# CARIBBEAN METEOROLOGICAL ORGANIZATION

**CARIBBEAN METEOROLOGICAL COUNCIL** **Doc. 11**
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## PROJECT UPDATES AND PROPOSALS

(Submitted by the Coordinating Director)

### Background

1. The Council will recall receiving progress updates on project activities related to non-tropical cyclone severe weather forecasting, the adaptation of model meteorological legislation and strategic planning, implementation of the Common Alerting Protocol (CAP), lightning safety and awareness, and Quality Management System (QMS) compliance baseline assessment at the *Sixty-Fifth Session of the Caribbean Meteorological Council* (CMC65, Port of Spain, November 2023). At that session, the Council urged Members to enact the draft legislation prepared under the first CREWS Caribbean project, continue developing and reviewing strategic plans and frameworks for weather, water, and climate services, and sustain the Severe Weather Forecasting Programme for the Eastern Caribbean. At the mid-year Session of Council (*CMC66*) held in August 2024, the CMO Headquarters Unit (CMO HQ) provided the Council with further updates on projects and proposals, which are briefly recapped below:

(i) CREWS Caribbean 2.0: Project approved in March 2024 with a budget of approximately US$535,000. Preliminary discussions were held with the WMO, United Nations Office for Disaster Risk Reduction (UNDRR), Caribbean Disaster Emergency Management Agency (CDEMA), and Caribbean Broadcasting Union (CBU) on potential joint activities. A draft Implementing Arrangement (IA) was submitted for independent legal review.

(ii) GCF-SAP-CREWS Scaling Up Project: CMO HQ intends to upgrade weather radars in Belize and Trinidad and Tobago and support the implementation of Multi-Hazard Early Warning Systems (MHEWS), initially in Belize, Guyana and Trinidad and Tobago. Guyana has since withdrawn from the project. A consultant has been hired to develop the Funding Proposal, and stakeholder consultations are planned.

(iii) QMS Implementation: CMO HQ conducted a baseline assessment of Quality Management System (QMS) compliance and presented the findings at the WMO RAIV Aviation Workshop. A potential partnership with the International Civil Aviation Organization (ICAO) was explored but did not materialize. A concept note is being developed, and opportunities to secure funding for training and model documentation development are being explored with the WMO Education and Training Office.

(iv) Other Activities:
   i. *SERVIR Amazonia*: Trainees from the Tobago Emergency Management Agency (TEMA) and Trinidad and Tobago Institute of Marine Affairs (IMA) applied techniques learned at the program to support the national response to the Tobago Oil Spill in February 2024.

ii. *Smart Seas Project*: CMO HQ helped set priorities for accessible communications at sea for small-scale fishers.
iii. *Community Hydrological Observers Programme*: Provided support to the Water Resources Agency of Trinidad and Tobago.
*iv.* *NOAA/WMO RA IV Workshop: An Interactive Analysis of Tropical Storm Philippe:* Organizing Committee.
i. *Public Engagements*: Participated in the CTU's 35th Anniversary Open House and the Recommissioning of the Trinidad Doppler Weather Radar.

2. This report continues the process of providing regular updates to the Council on the current status and ongoing progress of projects and activities which the CMO HQ intends to deliver on behalf of Member States.

**a) Climate Risk and Early Warning Systems (CREWS) Caribbean Project Phase 2 (CREWS Caribbean 2.0): Strengthening Hydro-Meteorological and Early Warning Services in the Caribbean**

3. The Council will recall that *CREWS Caribbean 2.0* focuses on achieving the UN-mandated '*Early Warnings for All" Initiative* (EW4ALL), which extends to March 2027. An approved budget of US$7 million was allocated to the Caribbean region to strengthen MHEWS Governance, improve disaster risk knowledge, strengthen National Meteorological and Hydrometeorological Service (NMHS) and National Disaster Risk Management Office (NDRMO) capacities, support warning dissemination and communication, and develop inclusive and gender-responsive approached in the development of Early Warning Systems (EWS).

4. The Council will be pleased to note that the CMO HQ obtained a favourable independent legal assessment of the draft IA with recommendations in September 2024. Minor concerns raised by the legal advisors were resolved in consultation with the WMO. The final IA, with a revised budget of US$583,150, was reviewed and approved by the Chair of the CMC, who delegated authority to the Coordinating Director, Dr. Arlene Laing, to implement the project activities on behalf of the CMO. The final IA was signed on 11 November 2024.

5. The Council is informed that through the IA, the CMO HQ will receive funding to support Member States and NMHSs through:

(i) Development or adjustment of Standard Operating Procedures between NMHSs and NDRMOs;
(ii) Development of National Strategic Plans and Frameworks for Weather, Water, and Climate Services;
(iii) Regional and National Severe Weather Forecasting workshops;
(iv) Familiarization missions for operational forecasters on a limited basis;
(v) Development of capacities for lightning detection and awareness building;
(vi) Capacity-development in the WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS) 2.0;
(vii) Regional and National workshops to strengthen collaboration and mutual understanding among NMHSs, NDRMOs, and the Media; and
(viii) National Common Alerting Protocol (CAP) Implementation Workshops.

**b) Green Climate Fund (GCF) Simplified Approval Process (SAP) for Climate Risk Early Warning Systems (CREWS) Scaling up Hydrometeorological and Multi-hazard Early Warning Systems in Belize and Trinidad and Tobago Project**

6. The Council is reminded that the CMO HQ is working with the Caribbean Development Bank (CDB) to upgrade CMO Doppler Weather Radars in Belize and Trinidad and Tobago and strengthen regional MHEWS, with grant funding from the GCF Simplified Approval Process (SAP) and the new

*Scaling Up Framework* of the GCF CREWS Initiative. This modality fast-tracks access to a maximum of US$25 million for EWS, and is only available to the CMO since the organization has completed previous CREWS projects. A "Write-Shop" was hosted in Port of Spain in January 2024 to develop the project concept note, to be developed into a full GCF Funding Proposal (FP).

7. As reported at CMC66, a consultant was onboarded to develop the FP. Since then, two rounds of consultations with key stakeholders from Belize and Trinidad and Tobago have been completed, the first in September with a broader group of interested parties, then the second in October with the NMHSs, NDRMOs, and Nationally Designated Authorities (NDAs). The draft FP was sufficiently reviewed and developed, and submitted to the GCF and NDAs of both countries on 13 November 2024, to seek Climate Investment Committee (CIC2) endorsement and undergo one round of review from the GCF, before expecting the full FP and Annexes in January 2025. Non-Objection Letters (NOLs) are required from the NDAs of both countries to facilitate the final submission. The FP has also been submitted to the CREWS Initiative and CREWS Implementing Partners WMO and UNDRR for their feedback, which will be incorporated into the FP along with the GCF's recommendations.

8. The Council is informed that this project intends to leverage **US$24,930,167** in grant funding to deliver thirteen (13) outputs and execute the forty-two (42) activities detailed in **Annex I**, which will directly benefit Belize and Trinidad and Tobago and indirectly reduce disaster risk and increase climate adaptation to the broader Caribbean through the attainment of the following outcomes and co-benefits:

(i) *Outcome 1*: Strengthened Multi-Hazard Early Warning Systems (MHEWS) governance on national levels
(ii) *Outcome 2*: Improved disaster risk knowledge on regional, national and community levels
   i. Co-benefit 1: Increased access to education
(iii) *Outcome 3*: Strengthened National Meteorological and Hydrological Services (NMHS) provision, detection, observation, monitoring, analysing, forecasting and warning of hazards
(iv) *Outcome 4*: Strengthened early warning communication, and preparedness and response capabilities in beneficiary countries
   i. Co-benefit 2: Greater gender equality.

9. CMO Member State NMHSs are expected to directly benefit from the:

(i) Operationalization and institutionalization of Impact-based Forecasting and MHEWS;
(ii) Implementation of high-resolution Numerical Weather Prediction Models;
(iii) Upgrading of Doppler Weather Radar Systems;
(iv) Modernization of ICT systems for forecasting, early warning, and alerting;
(v) Implementation of QMS;
(vi) Strengthening of communication systems;
(vii) Development and building of NMHS staff capacity in MHEWS, observations, analysis, and forecasting.

**c) Quality Management Systems (QMS) Implementation**

10. At CMC63 (Grand Cayman, November 2022), the Council was reminded of ICAO requirements for all meteorological service providers to implement a Quality Management System (QMS), which also enables the pursuit of Cost Recovery for meteorological services to international air navigation. This resulted in the Council instructing CMO HQ to incorporate a programme of actions, including baseline assessments of Member States' QMS status, leading to a regional project that facilitates QMS certification. The Council was previously updated on the results of a regional baseline assessment survey at CMC65, and efforts to develop a project to pursue grant funding at CMC66.

11. Since then, the CMO HQ refined earlier concepts and developed a draft concept note aimed at enhancing the regional and Member State NMHS capacity to implement and sustain effective QMS.

The CMO HQ intends to pursue grant funding opportunities with the WMO Education and Training Office to support the execution of activities detailed in **Annex II**, summarized as follows:

(i) Leadership Training: Training for NMHS/QMS leaders to implement and document an ISO 9001:2025 compliant QMS;
(ii) Auditor Certification: Certification training for NMHS personnel to become QMS Lead Auditors;
(iii) QMS Documentation Assessment: Assessment of existing QMS documentation used by NMHSs and development of model QMS documentation;
(iv) Regional Workshop: Hosting a regional workshop to adapt model QMS documentation to national and operational contexts, as well as to develop a regional QMS audit strategy and plan.

**d) Lightning Detection System and Lightning Safety Awareness**

12. Council will recall that at the 59th Session (Anguilla, 2019), Council approved the CMO Headquarters initiating a project to develop a CMO Lightning Detection Network. CMO Headquarters is pleased to report to the Council that ground-based lightning detection will be developed as part of the CREWS Caribbean (Phase 2.0) through the WMO-CMO Implementing Arrangement ab.

**e) The International Relations of Tropical Storms in the Caribbean**

13. Council is informed of a project entitled, "*The International Relations of Tropical Storms in the Caribbean*", a collaboration between King's College London and The University of the West Indies that is funded by the UK Economic and Social Research Council. The project will be examining how barriers to international cooperation around hurricanes and tropical storms in the Caribbean region are understood, distributed, and might be resolved in the future. It asks important questions relating to the impacts of climate change and a changing international order on meteorological cooperation, studying the unique contributions of the CMO within the World Meteorological Organization, and exploring historical legacies for the vulnerabilities that communities in the Caribbean face to hurricanes and tropical storms.

14. Through the project archival fieldwork will be conducted at the WMO, CMO Headquarters Unit, CIMH, CARICOM, and the West Indies Federation archives. The project will examine expert discourses, practices, and institutional processes that influence international cooperation around tropical storms, and by which they constitute international relations.

> "The team expects to interview a sample of approximately 90 individuals across the WMO, CMO, CARICOM, Caribbean governments, community groups, donor and response agencies, practitioners in early warning, disaster response and resilience building. These interviews will track networks of expertise outwards from the Caribbean Meteorological Council, which sets policy for the CMO, and the secretariat of the WMO, using a snowball method to identify key actors engaged in international cooperation around prediction (e.g., meteorologists, hydrologists), designing response (e.g., early warning systems, resilience building) and mitigation (e.g., disaster response and recovery). Secondly, interviews will seek to identify the challenges to international cooperation around tropical storms as perceived across the field engaged in prediction, observation, management and response. Thirdly, interviews will gather data on how cooperation around tropical storms in the Caribbean is practiced in the face of these challenges, identifying best-practices and means to improve collaboration."

15. The Coordinating Director, Dr Arlene Laing, will be serving on the project's advisory board which comprises Professor Berkhout, Assistant Principle for Climate and Sustainability at KCL, Professor Taylor, Dean of the Faculty of Science and Technology at UWI, Professor Amanda Lynch, Chair of the WMO Research Board. The board will advise on delivery and impacts, and have input into workshop

design. The Project Lead (PL) is Dr Michelsen, Associate Dean in the Faculty of Social Science and Public Policy, KCL. Project Co-lead is Dr Haughton, Head of the Department of Government at UWI.

**f) Advancing Alternative Energy Education within the Ministry of Education CSEC and CAPE Science and Mathematics Syllabi**

16. The Council is informed that the CMO Headquarters received a request from the Faculty of Science and Technology (FST), The University of the West Indies, St Augustine Campus to partner with the FST on *Advancing Alternative Energy Education* within the Ministry of Education CSEC and CAPE Science and Mathematics Syllabi. The FST is seeking to advance education and raise public awareness on Alternate Energy by complementing the general objectives of Science and Mathematics Syllabi at CSEC and CAPE levels. FST has also invited the Ministry of Education to approve and partner with the FS on this project and also invited the Trinidad and Tobago Meteorological Service as a partner.

17. The objective of the project is to bring awareness to alternative energy by engaging school children in the measurement, storing, processing, analyzing, and reporting of meteorological parameters that are important for climate resilience and alternative energy solutions. The project is designed to be integrated into the curricula for secondary school children and is also aligned with the WMO Strategic priority to enhance meteorological observing and modeling systems by embarking on an integrated approach to monitoring and enhancing data availability, data management, and data processing.

18. The FST is preparing an application for funding from the Trinidad and Tobago Green Fund, also known as the National Environmental Fund, to acquire and install meteorological stations in Trinidad and Tobago, following which UWI, School Teachers, and school children within Trinidad and Tobago. Training would be provided for school teachers and students on use and maintenance of the AWS and data from the AWS would be available to all secondary schools to serve and support school-based projects. The long-term impact of the project will be the inclusion of Alternative Energy topics at the CAPE and CSEC curriculum levels in the subjects of Mathematics and Science.

**ACTION PROPOSED TO COUNCIL**

19. The Council is invited to:

(i) **Note**:

a. Updates on the development of projects and activities to strengthen NMHS operational and management capacity, early warning systems, and consequently, climate adaptation and sustainable development in Member States.

b. CMO Headquarters invitation to partner with the Faculty of Science and Technology (FST), UWI St Augustine on a project, *Advancing Alternative Energy Education* within the Ministry of Education CSEC and CAPE Science and Mathematics Syllabi in Trinidad and Tobago.

(ii) **Support** the CMO Headquarters Unit in:

a. The implementation of activities under the CREWS Caribbean Project Phase 2.

b. The pursuit of grant funding to support Member States' implementation of Quality Management Systems for their National Meteorological and Hydrometeorological Services.

(iii) **Endorse** the CMO Headquarters Unit in its efforts to develop and implement the GCF-SAP-CREWS Scaling Up Project, including the upgrades to Doppler Weather Radars, and the strengthening of MHEWS in Belize and Trinidad and Tobago.

(iv) **Encourage** cooperation of Members with the study on the international relations of tropical cyclones in the Caribbean to be conducted by The University of the West Indies and Kings College of London.

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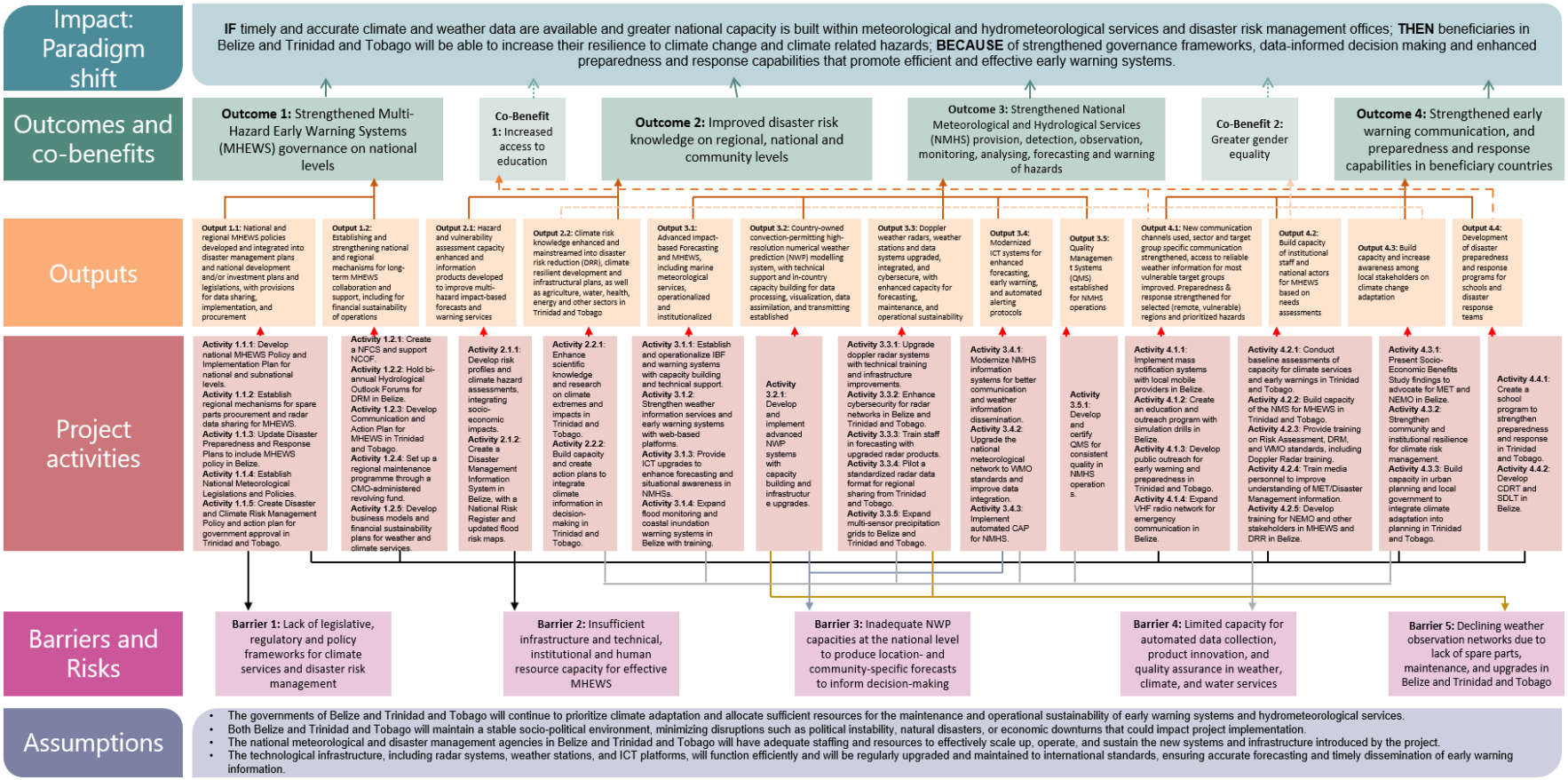
CMO Headquarters
November 2024

## Annex I

## Scaling up of Caribbean Hydrometeorological and Multi-hazard Early Warning Services in Belize and Trinidad and Tobago – Theory of Change




**Subject to change/updates**

## Annex II

## Quality Management Systems (QMS) Implementation Proposed Capacity Development Activities – Logframe/Theory of Change

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|---|
| **Impact**: Enhanced regional transportation safety, disaster preparedness, economic resilience, and fulfilment of international obligations |
| **Outcomes:**<br>1. Increased regional capacity in quality management systems (QMS) for meteorological and hydrometeorological services leading to improved transportation safety and disaster preparedness.<br>2. Improved compliance with international conventions, customer requirements, standards, and recommended practices, towards economic resilience.<br>3. Strengthened regional coordination for QMS implementation, ensuring long-term sustainability. |
| **Outputs:**<br>1. NMHS and QMS leadership with increased QMS implementation knowledge and skills<br>2. Regional pool of internationally accredited certified QMS Lead Auditors<br>3. Summary report on current operational and support processes documentation, with action plan for regional harmonization<br>4. Model QMS and QMS documentation<br>5. QMS documentation tailored to national/operational circumstances of NMHSs<br>6. Regional QMS Audit Strategy and Plan |
| **Barriers:**<br>1. Limited human resources available to focus on QMS in NMHSs and Regional Institutions<br>2. Lack of available financial resources to allocate to QMS implementation<br>3. NMHS personnel do not possess practical skills in quality control and assurance for meteorology |
| **Risks:**<br>1. Inability of NMHSs to conduct cost-recovery activities for meteorological services provided to international air navigation<br>2. Travel blacklisting of countries by airlines over failure to comply with ICAO safety and quality management requirements<br>3. Economic losses by Caribbean countries due to decreases in tourist arrivals and loss of Air Navigation Services and Ground Handling Fees by airports<br>4. Continued non-compliance with ICAO Standards and Recommended Practices and WMO Technical Regulations<br>5. Uncertain or poor-quality meteorological observations being exchanged internationally and assimilated by global and regional numerical weather prediction models<br>6. Reduced accuracy and reliability of numerical weather predictions and weather forecasts by NMHSs<br>7. Reductions in investments into NMHSs by Governments<br>8. Erosion of trust in NMHSs by the public and key sectors<br>9. Decreased preparedness by exposed communities and increased disaster-related losses. |
| **Activities:**<br>1. Capacity development training for NMHS/QMS leaders in implementing and documenting an ISO 9001:2015 QMS<br>2. Certified Quality Management Systems Lead Auditor training<br>3. Evaluation of current QMS documentation systems and practices in the Caribbean<br>4. Development of model QMS and QMS documentation<br>5. Workshop to tailor model QMS and QMS documentation to national/operational circumstances, and to develop a regional QMS audit strategy and plan |

| **Implementation Period:** | Three (3) years |
|---|---|

The project is designed to enhance regional transportation safety, disaster preparedness, economic resilience, and compliance with international obligations by strengthening QMS across Caribbean NMHSs. This will be accomplished by increasing NMHS leadership's knowledge and skills in QMS implementation, establishing a regional pool of certified QMS Lead Auditors, and developing tailored QMS documentation for regional harmonization. These outputs will directly support the project's outcomes of increasing regional capacity for QMS, improving compliance with international conventions and standards, and strengthening coordination for the long-term sustainability of QMS efforts. Additionally, better compliance with international standards will foster economic resilience as NMHSs will better meet customer and regulatory requirements, enhancing their ability to support critical economic sectors like aviation and tourism and keep Caribbean Small Island and Coastal Developing States on the sustainable development pathway through better support for disaster preparedness.

The project's activities are designed to mitigate key barriers and risks identified by NMHSs. To address limited human resources and practical QMS skills in NMHSs, the project offers targeted capacity development through ISO 9001:2015 QMS training, workshops, and certified QMS Lead Auditor programs. These activities will equip NMHS personnel with the skills necessary for effective QMS implementation and foster a pool of certified auditors who can maintain and verify QMS compliance across the region.

Financial constraints on QMS implementation are addressed through regional collaboration and resource sharing, as organized in the Regional QMS Audit Strategy and Plan, which reduces the individual financial burden on NMHSs. This collective approach strengthens regional coordination, ensuring that QMS efforts are sustainable and scalable. The development of tailored QMS documentation and a regional QMS audit strategy further ensures that implementation can be adapted to national circumstances, reducing development costs and leveraging economies of scale.

The project also mitigates risks associated with non-compliance with ICAO standards, which could lead to travel blacklisting and economic losses by vulnerable Caribbean economies. By improving QMS implementation, NMHSs will increase the quality of weather and climate service delivery, which is critical for international civil aviation and disaster preparedness, but also mitigates the erosion of public trust and ensures continued government investment.

**Subject to change/updates**