Annex 1 – Template for CREWS Action Presentation Note

Action Title	**Artificial Intelligence (AI) for Early Warnings for All (EW4All)—Malawi Pilot Project**
Country(ies)	**Malawi**
Partner Country Entity / Entities	Department of Climate Change and Meteorological Services (DCCMS), under the Ministry of Natural Resources and Environmental Management (MNREM)
Implementing Partner *(if submission by Implementing Partner)*	
Implementing Partner Requested *(if submission by Partner Country)*	*Select at least 1:* ☐ World Bank/GFDRR ☒ WMO ☐ UNDRR ☐ No preference *[Please note that the requested Implementing Partner is not guaranteed; the Secretariat will review the nature of the Action and determine the most appropriate Implementing Partner, and the Implementing Partner will also need to confirm interest and availability to proceed with the Action Presentation Note in partnership with the Partner Country]*
Action Type	*Select at least 1:* ☐ Continued Assistance ☒ Analyses and Assessments ☐ Advisory Services ☒ *Support to Project Preparation*
Early Warning System Element(s) Supported	*Select at least 1:* ☒ Monitoring, detection, analysis and forecasting of hydro-meteorological hazards providing lead-times for action. ☐ Dissemination of timely and authoritative warnings ☐ Preparedness and response plans triggered by warnings and weather and climate predictions. ☐ Disaster risk knowledge based on the systematic collection of data and disaster risk assessment. *[Optional: provide additional information as relevant]*

Contributions to CREWS Programming Principles and Results Framework	**CREWS Programming Principles addressed:** *Select all relevant:* ☒ People-centered ☐ Gender-responsive ☒ Promotes Coherence ☒ Leverage Developing numerical weather prediction skills in Malawi will build upon technical training, data assimilation, model interpretation, thus leveraging from CREWS, GCF, WB and UNDP support. It is also expected to further encourage cross-agency collaboration (e.g., between the Department of Climate Change and Meteorological Services, Department of Water Resources, disaster management units) so as to make use of weather forecasts for flood forecasting and emergency preparedness. **CREWS Results Framework Outputs to which the Action is expected to contribute to:** *Select at least one:* ☐ A country and/or region has developed or strengthened legislative and/or institutional frameworks to support and sustain multi-hazard early warning systems. ☐ Multi-hazard needs, gaps and priority assessments, analyses, and related investment plans for early warning systems in a country or region are driven by CREWS financing. ☐ Partnerships and cooperation frameworks developed for financing and scaling up support to multi-hazard early warning systems. ☒ Risk information and tools generated by countries to enable the delivery of impact-based early warnings. ☒ Monitoring, analysis and forecasting of hazards that threaten the country/region are improved and sustained by the countries. ☐ Warnings are communicated by the countries based on common alerting protocols under agreed standard operational procedures (SOPs) ☐ Warnings are received, understood and acted upon based on co-produced preparedness and response plans by the countries. ☐ People of different backgrounds, gender, youth, older persons, people with disability, poor, marginalized, displaced and non-native, as well as related institutions have co-produced climate and weather information products tailored to their needs.

	☐ Private sector is engaged to foster innovation and sustainability in delivery of early warning services. **CREWS Programme Indicators to which the Action is expected to contribute to:** *Select at least one:* ☐ Loss of life ☒ Forecasting and warning capacity ☐ Access to early warning ☐ Use of risk information ☐ Capacity to disseminate warnings. ☐ Capacity to prepare for and respond to warnings. *[Optional: provide additional information as relevant]*
Specific Action and Objectives	This Action aims to pilot the use of Artificial Intelligence (AI) to enhance weather prediction capabilities and strengthen early warning systems in Malawi. The project will deploy and test an AI-based Weather Prediction (AI-WP) system, building on the Bris model developed by the Norwegian Meteorological Institute (MET Norway) and the "forecast-in-a-box" concept being advanced under WMO's Integrated Processing and Prediction System (WIPPS). This pilot will evaluate how an AI-WP system can contribute to closing critical capacity gaps in National Meteorological and Hydrological Services (NMHSs) in Least Developed Countries (LDCs) and Small Island Developing States (SIDS), particularly those with limited infrastructure, constrained human resources, and outdated forecasting systems. Through this pilot, Malawi's Department of Climate Change and Meteorological Services (DCCMS) will gain hands-on experience running AI-enabled forecasts locally, assessing their operational feasibility, forecast skill, and potential to support timely early warnings for high-impact weather events. The Action also seeks to demonstrate the scalability and adaptability of AI-WP in data-scarce, resource-constrained environments, particularly relevant to Least Developed Countries (LDCs) and Small Island Developing States (SIDS). Objectives include: • Integrating the AI-WP system into DCCMS's forecasting workflow; • Providing targeted training and technical support to DCCMS staff; • Evaluating improvements in forecast accuracy, lead time, and usability; • Gathering feedback on operational integration through forecaster interviews, focus groups, and participatory workshops; • Producing actionable insights and a roadmap for potential scale-up in other regions.

Need and Rationale	Malawi remains highly vulnerable to climate-related hazards, yet its early warning systems (EWS) face significant gaps due to limited observational infrastructure, constrained human resources, and outdated forecasting systems. To achieve universal early warning coverage by 2027, as outlined in the United Nations' Early Warnings for All (EW4All) initiative, there is an urgent need to modernize and enhance the capacity of DCCMS. This Action will deploy and test an AI-WP system, building on the Bris model and the "forecast-in-a-box" framework developed by MET Norway and aligned with WIPPS. The Action is designed as a direct contribution to **Pillar 2 of EW4All**, led by WMO, focusing on forecasting and detection. It aims to strengthen DCCMS's forecasting capacity through the integration of AI tools, enhanced data workflows, and operational training. Furthermore, this Action builds upon and complements CREWS-supported initiatives by piloting next-generation forecasting innovations that are cost-effective and scalable to other LDCs and SIDS. By enabling DCCMS to run AI-based forecasts locally, the Action contributes to closing capacity gaps, promoting sustainability, and generating insights for replication. Results and lessons learned will be synthesized and presented at the WMO Extraordinary Congress (Cg-Ext 2025), contributing to global efforts under EW4All. The Action serves as a foundational step toward sustainable, next-generation forecasting in Malawi and beyond.
Alignment	The proposed Action is firmly aligned with Malawi's national priorities and global commitments to strengthen early warning systems (EWS) and build climate resilience. At the national level, it supports the implementation of the **National Adaptation Plan (NAP)** and contributes to the country's **Nationally Determined Contributions (NDCs)** under the Paris Agreement, which emphasize the importance of robust climate information services, risk-informed planning, and anticipatory action for vulnerable communities. The Action complements ongoing **CREWS-supported initiatives** in Least Developed Countries (LDCs) by piloting cost-effective, scalable tools that modernize forecasting capacities. It builds directly on Malawi's partnership with **MET Norway** under the SAREPTA project, integrating the Bris AI-based weather prediction model and the "forecast-in-a-box" system to enhance operational efficiency and improve forecasting accuracy in data-scarce environments. Globally, the Action is fully aligned with **EW4All** initiative—specifically **Pillar 2**, led by the **World Meteorological Organization (WMO)**, which focuses on forecasting, detection, and monitoring. It also contributes to **WIPPS**, through synergies with its pilot project, *Global to Local Data-Driven Predictions in a Common Framework*, aimed at mainstreaming AI-enhanced forecasting across vulnerable regions. Furthermore, the Action supports Malawi's proactive engagement with the **Santiago Network on Loss and Damage** by piloting practical technologies and institutional partnerships that improve national capacity to anticipate, respond to, and reduce the impacts of climate-related hazards.

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<tr><td>Timeframe</td><td>The proposed Action is expected to run for six months, from May to October 2025, in alignment with key global milestones under the EW4All initiative and the WMO Cg-Ext 2025 scheduled for October 2025.

This timeframe allows for the rapid deployment and testing of the AI-based forecasting system (“forecast-in-a-box”) tailored to Malawi’s operational needs. It includes structured phases for infrastructure setup, system integration, capacity building, performance evaluation, and knowledge sharing. The six-month duration ensures that actionable insights and results will be available in time to inform WMO Member States and partners during the EW4All-focused Congress, where the project outcomes will be presented.

While the pilot is designed for short-term execution, it is nested within a broader multi-year vision linked to the WIPPS. The results of this Action will inform the potential for sustained scaling and follow-up investment beyond the initial pilot window.

Should further developments or scaling be needed, a continuation phase may be proposed based on lessons learned and operational feedback.

<table>
<tr><th>Timeline</th><th>May</th><th>June</th><th>July</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov-Apr</th></tr>
<tr><td>Phase 1: Planning & Infrastructure Setup</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Phase 2: Implementation & Training</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Phase 3: Evaluation & Optimization</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Phase 4: Reporting & Future Planning</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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<tr><td>Action Cost (To be completed by Implementing Partner)</td><td>USD 250,000</td></tr>
<tr><td>Attachments</td><td>The Three attached documents as required

1. Letter from Malawi[1]
2. Activity List
3. Budget for Activities</td></tr>
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[1] This can include existing Letters or Frameworks in place between the Implementing Partner and Partner Country or Countries in the event that the scope of engagement includes the specific early warning system Action being requested. For Regional Action requests, the Endorsement Letter or similar existing Letter or Framework can originate from relevant regional institutions.

Annex 1: *Letter from Malawi*

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Department of Climate Change and
Meteorological Services,
P.O. Box 1808,
BLANTYRE,
MALAWI.

Ref. MET/TCP/32

26 May, 2025

John Harding
Head, CREWS Secretariat
World Meteorological Organization
Geneva, Switzerland

Dear Mr. Harding,

SUBMISSION OF ACCELERATED SUPPORT WINDOW (ASW) ACTION PROPOSAL – ARTIFICIAL INTELLIGENCE FOR EARLY WARNINGS FOR ALL (EW4ALL) PILOT PROJECT IN MALAWI

I am pleased to submit the attached Proposal titled "Artificial Intelligence (AI) for Early Warnings for All (EW4All)—Malawi Pilot Project" for consideration under the CREWS Accelerated Support Window (ASW).

This proposal outlines an innovative approach aimed at significantly enhancing Malawi's weather prediction capabilities through the integration of advanced artificial intelligence systems. Specifically, it builds upon existing collaboration with MET Norway and leverages the "forecast-in-a-box" system under the WMO Integrated Processing and Prediction System (WIPPS). The proposed pilot aligns with national priorities articulated in Malawi's National Adaptation Plan (NAP) and its commitments under the Paris Agreement. Furthermore, it directly contributes to global initiatives, notably the United Nations' Early Warnings for All (EW4All) and Pillar 2 of EW4All led by WMO, focusing on forecasting, detection, and monitoring.

We firmly believe this initiative represents a strategic opportunity to strengthen Malawi's early warning infrastructure, deliver actionable insights, and support long-term capacity development for our forecasting staff.

Your favorable consideration of this proposal will significantly support Malawi's efforts towards achieving robust, reliable, and sustainable early warning systems. We remain at your disposal should you require any additional information or clarification regarding this submission.

Thank you for your continued support and consideration.

Yours sincerely,

Lucy Mtilatila, PhD
DIRECTOR FOR CLIMATE CHANGE AND METEOROLOGICAL SERVICES AND PERMANENT REPRESENTATIVE OF MALAWI WITH THE WORLD METEOROLOGICAL ORGANISATION (WMO)

Annex 2: Detailed activity List

Phase 1: Planning & Infrastructure Setup (May 2025)	**Kick-off meeting and joint work planning workshop (virtual or hybrid)**	**WMO, MET Norway, DCCMS**	**Inception report; validated work plan**
	Assessment of DCCMS's computational capacity and infrastructure	MET Norway, DCCMS	Infrastructure assessment report
	Adaptation of Bris AI-WP model to the Malawi regional domain	MET Norway, DCCMS	Customized Bris model configuration
	Setup of forecast-in-a-box architecture at DCCMS	MET Norway, DCCMS	Installed system components and initial configuration
	Stakeholder mapping and engagement planning	MET Norway, DCCMS	Stakeholder matrix; engagement plan
	Initial focus group sessions with DCCMS forecasters	DCCMS, MET Norway	Expectations and perception mapping report
Phase 2: Implementation & Training (June–July 2025)	Forecast system integration and testing at DCCMS	MET Norway, DCCMS	Operational test reports; logbook of model runs
	Establishment of data pipelines for ingestion and visualization	MET Norway, DCCMS	Data workflow documentation
	Conduct of training sessions/webinars on AI-WP and system operation	MET Norway, WMO, DCCMS	Training materials; attendance logs
	Parallel forecast runs: AI-WP vs traditional NWP	MET Norway, DCCMS	Comparative forecast dataset
	Initial user feedback collection (interviews, observations)	DCCMS, MET Norway	Interview summaries; participant observation notes
Phase 3: Evaluation & Optimization (August–September 2025)	Verification of AI-WP forecast performance (statistical and subjective)	MET Norway, DCCMS	Forecast evaluation report
	Refinement of system settings based on operational feedback	MET Norway, DCCMS	Configuration updates
	Second round of focus groups and structured interviews	DCCMS, MET Norway	Forecast usability and acceptance report
	Workshop: review of findings with national stakeholders	MET Norway, DCCMS, WMO	Workshop report; participant feedback
Phase 4: Reporting & Future Planning (October 2025)	Synthesis of lessons learned and best practices	MET Norway, DCCMS	Lessons learned brief
	Presentation preparation for WMO Congress (Cg-Ext 2025)	MET Norway, DCCMS, WMO	Slide deck; presentation script
	Final report and roadmap for future scale-up	WMO, DCCMS, MET Norway	Final narrative report; roadmap for LDC/SIDS replication

Annex 3: Estimated Budget

The total budget requested for the AI for EW4All Pilot Project in Malawi is **USD 250,000**, which includes funding for technical activities (USD 217,500) and the implementing partner (WMO) administrative fee (USD 32,500). The activities budget is divided between two core entities: **MET Norway** and **DCCMS (Malawi)**, with a total of USD 150,000 allocated to MET Norway and USD 67,500 to DCCMS.

1. **MET Norway Budget – USD 150,000**

MET Norway is responsible for leading the technical development and deployment of the AI-based weather prediction system, staff training, and system evaluation. The staff budget covers the work of senior researchers, forecasters, and IT developers involved in customizing and deploying the Bris AI-WP model, integrating it into the forecast-in-a-box system, and providing remote and in-country technical support. The budget is allocated as follows:

Category	Detail	Amount (USD)
Staff	All MET Norway Staff (1,751 hours)	126,000
Travel	Travel to workshop	16,000
Training & Workshops	Webinars, materials, facilitation	8,000
Total		**150,000**

2. **DCCMS Budget – USD 67,500**

DCCMS will support operational implementation in Malawi, including local infrastructure preparation, coordination, and staff participation in testing and feedback.

Category	Amount (USD)	Detail / Justification
Staff	15,000	To support ~4 core technical staff for six months (AI model operations, system setup, integration with forecasting workflows).
Travel	16,500	Local travel to support implementation, outreach, and coordination activities.
Workshops	18,000	For 2 national-level events (inception and dissemination) covering venue, logistics, and stakeholder participation.
Equipment	18,000	Procurement of computing hardware, accessories, and necessary software for running and visualizing AI-WP outputs.
Total	**67,500**	

3. **Implementing Partner Fee**

Implementing Partner Fee (13%) - WMO is **USD 32,500**