

## Annex 2a. Project Objective, the Logic of Action and Components

	Description	Indicators	Baseline	Targets (mid-term)	Targets (final)	Sources and means of verification	Assumptions
<b>Objective related to GCF RMF Impact Areas Impact</b>	Reduced exposure of Liberia's communities, livelihoods, and infrastructure to climate-induced natural hazards	Change in expected losses of lives and economic assets (US\$) due to the impact of extreme climate-related disasters in the project zone	Project indicators will be used to update baseline information	Beneficiaries of 1,200,000 people (50% will be females)	Beneficiaries of 2,312,400 people (50% will be females)	Climate risk assessment and Socio-economic survey	This is based on the assumption that 20% of the Liberian population will benefit from the project outputs at mid-term and 100% at the long-term if funds are being released
	A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities, and regions	A1.1 Change in expected losses of lives and economic assets (US\$) due to the impact of extreme climate-related disasters in the geographic area of the GCF intervention	Calculation of the percentage reduction in annual monetary loss from climate hazards Public data related to lives loss due to natural disaster in the project area	There will be a continuous increment in the economic losses attributable to climate hazards	At least a 25% reduction in the annual monetary losses through climate hazards 2030	At least a 75% reduction in the annual monetary losses through climate hazards 2040	There will be climate hazards across all or many counties across the country Climate services is mainstreamed in national planning and DRR strategy
	A2.0 Increased resilience of health and well-being, and food and water security	A2.2 Number of food-secure households (in areas/periods at risk of climate change impacts)	Field Surveys Agriculture production output data	100% of food-secure households are at risk	70% of food-secured households are at risk	50% of food secure household are at risk	Climate services is mainstreamed in national planning and farmer's decision-making
	A3.0 Increased resilience of infrastructure and the built environment to climate change threats	A3.1 Number and value of physical assets made more resilient to climate variability and change, considering human benefits (reported where applicable)	EPA Assessment Report	Baseline assessment of climate hazards impact to be undertaken during year 1	At least 30% improvement in the resilience of infrastructure and built environment to climate treats	At least 70% improvement in the resilience of infrastructure and built environment to climate treats	Timely and sufficient mobilization of resources to enhance the resilience of infrastructure and built environment to climate-related treats

	A4.0 Improved resilience of ecosystems and ecosystem services	A4.1 Coverage/scale of ecosystems protected and strengthened in response to climate variability and change	EPA Assessment Report	35% of ecosystem is protected from climate variability and change			
<b>Component 1: Enhanced Disaster Risk Knowledge of individuals and institutions across the country</b>		# of decision support system established	Baseline study to be conducted year 1	1	1	Designed framework for hydromet services  Climate-related hazard assessment report  Annual performance report  M & E report	Based on the assumption that the geospatial information system would have been established to provide knowledge on climate risk and impacts
<b>Component 2: Enhanced Detection, Monitoring, Analysis and Forecasting of the Hazards and Possible Consequences</b>		# of production, support, and delivery systems improved	Baseline study to be conducted year 1	0	1	Climate information reports  Seasonal rainfall prediction  Monthly weather and climate review	Based on the assumption that the density of observing networks would have been improved.  Adequate generation of climate data and products
		# of hydromet forecasting system established	Baseline study to be conducted year 1	1	2	Climate information reports  Seasonal rainfall prediction  Monthly weather and climate review	Based on the assumption that the density of observing networks would have been improved.  Adequate generation of climate data and products

<b>Component 3: Improved warning dissemination and communication</b>	# of community-based EWS communication mechanism established	0	1	1	Daily Public weather service  Monthly climate bulletins.  M & E reports	Effective and comprehensive communication of weather and climate information to people at risk
	# of Public Weather Service studio established	0	1	1	Daily weather forecast	Availability of Daily weather forecast via different media outlets
<b>Component 4: Improved Preparedness and Response Capabilities through forecast-based financing (FbF) mechanism</b>	# of legislations developed or updated (Independence of the LMS and LHS, and mobilization of resources for FbF)	0	1	3	M & E report Annual performance report (APR)	Independence of the LMHSs and sufficient funds are mobilized for FbF
	# of FbF mechanism established	0	1	1	M & E report APR	Timely and sufficient funds for the FbF
<b>Component 5 Co-ordinated Project management and implementation across all climate information service units in Liberia.</b>	# of collaboration agreement signed disaggregated by type	0	2	5	Quarterly/annual performance report	There exists good relationship with international institutions including regional organization to share data and experiences
	# of Annual Work Program and Budget approved and implemented	0	3	5	Annual Work or Budget	AWP continue to be required by the AfDB
	# of MEL systems established	0	1	1	Monitoring and evaluation report	M&E activities is carried out unhindered
	# of Annual Project Audits undertaken	0	3	5	Audit Report	Annual Audits continue to be required by the AfDB

		# of performance report report by type (APR, IPR, MTR, PCR)	0	6	9	APR, IPR, MTR, PCR	GCF continues to make use of the APR
<b>Component 1</b>	<b>Output 1.1 :</b> Established Guidelines, risk modelling tools and climate knowledge dissemination platform	# of standard guidelines produced on climate information in Liberia laboratory in operation	0	1	2	Annual performance report	Institutions/entities forming part of the CSIS hub will be open and cooperative in developing and implementing the guidelines.
		# of internet-based geospatial platforms established	0	1	2	Climate-related hazards Assessment report	Disaster management decision will be evidence based
	<b>Output 1.2:</b> Enhanced risk analysis for the design of Forecast based Financing and capacity building	# of climate hazards assessments undertaken	0	2	4	Climate hazard assessment reports	Improved on climate risk and associated impacts as well as the willingness to learn
		# of national databases	0	1	2	National Database	Availability of data at the country level which will be aggregated for national database
		# of people trained disaggregated by gender and type of training	0	50 (50% female)	100 (50% female)	M & E Report and APR	Willingness to be trained
<b>Component 2</b>	<b>Output 2.1: Established Climate smart labs and automated decision management systems</b>	# of operational labs/ centres for climate information services established	0	2	4	Annual Performance review report Project mid-term review report.	Implementation schedule for construct will be maintained in line with the project timelines. Land and site arrangement will be not be of challenge
		# of automated decision management system for climate services established and operationalized	0	1	1	Annual project performance review report Project mid-term review report	Decision management system is established and operational conditioned on the availability of funds

	<b>Output 2.2: Rehabilitated National Meteorological Center (NMC) and Enhanced hydromet observation networks</b>	# of NMC buildings refurbished	0	1	1	Annual project performance review report Project mid-term review report	Commitment to provide NMC space to be rehabilitated will be upheld by Government.
		# of hydromet observation networks enhanced	1	2	3	Project mid-term review report. Annual performance report	Maintenance and upgrade of hydromet network will be executed as per schedule
	<b>Output 2.3 Established Quality Management System (QMS) for LMHS</b>	# of QMS established for the LMHS	0	1	1	LCAA review reports	There will be a high and acceptable compliance level on QMS maintained by RIA
	<b>Output 2.4: Enhanced climate services information system</b>	Percentage of climate service recipients increased	5%	15%	50%	Project performance review report Survey report on access to CIS	The public will have interest in climate services
<b>Component 3</b>	<b>Output 3.1: Effective communication channels and improved public weather services developed</b>	# of Public Weather Service studio established	0	1	1	Daily weather forecast	Availability of Daily weather forecast via different media outlets
		% of men and women who believe that the quality and quantity of climate information has improved	0%	50%	75%	Sector specific information platform	Resources to facilitate the timely production sector specific information will be made available
	<b>Output 3.3: Improved impact-based risk information service and Community-based EWS communication mechanism</b>	% of men and women who believe that they are better-informed about climate hazard	0	1	1	Survey	Resources ensure that the PWS studio is functional are made available in a timely fashion
		% of men and women who find the community-based EWS effective	0	50%	75%	Survey	Targeted audience (beneficiaries) are willing to uptake the

							provided climate information
<b>Component 4</b>	<b>Output 4.1: Strengthened Legislation and Disaster Management Framework</b>	# of legislations developed or updated (Independence of the LMS and LHS, and mobilization of resources for FbF)	0	1	3	M & E report Annual performance report (APR)	Independence of the LMHSs and sufficient funds are mobilized for FbF
		# of FBF mechanism established	0	1	1	M & E report APR	Timely and sufficient funds for the FbF
	<b>Output 4.2 Risk scenarios developed and outreach strategies designed for stakeholders at all level</b>	Total # of documents on disaggregated climate information users and package tailored information produced	0	1	1	Annual performance report, Mid-term evaluation report Survey report on access to CIS	There will be increased interest and willingness by the public to receive early warnings
	<b>Output 4.4: Liberian Climate Change Trust Fund established</b>	# of Climate Change Trust Funds established	0	1	1	Annual financial report; Annual performance report, mid-term evaluation report	There will be a strong political will and support toward the establishment of the NCF
<b>Component 5</b>	<b>Output 5.1: Enhanced collaboration with regional organization and other African Institutions</b>	# of collaboration agreement signed disaggregated by type	0	2	5	Quarterly/annual performance report	There exists good relationship with international institutions including regional organization to share data and experiences
	<b>Output 5.2: A Project Management Unit is in place and Project Supervision is achieved</b>	# of performance report by type (APR, IPR, MTR, PCR)	0	6	9	APR, IPR, MTR, PCR	GCF continues to make use of the APR
		# of Annual Project Audits undertaken	0	3	5	Audit Report	Annual Audits continue to be required by the AfDB
	<b>Output 5.3 Monitoring, Evaluation and Learning system is established</b>	# of MEL systems established	0	1	1	Monitoring and evaluation report	M&E activities is carried out unhindered

Activities	<i>List the activities.</i>	<i>Description:</i>	<i>Inputs</i>
	<p><b>Activity 1.1.1:</b> <i>Establishment of Guidelines and risk modelling tools</i></p> <p><b>Activity 1.2.1:</b> <i>Establish an internet-based Geospatial platform</i></p> <p><b>Activity 1.2.1:</b> climate hazards assessments, communities' consultations and national database</p> <p><b>Activity 1.2.1:</b> climate hazards assessments, communities' consultations and national database</p> <p><b>Activity 1.2.2:</b> Community based actions and capacity building</p> <p><b>Activity 2.1.1:</b> Development and Operationalization of an automated decision</p>	<p>This activity will strengthen the regulatory framework for hydromet services. It entails the following (i) Development of guidelines for streamlining meteorological and hydrological information generation; and (ii) Conduct of risk modelling to assess the potential impact of climate-related hazards and accompanying losses - including lives, livelihoods, properties, and cost implications</p> <p>This activity entails setting up an internet-based Geospatial platform and laboratory for national climate-hazard mapping studies. It will consist of a database and a decision support system to carry out a climate-hazard risk assessment and evaluation of optimal risk reduction alternatives related to physical planning and infrastructure.</p> <p>This activity entails setting up an internet-based Geospatial platform and laboratory for national climate-hazard mapping studies. It will consist of a database and a decision support system to carry out a climate-hazard risk assessment and evaluation of optimal risk reduction alternatives related to physical planning and infrastructure.</p> <p>This activity involves: (i) conducting a preliminary assessment of climate-related hazards and losses; (ii) community level consultation; and (iii) support for the development of a database of historical disaster impacts at NS and national level</p> <p>This activity entails: (i) Staff training and capacity building; (ii) Scale up and establish Community-Based Actions (CBATs) in the counties; (iii) Staff Training on technical services (iv) Staff Training on instrument maintenance and calibration</p> <p>This activity will: (i) Develop an automated decision management system for climate services ; (ii) operationalization automated decision management system for retrieving products and services</p>	<p><i>Consultants, materials, equipment</i></p> <p><i>Consultants, materials, equipment</i></p> <p><i>Consultants, materials, equipment</i></p> <p><i>Professional services, consultants, materials, and equipment</i></p> <p><i>Professional services and Consultants</i></p> <p><i>Professional services of firm, equipment, materials</i></p> <p><i>Training materials, consultants, equipment</i></p>

	<p>management system for climate services</p> <p><b>Activity 2.1.2:</b> Establishment of Meteorological and Hydrological lab with LMS and LHS</p> <p><b>Activity 2.1.3 :</b> Strengthening environmental monitoring lab and enhancing NDMA emergency operations</p> <p><b>Activity 2.1.4:</b> Installing solar systems for sustainable and uninterrupted power supply</p> <p><b>Activity 2.2.1:</b> NMC Rehabilitation</p> <p><b>Activity 2.2.2:</b> Enhancing the Hydrometeorological observation networks</p>	<p>The activity will involve: (i) establishment of Meteorological lab within the LMS consisting of forecasting, observation and instrumentation, remote sensing and satellite, climatology, and agrometeorology units; and (ii) establishment of Hydrological lab within the LHS for groundwater and surface water assessment</p> <p>This activity entails (i) Strengthening the environmental monitoring lab at the EPA (ii) Enhancement of the National Disaster Management Agency's emergency operations centre</p> <p>This activity calls for detailed engineering and installation of a 142 kWp solar system including storage for continuous power supply</p> <p>This entails the following: (i) rehabilitating the forecast and observing office; (ii) equipping and furnishing the rehabilitated NMC building; and (iii) establishing and equipping Central Forecasting Office (CFO)</p> <p>This activity calls for the following: (i) acquisition of new automatic weather stations and hydrological monitoring stations to strengthen existing networks; (ii) rehabilitation of damaged equipment and measuring instruments, including the satellite receiving systems Rehabilitate damaged equipment and measuring instruments, including the satellite receiving systems; (iii) procure and install a radar at the Roberts International Airport; (iv) establish Unmanned Aerial Systems (UAS) for upper air observation networks; (v) set up a facility for the operations and maintenance of hydromet infrastructure; and (vi) procure and maintain project vehicle</p> <p>This includes, (i) Developing a good understanding of QMS – This activity will involve a desk review with the support of QMS experts in countries that already have implemented such a system; (ii) Preparing gap analysis and workplan</p>	<p><i>Training materials, consultants, equipment</i></p> <p><i>Professional services, Materials, equipment</i></p> <p><i>Professional services, Materials, equipment, consultant</i></p> <p><i>Professional services, consultants, equipment, and materials</i></p> <p><i>Professional services, Consultants, materials and equipment</i></p> <p><i>Professional services, Equipment, materials</i></p>
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	<p><b>Activity 2.3.1:</b> Developing good understanding of QMS, gap analysis and workplan</p>	<p>This activity will (i) Establish quality policy and quality objectives; and (ii) Training on QMS and validation of workplan</p>	<p><i>Professional services, Equipment</i></p>
	<p><b>Activity 2.3.2:</b> QMS Policy Development and policy related training</p>	<p>This activity will (i) Conduct internal audit; and (ii) Acquire QMS ISO 9001 certification</p>	<p><i>Professional services, Equipment, material, consultants</i></p>
	<p><b>Activity 2.3.3:</b> QMS ISO 9001 Certification</p>	<p>This activity will (i) Establish an E-infrastructure for weather and seasonal forecasting, data, and information management ; and (ii) Build an effective support system with innovative information and communications technology infrastructure for data transmission, storage, processing, quality control, and visualization</p>	<p><i>Equipment, materials, consultants</i></p>
	<p><b>Activity 2.4.1:</b> Establishing an E-infrastructure for weather and seasonal forecasting with support system</p>	<p>This activity will (i) Create a community of practice (CoP) in operational numerical weather and seasonal prediction and forecasts verification; (ii) Create CoP in development, use, and management of information and e-infrastructure; (iii) LNRCS to participate in co-production of forecasts for decision making to bring user perspective, designing forecast thresholds for FbF triggers, and carrying out forecast verification to calculate the probability of acting in vain</p>	<p><i>Equipment, materials, consultants</i></p>
	<p><b>Activity 2.4.2:</b> Establishment of Communities of Practice</p>	<p>This activity will involve the following: (i) Produce and validate core weather and seasonal information products for priority sectors; (ii) LNRCS and NDMA to help in the Training of LMHS staff to improve understanding of forecast needs by communities in order to develop tailored products that will be relevant and inform decision-making</p>	<p><i>Professional services, Consultants, Equipment</i></p>
	<p><b>Activity 2.4.3:</b> Production of seasonal forecasts and related trainings</p>	<p>This activity will involve the following: (i) provide Wireless Training at the International Centre for Theoretical Physics (ICTP); (ii) Undertake site survey, on-site training, and initial deployment; (iii) provide direct engineering assistance; (iv) provide on-site Internet of Things (IoT) Training in Liberia; (v) Conduct surveys to determine ideal communication channels for different users; (vi) Conduct surveys to ascertain the reach of climate information (feedback); and (vii) Evaluate the impact of climate information based on users' response/reaction</p>	<p><i>Professional services, Consultants, Equipment</i></p> <p><i>Consultants, Equipment, materials</i></p>
	<p><b>Activity 3.1.1:</b> Trainings, surveys, engineering</p>		

	<p>assistance and impact evaluation of dissemination measures</p> <p><b>Activity 3.1.2:</b> Establishment of Public Weather Service studio</p> <p><b>Activity 3.2.1:</b> Delivering improved impact based risk information service</p> <p><b>Activity 3.2.2:</b> Establishing community-based EWS communication mechanism</p> <p><b>Activity 4.1.1:</b> Developing and updating legislations in order to transform LMHS into a semi-autonomous agency</p> <p><b>Activity 4.1.2:</b> Strengthening Liberia's Disaster Management Framework</p>	<p>This activity will, (i) Procure and install equipment for PWS studio; (ii) Procure TV weather presentation facilities and system; and (iii) procure single size band (SSB) radio communication for staff</p> <p>This activity will (i) Develop and implement an LHMS information portal; (ii) Monitor user assessment of services provided by LHMS institutions and organisations Monitor user assessment of services provided by LHMS institutions and organisations; (iii) 3 Undertake training in media relations to improve hydrometeorological data users experiences; and (iv) Organise six dialogues in communities vulnerable to climate risk</p> <p>This activity entails the following: (i) Consultation and engagement with communities on tailored early warning information through Community-based Action teams; (ii) 2 Develop communication guidance and Communication Action Response Plans (CARPs); (iii) Facilitating a Seasonal Participatory Scenario Planning; (iv) Develop IEC materials in multiple local languages and conduct CBATs in coordination with the NDMA to promote Disaster Risk Reduction awareness and behaviour change (v) Establish an Emergency operations Centre within LNRCS to facilitate receipt, analysis and dissemination of the early warning information</p> <p>This activity will (i) Formulate legislation to transform LMHS into a semi-autonomous government agency; (ii) Facilitate regular meetings with policymakers to inform them of LHMS activities and plans as well as demonstrate the relevance of their services to socio-economic development</p> <p>This activity will, (i) Develop guide to govern DRM in Liberia and also use it to benchmark the checklist on Law and Disaster Preparedness and Response (ii) Organise a national workshop with key stakeholders to share the findings of the mapping and design a roadmap to implement the recommendations (iii) Provide technical support in the revision of a Disaster Risk management instrument</p> <p>Activity 4.2.1 entails: (i) Collaboration with NDMA to develop SOPs for early actions; (ii) Completing a scoping study; (iii) Consultations on FbF and a national dialogue; (iv) Development of FbF Roadmaps</p>	<p><i>Consultants, Professional services</i></p> <p><i>Equipment, fuel and lubricants</i></p> <p><i>Equipment, training, materials</i></p> <p><i>Consultants, equipment</i></p> <p><i>Consultants, Equipment</i></p> <p><i>Travel, training, consultants</i></p> <p><i>Consultants</i></p>
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	<p><b>Activity 4.2.1 :</b> Delivering on early actions, consultations and roadmaps</p> <p><b>Activity 4.2.2:</b> Dialogue, peer to peer learning, capacity building and pilot testing</p> <p><b>Activity 4.3.1 :</b> Establishment of Liberian Climate Change Trust Fund</p> <p><b>Activity 5.1.1:</b> Facilitation collaboration and organizing study tours</p> <p><b>Activity 5.2.1:</b> Recruitment of PMU staff, Preparation of the Operational manual and Project supervision</p> <p><b>Activity 5.3.1:</b> Monitoring, Evaluation and Learning System</p> <p><b>Activity 5.3.2:</b> Impact Evaluation</p>	<p>(v) Ensure early actions are implemented at all levels the following the forecast and in the case of trigger activation</p> <p>This activity involves, (i) Capacity-building on FbF ; (ii)High-level dialogues; (iii) Support pilot testing and implementation of early actions for identified hazards; and (iv)Facilitate peer to peer learning</p> <p>This activity will establish the LCCTF as a financial mechanism targeted at addressing climate change as proposed in the National Policy and Response Strategy on Climate Change document</p> <p>This activity will (i) Facilitate LMHS collaboration with regional organisations and African institutions for the production and delivery of weather and climate services; and (ii) 2 Organize study tours of African countries with advanced NMHS;</p> <p>This activity entails, (i) recruitment of the six key staff that will be responsible for implementation; (ii) Prepare the operational manual; (iii) Undertake project supervision missions; (iv) Undertake a mid-term review; and (v) Undertake a project completion mission (including supervision missions from Red Cross)</p> <p>Activity 5.3.1 involves: (i) Developing an MEL Plan; (ii) Preparing annual financial audit reports; (iii) Develop M&amp;E Tools including Results Indicator Reference Sheet (RIRS), and Results Indicator Tracking Matrix (RITM); (iv) Undertake a baseline analysis; (v) Procure MEL software (vi) Undertake Data Quality Assessment (DQA); and (vii) Provide MEL training</p> <p>Activity 5.3.2 will, (i) Conduct an impact evaluation assessment of the project; and (ii) Prepare donor reports</p>	<p><i>Training materials, consultants</i></p> <p><i>Training materials, consultants</i></p> <p><i>Consultant, Project team, GCF and AfDB Team</i></p>
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