Financial Needs

USD 120 million balances seed security with loss reduction.

- **Component 1 (Regional Seed Hubs and Multiplication, ~USD 24 million):** four hubs (land, nurseries, processing) and outgrower contracts.
- **Component 2 (Quality Assurance and Labs, ~USD 10 million):** seed certification, germination testing, and phytosanitary capacity.
- **Component 3 (Hermetic Storage and Drying, ~USD 12 million):** household and cooperative-scale hermetic solutions and improved drying floors.
- **Component 4 (Cold Chain Pilots for Perishables, ~USD 12 million):** solar-assisted cold rooms (**this is a co-benefit of a mitigation measure**) and logistics partnerships.
- **Component 5 (Post-Harvest Training and Market Linkages, ~USD 8 million);**
- **Component 6 (Monitoring and Surveillance, ~USD 6 million);**
- **Component 7 (Safeguards, Governance and Contingency, ~USD 18 million).**
- **Component 8 (Seed exchanges, participatory breeding, local innovation support, ~USD 1m).**

3.5 Implementation Agency

- MoAFFS leads with the Sierra Leone Standards Bureau overseeing quality protocols.
- SLARI, Scaling up Nutrition.
- Njala University provides varietal trials and seed technology support.
- WFP and FAO partner on storage pilots and community training.
- Seed enterprises and cooperatives sign performance-based contracts tied to certified volumes and quality thresholds.

3.6 Implementation Schedule

- **2025–2027:** establish seed hubs, QA systems, and drying infrastructure.
- **2028–2032:** expand multiplication networks and storage uptake; introduce cold-chain pilots for high-value perishables.
- **2033–2035:** national consolidation, with periodic aflatoxin surveillance and market stabilization mechanisms.

4 Climate Resilient Water Supply and Sanitation

4.1 Detailed Description

This measure is based upon the National Water Supply and Sanitation Policy (2020) and the Freetown WASH and Aquatic Environment Revamping Project led by MoWR and Freetown City Council. Many solar boreholes and rural WASH pilots are already being implemented by UNICEF, GIZ, and the World Bank.

This measure will build on these by strengthening monitoring and maintenance systems, especially through public-private contracts and digital monitoring. It would also help to specify how climate risk screening will be applied to new WASH infrastructure, not just expansion.

Expand access to safe water through

a) Conventional methods: Solar-powered boreholes with elevated storage, chlorination, and climate-resilient distribution to rural communities.
b) Non-conventional methods: Harvested water in water spring and other sources

Introduce remote monitoring (flow, uptime) and preventive maintenance contracts with local enterprises; integrate hygiene promotion and drought contingency protocols.

Expand access to sustainable sanitation through:

a) Community mobilisation: build and improved toilets and thereby end open defecation resulting in clean and safe environment
b) Private sector engagement: for construction of communal toilets in strategic locations across the country including coastal areas resulting in safe marine ecosystem.

4.2 Vulnerability Addressed

Drought and rainfall variability compromise rural water security; hand-pump downtime and saline intrusion reduce safe access.

4.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** 350,000 people served with reliable safe water year-round; average system uptime ≥ 95%.
- **2035:** 750,000 people served with sustainable climate resilient sanitation services
- **Key Indicators:** Number of functional solar water systems; uptime (%); litres/person/day; diarrheal disease incidence; O&M response times.

4.4 Financial Needs

USD 100 million

- **Component 1 (Drilling and Borehole Development, ~USD 45 million):** siting, drilling, test pumping, and well development.
- **Component 2 (Solar Arrays, Pumps, Elevated Storage, ~USD 30 million):** standardized packages with protection and controllers.
- **Component 3 (Disinfection, Distribution and Taps, ~USD 10 million):** chlorination, standpipes, and limited household connections.
- **Component 4 (Remote Telemetry and O&M Contracts, ~USD 7 million):** uptime monitoring and service-level agreements with local enterprises.
- **Component 5 (Hygiene Promotion, Water Quality Testing, M&E and Contingency, ~USD 8 million).**

4.5 Implementation Agency

- Ministry of Water Resources leads with district WASH units; National Water Resource Management Agency (NWRMA), MoHS supports water quality surveillance. UNICEF/NGOs facilitate community mobilization and tariff setting.
- Private service providers maintain systems under verifiable uptime KPIs.
- Local councils approve sitting and oversee grievance redress.

4.6 Implementation Schedule

- **2025–2026:** hydro-geological surveys and procurement frameworks.
- **2027–2031:** annual waves of 500–700 systems prioritized by water stress and disease incidence.
- **2032–2035:** system replacements, extensions, and tariff/O&M performance reviews.

Water Resources & Coastal Management

Photo Credit: Liberia National Cultural Festival

5 Integrated Watershed Management for Rokel, Sewa, Jong/Panpana and Transboundary River Basins (Moa, Mano, Great and Little scarcies).

5.1 Detailed Description

This measure is linked to the ongoing National Integrated Water Resources Management (IWRM) Plan and the GCF-funded Water Security Readiness Project. The idea of basin committees and hydromet nodes is already being developed under the FAO and GWP programmes. There are also synergies with reforestation and soil restoration activities under the National Forest Inventory and REDD+ Readiness Programme for better alignment across sectors.

Develop and implement basin plans that integrate reforestation of critical slopes, riverbank stabilization, erosion control, managed aquifer recharge, and water allocation rules across agriculture, domestic, and ecosystem needs. Establish basin committees with data-sharing agreements and hydromet nodes. Programs must include safe water access for children, protection from GBV during water collection, and child-sensitive safeguards in relocation and community forestry initiatives.

5.2 Vulnerability Addressed

Upstream deforestation and land degradation intensify flood peaks and dry-season scarcity; weak institutions for water allocation heighten conflict risk. Protection from GBV and strengthening of child safeguarding

5.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** Basin plans adopted; 30,000 hectares of priority slopes under restoration and erosion control; hydromet stations upgraded at 50 sites.
- **2035:** Sustained baseflows in dry season increased by ≥10% in pilot sub-catchments; sediment loads reduced by ≥20% at monitoring points.
- **Key Indicators:** Hectares restored; km of riparian buffer established; baseflow indices; sediment concentrations; number of basin committee decisions enforced.

5.4 Financial Needs

USD 120 million anchored in large-scale nature-based works.

- **Component 1** (Basin Planning and Institutions, ~USD 5 million);
- **Component 2** (Slope Restoration/Erosion Control, ~USD 60 million for ~30,000 ha at ~USD 2,000/ha);
- **Component 3 (**Hydrometeorology infrastruture Upgrade, ~USD 7.5 million for ~50 stations at ~USD 150,000/site);
- **Component 4** (Riverbank Stabilization and Riparian Buffers, ~USD 25 million);
- **Component 5** (Community Stewardship Incentives and Compliance, ~USD 12 million);
- **Component 6** (M&E and Contingency, ~USD 10.5 million).

5.5 Implementation Agency

Co-leads are Ministry of Water Resources, SLMet, NWRMA andEPA-SL. Basin committees with local councils, MoAFS, and community representatives will approve sub-catchment plans and oversee compliance. Universities and NGOs support restoration design and monitoring; hydromet is maintained by SLMet and NWRMA.

5.6 Implementation Schedule

- **2025–2026**: Basin plans, institutions, and priority site designs.
- **2027–2030:** Implement priority sub-catchments and hydromet network; publish annual basin scorecards.
- **2031–2035:** Expand to additional sub-catchments and embed O&M with local budget lines.

6 Coastal Resilience: Mangrove Restoration and Urban Flood Protection

6.1 Detailed Description

This measure strongly with current national priorities. The World Bank's Resilient Urban Sierra Leone Project, the FAO-supported Blue Carbon initiative, and the Wetlands International mangrove restoration programme are all already addressing this issue. Hence, this measure will coordinate these overlapping efforts, streamline coastal land-use planning, and expand community agreements for mangrove protection to avoid duplication.

This measure proposes the protection, restoration, and sustainably management of Sierra Leone's wetlands, forests and mangroves, focusing on high-risk deforestation fronts and coastal ecosystems (e.g., Sherbro, Scarcies). Interventions include: (i) community forestry agreements with performance-based incentives; (ii) protected area strengthening (patrols, boundary demarcation, fire management, livelihood alternatives); (iii) assisted natural regeneration (ANR) and enrichment planting with native species; (iv) mangrove restoration and hydrological rehabilitation; (v) land-use planning and a basic land cadastre to reduce encroachment; and (vi) sustainable woodfuel measures where appropriate (efficient kilns, regulated harvest). Protection of embarkments, sea defense, retaining walls, tree planting, boardwalks, Gender-inclusive governance and benefit-sharing are integrated across all activities.

Site selection prioritizes biodiversity value, carbon density (including blue carbon), community readiness, and threat level. Nursery networks and local contractor models will deliver seedlings and ANR services. Social safeguards, FPIC principles, and grievance redress mechanisms apply across the program.

6.2 Vulnerability Addressed

Sea-level rise, storm surges, and unplanned urban expansion drive coastal erosion and frequent urban flooding and landslides. This adaptation measure is a **co-benefit of the mitigation measure**

Outcomes (2030 and 2035)

- **2030:** 30 retaining walls and embarkments constructed around highly vulnerable coastal areas, 10,000 mangroves restored 25,000 hectares of mangrove will be conserve and protected. 10 boardwalks constructed around mangrove forest areas.
- **2035:** construction of retaining walls and embarkments for vulnerable tourism beach areas and communities around coastal communities, 20, 000 hectares of mangroves restored, committed to conserve and protect 100,000 hectares of mangrove and designate at least 2 mangrove parks, protected and restored, 20 boardwalks constructed around mangrove forest areas, develop policies and laws around sand mining in coastal communities, provides alternative livelihood and skill training opportunities for youth in sand mining.
- **Key Indicators:** Number of retaining walls and embarkments constructed, number of hectares of mangrove trees planted and restored, number of youths trained and provided with alternative livelihood opportunities, Assessments, research, and innovative strategies for seaweed mitigation along coastal areas.

Financial Needs

USD 150 million for coastal resilience, mangrove restoration and urban flood protection

- **Component 1** (Retaining walls and embarkment - $50 million)
- **Component 2** (30,000 hectares of mangrove planted and restored – $50 million)
- **Component 3** - Conserve and protect 100,000 hectares of mangrove and designate 2 mangrove parks- $20 million
- **Component 4** (board walk constructed- $10 million)
- **Component 5** (Sand mining policies and laws developed - $1 million).
- **Component 6** (Livelihood skill training opportunities for youth- $9 million
- **Component 7** - Seaweed Mitigation and coastal waste management- $ 10 million

Implementation Agency

Leader: Ministry of Environment and Climate Change

Collaborating: Ministry of Tourism and Cultural Affairs, National Tourist Board Sierra Leone, NPAA, Local Councils, NDMA, EPA, Private Sector-SLAHTOP , MoPED, Ministry of Local Government and Community/ Decentralization Secretariat

Implementation Schedule

- **2025–2026:** Assessments and stakeholder consultations
- **2027–2034:** Project implementation
- **2035:** Project Monitoring and endline evaluation.

Health

7 Climate-Resilient Health Facilities (Power, Water, and Safe Siting) and health systems strengthening

7.1 Detailed Description

This measure is linked to the Ministry of Health and Sanitation's Climate and Health Adaptation Plan (2023) and the World Bank/UNDP-supported Primary Health Care Resilience Project. The emphasis should be on scaling and standardising facility retrofits, using national construction codes already under review.

A strong and practical measure, but this should be tied to the Ministry of Health and Sanitation's Climate and Health Adaptation Plan (2023) and the World Bank/UNDP-supported Primary Health Care Resilience Project. The emphasis should be on

Retrofit and construct climate-resilient facilities with elevated platforms in flood-prone zones, reinforced roofs and drainage, on-site solar with battery storage, and resilient WASH systems. Prioritize district hospitals and 50 high-traffic primary health units; include cold-chain reliability for vaccines. As well as the infrastructure, emphasis should be on strengthening the resilience of health systems across all key building blocks with emphasis on supply chain system strengthening, human resources, financing and health information systems/surveillance strengthening.

Decarbonisation of health care services. Assess the barriers and perceptions surrounding climate change and its impacts on health and nutrition services as well as diets. Use the barrier analysis to conduct social and behaviour change communication on the risks as well as mitigation and adaptation measures to address climate change on the overall health and wellbeing of the population especially the most vulnerable.

Promote practices that reduce the vulnerability to climate change.

Also, ensure resilient health systems include child-friendly services, psychosocial support, and safeguarding protocols during climate emergencies.

Its co-benefits with energy access, linking this with the Health Facility Electrification Plan led by the Ministry of Energy and UNOPS.

7.2 Vulnerability Addressed

Floods and heatwaves disrupt service delivery; unreliable power supply, improper medical waste management system and water undermine essential care and vaccine cold chains.

7.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** 50 primary health facilities climate-proofed with ≥ 80% renewable power fraction; zero cold-chain losses attributable to power outages in upgraded sites. 50% of healthcare facilities would have adopted and implemented adequate WASH services in healthcare facilities using the WASHFIT model, proper healthcare waste management system are established to ensure quality of care and patients, staff and visitors safety.
- **2035:** All district hospitals and 150 PHUs upgraded; health facility downtime from climate-related causes reduced by ≥ 60% vs. 2020 baseline.
- **Key Indicators:** Number of facilities upgraded; % renewable power fraction; cold-chain excursion events; downtime hours; WASH service levels.

7.4 Financial Needs

USD 75 million for resilient service continuity.

- **Component 1 (District Hospital Retrofits, ~USD 25 million):** ~14 district hospitals at ~USD 4 million each (structural works, power, WASH).
- **Component 2 (PHU Upgrades, ~USD 40 million):** ~150 PHUs at ~USD 0.5 million each (solar+battery, water, cold chain).
- **Component 3 (Equipment and ICT, ~USD 5 million);**
- **Component 4 (Design, Supervision, M&E, Safeguards and Contingency, ~USD 5 million).**

7.5 Implementation Agency

MoHS leads via an Infrastructure PMU with engineers and biomedical staff. Local councils manage site access and community engagement. National Disaster Management Agency (NDMA), Sierra Leone Meteorological Agency (SLMet), Private EPC firms deliver under design-build-operate or warranty-backed contracts. UNICEF/WHO provide standards and quality assurance.

7.6 Implementation Schedule

- **2025–2026:** audits and standard designs; tender first hospital and PHU bundles.
- **2027–2032:** rolling retrofits in 3–4 annual tranches; quarterly continuity-of-service audits.
- **2033–2035:** finalization, O&M contracts renewal, and endline evaluation.

8 Climate-Informed Disease Surveillance and Early Action

8.1 Detailed Description

This measure is linked to the Sierra Leone's DHIS2 platform which already operational, and climate-linked modules for malaria and cholera surveillance are being piloted with WHO and CDC support.

Integrate meteorological data and seasonal forecasts into DHIS2-based surveillance for malaria, cholera, malnutrition and other climate-sensitive diseases. Deploy analytics for hotspot prediction, stock pre-positioning, and targeted community outreach. Establish district rapid response teams with clear SOPs. Conduct environmental impact assessments and track progress including monitoring air pollution, low-carbon healthcare facilities and early warning system for climate-sensitive diseases.

It also links to the Public Health Emergency Operations Centre (PHEOC) strengthening institutional relevance.

8.2 Vulnerability Addressed

Climate variability alters disease vectors and transmission pathways; current systems lack predictive capabilities and surge logistics.

8.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** Operational climate-informed surveillance in all districts; mean detection-to-response time reduced by 25%.
- **2035:** Outbreak size and duration for cholera and malaria reduced by ≥ 30% in districts with predictive interventions.
- **Key Indicators:** Detection-to-response time; number of districts using climate-triggered alerts; stockout rates; outreach coverage.

8.4 Financial Needs

USD 30 million

- **Component 1** (Data Integration and Platform, ~USD 5 million);
- **Component 2** (Analytics and Forecasting, ~USD 6 million);
- **Component 3** (Laboratory Capacity, ~USD 7 million);
- **Component 4** (Rapid Response Teams and Logistics, ~USD 6 million);
- **Component 5** (Training, M&E and Contingency, ~USD 6 million).

8.5 Implementation Agency

MoHS leads; the Met Agency and EPA-SL supply climate data. District health management teams operate response cells. National Disaster Management Agency (NDMA), Office of National Security (ONS), National Public Health Agency (NPHA), A national technical committee sets alert thresholds and validates triggers for action and stock pre-positioning.

8.6 Implementation Schedule

- **2025–2026:** platform build and pilot in two regions.
- **2027–2029:** national deployment with SOPs; 2029 mid-term review.
- **2030–2035:** refinement of thresholds, integration of new vectors, and periodic surge simulations.

9 Integrated Vector Management and Heat-Health Action Plans

9.1 Detailed Description

This measure builds on the National Malaria Strategic Plan (2021–2025) and the National Disaster Management Agency's (NDMA) work on heatwave preparedness. The focus is on cross-sector coordination (between health, meteorology, and local councils) avoiding parallel systems.

Expand integrated vector control (ITNs, indoor residual spraying where appropriate, larval source management) and establish heat-health action plans with early warnings, cooling shelters in high-risk urban wards, and public guidance for vulnerable groups (elderly, pregnant women).

It will set up collaboration pathways (e.g., district-level coordination units) and link with the existing WHO support for urban heat-health early warnings in Freetown.

9.2 Vulnerability Addressed

Rising temperatures and altered rainfall patterns increase vector habitats and heat stress risk, especially in dense urban settlements.

9.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** Household ITN coverage and usage ≥ 85% in target districts; heat early warning messages reach ≥ 70% of at-risk population in Freetown.
- **2035:** Sustained vector indices below epidemic thresholds in target zones; heat-related morbidity reduced by ≥ 25% vs. 2025 baseline.
- **Key Indicators:** ITN ownership/usage rates; entomological indices; number of heat alerts issued; health facility heat-related case counts.

9.4 Financial Needs

USD 45 million.

- **Component 1** (ITNs/IRS and Larval Source Management, ~USD 25 million);
- **Component 2** (Heat-Health Plans and Cooling Shelters, ~USD 8 million);
- **Component 3** (Risk Communication and Community Campaigns, ~USD 4 million);
- **Component 4** (Surveillance, Training, M&E and Contingency, ~USD 8 million).

9.5 Implementation Agency

MoHS leads implementation with FCC managing urban heat plans and shelter operations. Community health workers, National Public Health Agency (NPA), Red Cross, and NGOs deliver last-mile distribution and awareness. Procurement aligns with donor malaria programs to leverage pricing.

9.6 Implementation Schedule

- **2025–2026:** planning and procurement; align ITN distribution before rainy seasons.
- 2027–2030: sustained campaigns and heat-alert operations each dry season; operational review in 2029.
- 2031–2035: maintenance distributions and integration into routine public health budgets.

10 Environmental Health Management Action Plan

10.1 Detailed Description

Enhance proper environmental health intervention, reducing climate impact at health care facilities, households and communities. By addressing environmental health issues at healthcare facilities and the immediate environment e.g. tree planting, household air pollution (indoor and outdoor), fumigation of healthcare facilities (vector control). Installation of a renewable energy system, regular monitoring, community awareness campaign, and research on environmental health impacts.

10.2 Vulnerability Addressed

The increase in use of fossil fuel, coal, and wood, rising temperatures and altered rainfall patterns increase the vulnerability of the population's health, which contributes to an unhealthy environment.

10.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** 50% of healthcare facilities are climate resilient and ensure service delivery in the face of climate impact through solar power supply.
- **2030:** Sustained adequate environmental health services at healthcare facilities, which will contribute to the reduction of morbidity by ≥ 25%.
- **2030:** Reduce household pollution by ≥ 5% through the introduction of clean cooking.
- **2035:** 50% of healthcare facilities will have environmentally friendly facilities through tree planting.
- **2035:** Sustained healthcare facilities vector control to reduce vector-related morbidity by ≥ 25%.

10.4 Financial Needs

USD 30 million

Education


1- Construire les adverbes à partir d
Juste
Évident
Joli
Brillant
2- Analyse la première
phrase
Douala

11 Disaster and Climate Risk Management in Schools

11.1 Detailed description

Education continuity in Sierra Leone is increasingly at risk due to climate-induced disasters such as floods, landslides, and heatwaves that damage infrastructure and disrupt teaching and learning. To address this, the education sector will enhance system-wide resilience through stronger disaster preparedness, response, and recovery mechanisms across national, district, and school levels. Key interventions will include the development and implementation of school-based disaster-preparedness and learning-continuity plans; the re-establishment of the Emergency Education Taskforce as a standing coordination mechanism; the integration of schools into the national early-warning system; and the establishment of clear protocols for the safe use of schools as evacuation centres during emergencies. These actions will ensure that children—especially girls and learners with disabilities—can continue accessing safe, inclusive, and uninterrupted education during climate shocks, while schools also serve as key community hubs for disaster awareness and resilience building.

11.2 Vulnerability Addressed

- Frequent flooding, heatwaves, and landslides damage school infrastructure, leading to temporary or prolonged closures.
- Weak institutional preparedness: most schools lack contingency or learning-continuity plans.
- Gendered impacts: girls face increased risk of absenteeism or dropout when schools close due to climate shocks. All school disaster-preparedness and continuity plans should integrate child protection protocols, including safe use of schools as evacuation centres, referral systems, and GBV prevention.
- Limited coordination between MBSSE, NDMA, and local councils for school-level disaster response.

11.3 Outcomes (2030 and 2035) (Indicators)

2030

- 20% of schools with school-based disaster-preparedness plans
- 20% of schools with learning-continuity plans for climate disruptions
- National guidelines for using schools as evacuation centres developed
- Emergency Education Taskforce re-established and functional nationwide
- 20 % of schools with access to early warning systems

2035

- 35% of schools with school-based disaster-preparedness plans
- 35% of schools with learning-continuity plans for climate disruptions
- 35 % of schools with access to early warning systems

11.4 Financial Needs

USD 6 million

11.5 Implementing agency

- **Lead:** Ministry of Basic and Senior Secondary Education (Sierra Leone), Teacher Service Commission (TSC), Ministry of Higher and technical Education

- **Key Partners:** National Disaster Management Agency (Sierra Leone), EPA, Local Councils, Teacher Training Institutions, Ministry of Social Welfare, Ministry of Gender and Children's Affairs, UNICEF, UNESCO, UNDP, World Bank, Save the Children, and development partners, School Management Committees.

11.6 Implementation Schedule

2025 - 2030

- Finalize and roll out national DRM plan and school-based disaster preparedness guidelines.
- Establish Emergency Education Taskforce and coordination mechanisms.
- Pilot early-warning system integration and school-based disaster preparedness guidelines.
- Train school heads, teachers, and SMCs on disaster preparedness and learning continuity
- Develop protocols for safe use of schools as evacuation centres.

2031 - 2035

- Scale up school-based disaster preparedness planning and early-warning integration nationwide.
- Institutionalize DRM in education sector planning and EMIS.
- Expand training and capacity building.
- Strengthen protocols for protection and inclusion.
- Regularly update and review DRM practices.

12 Climate-Resilient Infrastructure and Safe Access

12.1 Detailed description

This measure focuses on ensuring that school infrastructure, access routes, and learning environments are resilient to current and future climate risks. Actions include conducting a national school-infrastructure inventory through the Annual School Census and EMIS to map vulnerability; retrofitting and upgrading existing schools using climate-smart materials and designs; and ensuring new school construction complies with national climate-resilient building standards.

In parallel, WASH and energy facilities will be upgraded through rainwater harvesting systems, improved drainage, and solar electrification of public schools, enhancing safety and continuity of learning. Guidance will also be developed for the safe use of schools as evacuation centres during disasters.

12.2 Vulnerability Addressed

- **Physical vulnerability:** many schools are constructed with non-permanent materials, exposing learners to flooding and wind damage.
- **Unsafe access:** poor roads and bridges hinder children's mobility during heavy rainfall, particularly in remote areas.
- **Lack of data:** absence of infrastructure inventory limits evidence-based planning and prioritisation of rehabilitation.
- **Inefficient energy and WASH systems exacerbate school closures and unsafe conditions.**

12.3 Outcomes (2030 and 2035) (Indicators)

2030

- 8% of schools retrofitted or built to climate-smart standards
- Increased by 20% the number of schools that meets climate-smart WASH facility standards
- National school-infrastructure inventory integrated into EMIS (Yes by 2030, Yes by 2035)

2035

- 10% of schools retrofitted or built to climate-smart standards
- Increased by 35% the number of schools that meets climate-smart WASH facility standards

12.4 Financial Needs

USD 62 million

12.5 Implementing agency

- **Lead:** Ministry of Basic and Senior Secondary Education (Sierra Leone), Ministry of Works and Public Assets, Ministry of Water Resources and Sanitation, Ministry of Energy

- **Key Partners:** National Disaster Management Agency (Sierra Leone), Ministry of Environment and Climate Change, EPA, Local Councils, UNICEF, UNESCO, World Bank, NGOs, and development partners, School Management Committees.

12.6 Implementation Schedule

2025 - 2030:

- Map school infrastructure vulnerabilities and integrate into EMIS.
- Develop climate-smart construction guidelines.
- Pilot retrofitting and upgrading of schools and access routes.
- Improve WASH and energy systems.
- Strengthen inter-ministerial coordination on infrastructure.

2031 - 2035:

- Scale up climate-smart construction and retrofitting.
- Expand WASH and renewable energy coverage.
- Ensure all new infrastructure complies with standards.
- Institutionalize maintenance and monitoring.

13 Climate and Environmental Education in Curricula and Teacher Training

13.1 Detailed description

Building knowledge and skills for climate action among learners and educators is central to long-term resilience. This measure supports the integration of climate and environmental education across curricula for primary, secondary, and non-formal education. It also includes national pre-service and in-service teacher training programmes on climate change, environmental stewardship, and disaster preparedness.

13.2 Vulnerability Addressed

- Low climate literacy limits understanding of environmental risks and adaptation options.
- Teachers lack training on integrating climate content into lessons.
- Students and communities have limited awareness of environmentally sustainable practices.

13.3 Outcomes (2030 and 2035) (Indicators)

2030

- For primary-SSS, climate-change education mainstreamed in core subjects for all schooling levels
- 15% of teachers trained on climate and environment education
- 15% of schools with access to climate-education resources
- 50% of primary-senior secondary schools with environment/nature or climate clubs (baseline: 1112 schools (9%) in 2024)

2035

- For preprimary-SSS, climate-change education mainstreamed in core subjects for all schooling levels
- 40% of teachers trained on climate and environment education
- 40% of schools with access to climate-education resources
- 80% of primary-senior secondary schools with environment/nature or climate clubs

13.4 Financial Needs

USD 8 million

13.5 Implementing agency

- **Lead:** Ministry of Basic and Senior Secondary Education (Sierra Leone), Teacher Service Commission (TSC), Ministry of Higer and technical Education, Teacher Training Institutions.

- **Key Partners:** National Disaster Management Agency (Sierra Leone), EPA, Local Councils, Ministry of Social Welfare, Ministry of Gender and Children's Affairs, UNICEF, UNDP, Save the Children, NGOs and development partners.

13.6 Implementation Schedule

2025-2030:

- Finalize climate change education teaching and learning materials for primary and JSS.
- Deliver teacher training on climate change for primary-SSS.
- Provide climate education materials.
- Expand school climate/environment clubs.

2031-2035:

- Extend curriculum to pre-primary and SSS.
- Scale teacher training and integrate into TTI/CPD.
- Expand resource distribution.
- Increase club coverage nationwide.
- Embed monitoring into EMIS and QA systems.

14 Greening School Communities and Operations

14.1 Detailed description

This measure promotes climate-smart operations within schools, linking environmental stewardship with community adaptation. Activities include school-based tree-planting, composting, and waste-management programmes, as well as integration of renewable energy and clean-cooking technologies into school operations and feeding programmes.

14.2 Vulnerability Addressed

- High waste generation and limited waste management in schools contribute to pollution and GHG emissions.
- Dependence on firewood for school feeding contributes to deforestation.
- Limited green spaces in school compounds reduce natural cooling and biodiversity.

14.3 Outcomes (2030 and 2035) (Indicators)

2030

- 20% of schools adopting waste-segregation or composting systems
- 20% of schools practicing on-site composting and recycling (baseline to be collected)
- 20% of schools using clean-cooking
- 20% of schools using renewable energy sources
- 20% of schools which have rainwater harvesting system

2035

- 35% of schools adopting waste-segregation or composting systems
- 35% of schools practicing on-site composting and recycling (baseline to be collected)
- 35% of schools using clean-cooking
- 35% of schools using renewable energy sources
- 35% of schools which have rainwater harvesting system

14.4 Financial Needs

USD 10 million

14.5 Implementation Agency

- **Lead:** Ministry of Basic and Senior Secondary Education (Sierra Leone), Teacher Service Commission (TSC), Ministry of Higer and technical Education, Ministry of Environment and Climate Change, Ministry of Energy
- **Key Partners:** National Disaster Management Agency (Sierra Leone), EPA, Local Councils, Ministry of Social Welfare, Ministry of Gender and Children's Affairs, UNICEF, UNESCO, World Bank, Save the Children, and development partners, School Management Committees.
- **Implementation Modality:** Integration into education-sector planning and infrastructure programmes, with community participation, and partnerships with private sector for renewable energy and climate-resilient construction.

14.6 Implementation Schedule

2025-2030:

- Develop national green school guidelines.
- Pilot waste management, composting, clean cooking, and solar/rainwater systems.
- Engage SMCs and communities.
- Promote environmental stewardship in schools.

2031-2035:

- Scale up green initiatives nationally.
- Institutionalize incentives and recognition for green schools.
- Integrate renewable energy and waste management in operations.
- Link greening with community adaptation initiatives.
- Monitor and report on progress.

Infrastructure

15 Infrastructure Resilience in the Energy Sector

15.1 Detailed Description

This measure builds upon the Energy Transition and Green Growth Plan and Hydropower Master Plan, both addressing climate resilience.

Sierra Leone's energy infrastructure is highly exposed to climate risks such as heavy rainfall, flooding, rising temperatures, and extreme weather events. Hydropower plants suffer from droughts and irregular rainfall, transmission and distribution lines are vulnerable to storms and landslides, and thermal generation facilities face risks from coastal flooding and sea-level rise. Without adaptation, these risks could undermine energy security, disrupt supply to households and industries, and raise long-term maintenance and repair costs.

This measure focuses on enhancing the **climate resilience of energy infrastructure** through updated climate risk assessments, engineering standards, design standards, strategic planning, and investment in adaptive technologies. It includes reinforcing hydropower dams and reservoirs, elevating or rerouting transmission lines in flood-prone areas, integrating resilient materials into infrastructure, upgrading drainage systems around energy facilities, and strengthening coastal defenses for generation plants near the shoreline. It also requires mainstreaming climate risk assessments into all energy planning, adopting disaster preparedness protocols, and building redundancy in supply systems, including decentralized renewable energy solutions.

15.2 Vulnerability Addressed

- Physical damage to hydropower, transmission lines, and thermal plants from floods, storms, and landslides.
- Reduced hydropower generation during droughts and erratic rainfall.
- Economic risks from frequent outages, high repair costs, and lost productivity.
- Social risks from unreliable electricity supply, particularly for health, education, and rural communities.

15.3 Outcomes and Indicators (2030 and 2035)

2030

- Climate risk and vulnerability assessments conducted for all major energy assets.
- At least 50% of new energy infrastructure projects built to climate-resilient design standards.
- Pilot programs for flood-proofing substations and reinforcing hydropower facilities implemented.

2035

- Over 80% of critical energy infrastructure (hydropower, thermal plants, transmission lines) upgraded or designed for climate resilience.
- Significant reduction in climate-related power outages nationwide.
- Increased capacity of decentralized renewable systems to provide backup during disruptions.

15.4 Financial Needs

The estimated cost is **USD 200 million** between 2025 and 2035, covering infrastructure upgrades, resilient design standards, flood defences, and capacity building. Funding sources will include:

- National infrastructure and energy budgets.
- International climate finance (Green Climate Fund, Adaptation Fund, Global Infrastructure Facility).
- Multilateral development bank loans (World Bank, AfDB).
- Public–private partnerships for energy infrastructure modernization.

15.5 Implementation Agencies

- **Lead:** Ministry of Energy.
- **Co-lead agencies:** Sierra Leone Electricity and Water Regulatory Commission, National Power Authority.
- **Supporting partners:** Environment Protection Agency–Sierra Leone (EPA-SL), Ministry of Works and Public Assets, local councils, and private energy developers.
- **International partners:** African Development Bank, World Bank, UNDP, UNEP, bilateral donors financing energy and infrastructure resilience.

15.6 Implementation Schedule

Phase I: Foundations and Risk Assessment (2025–2027)

- Carry out a nationwide **climate risk and vulnerability assessment** of existing energy assets, including hydropower plants, substations, transmission lines, and thermal facilities located in flood- or erosion-prone areas.
- Update **national energy infrastructure design standards** to reflect climate projections (flood maps, sea-level rise scenarios, and temperature extremes).
- Establish a **multi-agency task force** (Ministry of Energy, EPA-SL, Ministry of Works, private operators) to oversee climate-resilient energy planning.
- Develop and test **emergency preparedness and response protocols** for power outages caused by extreme weather.
- Launch **pilot reinforcement projects** such as elevated substations, storm-resistant transmission poles, and improved drainage around hydropower facilities.
- Begin training programs for engineers, contractors, and regulators on **climate-resilient design and maintenance practices**.

Phase II: Scaling Resilient Infrastructure (2028–2030)

- Retrofit priority **hydropower plants and reservoirs** with adaptive measures such as dredging to maintain water storage, improved spillway capacity, and slope stabilization.
- Relocate, elevate, or reinforce **transmission and distribution lines** in high-risk flood and landslide zones.
- Install **flood protection systems** (drainage, dikes, embankments) around critical substations and generation plants.
- Integrate **renewable energy microgrids and hybrid systems** as backup power solutions in vulnerable rural and peri-urban areas.
- Institutionalize **mandatory climate risk assessments** for all new power generation and grid expansion projects.

- Develop **coastal protection infrastructure** (seawalls, mangrove buffers) for thermal power plants near coastal zones.
- Introduce **public–private partnership frameworks** for financing climate-resilient energy projects.

Phase III: Full Integration and System Redundancy (2031–2035)

- Complete retrofitting of **all critical energy assets** to climate-resilient standards, focusing on national transmission corridors and urban substations.
- Expand **distributed renewable energy systems** (solar mini-grids, battery storage) to provide redundancy and ensure energy access during system failures.
- Establish a **national monitoring system** for climate impacts on energy infrastructure, linked to an MRV platform for adaptation.
- Mainstream **resilience clauses** into power purchase agreements and infrastructure contracts to enforce compliance with adaptation standards.
- Strengthen **cross-border energy interconnections** (e.g., through the West African Power Pool) to diversify supply and reduce national vulnerability to climate shocks.
- Implement **continuous capacity-building programs** for engineers, regulators, and utilities, supported by universities and training centers.
- Launch a **public awareness program** on the importance of resilient energy infrastructure to secure community support and attract investment.

16 Risk-Informed Urban Planning and Safe Relocation

16.1 Detailed Description

This measure is linked to the NDMA Resettlement Policy Framework, MoPED's National Resettlement Policy and the Freetown Structure Plan (2023). Relocation and hazard mapping are already underway in several communities through SLURC and FCC projects.

Develop risk-informed land-use plans using hazard maps (flood, landslide, coastal erosion) and implement voluntary, dignified relocation from the most dangerous sites, paired with serviced plots and livelihood support. Establish social safeguards and grievance redress mechanisms.

16.2 Vulnerability Addressed

High-density informal settlements on steep slopes and floodplains create recurrent disaster losses and loss of life.

16.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** City-scale hazard maps adopted; 10,000 residents relocated from extreme-risk zones to serviced plots; zero forced evictions.
- **2035:** Sustained reduction in casualties from landslides/floods by ≥ 50% vs. 2020 baseline; integrated land-use plans active in major cities.
- **Key Indicators:** Adoption of hazard-informed plans; number of households voluntarily relocated; availability of services at resettlement sites; casualty statistics.

16.4 Financial Needs

USD 50 million

- **Component 1** (Hazard Mapping and Planning, ~USD 5 million);
- **Component 2** (Social Dialogue, Safeguards, and GRM, ~USD 4 million);
- **Component 3** (Serviced Plots and Basic Infrastructure, ~USD 20 million for ~2,000 households at ~USD 10,000/plot);
- **Component 4** (Livelihood Packages and Services, ~USD 10 million);
- **Component 5** (M&E and Contingency, ~USD 11 million).

16.5 Implementation Agency

Ministry of Lands and FCC co-lead; NDMA ensures risk prioritization. Social protection agencies manage livelihood support; civil society monitors safeguards. A relocation task force validates eligibility and prevents forced evictions.

16.6 Implementation Schedule

- **2025 – 2027:** planning, social dialogue, and site servicing.
- **2027 – 2033:** voluntary relocations in waves synchronized with housing readiness; independent audits each year.
- **2033 – 2035:** aftercare services and monitoring of outcomes.

17 Climate-Proofing Roads and Bridges

17.1 Detailed Description

This aligns well with national infrastructure priorities and it is linked to the National Road Maintenance Strategy, SLRA's climate risk screening tool, and the World Bank's Transport Infrastructure Resilience Project.

Upgrade resilient design codes design standards and rehabilitate priority corridors with improved drainage, higher bridge clearances, scour protection, and climate-resilient materials. Introduce asset management systems that integrate climate risk and lifecycle maintenance budgeting.

17.2 Vulnerability Addressed

Intense rainfall and flooding cause frequent washouts and isolation of communities; transport disruptions impede emergency response and markets.

17.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** 600 km of priority roads rehabilitated with resilient standards; 40 bridges upgraded; asset management system operational in the roads agency.
- **2035:** 1,200 km upgraded cumulatively; average annual days of road closure on critical links reduced by ≥ 60% vs. 2020 baseline.
- **Key Indicators:** Km rehabilitated; number of bridges upgraded; days of closure; O&M budget execution rates; condition indices.

17.4 Financial Needs

USD 200 million

- **Component 1** (Standards Update and Design, ~USD 10 million);
- **Component 2** (Road Rehabilitation, ~USD 100 million for ~600 km at ~USD 0.3 million/km);
- **Component 3** (Bridge Upgrades, ~USD 50 million for ~40 bridges at ~USD 2.5 million each);
- **Component 4** (Drainage and Culverts, ~USD 30 million);
- **Component 5** (Asset Management System and O&M, ~USD 10 million); Component 6 (M&E, Safeguards, Contingency, ~USD 45 million).

17.5 Implementation Agency

The Roads Authority and Ministry of Transport co-lead. Local contractors execute works with supervision consultants; climate risk is embedded in designs. An inter-ministerial committee prioritizes corridors for connectivity and emergency access.

17.6 Implementation Schedule

- **(2025–2027) Planning and Feasibility:** **C**onduct a comprehensive climate vulnerability and adaptation assessment of the entire transport network, focusing on key roads, bridges, and ports. Finalize and adopt a new set of climate-resilient engineering standards for all future transport infrastructure projects. Develop a project pipeline and secure all necessary permits. Actively

mobilize international and domestic funding and finalize Public-Private Partnerships (PPPs) for key projects.

- **(2028–2032) Implementation:** **C**onstruction, retrofitting of existing infrastructure, and procurement of materials.
- **(2033–2035) Operationalization and Monitoring:** Establishment of a long-term monitoring system. All newly constructed and upgraded infrastructure becomes fully operational. Establish a **data-driven monitoring system** to track climate-related disruptions and measure the effectiveness of the upgrades.

18 Upgrading and reinforcing existing industrial infrastructure

This measure builds on the Industrial Policy (2023) and the ongoing UNIDO/MAF projects that promote resource-efficient and cleaner production.

The industry typically employs outdated technologies and has a limited capacity for research and development. This measure involves the physical retrofitting and reinforcement of industrial facilities in the Industrial Processes and Product Use (IPPU) sector to protect them from climate-related damage and disruption.

The measure will also highlight how industrial retrofitting can be supported by green finance instruments and energy audits, linking directly with the National Energy Efficiency Policy for coherence.

18.1 Vulnerability Addressed

- **Flooding and Storm Surges:** By protecting physical assets from damage and operational disruption.
- **Water Scarcity and Erratic Rainfall:** By ensuring a consistent water supply for industrial processes.
- **Extreme Heat:** By reducing the risk of equipment failure and productivity losses due to high temperatures.

18.2 Outcomes (2030 and 2035) (Indicators)

- **2030:** Adoption of climate-resilient building codes for the industrial sector.
- **2035:** Asset Vulnerability Index: A quantitative index measuring the risk exposure of key industrial assets which can be tracked over time to show improvements in resilience.

18.3 Financial Needs

40 million (est.)

This will serve as a significant capital investment for detailed designs, physical upgrades like flood barriers and improved equipment.

18.4 Implementation Agency

- **Lead Agency:** Ministry of Trade and Industry
- **Co-Leads:** The Environment Protection Agency (EPA), private sector IPPU companies and international development partners.

18.5 Implementation Schedule

- **(2025–2027) Planning and Assessment:** This will focus on conducting detailed climate vulnerability assessments for all major industrial facilities. This will be followed by developing a comprehensive policy framework and new engineering standards specifically for climate-resilient industrial infrastructure.
- **(2028–2032) Retrofitting and Upgrading:** This is the core implementation period for all physical upgrades. Based on the assessments done, the physical retrofitting of priority facilities will begin.
- **(2033–2035) Monitoring and Long-Term Resilience:** within this period, the long-term sustainability of the upgrades should be monitored. All newly retrofitted and upgraded facilities will become fully operational.

19 Landfill Methane Management

19.1 Detailed Description

This measure builds on the already launched National Pollutant Inventory (NPI) and the National Plan for Pollution Prevention (N3P) under EPA-SL. The Freetown Waste Management Strategy and the upcoming Shifting to Zero Waste Against Pollution (SWAP) Project also address landfill upgrades and methane capture. This measure could be seen as a scaling effort, integrating methane recovery with renewable energy options (e.g., biogas for power).

This measure upgrades existing dumps/landfills to engineered cells with daily cover, stormwater/leachate control, weighbridge, and landfill gas (LFG) collection. Phase 1 installs passive vents and surface emissions monitoring; Phase 2 adds vertical wells and horizontal collectors with a flare station; Phase 3 enables energy recovery (gensets or pipeline) subject to gas yield. Fire control, access control, and waste compaction will be enforced to reduce fugitive emissions and improve site safety.

The gas system will include blowers, enclosed flares, condensate management, and SCADA for flow and methane fraction. Periodic surface scans (OGI/flux box) will verify performance. Site operations will maintain intermediate cover and segregate incoming waste to protect gas infrastructure.

19.2 Vulnerability Addressed

- **Flooding and Extreme Rainfall:** By preventing the overflow of dumpsites and the spread of leachates into rivers or streams.
- **Public Health Risks:** By reducing the incidence of waterborne diseases and other health issues associated with unmanaged waste in flooded areas.

  This is a co-benefit of the mitigation Measure

Forestry & Land Use

20 Community Forestry and Co-Managed Protected Areas

20.1 Detailed Description

This measure is directly tied to the REDD+ Readiness Programme, National Forest Inventory (2024), and FAO's forest landscape restoration work. It focuses on scaling up community forestry models that already exist in Gola and Kambui Hills, not introducing new frameworks.

Establish community forest management agreements and co-managed protected areas over 50,000 hectares to reduce deforestation and enhance ecosystem services. Provide benefit-sharing, sustainable harvesting plans, and alternative livelihoods (beekeeping, ecotourism).

20.2 Vulnerability Addressed

Unsustainable fuelwood and timber harvesting, agricultural expansion, and weak enforcement accelerate forest loss and erosion.

20.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** 50,000 hectares under community-based management; annual deforestation rate reduced in locations reporting high rates by ≥ 25%.
- **2035:** Forest cover stabilized or increasing in co-managed zones; measurable improvements in soil retention and streamflow stability.
- **Key Indicators:** Hectares under agreements; deforestation rate; enforcement actions; livelihood income from alternatives; biodiversity indicators.

20.4 Financial Needs

USD 80 million

- **Component 1** (Legal Frameworks and Mapping, ~USD 5 million);
- **Component 2** (Community Rangers and Patrols, ~USD 10 million);
- **Component 3** (Alternative Livelihoods — beekeeping, eco-tourism, NTFPs, ~USD 20 million);
- **Component 4** (Monitoring/Enforcement, ~USD 10 million);
- **Component 5** (Capacity Building, ~USD 10 million);
- **Component 6** (Safeguards, Community Grants and Contingency, ~USD 25 million).

20.5 Implementation Agency

- MoECC and EPA-SL lead with Forestry Division;
- **Key ministries**: NPAA, Ministry of Tourism and Cultural Affairs
- Others: local councils and community-based organizations co-manage. Contracts include community benefit-sharing, rangers' stipends, and joint patrols with enforcement agencies.

20.6 Implementation Schedule

- **2025–2026**: agreements and boundary demarcation.
- **2027–2031:** patrols, livelihood roll-out, and enforcement; annual deforestation reviews.
- **2032–2035:** consolidation and scaling to additional chiefdoms.

21 Agroforestry and Climate-Smart Tree Crop Intensification

21.1 Detailed Description

This measure is consistent with the Tree Crop Master Plan and ongoing World Bank and IFAD-funded tree crop projects. The measure focuses on

- Improved extension, market access, and processing facilities, creating economic incentives for smallholders to adopt agroforestry rather than treating it as a purely environmental intervention.
- Scale agroforestry systems integrating cocoa, cashew, oil palm, and timber species with food crops, using contour hedgerows and shade management.
- Promote farmer cooperatives and climate-resilient processing to increase value-add and reduce land-pressure.

21.2 Vulnerability Addressed

Declining soil fertility and income variability drive encroachment into forests; monocultures are vulnerable to climate stress.

21.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** 30,000 smallholders adopt agroforestry practices; 30,000 hectares under diversified systems; average farm income increased by ≥ 10%.
- **2035:** Agroforestry mainstreamed in major tree-crop belts; sustained soil organic matter gains and yield stability documented.
- **Key Indicators:** Households adopting; hectares under agroforestry; soil organic carbon (%); farm income; yield variance.

21.4 Financial Needs

USD 90 million

- **Component 1** (Nurseries and Seedlings, ~USD 15 million);
- **Component 2** (Training and Extension, ~USD 20 million);
- **Component 3** (Inputs and On-farm Infrastructure, ~USD 25 million);
- **Component 4** (Cooperative Development and Processing, ~USD 20 million);
- **Component 5** (M&E and Contingency, ~USD 10 million).

21.5 Implementation Agency

Ministry of Environment and Climate Change leads; co-lead MoAFS; cooperatives manage aggregation and processing; private agribusinesses provide off-take contracts. Universities support soil and shade management guidance; microfinance partners extend seasonal credit.

21.6 Implementation Schedule

- **2025–2027:** nursery scale-up and lead farmer training.
- **2027–2032:** adoption waves with input packages and extension; cooperative processing lines commissioned.
- **2033–2035:** productivity stabilization, quality certification, and market linkage deepening.

22 Wetland and Mangrove Restoration

22.1 Detailed Description

This measure is linked to Coastal Resilience. It recognizes that Sierra Leone already has a Wetlands Policy, ongoing FAO blue carbon assessments, and restoration pilots supported by Wetlands International.

This program protects, restores, and sustainably manages Sierra Leone's wetlands, forests and mangroves, focusing on high-risk deforestation fronts and coastal ecosystems (e.g., Sherbro, Scarcies). It consolidates and expands current programs, ensuring long-term financing and clear community co-management frameworks. Interventions include: (i) community forestry agreements with performance-based incentives; (ii) protected area strengthening (patrols, boundary demarcation, fire management, livelihood alternatives); (iii) assisted natural regeneration (ANR) and enrichment planting with native species; (iv) mangrove restoration and hydrological rehabilitation; (v) land-use planning and a basic land cadastre to reduce encroachment; and (vi) sustainable woodfuel measures where appropriate (efficient kilns, regulated harvest). Gender-inclusive governance and benefit-sharing are integrated across all activities.

Site selection prioritizes biodiversity value, carbon density (including blue carbon), community readiness, and threat level. Nursery networks and local contractor models will deliver seedlings and ANR services. Social safeguards, FPIC principles, and grievance redress mechanisms apply across the program.

22.2 Vulnerability Addressed

Loss of wetlands and mangroves increases flood and erosion risk and undermines coastal livelihoods and water quality. **This is a co-benefit of the Mitigation Measure**

Disaster Risk Reduction & Early Warning

Wall Street Journal – www.wsj.com

23 National Multi-Hazard Early Warning System with Last-Mile Delivery

23.1 Detailed Description

This measure builds on existing efforts led by SLMet, NDMA, and EPA-SL under the Early Warning for All (EW4All) initiative and the UNDP-supported Disaster Risk Reduction Programme. Sierra Leone has already developed the first phase of a multi-hazard early warning platform, but gaps remain in data integration and last-mile communication.

This measure focuses on consolidating and scaling what is in progress, such us the national EW4All roadmap, the SLMet modernization project, and community-level alert systems piloted in Freetown, Bo, and Kambia.

Build an integrated platform linking meteorological, hydrological, and geospatial data to produce actionable alerts for floods, landslides, coastal storms, and heat. Deliver last-mile warnings via SMS, radio, sirens, and community focal points with standardized color-coded protocols.

23.2 Vulnerability Addressed

Delayed warnings magnify disaster losses; last-mile communication gaps in informal settlements and rural areas.

23.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** Nationwide alerting coverage ≥ 85% of population; warning lead-times improved by 30% for flood events.
- **2035:** Disaster-related mortality reduced by ≥ 50% compared to 2020 baseline in covered hazards/areas.
- **Key Indicators:** % population reached; lead time (hours); false alarm ratio and hit rate; post-event surveys of action taken.

23.4 Financial Needs

USD 40 million

- **Component 1** (Hydrometeorological monitoring stations, MCHS Data Platform, ~USD 10 million);
- **Component 2** (Sensors/Stations, ~USD 12 million);
- **Component 3** (Telecom Integration and Alerting, ~USD 8 million);
- **Component 4** (Community Alerting Equipment and Drills, ~USD 5 million);
- **Component 5** (O&M, M&E and Contingency, ~USD 5 million).

23.5 Implementation Agency

NDMA and the Met Agency co-lead. Telecom operators sign MoUs for priority alert channels; FCC and local councils coordinate community focal points and sirens. A scientific advisory panel validates thresholds and messages.

23.6 Implementation Schedule

- **2025–2026:** system design and pilots;
- **2027–2030:** national rollout;
- **2031–2035:** maintenance, sensor upgrades, and public drills with after-action reviews.

24 NDMA Capacity, Equipment, and Emergency Logistics

24.1 Detailed Description

This measure aligns with existing investments under the World Bank–funded IRUMP and UNDP's resilience support to NDMA. It is also linked with the Emergency Operations Centres (EOCs) established under the Ministry of Health and SLMet's national response coordination framework, ensuring interoperability and joint simulation exercises.

The focus of the measure is on

- Standardising training curricula, equipment specifications, and stockpiling procedures across districts.
- Strengthening logistics and coordination systems through digital platforms (e.g., incident tracking and rapid mapping tools).
- Equip NDMA and district emergency units with command-and-control tools, emergency operations centers, boats and high-clearance vehicles, temporary shelters, and stockpiles of essential supplies.
- Institutionalize regular drills and incident command training.

24.2 Vulnerability Addressed

Limited response capacity and logistics prolong disaster impacts and recovery times.

24.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** Functional EOCs in all regions; annual multi-agency drills conducted; response times reduced by ≥ 25%.
- **2035:** Sustained readiness with replenished stockpiles; standardized incident command system embedded nationwide.
- **Key Indicators:** EOC operational status; drill frequency and evaluation scores; average response times; stockpile adequacy indices.

24.4 Financial Needs

USD 35 million

- **Component 1** (National and Regional EOCs, ~USD 10 million);
- **Component 2** (Vehicles/Boats, ~USD 8 million);
- **Component 3** (Stockpiles and Shelters, ~USD 7 million);
- **Component 4** (Training/Incident Command, ~USD 5 million);
- **Component 5** (ICT/Comms, M&E and Contingency, ~USD 5 million).

24.5 Implementation Agency

NDMA leads with sectoral liaisons (health, works, security). Regional coordinators manage EOC operations; annual joint exercises test interoperability with local councils and humanitarian partners.

24.6 Implementation Schedule

- **2025–2028:** EOC construction/equipping and fleet procurement;
- **2029–2035:** recurrent drills, replenishment of stockpiles, and capability reviews every two years.

25 Community-Based Disaster Risk Management (CBDRM) and Safe Infrastructure

25.1 Detailed Description

This measure is aligned with ongoing community DRR programmes under NDMA, FAO, and Red Cross. Many chiefdoms already have local disaster committees, so the measure focuses on revitalising and resourcing these structures.

It is also linked to the school safety and education in emergencies programme, led by the Ministry of Basic Education and UNICEF.

Establish and train community DRM committees, SLMet volunteers in high-risk wards and chiefdoms, prepare evacuation routes and signage, construct micro-infrastructure (footbridges, culverts) and safe assembly points, and integrate contingency planning in school curricula.

The education sector will be systematically integrated into national and district DRR planning. Schools serve as first-response centers and information hubs for early warning dissemination.

25.2 Vulnerability Addressed

Households in hazard-prone zones lack organized preparedness, interpretation of climate information early warning and safe evacuation options.

25.3 Outcomes (2030 and 2035) (Indicators)

- **2030:** CBDRM committees and SLMet volunteers active in 300 communities; evacuation routes mapped and signposted; school-based drills institutionalized.
- **2035:** Community disaster losses (assets and livelihoods) reduced by ≥ 30% in participating areas; sustained committee functionality and funding.
- **Key Indicators:** Number of active committees; drills conducted; evacuation route coverage; post-event loss assessments.

25.4 Financial Needs

USD 20 million.

- Component 1 (Committee and volunteering group Formation and Training, ~USD 6 million);
- Component 2 (Micro-infrastructure — culverts, footbridges, ~USD 8 million);
- Component 3 (Mapping, Signage and School Drills, ~USD 4 million);
- Component 4 (Contingency and Community Grants, ~USD 2 million).

25.5 Implementation Agency

NDMA, SLMet and local councils co-lead with FCC in urban wards. Schools integrate drills into curricula; NGOs provide facilitation and community grants oversight.

25.6 Implementation Schedule

- **2025–2030:** rollout to ~300 communities in waves of 50–70/year.
- **2031–2035:** maintenance of micro-infrastructure, refresher trainings, and community-managed contingency funds.

26 Strengthening Climate Observation and Early Warning Systems for Sierra Leone

26.1 Detailed Description

This measure is linked to the ongoing work by SLMet under the World Meteorological Organization's Systematic Observations Financing Facility (SOFF) and the AFDB-funded hydromet modernisation project. These already aim to increase observation coverage and forecast reliability.

This measure addresses key gaps such as maintenance of automatic weather stations, data sharing between SLMet and NDMA, and human capacity for forecast interpretation and communication.

26.2 Vulnerability Addressed

- Limited capacity of SLMet to monitor and forecast extreme weather events (floods, droughts, storms).
- Inadequate early warning systems for climate-sensitive sectors (agriculture, fisheries, health, infrastructure).

26.3 Outcome Indicator

- Increased coverage and reliability of meteorological observation networks (from 35% to 60%).
- Timely dissemination of early warning information to at least 80% of vulnerable districts.

26.4 Implementing Agency

Sierra Leone Meteorological Agency (SLMet), in collaboration with Ministry of Environment and Climate Change and National Disaster Management Agency.

26.5 Financial Needs

USD 5,000,000

- **Component 1:** Modernization of weather observation infrastructure – $2,000,000
- **Component 2:** Early warning system development and dissemination tools – $1,500,000
- **Component 3:** Capacity building, training, and institutional strengthening – $1,000,000
- **Component 4:** Research, monitoring, and community outreach – $500,000

27 AI-Based Climate and Weather Forecasting System for Resilient Development in Sierra Leone

27.1 Detailed Description

This measure is framed as a long-term extension of SLMet's modernisation efforts, once baseline infrastructure and data systems are fully operational.

The measure, after strengthening basic data reliability and partnering with regional climate centres like ACMAD or universities under WASCAL would lend technical credibility and open opportunities for South–South cooperation and hence modernising SL Met.

27.2 Vulnerability Addressed

- Low accuracy and timeliness of forecasts affecting agriculture, energy, water resources, and disaster preparedness.
- High reliance on traditional methods with limited use of advanced technologies like AI and big data.

27.3 Outcome Indicator

- Forecasting accuracy improved by at least 30% through AI integration.
- User-friendly climate services accessed by at least 70% of target sectors (farmers, energy, fisheries, health).

27.4 Implementing Agency

Sierra Leone Meteorological Agency (SLMet), in collaboration with Fourah Bay College, University of Sierra Leone and international technical partners (e.g., Julich Forschungzentrum, Germany, WMO, UNEP).

27.5 Financial Needs

USD 6,500,000

- **Component 1:** AI-powered forecasting system and data infrastructure – $2,500,000
- **Component 2:** Digitization of climate data and establishment of big data platforms – $1,500,000
- **Component 3:** Training of SLMet staff and sectoral end-users – $1,500,000
- **Component 4:** Community-based climate information services and outreach – $1,000,000

Cross-Cutting and Policy Measures

28 Integration of Human Rights-Based Approach (HRBA) into Climate Induced Disaster Recovery Programmes for Disproportionately Impacted Groups

28.1 Detailed Description

This measure is based on existing frameworks such as the National Resettlement Policy (2021), the Gender Equality and Women's Empowerment Act (2022), and the Human Rights Commission's climate justice framework.

Mainstream a Human Rights-Based Approach (HRBA) into all climate-induced disaster recovery programmes to ensure that the dignity, rights, and protection of disproportionately impacted groups (including women, children, persons with disabilities, the elderly, human rights defenders, migrants/displaced persons and marginalized rural communities) are safeguarded through the integration of the principles of equality, participation, accountability, and non-discrimination into recovery planning, relief distribution, relocation, rehabilitation, and rebuilding processes after climate-related disasters such as floods, landslides, droughts, and coastal erosion.

28.1 Vulnerability Addressed

Disproportionate exposure of women, children, persons with disabilities, migrants, youth and the elderly to climate-induced disasters, and inequality and equity access to recovery resources.

28.2 Outcomes (2030 and 2035) (Indicators)

- **2030:** At least 50% of disaster recovery programmes integrate HRBA guidelines; Rights-based vulnerability and recovery assessments conducted in all disaster-prone districts; 50% increase in equitable access to recovery resources by disproportionately impacted groups; and a national grievance redress and monitoring system established.
- **2035:** 85% of climate-induced disaster recovery initiatives are HRBA-compliant: documented reduction in post-disaster rights violations and discrimination cases by 70%; strong institutional framework ensuring meaningful participation of vulnerable groups in recovery planning and implementation ensured; and increased resilience of marginalized communities, reflected in improved housing security, livelihood restoration, and social protection coverage by 50%.
- **Key Indicators:** 75% of recovery projects with HRBA compliance checklists; 75% of human rights complaints addressed during recovery; 85% of recovery aid/resources accessed by vulnerable groups; and 85 % of policies and frameworks revised to embed HRBA principles.

28.3 Financial Needs

USD 35 million

- **Component 1:** (Capacity-building, community outreach and Awareness raising: USD 5 m)
- **Component 2**: (Community-based HRBA recovery projects (Restitution & Empowerment): USD 10m)
- **Component 3:** (Monitoring, grievance redress, and accountability mechanisms: USD 5m)
- **Component 4:** (Infrastructure and social protection support for vulnerable groups: USD 15m)
- **Funding sources**: National budget allocation, Green Climate Fund (GCF), Loss & Damage Fund, bilateral development partners, UN agencies, and human rights-focused donor agencies

28.4 Implementation Agency

- **Lead Agencies:** Human Rights Commission of Sierra Leone HRCSL.
- **Supporting Agencies:** and National Disaster Management Agency (NDMA), National Commission for Social Action (NaCSA), Ministry of Gender and Children's Affairs, Ministry of Environment, Climate Change, Ministry of Social Welfare, and Ministry of Youth.
- **Partners:** CSOs, community-based organizations, UNDP, OHCHR, IOM, and development partners

28.5 Implementation Schedule

- **2025–2027:** Develop HRBA disaster recovery framework and guidelines, build institutional capacity (HRCSL, NDMA, NaCSA), and pilot HRBA integration in 5 disaster-prone districts.
- **2028–2032:** Scale-up HRBA recovery programmes nationwide, Establish grievance redress and accountability mechanisms, and Mainstream HRBA into disaster laws, policies, and national DRM strategy.
- **2033–2035:** Consolidate and institutionalize HRBA in all climate recovery frameworks, evaluate progress, lessons learned, and scale best practices, and Strengthen resilience of vulnerable groups with rights-protected relocation and rehabilitation systems

29 Adaptation MRV/Tracking System and Indicator Framework

29.1 Detailed Description

This measure establishes and operationalizes a **national Enhanced Transparency Framework (ETF) and MRV system** to generate timely, high-quality data for mitigation planning, tracking, and reporting. It creates a legally-mandated governance structure; standardized MRV protocols for all emitting sectors (Energy, Transport, Waste, IPPU, AFOLU); a digital **Climate Data & MRV Platform** for data intake, QA/QC, calculation, and reporting; and a **Mitigation Outcomes & Article 6 Registry** to avoid double counting and enable results-based finance. The system covers: (i) **GHG inventory** production (IPCC-aligned, with Tier upgrades where feasible), (ii) **mitigation action tracking** with unique IDs, baselines, and monitoring plans, (iii) **finance tracking** (tagging public/external climate finance against actions), and (iv) **KPI dashboards** for decision-makers. It embeds **data-sharing MoUs** with line ministries, utilities, regulators, local councils, and private operators, and builds a professional **MRV cadre** (sector focal points, data engineers, inventory compilers, verifiers). Outputs feed **BTRs**, **NDC stocktakes**, and domestic policy cycles.

29.2 Vulnerability Addressed

Lack of visibility on adaptation progress hampers resource allocation and accountability; weak data systems limit learning. **This is a co-benefit of the Mitigation Measure**

30 Integrating Conflict Sensitivity and a Climate Security Lens to Address Climate-Induced Conflict, Fragility, and Vulnerability

30.1 Detailed Description

This measure builds on existing national frameworks, including the National Security Policy and Strategy (2024), which integrates environmental risks into security planning, and the Independent Commission for Peace and National Cohesion's Roadmap, which promotes community resilience and inclusive dialogue to address conflict and fragility, including those driven by climate impacts. It also aligns with SDGs 10 and 16, which anchor climate action in principles of peace, justice, accountability, and institutional strength. These commitments are reinforced through Sierra Leone's National Action Plan on Women, Peace and Security and the ongoing National Action Plan on Youth, Peace and Security, both of which highlight the disproportionate impact of climate-induced conflict and fragility on women and youth, and their critical role in building peaceful, resilient communities.

Sierra Leone faces significant climate vulnerabilities—including coastal erosion, floods, landslides, mudslides, rockfalls, epidemics, and windstorms—that intensify existing social and economic pressures. These hazards exacerbate competition over agricultural and livelihood resources, with some districts already experiencing heightened local tensions and outbreaks of violence linked to resource access.

By integrating a conflict-sensitive and climate security-informed approach across adaptation and mitigation measures, the NDC 3.0 recognises the urgent need to address the complex interplay between climate change, conflict, and stability. It aims to strengthen national resilience to climate impacts, particularly those that exacerbate social tensions, insecurity and institutional fragility. This integrated lens ensures that climate adaptation efforts are not only environmentally sound but also socially cohesive, peace and security-promoting.

30.2 Vulnerability Addressed

- Limited data and knowledge on climate-induced fragility and vulnerabilities, particularly regarding how climate impacts exacerbate resource competition, social tensions, and the risk of violent conflict
- Institutional weakness across government and civil society to support community-based resilience and prevent climate-related violence and instability in high-risk communities and districts.
- Insufficient climate adaptation efforts focused on natural resource management and climate-resilient livelihoods in areas most affected by climate-induced fragility, vulnerability, and conflict.
- Social exclusion of marginalised groups—especially youth and women in climate adaptation, peacebuilding, and resilience efforts.

30.3 Outcome Indicators

2030

- Climate Risk and Fragility Assessments conducted to identify and map vulnerable districts.
- 50% of hotspot districts reduce local tensions over resource access through inclusive dialogue and conflict-sensitive planning.
- Pilot programs engage vulnerable groups—especially youth and women—in climate adaptation, natural resource management, and climate-resilient livelihoods, achieving a 30% increase in participation from the 2026 baseline

2035

- Climate-induced conflict drivers (e.g. displacement, land competition, livelihood loss) systematically addressed, reducing national fragility scores by over 50%.
- Climate finance prioritizes high-risk districts and vulnerable populations, supporting climate-resilient agriculture and livelihoods with a 60% increase from the 2026 baseline.
- Conflict sensitivity and climate security fully integrated into national and local adaptation and development plans, promoting sustainability, risk reduction, and equitable growth.

30.4 Financial Needs

USD 15m

- **Component 1:** Climate risk, fragility and vulnerability assessments (CRFV) - data and knowledge products and knowledge dissemination - USD 2 m
- **Component 2:** Capacity building, institutional strengthening for inclusive climate change adaptation, peace, and resilience efforts - USD 3m
- **Component 3:** Climate adaptation programs on climate-resilient agriculture and socio-economic livelihood in the hotspots of climate-induced fragility, vulnerability and conflict. USD 10m
- **Funding sources**: National budget allocation, Green Climate Fund (GCF), Loss & Damage Fund, bilateral development partners, UN agencies, and Peace and Security-focused donor agencies.

30.5 Implementing Agency

- **Lead Agencies:** Office of National Security (ONS) and the Independent Commission for Peace and Social Cohesion (ICPCN).
- **Supporting Agencies:** Ministry of Environment, Climate Change, Ministry of Agriculture, Ministry of Gender and Children's Affairs, and Ministry of Youth Affairs.
- **Partners:** CSOs, community-based organisations, UNDP, UN Women and development partners

31 Policy Measures

31.1 Climate Finance Mobilization and Project Pipeline Facility

Detailed Description

Create a dedicated facility to prepare bankable adaptation projects (pre-feasibility, feasibility, ESIA, economic analysis) and match them to GCF, Adaptation Fund, IFIs, and philanthropy. Establish a transaction advisory roster and standardized templates to accelerate approvals.

Vulnerability Addressed

Limited capacity to originate and structure adaptation investments delays implementation and access to concessional finance.

Outcomes (2030 and 2035) (Indicators)

- **2030:** All district councils trained and applying climate budgeting tools; GESI action plans operational in priority sectors.
- **2035:** Sustained local implementation quality with inclusive participation and benefits; improved citizen satisfaction with services.
- **Key Indicators:** Sixteen (16) councils trained; 45 % of budgets with climate tags; GESI participation rates; beneficiary satisfaction surveys.

Financial Needs

USD 18 million

- Component 1 (District Training Programs, ~USD 6 million);
- Component 2 (Budgeting/Procurement Toolkits and Systems, ~USD 5 million);
- Component 3 (Local Facilitators and Helpdesks, ~USD 2 million);
- Component 4 (Monitoring and Learning, ~USD 1 million);
- Component 5 (Inclusive Grants and Contingency, ~USD 3 million).

Implementation Agency

Ministry of Local Government and Rural Development leads with MoECC. MoGCA, MoYA, MoSW, CSO networks co-design GESI actions; Statistics SL supports sex-disaggregated indicators; local councils implement budgeting tools.

Implementation Schedule

- **2025:** curriculum and toolkits.
- **2026–2030:** training waves and coaching;
- **2031–2035:** institutionalization, refresher courses, and audits on inclusion metrics.

31.2 Local Government Capacity and Gender & Social Inclusion Mainstreaming

Detailed Description

This measure is linked to the Local Climate Adaptation Fund (LCAF) model piloted under the UN Capital Development Fund (UNCDF) and EPA's climate decentralisation initiatives. District-level mainstreaming of gender and social inclusion is already happening through MoLGCA and MoGCA collaborations.

This measure will

- Focus on scaling and institutionalising these approaches
- Specify mechanisms for embedding climate budgeting into local planning cycles and tracking resource allocation by gender and vulnerability through standard templates
- Provide multi-year capacity building for district councils on climate budgeting, procurement, safeguards, and community engagement.
- Mainstream gender equality and social inclusion with quotas in decision bodies, targeted benefits for vulnerable groups, and sex-disaggregated indicators.
- Integrate Climate and Environmental Education into national curricula and teacher training programmes to build climate literacy and adaptive skills among youth

Vulnerability Addressed

Weak local delivery capacity and exclusion of vulnerable groups reduce effectiveness and equity of adaptation outcomes.

Outcomes (2030 and 2035) (Indicators)

- **2030:** All district councils trained and applying climate budgeting tools; GESI action plans operational in priority sectors.
- **2035:** Sustained local implementation quality with inclusive participation and benefits; improved citizen satisfaction with services.
- **Key Indicators:** Sixteen (16) councils trained; 45 % of budgets with climate tags; GESI participation rates; beneficiary satisfaction surveys.

Financial Needs

USD 18 million.

- Component 1 (District Training Programs, ~USD 6 million);
- Component 2 (Budgeting/Procurement Toolkits and Systems, ~USD 5 million);
- Component 3 (Local Facilitators and Helpdesks, ~USD 2 million);
- Component 4 (Monitoring and Learning, ~USD 1 million);
- Component 5 (Inclusive Grants and Contingency, ~USD 3 million).

Implementation Agency

Ministry of Local Government and Rural Development leads with MoECC. MoGCA, MoYA, MoSW, CSO networks co-design GESI actions; Statistics SL supports sex-disaggregated indicators; local councils implement budgeting tools.

Implementation Schedule

- 2025: curriculum and toolkits.
- 2026–2030: training waves and coaching;
- 2031–2035: institutionalization, refresher courses, and audits on inclusion metrics.

31.3 Mainstreaming child protection in climate resilience planning

Detailed Description

This measure connects directly to the National Child Protection Policy (2023) and UNICEF-supported Child-Friendly Resilience Programme, which already address child safety in emergencies.

The measure will define the entry points for mainstreaming, such as early warning communication, school safety plans, and social protection systems. Collaboration between NDMA, MoSW, and education authorities would make this operational rather than aspirational.

The impacts of climate change disproportionately affect children, particularly those living in vulnerable communities, increasing their exposure to risks such as food insecurity, displacement, health threats, and gender-based violence. Mainstreaming child protection into national and local climate adaptation and disaster risk management frameworks is of necessity.

Vulnerability Addressed

- Floods, heatwaves, food insecurity, and displacement, increasing risks of child labour, abuse, and school dropouts.
- Lack of resilient infrastructure leaves children exposed during climate shocks.
- Climate shocks push families into poverty, reducing children's access to education, food, and safety.

Outcome Indicator (2030–2035)

- Climate adaptation laws and policies that integrate child protection (2030)
- 1,000,000 Children benefiting from climate-resilient social protection (2035)

Finance

Estimated: $2million Policy development, training and coordination

Implementing Agency

- **Lead:** EPA-SL & Ministry of Gender and Children's Affairs (MoGCA).
- **Co-implementers:** National Disaster Management Agency (NDMA), Ministry of Basic Science and School Education, Ministry of Health and Sanitation, MoSW, HRCSL, Ministry of Local government and Local Councils

Implementation Schedule

2025–2035: Develop guidelines and integrate into policies, Pilot in 5 vulnerable districts, National roll-out, Consolidation and evaluation.

31.4 Energy source diversification

Detailed Description

Sierra Leone's electricity sector is highly vulnerable to climate variability and external shocks. Hydropower, which currently supplies a significant portion of the national grid, is increasingly affected by irregular rainfall and droughts, while reliance on imported fossil fuels exposes the country to global price fluctuations and supply risks. Diversifying the national energy mix is therefore a key adaptation measure to ensure energy security, resilience, and sustainable economic growth.

Energy source diversification involves expanding investments in solar, biomass, and small-scale hydro, while strengthening decentralized and off-grid solutions such as solar mini-grids and hybrid systems. It also requires policy frameworks that encourage private sector participation, create incentives for renewable energy deployment, and integrate climate risk assessments into national energy planning. The diversification will come through solar, biomass, and hybrid mini-grids, while reducing hydropower dependence.

This measure is aligned with the Energy Transition and Green Growth Plan, the Renewable Energy Policy (2016), and the ongoing Energy Sector Recovery Project (ESRP) and linked to the National Electrification Strategy (2022).

Vulnerability Addressed

- **Climate-related risks:** Reduced hydropower generation during droughts and extreme weather events.
- **Economic risks:** Dependence on imported fossil fuels increases vulnerability to global price volatility and supply disruptions.
- **Social risks:** Limited and unreliable energy access, particularly in rural areas, undermines livelihoods, education, and health services.

Outcomes and Indicators (2030 and 2035)

By 2030:

- At least 35% of national electricity generation comes from diversified renewable sources (solar, biomass, small hydro).
- 1 million people gain access to reliable, climate-resilient off-grid solutions.
- Reduced frequency of power outages linked to rainfall variability

By 2035:

- Over 50% of the energy mix derived from diversified renewables.
- At least 70% of rural communities benefit from resilient off-grid or hybrid power systems.
- Demonstrated reduction in economic losses from fossil fuel import volatility.

Financial Needs

This is a co-benefit

Implementation Agencies

- **Lead:** Ministry of Energy.
- **Co-lead agencies:** Ministry of Environment and Climate Change; Environment Protection Agency–Sierra Leone (EPA-SL), SLEWRC gives license permit for implementation of minigrids
- **Supporting partners:** National Power Authority, rural electrification agencies, private renewable developers, local councils, civil society, and community-based organizations.
- **International partners:** African Development Bank, World Bank, UNDP, and bilateral donors supporting energy transition.

Implementation Schedule

- **2025–2027:** Policy reforms, renewable energy incentives, pilot hybrid mini-grid projects, and feasibility studies for biomass.
- **2028–2030:** Scale-up of solar farms and mini-grids; integration of diversified renewables into national energy planning; mainstreaming climate risk analysis into energy sector investment plans.
- **2031–2035:** Expansion of biomass-to-energy projects; large-scale rural deployment of resilient off-grid systems; strengthening of adaptive grid infrastructure and cross-border interconnections.

31.5 Climate-Resilient Infrastructure Policies in the Transport sector

Detailed Description

Sierra Leone's transport sector is particularly vulnerable to the impacts of climate change. Heavy rainfall, flooding, sea-level rise, and extreme weather events regularly damage roads, bridges, and ports, disrupting connectivity and increasing maintenance costs. As transport is essential for trade, agriculture, access to markets, and public services, climate impacts in this sector carry significant economic and social consequences.

To address these challenges, this adaptation measure focuses on mainstreaming **climate-resilient infrastructure policies** into transport planning, construction, and maintenance. It entails updating engineering standards to reflect future climate risks, adopting resilient materials and designs, strengthening early warning systems for transport corridors, and integrating climate risk assessments into national and local transport projects. It also emphasizes the need for robust institutional frameworks, capacity building of engineers and planners, and long-term investment planning that reduces exposure to climate-related damages.

This measure is linked to the National Transport Policy (2021) and the Integrated and Resilient Urban Mobility Project (IRUMP).

Vulnerability Addressed

- **Physical risks:** Flooding, erosion, and landslides damaging transport assets.
- **Economic risks:** Rising costs of repairs and disruptions to trade, agriculture, and tourism.
- **Social risks:** Reduced mobility and access to health, education, and markets, particularly in rural and coastal communities.

Outcomes and Indicators (2030 and 2035)

- **By 2030:**
  - At least 50% of new road and bridge projects adopt climate-resilient design standards.
  - Climate risk assessments integrated into all major transport infrastructure investments.
  - Establishment of national guidelines for resilient road construction and maintenance.
- **By 2035:**
  - Over 80% of the core transport network upgraded or retrofitted to meet climate-resilient standards.
  - Reduced frequency and cost of climate-related transport disruptions.
  - Significant increase in rural communities with year-round access to climate-resilient transport corridors.

Financial Needs

Estimated financing requirements are **USD 2 million** over 2025–2035. Funding sources will include:

- National budget allocations for infrastructure.
- Climate adaptation finance (Green Climate Fund, Adaptation Fund, Global Infrastructure Facility).
- Multilateral development bank loans and concessional finance.
- Private sector participation in public–private partnerships (PPP) for transport development.

Implementation Agencies

- **Lead:** Ministry of Transport and Aviation.
- **Co-lead agencies:** Sierra Leone Roads Authority, Ministry of Works and Public Assets.
- **Supporting partners:** Environment Protection Agency–Sierra Leone, Ministry of Finance, local councils, private contractors, and engineering associations.
- **International partners:** African Development Bank, World Bank, UNOPS, and bilateral donors financing resilient infrastructure.

Implementation Schedule

- **2025–2027:** Development of national climate-resilient infrastructure policy and design guidelines; pilot projects in flood-prone regions; training programs for engineers and planners.
- **2028–2030:** Integration of resilience standards into all new transport projects; retrofitting of high-priority roads, bridges, and ports; establishment of climate-resilient maintenance contracts.
- **2031–2035:** Nationwide roll-out of resilient transport infrastructure, expansion of early warning systems for key corridors, and long-term investment in adaptive infrastructure such as elevated roads, reinforced drainage systems, and coastal protection for ports.

31.6 Integrated Planning and Policy Development in the Transportation Sector

Detailed Description

The transportation sector in Sierra Leone faces growing risks from climate change, including flooding, sea-level rise, storms, and extreme heat. These hazards threaten to disrupt mobility, damage infrastructure, increase maintenance costs, and isolate vulnerable communities. Currently, planning processes are fragmented, with climate considerations not consistently embedded in transport policies and investment decisions.

This adaptation measure calls for the development of an **integrated planning and policy framework** that mainstreams climate resilience into all aspects of transport sector governance. It emphasizes aligning national transport strategies with climate change policies, incorporating climate risk assessments into master plans, and strengthening coordination between ministries, local governments, and development partners. Integrated planning will ensure that transport projects are not designed in isolation but instead contribute to broader climate-resilient development goals, such as the Medium-Term National Development Plan (MTNDP 2024–2030) and the forthcoming Long-Term Low-Emission Development Strategy (LT-LEDS).

Vulnerability Addressed

- Lack of coordination between transport, environment, and urban planning institutions.
- Climate risks not systematically considered in transport sector policies or budgets.
- Inefficient investment due to fragmented planning and absence of resilience standards.
- Increased vulnerability of rural and coastal transport networks to floods and erosion.

Outcomes and Indicators (2030 and 2035)

- **By 2030:**
  - A national policy framework adopted that integrates climate resilience into transport planning and regulation.
  - All new transport infrastructure projects subject to climate risk and vulnerability assessments.
  - Establishment of inter-ministerial coordination mechanisms linking transport, energy, environment, and local government.
- **By 2035:**
  - At least 80% of transport projects nationwide designed and implemented under climate-resilient standards.
  - A fully functional national transport and climate data system established to guide evidence-based decision-making.
  - Demonstrable reduction in climate-related transport disruptions and infrastructure losses.

Financial Needs

The estimated financing requirement is **USD 2 million** for institutional reforms, policy development, capacity building, data systems, and integration of climate risk assessments. Funding will come from:

- National government allocations for transport and planning reforms.

- International climate finance supporting governance and institutional strengthening (e.g., GCF readiness funds, UNDP, AfDB).
- Bilateral technical assistance for integrated planning, modeling, and data systems.

Implementation Agencies

- **Lead:** Ministry of Transport and Aviation.
- **Co-lead agencies:** Ministry of Planning and Economic Development, Ministry of Environment and Climate Change.
- **Supporting partners:** Environment Protection Agency–Sierra Leone, local councils, Statistics Sierra Leone, Sierra Leone Roads Authority.
- **International partners:** World Bank, UNDP, AfDB, UNEP, bilateral donors supporting institutional and policy reforms.

Implementation Schedule

- **2025–2027:** Establish inter-ministerial task force on transport and climate; develop integrated transport-climate policy framework; initiate training for planners and engineers.
- **2028–2030:** Roll out climate risk assessment tools; mandate their use in all transport feasibility studies; strengthen policy alignment with national development and climate strategies.
- **2031–2035:** Operationalize national transport-climate data systems; scale up integration of resilience standards into all project cycles; institutionalize continuous monitoring, reporting, and evaluation mechanisms.

31.7 Institutional Capacity building in the Waste Sector

Detailed Description

Sierra Leone's waste sector is highly vulnerable to climate impacts such as flooding, heavy rainfall, and rising temperatures, which accelerate leachate generation, methane emissions, and the spread of vector-borne diseases. Poorly managed waste also clogs drainage systems, intensifying flood risks in urban areas. Currently, institutional and technical capacities in the waste sector remain limited, with weak coordination between agencies, lack of enforcement capacity, and insufficient integration of climate resilience into waste management policies.

This measure aligns with EPA's ongoing work on the National Pollutant Inventory (NPI), Pollution Prevention Plan (N3P), and the SWAP (Shifting to Zero Waste Against Pollution) Project.

This adaptation measure focuses on strengthening institutional and human capacity across the waste sector to integrate climate resilience into planning, regulation, and operations. It includes building the technical skills of waste management authorities, enhancing regulatory frameworks, equipping local governments with monitoring tools, and creating knowledge platforms for data sharing. It also emphasizes mainstreaming climate considerations into waste policies and fostering partnerships with private sector actors, community-based organizations, and development partners. Finally, it will scale up national initiatives, focusing on enforcement, private-sector engagement, and municipal waste capacity. The measure could also promote partnerships with FCC, BO City, and Koidu City Councils, where pilot methane and solid waste segregation projects are already in progress.

Vulnerability Addressed

- Limited institutional capacity to manage climate-related risks in the waste sector.
- Weak regulatory and enforcement frameworks for climate-resilient waste management.
- Insufficient technical expertise to monitor and reduce methane and leachate emissions.
- Poor inter-agency coordination between national, municipal, and community-level actors.

Outcomes and Indicators (2030 and 2035)

By 2030:

- Establishment of a national waste and climate resilience unit within the Ministry of Environment and Climate Change or EPA-SL.
- At least 70% of municipal councils trained in climate-smart waste management practices.
- Implementation of a monitoring and reporting system for methane and leachate emissions in two major cities (Freetown and Bo).

By 2035:

- All major municipalities adopt and enforce climate-resilient waste management policies.
- Significant reduction in flood-related waste blockages in urban drainage systems.
- Demonstrated capacity to capture and report methane reductions for potential carbon market participation.

Financial Needs

The measure will require an estimated **USD 2 million** over the period 2025–2035. Funding sources include:

- National government allocations for institutional strengthening.
- International climate finance (Green Climate Fund readiness grants, Adaptation Fund).
- Development partner support for training, equipment, and data systems.
- Public–private partnerships for waste collection, treatment, and methane capture projects.

Implementation Agencies

- **Lead:** Ministry of Environment and Climate Change; Environment Protection Agency–Sierra Leone (EPA-SL).
- **Co-lead agencies:** Ministry of Local Government and Rural Development, municipal councils (e.g., Freetown City Council).
- **Supporting partners:** Waste management companies, community-based organizations, universities and training institutes.
- **International partners:** UNDP, UNEP, AfDB, World Bank, bilateral donors supporting climate-resilient waste management.

Implementation Schedule

- **2025–2027:** Establish a national waste-climate resilience unit; conduct nationwide training programs; pilot methane and leachate monitoring systems.
- **2028–2030:** Scale up training to all municipal councils; integrate climate resilience into municipal waste bylaws; create data-sharing platforms between local and national authorities.
- **2031–2035:** Institutionalize climate-smart waste management across all major municipalities; strengthen enforcement mechanisms; expand monitoring systems nationwide and prepare for participation in carbon market opportunities.

31.8 Institutional Capacity building in the IPPU sector

Detailed Description

The Industrial Processes and Product Use (IPPU) sector in Sierra Leone is relatively small but growing, with activities in cement, mining, food processing, and manufacturing. These industries are vulnerable to climate change through supply chain disruptions, flooding, heat stress on equipment and workers, and impacts on resource availability (such as water and raw materials). Institutional and technical capacity to integrate climate risk management into IPPU sector planning remains limited. Currently, there are gaps in data collection, regulatory frameworks, monitoring of emissions and process efficiencies, and awareness of climate-resilient technologies.

The measure aligns with EPA's work under the Industrial MRV system and UNIDO's Resource Efficiency and Cleaner Production (RECP) initiatives.

This adaptation measure focuses on **strengthening institutional capacity** in the IPPU sector to embed climate resilience in industrial policy, regulation, and operations. It will involve developing technical expertise for climate risk assessments, building data and MRV systems tailored for industrial processes, strengthening regulatory enforcement capacity, and creating platforms for industry-government collaboration. It will also emphasize the adoption of climate-smart technologies and practices, including resource efficiency, circular economy approaches, and resilient supply chain management. It will also promote links with private sector associations and SME financing mechanisms that can incentivise climate-smart technologies and resilient supply chains.

Vulnerability Addressed

- Lack of institutional expertise to integrate climate adaptation into industrial planning.
- Weak data and MRV systems for monitoring industrial vulnerabilities and emissions.
- Low adoption of climate-smart technologies due to knowledge and capacity gaps.
- Limited awareness and preparedness among industries for climate-related risks (floods, extreme heat, supply chain disruptions).

Outcomes and Indicators (2030 and 2035)

- **By 2030:**
  - A national IPPU-climate resilience unit established within the Ministry of Trade and Industry or EPA-SL.
  - Sector-specific climate risk assessment guidelines developed and applied in at least two key industries (cement and mining).
  - At least 50% of large industries trained in resource efficiency and climate adaptation practices.

- **By 2035:**
  - All major IPPU subsectors integrate climate risk management into production planning and operations.
  - Functioning MRV system for industrial adaptation and emissions reporting operationalized nationwide.
  - Widespread adoption of resilient and resource-efficient technologies in at least three priority subsectors.

Financial Needs

The estimated cost is **USD 2 million** over 2025–2035, covering capacity building, MRV system development, training, and technology demonstration projects. Funding sources include:

- National budget allocations for industrial development and environmental governance.
- International climate finance for capacity building and readiness (GCF readiness funds, Adaptation Fund, UNIDO support).
- Private sector cost-sharing for adoption of resilient technologies.
- Bilateral technical assistance for industrial adaptation and data system development.

Implementation Agencies

- **Lead:** Ministry of Trade and Industry; Environment Protection Agency–Sierra Leone (EPA-SL).
- **Co-lead agencies:** Ministry of Environment and Climate Change; Standards Bureau.
- **Supporting partners:** Industrial associations, chambers of commerce, universities and technical institutes.
- **International partners:** UNIDO, UNEP, World Bank, AfDB, bilateral donors with industrial development and climate portfolios.

Implementation Schedule

- **2025–2027:** Establish IPPU-climate resilience unit; conduct baseline studies and industrial vulnerability assessments; develop training curricula and MRV frameworks.
- **2028–2030:** Roll out training for industries nationwide; pilot resilient technologies in cement and mining sectors; operationalize industrial MRV systems.
- **2031–2035:** Scale up adoption of climate-smart technologies across multiple subsectors; institutionalize resilience standards in industrial licensing and permitting; expand industry-government knowledge-sharing platforms.

31.9 Agroecology policy and strategy

Detailed Description

Agroecology provides a pathway to not only increase food production but also improve the diversity, resilience, and nutritional quality of food. Through the adoption of agroecological practices, smallholder farmers can diversify their crops, reduce dependency on monocultures, and adapt to climate variability. This transformation strengthens food systems by making them more resilient and sustainable, ensuring that all communities have access to diverse, healthy, and nutritious food. The integration of agroecology into food security policies will also help address the root causes of food insecurity, malnutrition, and climate-related vulnerabilities.

Vulnerability Addressed

- **Ecological vulnerabilities:** Unsustainable farming practices leading to soil degradation, biodiversity loss, and water scarcity.
- **Social vulnerabilities:** Marginalized groups, including women and youth, face unequal access to land, resources, and decision-making within the agri-food system.

- **Economic vulnerabilities:** Smallholder farmers struggle with low incomes, inadequate market access, and reliance on external inputs that increase their vulnerability to global price shocks.

Outcomes (2030 and 2035) (Indicators)

By 2030: Agroecology strategy and policies developed and adopted at the national level.

By 2035:

- 80% of smallholder farmer households practice diversification in food production, with 60,000 households having adopted agroecological methods, and increased annual farming outputs by 20% compared to baseline, with reduced seasonal yield volatility due to agroecological practices.
- National food security and nutrition policies fully integrate agroecology, with clear support for diversified and resilient farming systems.
- Enhanced resilience of smallholder farmers to climate change, as evidenced by reduced vulnerability to seasonal and extreme weather events.

Finance

Estimated **USD 12 million** for policy development, farmer training, market access facilitation, and diversified crop programs.

Implementing Agency

- **Lead:** Ministry of Agriculture and Forestry.
- **Co-Implementers:** Ministry of Health and Sanitation, Directorate of Food and Nutrition, Local Councils, Civil Society Organizations, Smallholder Farmer Cooperatives.

Implementation Schedule

- **2025–2030:** Develop and adopt agroecology-based food security policies and strategies. Begin piloting agroecological practices in key districts.
- **2031–2035:** Expand agroecology adoption, focusing on training, market access, and scaling successful pilot projects, and achieve full integration of agroecology into national food security strategies, ensuring the widespread adoption of diversified and resilient food systems.


UNITY
FREEDOM
JUSTICE


EPA-SL
ENVIRONMENT PROTECTION AGENCY