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| AWEATHER CLIMATE WATER | **World Meteorological Organization****EXECUTIVE COUNCIL****Seventy-Eighth Session**10 to 14 June 2024, Geneva | **EC-78/INF. 3.1(1)** |
| Submitted by:Chair TCC with PTCs, C/RB and PRAs4.IV.2024 |

## DRAFT ZERO OF THE ROADMAP FOR THE WMO CONTRIBUTION TO THE EARLY WARNINGS FOR ALL INITIATIVE

*[Version for TCC-PAC. The document is being proofread for EC-78]*

### Background

1. On the World Meteorological Day 2022, the United Nations (UN) Secretary-General (SG) announced that the UN would spearhead a new action to ensure that every person on Earth is protected by Early Warning Systems (EWSs) within five years. The initiative, called Early Warnings for All (EW4All), is co-led by the World Meteorological Organization (WMO) and the United Nations Office for Disaster Risk Reduction (UNDRR).

2. The WMO Executive Council (EC), through its [Resolution 3 (EC-75)](https://library.wmo.int/doc_num.php?explnum_id=11550#page=19) – United Nations Global Early Warning/Adaptation Initiative, requested the Commission for Weather, Climate, Water and Related Environmental Services and Applications (SERCOM), in consultation with other WMO bodies and with the support of the Secretariat, to develop an initial action plan to respond to the EW4All initiative.

3. SERCOM and the Commission for Observation, Infrastructure and Information Systems (INFCOM) jointly hosted the [WMO Technical Conference on - the UN Global Early Warning Initiative for Climate Adaptation: Early Warnings For All](https://wmo.int/events/meeting/wmo-technical-conference-un-global-early-warning-initiative-climate-adaptation-early-warnings-all), (Geneva, October 2022), which profiled the work of a range of stakeholders including the private sector within the framework of an early warning services value cycle and where the participants, both the public and private sector, expressed their strong support and intentions to collaborate in the EW4All initiative through a [Joint Statement](https://wmo.int/sites/default/files/2023-10/Statement_from_the_WMO_Early_Warnings_for_All_Conference__1.pdf).

4. SERCOM-2 (October 2022), through its [Resolution 2 (SERCOM-2)](https://library.wmo.int/doc_num.php?explnum_id=11528#page=15)– UN Global Early Warnings/Adaptation Initiative, requested the president (P) of SERCOM to “take immediate action to advance preparations for the practical implementation of the challenge” in close coordination with other WMO bodies, and “inform a recommendation to EC-76 relating to the priority activities, proposed subsidiary body structures and supporting partnerships necessary”.

5. The [*Early Warnings for All: Executive Action Plan 2023–2027*](https://library.wmo.int/index.php?lvl=notice_display&id=22154#.ZD-oQHZByUk)was launched by the UN SG at the twenty-seventh session of the Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC/COP 27) in Sharm El-Sheikh, Egypt in November 2022. The Executive Action Plan was developed under the WMO SG’s leadership and builds on and aligns with WMO and other stakeholders’ foundational elements already in place to pursue the early warning goal, notably those developed under the technical commissions, the Capacity Development Panel and the Research Board.

6. The Executive Action Plan is organized along the four pillars[[1]](#footnote-2) of a multi-hazard early warning system (MHEWS):

 Pillar 1 – Disaster risk knowledge

 Pillar 2 – Observations and forecasting

 Pillar 3 – Dissemination and communication

 Pillar 4 – Preparedness and response

7. EC, through its [Decision 8 (EC-76)](https://library.wmo.int/viewer/66258/?offset=2#page=1230&viewer=picture&o=bookmark&n=0&q=) – United Nations Early Warnings for All initiative follow-up, welcomed SERCOM’s establishment of an Expert Team on Early Warning Services (ET-EWS) under its Standing Committee on Disaster Risk Reduction and Public Services (SC-DRR). INFCOM further established a task team on EW4All and another for the Implementation of Products from Non-traditional Sources to support the initiative.

8. To keep up with the pace of other UN agencies and respond to the urgent call of the UN SG to foster implementation of EW4All on the ground in a subset of 30 initial countries announced in March 2023, the Secretariat developed a high-level draft strategy for Pillar 2 aligning to a priority hazard approach and developed with partners a theory of change, identifying outputs, outcomes and activities and the level of those from global to national level. The draft strategy was shared with P/SERCOM and the Chair of the ET-EWS in Spring 2023 for their review and suggestions for improvement.

9. The nineteenth session of the WMO Meteorological Congress, through [Resolution 4 (Cg-19)](https://library.wmo.int/idviewer/67177/61)- United Nations Early Warnings for All initiative, requested EC to oversee progress on WMO’s contribution to the EW4All initiative as a matter of highest priority and to ensure coordination and consolidation of all relevant WMO activities under the EW4All umbrella.

10. On the margins of Cg-19, the WMO Secretariat’s Monitoring, Evaluation, Risk and Planning (MERP) Office initiated a process within the subset of 30 countries to establish a baseline on capacity. MERP undertook a two-pronged approach involving: (a) the development of a rapid methodology for appraising the monitoring and forecasting capacity of 30 countries, including for specific priority hazards (see INF. 3.1(2)); and (b) the conduct of Country Hydromet Diagnostics (CHD) in all 30 countries as part of the SOFF Readiness Phase.[[2]](#footnote-3) The former tool provides a detailed view on the countries’ capacity for early warnings; the latter offers a big picture perspective on the NMHS operating environment and contribution to weather, climate, hydrological and environmental services and warnings. In addition, the EW4All Monitoring and Evaluation (M&E) Working Group chaired by WMO and UNDRR developed (i) [a theory of change](https://wmoomm.sharepoint.com/sites/wmocpdb/Planning%20%20Monitoring/Forms/AllItems.aspx?id=%2Fsites%2Fwmocpdb%2FPlanning%20%20Monitoring%2FMonitoring%20and%20Evaluation%2FEarly%20Warnings%20for%20All%20%28EW4All%29%2FTheory%2Dof%2DChange%5FEW4All%5FFINAL%2Epdf&parent=%2Fsites%2Fwmocpdb%2FPlanning%20%20Monitoring%2FMonitoring%20and%20Evaluation%2FEarly%20Warnings%20for%20All%20%28EW4All%29&p=true&ga=1) for the Initiative, which lays out the results chain consisting of impacts, outcomes, intermediary outcomes and illustrative outputs and (ii) [a M&E framework](https://wmoomm.sharepoint.com/sites/wmocpdb/Planning%20%20Monitoring/Forms/AllItems.aspx?id=%2Fsites%2Fwmocpdb%2FPlanning%20%20Monitoring%2FMonitoring%20and%20Evaluation%2FEarly%20Warnings%20for%20All%20%28EW4All%29%2FEW4All%2DOutcomes%2DOutputs%2DIndicators%5Fupdated%5F14Feb2024%2Epdf&parent=%2Fsites%2Fwmocpdb%2FPlanning%20%20Monitoring%2FMonitoring%20and%20Evaluation%2FEarly%20Warnings%20for%20All%20%28EW4All%29&p=true&ga=1) with a range of indicators at all levels. A monitoring plan is currently being developed to ensure that data from reliable sources is readily available.

11. The Executive Council through its [Resolution 1 (EC-77)](https://library.wmo.int/viewer/66333/?offset=1#page=9&viewer=picture&o=bookmark&n=0&q=) – WMO Contribution to the Early Warnings for All initiativedelegated the role of coordinating the technical bodies of the Organization (technical commissions, the Research Board, and other relevant bodies) and the regional associations to the Technical Coordination Committee (TCC). The TCC’s mandate is to coordinate the technical bodies with the regional associations to ensure that the technical work of the Organization is properly guided by the needs and priorities identified by Members.

12. Following the launch of the global [*Early Warnings for All: Executive Action Plan 2023–2027*](https://library.wmo.int/index.php?lvl=notice_display&id=22154#.ZD-oQHZByUk) Regional Associations (RAs) initiated discussions and planning to put in place arrangements to meet the aim of EW4All considering the specificities of the regions. The following bullets outline the status of the WMO Regional Associations (RAs) plans to implement EW4All:

* Regional Association I (Africa): a [*Multi-Hazard Early Warning for All – Africa Action Plan 2023–2027*](https://meetings.wmo.int/TCC/Session%20Documents/Lists/Session/By%20Agenda/Early%20Warning%20for%20All%20Action%20Plan%20for%20Africa_en.pdf) was launched by WMO and EW4All partners with the Africa Union Commission (AUC) on the occasion of the Africa Climate Summit in Nairobi, Kenya, (4 September 2023). The Action Plan is aligned with continental priorities, strategies and initiatives, and each of the four pillars[[3]](#footnote-4) of the EW4All Executive Action Plan has a scenario for success, required actions and activities. The implementation of the Action Plan is to be overseen by an EW4All African Steering Committee.
* Regional Association II (Asia): In RA II, there is no intention to develop a dedicated regional EW4All Action Plan (neither Pillar-specific nor cross-cutting). Rather, RA II would fully mainstream EW4All in its Operating Plan (OP), which is currently being updated, specifically in view of the RA II-18 Session in September 2024 and the recent RA II Working Group (WG) Services Meeting (November 2023). In addition, several existing subregional frameworks and plans, such as those of the UN Economic and Social Commission for Asia and the Pacific (ESCAP)/WMO Typhoon Committee, WMO/ESCAP Panel on Tropical Cyclones (PTC), Association of Southeast Asian Nations (ASEAN), League of Arab States, etc. as well as roadmaps for strengthening hydrometeorological services in Central and South Asia (developed under various World Bank-led initiatives), can be leveraged and updated where necessary to reflect the EW4All priorities. Furthermore, the inter-agency Asia-Pacific Action Plan for DRR 2024-2027 is being drafted, with the engagement of WMO.
* Regional Association III (South America): activities for the development of a regional action plan are ongoing.
* Regional Association IV (North America, Central America and the Caribbean): a regional action plan is under preparation and RA IV is also encouraging its Members to develop national plans.
* Regional Association V (South-West Pacific): Similar to RA II, there is no intention to develop a dedicated regional EW4All Action Plan (neither Pillar-specific nor cross-cutting) for RA V. Rather, RA V will fully mainstream EW4All in its OP, which is currently being updated. In the Pacific, the Pacific Island Meteorological Strategy (PIMS) 2017-2026, Pacific Roadmap for Strengthening Climate Services (PRSCS) 2017-2026, Pacific Climate Change Research Roadmap (PCCRR) 2017-2026 and, more recently, the decadal Weather Ready Pacific (WRP) Programme 2021-2030 (led by the Secretariat of the Pacific Regional Environment Programme (SPREP)), all provide plans that can be leveraged and accelerated to contribute to EW4All. The WRP Programme in particular was already endorsed by Pacific Leaders as the key implementation vehicle for EW4All in the Pacific (currently focused on Pillar 2, which is why Pillar leads are working with Members, SPREP, donors and implementing partners to ensure all Pillars are covered). It is also worth noting that the ASEAN Secretariat is interested in a dedicated initiative and in incorporating EW4All into their plans, while ESCAP last year adopted a Regional Strategy to Achieve Early Warnings for All by 2027 in Asia and the Pacific, which focuses especially on transboundary contexts.
* Regional Association VI (Europe): a regional action plan, covering especially Pillar 2, is under development on the basis of a concept note and regional consultations.

13. The draft zero of WMO’s EW4All Implementation Plan (IP) was requested by TCC to support its role as coordinating the technical bodies of the Organization (technical commissions, the Research Board, and other relevant bodies) and the RAs to ensure that the technical work of the Organization is properly guided by the needs and priorities identified by Members, particularly to ensure the delivery of the WMO-coordinated contribution to EW4All.

14. At its first meeting from 17 to 19 October 2023 in Geneva, the TCC considered a draft a proposed outline for a draft IP developed by the Secretariat as the basis for the development of a WMO-wide implementation plan to guide WMO coordinated contribution to the EW4All Initiative and the development of regional action plans and submit a related recommendation to the seventy-eighth session of the Executive Council (EC-78).

15. TCC-1 agreed that the draft IP outline should be considered as an initial base for further consultation and development, underlining the need to expand or develop the following components:

* Scope and vision, clarifying WMO specific contribution to EW4All, including addressing gaps such as extreme hazards
* Guiding principles, with a particular focus on capacity development
* Measures of success, to enable reporting on progress to the Executive Council and Congress

16. TCC-1 considered the five event types that were most frequently identified through the EW4All Rapid Assessment conducted with WMO Permanent Representatives attending Cg-19 from the 30 initial countries identified by the UN SG for implementation: Flash floods, Drought/dry spell, Riverine floods, Tropical cyclones and Thunderstorms/squall lines. To these five event types, heatwaves were added as the sixth event type because they are relatively large-scale phenomena to which global frameworks can contribute in the context of monitoring and forecasting. The TCC considered:

* Drought/dry spells could be complemented by cold spells and snow falls.
* Tropical cyclones could be seen in the context of a multi-hazard scenario, with extreme winds causing flash floods and storm surges.
* Thunderstorms/squall lines could be complemented by lightning.
* In addition, wildfires, volcanic eruptions and marine hazards, including tsunamis and sea level rise and storm surges as a result of climate change should be considered.

17. TCC-1 in Recommendation 1 – EW4All priority hazards requested:

* The RAs to identify (sub)regional priority hazards and the need for regional support in monitoring, forecasting and warning guidance through the RBON design process.
* The technical commissions to:
	+ Review CHD and Rapid Assessment methodologies, based on further clarifications by the Secretariat.
	+ Take note of the identification of (sub)regional priority hazards and needs for regional support based on RAs’ work.
	+ Prioritize activities for identified hazards to:
		- Develop relevant guidance and training materials.
		- Strengthen and establish supports under the framework of the WMO Integrated Processing and Prediction System (WIPPS).
		- Develop and consolidate technical regulations and other guidance materials related to EWS components.
		- Further development of nomenclature for emerging hazard types, such as those due to changes in the cryosphere, in the framework of the Catalogue of Hazardous Events.

18. TCC-1 considered the presentation of priority activities by the Technical Commissions and in Recommendation 2 – EW4All priority activities requested:

* The regional associations to:
	+ Identify priority activities in the work programmes to be adopted at their next sessions and task subsidiary bodies accordingly.
	+ Identify and communicate Members’ needs that should be addressed by the priority activities of the technical commissions.
	+ Develop their requirements for technical support relevant to the priority hazards identified by their Members through the RBON design process.
	+ Facilitate knowledge-sharing among Members.
* Technical commissions:
	+ Finalize a consolidated list of proposed priority activities for the work programmes to be adopted at their next sessions, including based on contributions from regional associations, and task subsidiary bodies accordingly.
	+ Undertake consultation on the draft concept note and provisions for the Early Warning Services section of the Technical Regulations (WMO-No. 49) for review by SERCOM-3 with the aim of taking recommendations to Cg-Ext (2025).

19. Subsequent TCC online update meetings held 22 November and 15 December 2023 have continued to provide inputs from the regional associations, technical commissions, and research board on the refinement of priority hazards and of the consolidated list of proposed priority activities contributing to the further development of draft zero of WMO’s EW4All IP. Supporting documentation as presented to the TCC through the online update meetings can be found on the SERCOM-3 mini-site under ‘Supporting material to the EW4All discussion’ [here](https://meetings.wmo.int/SERCOM-3/SitePages/Supporting%20material%20to%20the%20EW4All%20discussion.aspx).

20. The consolidated narrative list of proposed priority activities, revised by the respective Management Groups of the technical commissions and the Research Board, was then circulated in January 2024 to seek feedback from Members on what should be considered a WMO priority activity for the EW4All initiative. By 3 March 2024, the deadline for feedback from Members, 39 replies were received.

21 The draft zero of the WMO IIP was presented to TCC at the third update meeting on 21 February 2024. Having considered it, TCC agreed to move forward with the further development of a draft Resolution for EC-78, articulating over the vision for the WMO contribution to the EW4All initiative and recommended to change the name of the document to ‘Roadmap’. The Roadmap would serve as a guide to technical commissions, the Research Board, RAs and other subsidiary bodies of the Executive Council in the implementation of priority activities for the EW4All Initiative.

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**DRAFT ZERO OF THE ROADMAP FOR THE WMO CONTRIBUTION TO THE EARLY WARNINGS FOR ALL INITIATIVE**

**About this document**

The World Meteorological Organization’s (WMO) Early Warnings for All (EW4All) Roadmap will support internal alignment of WMO’s contribution to the EW4All initiative by clarifying the roles, responsibilities, activities, timelines and coordination modalities of the different WMO organs. It serves as a guiding document, to enable a common understanding between the different organs to support WMO’s collective and effective contribution to the EW4All initiative. Moreover, the Roadmap will serve as a reference document for Executive Council and the Technical Coordination Committee (TCC) to provide coordination and oversight of WMO’s contribution to the EW4All as directed in [Resolution 4 (Cg-19)](https://library.wmo.int/idviewer/67177/61) and [Resolution 1 (EC-77).](https://library.wmo.int/idviewer/66333/9) It could also form the basis of a future online monitoring tool for the implementation of EW4All activities.

This document contains an overarching narrative, two parts and an appendix. It has been framed by the organizational responsibilities outlined in [Resolution 4 (Cg-19)](https://library.wmo.int/idviewer/67177/61) *- United Nations Early Warnings for All initiative* and [Resolution 1 (EC-77)](https://library.wmo.int/viewer/66333/?offset=1#page=9&viewer=picture&o=bookmark&n=0&q=) – *WMO Contribution to the Early Warnings for All initiative* with due consideration to the Resolutions, Decisions and Recommendations of WMO constituent body meetings as referenced in Table 1.

Table 1 assigns WMO activities to Part I or Part II. The assignment is in accordance with the responsible body and its supreme or parent structure. Part I: *Scientific and Technical Activities* outlines the technical, scientific and regional activities within the Terms of Reference of the TCC, which primarily comprises the work of the Technical Commissions, Research Board, Regional Associations, Capacity Development Panel and Hydrological Coordination Panel.

Part II: *Project and Coordination Activities* outlines communications, partner coordination/cooperation, advocacy, resource mobilization, capacity development and extra-budgetary project implementation primarily delivered by the Secretariat and guided by the Policy Advisory Committee.

**Table 1. Organizational responsibilities EW4All as outlined in**
**Parts I and II of the Roadmap**

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| **Relevant Body** | **Reference document** | **Section** | **Roadmap Part** |
| 1. Services Commission | Resolution 4 (Cg-19) | Requests (2) | Part I |
| 2. Infrastructure Commission | Resolution 4 (Cg-19) | Requests (2) | Part I |
| 3. Research Board | Resolution 4 (Cg-19) | Requests (2) | Part I |
| 4. Regional Associations | Resolution 4 (Cg-19) | Requests (3) | Part I |
| 5. Capacity Development Panel1 | Resolution 4 (Cg-19) | Requests (2) | Part I |
| 6. Hydrological Coordination Panel | Resolution 4 (Cg-19) | Requests (4) | Part I |
| 7. Panel on Polar and High Mountain Observations, Research and Services (PHORS) | Resolution 2 (EC-77) | Requests | Part II |
| 8. Secretariat - coordination and cooperation with partners | Resolution 4 (Cg-19) | Requests (5) | Part II |
| 9. Secretariat - communications | Resolution 4 (Cg-19) | Requests (5) | Part II |
| 10. Secretariat – monitoring and evaluation | Resolution 4 (Cg-19) | Requests (5) | Part II |
| 11. Secretariat – voluntary contributions and resource mobilization | Resolution 4 (Cg-19) | Requests (5) | Part II |
| 12. SOFF and CREWS | Resolution 4 (Cg-19) | Requests (5) Acknowledging (3) | Part II |

**1. Background**

The Early Warnings for All (EW4All) initiative aims to ensure that every person on Earth is protected by Early Warning Systems (EWS) by 2027. The initiative is co-led by World Meteorological Organization (WMO) and the United Nations Office for Disaster Risk Reduction (UNDRR). The initiative covers the period from 2024 to 2027 and has two main objectives:

* To strengthen the capacities of National Meteorological and Hydrological Services (NMHSs) to provide timely, accurate and user-friendly early warning services for multiple hazards and sectors, in collaboration with other national and regional actors.
* To enhance the awareness, understanding and action of individuals, communities and decision-makers on the risks and opportunities related to weather, climate and water events, through effective communication, education and engagement strategies.

The EW4All initiative is aligned with the Sendai Framework for Disaster Risk Reduction, the Paris Agreement on Climate Change and the 2030 Agenda for Sustainable Development. The EW4All initiative also contributes to the Santiago Network and the WMO Vision 2040, which envisions a world where all people are safer, more resilient and more prosperous through the use of weather, climate and hydrological information and services.

To guide WMO implementation of the EW4All initiative, a roadmap has been identified as a necessity. The roadmap outlines WMO collective contribution to the effort, and is aligned with the WMO Strategic Plan 2024-2027, drawing from the work programmes of WMO technical commissions, research board and regional associations.

**Overall Objective:** The WMO Early warnings for All (EW4All) roadmap is a strategic document that outlines the vision, objectives, and actions of the World Meteorological Organization (WMO) to enhance the delivery and use of early warning systems for weather, climate, and water-related hazards. The roadmap covers the period from 2024 to 2027 and is aligned with the WMO Strategic Plan 2024-2027, and with the Early Warnings for All: Executive Action Plan 2023-2027.

**Vision statement:** The Early Warnings for All initiative, led by the United Nations, aims to ensure that everyone on Earth is protected from hazardous weather, water, or climate events through life-saving early warning systems by the end of 2027. With human-induced climate change causing more extreme weather conditions, these early warning systems are no longer a luxury but a critical tool. They save lives, reduce economic losses, and provide a nearly tenfold return on investment. This initiative will strengthen disaster risk knowledge, observation and forecasting, dissemination and communication of warnings, and preparedness and response capabilities. The Early Warnings for All initiative aligns with the priorities of the Paris Agreement, supports key provisions of the Sendai Framework for Disaster Risk Reduction, and contributes to the targets of the 2030 Agenda for Sustainable Development. Its goal is to ensure that early warning systems work for everyone, leaving no one behind.

**1.1 Guiding principles**

1. **Urgency:** We recognize that with climate change rapidly leading to more frequent extreme weather events, there is an urgent need to strengthen early warning systems to protect lives, livelihoods, and the environment.
2. **Capacity:** We commit to prioritizing capacity enhancement activities in least developed countries, small island developing states and those highly vulnerable to hydrometeorological hazards We recognize that focus needs to be on enhancing capacity of Member States.
3. **Resilience:** We aim to avert and minimize losses and damages, contributing to climate change adaptation by building resilience to hazardous weather, climate, and water events.
4. **Inclusivity:** We aim to help everyone become more resilient, in particular the most climate- and disaster-vulnerable as well as marginalized groups.
5. **People-centered, relevant and contextual:** We recognize that people are differently exposed to a range of hazards with different vulnerabilities, necessitating actionable warnings informed by peoples’ needs and where possible, ensuring that communities are involved in both the design and implementation of early warning systems.
6. **Multi-hazard**: We recognize that to strengthen resilience a holistic approach is needed, pursuing multi-hazard early warning systems based on the local risk profile.
7. **Sovereignty**: We recognize that the provision of authoritative early warnings and the strengthening of national early warning systems is the responsibility of national governments.
8. **Collaboration, coordination and integration:** We collaborate, coordinate and integrate our actions across the global, regional, and national scales, and across sectors, ensuring efficiency in our delivery.
9. **Alignment:** Our activities do not replace existing initiatives, rather complementing, supporting, building on and ensuring synergies with them across global, regional, and national partners.
10. **Scale**: We pursue rapid action at unprecedented scale through collective and aligned action by partners across the early warning value chain, building on recognized good practices, existing and new public-private partnerships, and leveraging advances and innovations in science and technology as applicable.
11. **Coherency**: We recognize that each pillar is crucial for successful early warning, such that we strive to ensure that all pillars make equal and coherent progress, as per national priorities and needs.
12. **Consistency:** We commit to support countries in a fair manner based on needs, building on agreed standards and adhering to the guiding principles of modern Multi-Hazard Early Warning Systems4.
13. **Accountability:** We ensure that our work contributes to the initiative’s over-arching objective, is performed to the highest level of integrity in accordance with agreed rules and standards and reported transparently and accurately.
14. **Sustainability of achievements:** We leverage existing WMO global, regional, and national structures to ensure coherence and sustainability of achievements.
15. **Technology, innovation and forward looking:** We leverage technology and innovation to accelerate towards our collective goal.

**1.2 Development**

This Roadmap was developed at the request of the Technical Coordination Committee (TCC) to support it in its coordination and oversight of WMO’s contribution to the EW4All as directed in [Resolution 4 (Cg-19)](https://library.wmo.int/idviewer/67177/61) and [Resolution 1 (EC-77).](https://library.wmo.int/idviewer/66333/9) The process started in October 2023 and developed over the following months, as explained below.

To ensure that the technical work of the Organization in relation to EW4All implementation is guided by the needs and priorities identified by Members, TCC requested the presidents of Regional Associations to review and agree on the list of priority hazards in their respective regions based on the WMO Methodology for Cataloguing Hazardous Events (CHE). The list of priority hazards by region, based on their input, is provided in Table 2.

**Table 2. Priority hazards assessed by Regional Association for each WMO region**

 

In response to the priority hazards assessed by the Regional Associations, the presidents of the Commission for Weather, Climate, Hydrological, Marine and related Environmental Services (SERCOM) and the Commission for Observation, Infrastructure and Information Systems (INFCOM), together with the Chair of the Research Board, compiled a list of planned or ongoing activities that could contribute to the EW4All implementation. The activities were compiled against the priority hazards most frequently identified by the regional associations and articulated over six categories representative of an end-to-end value cycle of hydrometeorological infrastructure and services for disaster risk reduction (DRR).

The six categories representative of an end-to-end value cycle of hydrometeorological infrastructure and services are listed below and illustrated in figure 1:

(1) Data and observation (global observation of variables and international exchange of data, both observation and products);

(2) Numerical weather prediction (global and limited area NWP);

(3) Forecaster added value (nowcasting and local data processing, forecasting, guidance products);

(4) Dissemination and communication;

(5) Decision support;

(6) Research.

**Figure 1 – End-to-end value cycle of hydrometeorological infrastructure and services**

Graphical representations of the top seven hazards identified by RAs depicting the activities across the six value cycle categories are provided in Appendix 1. Activities are colour coded to visualize implementation time horizons: green dots indicate short-term activities (2024), yellow squares medium term (2025-26) and red triangles long-term activities (2027).

RAs were invited to reflection on the list of SERCOM, INFCOM and RB activities to identify areas aligned to the specificities of their respective region, prioritize them and flag any potential gaps. This phase of collection of feedback from Members concluded in early March 2024, prior to the SERCOM-3 session, with 39 Members providing feedback.

For the development of the Roadmap, the activities were then grouped in two parts framed by the organizational responsibilities and in accordance with the responsible supreme or parent structure. Part I outlines the technical, scientific and regional activities under the responsibility of the TCC, which primarily comprises the work of the Technical Commissions, Research Board, Regional Associations, Capacity Development Panel and Hydrological Coordination Panel. Part II outlines communications, partner coordination/cooperation, advocacy, resource mobilization and extra-budgetary project implementation under the guidance of the PAC and mainly delivered by the Secretariat. Alignment of the technical activities along the value cycle approach facilitates insight into areas requiring close coordination between the two Commissions.

**Major Steps and Deliverables**:

The Roadmap, a living document reflecting the needs identified by Members and the additional developments in the work programmes of technical commissions, research board and regional associations, will guide the contribution of WMO to the EW4All initiative, and at the same time allow to summarize in a single tool the advancements on the implementation of WMO activities contributing to the EW4All initiative.

Technical commissions, research board, regional associations and the Secretariat will implement the relevant activities included in the Roadmap and regularly report to TCC on the status of advancement. TCC will then report at each EC session on the status of implementation of the Roadmap, and on its periodical updates.

In parallel to the implementation of the Roadmap, an iterative process of consultations with Members will be taking place to better define the needs and gaps in terms of early warning systems at the national level. This will entail a revision of the priority hazards, as well as a prioritization of WMO activities, reflecting the outcomes of technical commissions sessions, and leading to an update of the Roadmap by EC-79.

The main steps of this iterative process are described below, and represented in Figure 2


**Figure 2 – Steps of the Roadmap implementation and its update**

**Step 1:** implement those activities under the technical commissions work programmes that are relevant to the EW4All initiative, along the six categories representative of an end-to-end value cycle of hydrometeorological infrastructure and services. Explore under the Research Board ways to fill the scientific and technical gaps on end-to-end early warning systems and move from research to operations. Further implement ongoing voluntary cooperation projects aimed at improving EWS at the national and regional level.

**Deliverable 1:** An updated set of regulatory and guidance material, and other infrastructures, tools and platforms, are delivered to Members to assist them in the establishment of end-to-end early warning systems, including new technologies and innovative research products transitioned to the operational phase.

**Step 2:** Further assess the status and gaps of early warning systems (EWS) in each country and region, vis-à-vis to specific reviewed priority hazards, using the WMO EWS Maturity Index and other relevant tools, identifying for each country additional needs and gaps not tackled in step 1, and provide feedback for the adjustment of the Roadmap.

**Deliverable 2:** A comprehensive report on the strengths, weaknesses, opportunities and challenges of EWS in each region and as many countries as possible, with recommendations for improvement. Updated version of the Roadmap.

**Step 3:** Develop and implement national and regional action plans for EWS improvement, based on the findings and recommendations of the assessment reports.

**Deliverable 3:** A set of prioritized and costed actions for EWS improvement, with clear roles and responsibilities, timelines and indicators of progress, to feed further development of voluntary contribution projects.

**Step 4:** Provide technical assistance, training and knowledge exchange to support the implementation of the action plans, leveraging the expertise and resources of WMO and its partners.

**Deliverable 4:** A pool of trained and qualified experts, tools and methodologies, good practices and lessons learned, and platforms for collaboration and coordination.

**Step 5:** Monitor and evaluate the impact and effectiveness of the EWS improvement actions, using the WMO EWS Maturity Index and other relevant tools, measuring for each country the level of application of WMO regulatory and guidance material, as well as other infrastructures, tools and platforms provided through voluntary cooperation projects, and their impacts at the national level.

**Deliverable 5:** A report on the achievements, challenges and lessons learned from the EWS improvement actions, with recommendations for further enhancement. Updated version of the Roadmap.

**Tasks, Milestones, and Dependencies:**

The Roadmap for the WMO contribution to the Early warnings for All (EW4All) initiative is a global effort aimed at improving the access and use of weather, climate and hydrological information and services for vulnerable communities. As such, the activities included in the Roadmap can be grouped under three main tasks, each with its own milestones and dependencies.

**Task 1:** Develop a framework for assessing the needs and capacities of different user groups for early warning services in an iterative manner. This task involves conducting surveys, interviews and workshops with various stakeholders, such as national meteorological and hydrological services, disaster management agencies, humanitarian organizations, media, local authorities and community representatives. The expected milestones for this task could be:

* A comprehensive report on the current state of early warning services and user needs in selected pilot countries by December 2024.
* A set of indicators and criteria for measuring the effectiveness and inclusiveness of early warning services by December 2024.
* A toolkit for conducting user needs assessments in other countries by March 2025.

The dependencies for this task are:

* Availability of funding and human resources for conducting the assessments.
* Cooperation and coordination among different stakeholders at national and local levels.
* Access to reliable data and information on weather, climate and water hazards and risks.

**Task 2:** Enhance the quality and availability of early warning products and services for different user groups. This task involves developing and implementing new or improved methods, tools and standards for generating, disseminating and communicating early warning information and advice. The expected milestones for this task, mainly reflected through the work programmes of TCs, RB and RAs, as well as Voluntary Cooperation Projects, are:

* A set of guidelines and good practices for producing user-friendly and tailored early warning products and services .
* A platform for sharing and exchanging early warning products and services among different providers and users.

The timeline for the production of each guideline and of the platform’s content will depend on the timeline of the work programme of the relevant lead entity (TCs, RB, RAs, etc.), but keeping in mind the horizon of 2027 (see the first link in paragraph 8 of the Annex to Doc 3.1 (EC-78), also available [here](https://wmoomm.sharepoint.com/%3Ax%3A/s/wmocpdb/EW1-4uiP8jNKsgxEFWLxwHYBDQT7WvJc5kzGcPj9DN0Cvg?e=HucRCS)).

The dependencies for this task are:

* Availability of funding and human resources.
* Availability of scientific and technical expertise and infrastructure for developing early warning products and services.
* Adoption of common standards and protocols for data exchange and interoperability among different systems and platforms.
* Engagement and feedback from users on the quality and usefulness of early warning products and services.

**Task 3:** Strengthen the institutional and societal capacities for early warning action through the development and implementation of policies, plans, strategies and mechanisms for enabling effective early warning action at all levels. The expected milestones for this task are:

* A set of recommendations and advocacy materials for enhancing the legal, regulatory and institutional frameworks for early warning action by December 2026.
* A series of training courses, workshops and simulations for building the skills and knowledge of early warning actors on how to prepare for, respond to and recover from weather, climate and water-related disasters by June 2027.
* A collection of case studies, lessons learned and good practices for promoting community-based early warning action by December 2027.

The dependencies for this task are:

* Availability of political will and commitment from decision-makers and leaders for supporting early warning action.
* Availability of financial resources and mechanisms for investing in early warning action.
* Availability of social capital and trust among different actors involved in early warning action.

**1.3 Roles and responsibilities**

(a) **WMO Members**, as the actors with the primary responsibility to establish multi-hazard early warning systems:

(i) Provide the indispensable commitments of national governments with their strong ownership and leadership;

(ii) Shape the contribution of the Organization to the EW4All Initiative through provision of relevant information on their own initiatives at the national level and in bilateral and multilateral efforts, and through direct input of views to the WMO Secretariat via responses to questionnaire and other means;

(b) The **Congress** as the general assembly of Members:

(i) Makes decisions concerning WMO contribution to EW4All, including in response to recommendations of the United Nations, defines its broad purpose and scope and indicates to the Executive Council the machinery it wishes to be used for the implementation;

(ii) Considers the Secretary-General’s proposals for resourcing WMO contribution to the EW4All Initiative included in the programme and budget and approves the necessary financial resources;

(c) The **Executive Council** as the executive body of the Organization:

(i) Oversees progress on WMO’s contribution to the EW4All Initiative as a matter of highest priority and provides advice and direction to ensure there is coordination and consolidation of all relevant WMO activities under the EW4All Initiative umbrella;

(ii) Defines and establishes the machinery to be used for implementing WMO contribution to EW4All, including a Roadmap for implementation;

(iii) Sets the timetable for the preparation of the Roadmap and its update;

(iv) Monitors progress in the implementation of the Roadmap and reports to Congress;

(d) The **Technical Commissions** and the **Research Board** as the principal source of scientific and technical expertise in the WMO system:

(i) Serve as the lead mechanism for formulation of the Roadmap for implementation in the areas of their individual responsibility, and to this end, through the work of their subsidiary bodies:

* Implement high priority activities to address the urgent needs of Members in building effective multi-hazard early warning systems falling within their terms of reference – including the updating of technical regulations by the technical commissions – and consolidate and incorporate them into their respective work plans for the next financial period;
* Catalogue, and integrate priority emerging hazards, such as those due to changes in the cryosphere, in support of the development of necessary monitoring and early warning systems for affected Members;
* Implement the priority activities in a collaborative, coordinated, and synergetic manner;

(ii) Regularly monitor progress and report to the Executive Council for its guidance;

(e) The **regional associations** as the mechanism for ensuring regional implementation and co-ordination of WMO programmes, plans and initiatives:

(i) With the assistance of the regional offices, further identify priority hazards and ensure that focused actions on the implementation of the EW4All Initiative falling within their terms of reference are consolidated and prioritized in their respective work plans for the next financial period;

(ii) Co-ordinate, as necessary, national contributions to regional joint projects;

(iii) Regularly monitor and report progress to the Executive Council for its guidance;

(f) The **Technical Coordination Committee**, as the Executive Council’s coordination mechanism between the technical and regional bodies of WMO:

(i) Provides the necessary analytical information, including through reporting system, to inform decisions of the Executive Council on technical matters, with particular focus on EW4All;

(ii) Ensures WMO coordinated contribution to EW4All, including the prioritization of activities for the Roadmap and consistency of the WMO technical regulatory framework and supporting guidance materials;

(iii) Provides advice to the Executive Council as necessary;

(iv) Regularly reports progress to the Executive Council for its guidance;

(g) The **Policy Advisory Committee**, as the Executive Council’s body advising on matters concerning the strategy and policy of the Organization:

(i) Provides strategic guidance for the collective and collaborative engagement of the Organization and its Members in EW4All Initiative through partnerships with a range of stakeholders including the private sector, development partners, funding agencies and academia;

(ii) Regularly reports progress to the Executive Council for its guidance;

(h) The **Hydrological Coordination Panel**, as the Executive Council’s body advising on an integrated delivery of WMO water-related activities:

(i) Coordinates and suggests priorities and corrective measures for those outputs of the WMO Plan of Action for Hydrology, which contribute to the EW4ALL;

(ii) Regularly reports progress to the Executive Council for its guidance;

(i) The **Capacity Development Panel**, as the Executive Council’s body providing guidance and oversight regarding WMO efforts to strengthen assistance to the NMHSs of developing countries:

(i) Ensures that WMO activities that support capacity development, including the training and education of personnel, the Country Support Initiative and VCP, as well as WMO-related CREWS activities, are complementary to the EW4All initiative and take into consideration the unique national context of Members;

(ii) Regularly reports progress to the Executive Council for its guidance;

(j) The **Secretary-General**, as the Head of the Secretariat and the liaison with Members Permanent Representatives, international organizations and others, and the representative in negotiations with all these authorities:

(i) As appropriate and within the available budgetary and extrabudgetary resources, including as a result of the Secretary-General’s resource mobilization efforts, takes all necessary actions and allocates resources to support WMO’s contribution to the EW4All Initiative and facilitates the involvement of co-implementing organizations;

(ii) Regularly reports to the Executive Council on the progress of activities supporting the EW4All Initiative, including the engagement with the Early Warnings for All Advisory Panel and other high-level EW4All events, and takes direction from the Executive Council on future advancement of the initiative;

(iii) Works with UNDRR and other partners to help ensure a coordinated approach with other initiatives contributing to early warnings;

(iv) Makes available those EW4All communications created and used by WMO, UNDRR
and other partners, to secure global support for this initiative so Members can tailor
this information for their own engagement with public and private partners;

(v) Provides Secretariat support through the relevant programme departments to the technical commissions, Research Board and regional associations with corresponding functions in their contribution to the EW4All Initiative by the drafting of necessary documentation, conduct of studies and so on.

**1.4 Measures of success and Monitoring and Evaluation**

With consideration to the rapid assessment methodology (see INF 3.1(2)), TC, RB and RAs through the TCC would guide the monitoring of outcomes and outputs as defined in the theory of change and results framework established, including the development of WMO EWS Maturity Index and other relevant tools

Monitoring of the activities included in the Roadmap will be the responsibility of the relevant responsible entity for each activity’s implementation. The overall responsibility for monitoring progress, including methodological guidance and expertise, rests with the Secretariat’s MERP Office which co-chairs, together with UNDRR counterpart, the EW4All Monitoring and Evaluation Working Group. Regional associations will in parallel monitor and evaluate the implementation at the national level of the WMO activities, and their impact in the overall framework of the EW4All objective.

**WMO EW4All Roadmap**

**Part I – Scientific and Technical Activities (Organised along the functional value cycle)**

| **Item** | **Hazard Category** | **Implementation Tasks** | **Type of Activity** | **Constituent Body Lead** | **Secretariat Lead** | **Deliverables** | **Urgency** | **Time-line** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Global (and regional) observation of variables:** |
| 1 | Non-hazard specific/cross-cutting | A1.1 - GBON compliance monitoringA1.3 - Ensure Members have access to sufficient satellite data and products.A2 - Guide and support the RBON design process  | MonitoringLiaison, trainingGuidance, training | INFCOMINFCOMINFCOM | I/WIGOSI/WIGOSI/WIGOS | GBON statisticsAgreements, trainingRBON Guide, training | HighHighHigh | 202420242024 |
| 2 | Hydrological* Flash floods
* Riverine floods
 | A3 - Guidance on the use of Satellite data for flood forecasting and product requirements A5 – WHYCOS/HydroHub World Hydrological Cycle Observing SystemA5.3 - Guidance on observation network density requirements for flood forecasting | GuidanceCapacity development projects, monitoring stations, data managementGuidance | SERCOMINFCOMINFCOM | S/HWCI/ESMI/WIGOS | Draft guide to SERCOM in 2026Increased data availability from MembersDraft guide to INFCOM in 2026 | LowHighLow | 2026Continuous (2 countries per year added)2026 |
| 4 | Meteorological/synoptic* Tropical cyclones and extra-tropical storms
* Heatwaves
* Cold waves
 | A6 – Coordination to ensure continual access to satellite data/products, Radar images, AWS data, Buoys, Shipboard observations  | MonitoringCoordination with CGMS, GOOS and others | INFCOMINFCOM | I/WIGOSI/WIGOS | Increased data availability from Membersand continued availability of data | HighHigh | 20272026 |
| 5 | Extended range* Drought/dry spells
 | A4 – Standard GBON observations Support to or liaison with GOOS  | Monitoring | INFCOM | I/WIGOS | Increased data availability from Members | High | 2027 |
| 6 | Cross-domain* Coastal inundation/storm surge
* Cryosphere
* Emerging Hazards
 | A9 – Pilot recommendations by TPRCC-Network Ensure continued access to total water level and tides Ensure continued access to sea ice and iceberg observations | Report, guidanceMonitoring Monitoring | INFCOM, INFCOM INFCOM | I/IWGOSI/IWGOSI/IWGOS | Guidance on cryosphere observing systemsContinued availability of data | LowHighHigh | 202720272027 |
|  | **International exchange of data (both observation and products)** |
| 7 | Non-hazard specific/cross-cutting | B1.1 - Implementation of WIS2.0 Development of manuals and guidesDevelopment and distribution of WIS2.0 in a Box softwareTraining events and other capacity developmentB1.2 - Explore “Data-in-place” approach | Regulatory material, manuals, guides, capacity development, reports | INFCOM | I/WIS | Regulatory material, Manual and Guide, Training materials | High | 2024 |
| 8 | Hydrological* Flash floods
* Riverine floods
 | B3.1 – WHOS WMO Hydrological Observing System, WIS 2.0 hydrological componentB3.2 – FFGS Flash Flood Guidance SystemB4 – HydroSOS Hydrological Status and Outlook System | Data sharing system in placeRegional data and product sharing HydroSOS portal | INFCOMSERCOMINFCOM, SERCOM, HCP | I/WIS, I/ESMS/HWCS/HWC, I/ESM | Data sharing system, Regulatory material, Manual and Guide, Training events FFGS system available, training materialsHydroSOS portal | HighHighHigh | Continuous (2 countries per year added) Continuously updatedContinuously updated |
| 9 | Meteorological/ nowcasting* Thunderstorms/ squall lines
 | B7 - SWF subprogrammeB7.1 Extended coverage by nowcasting products | Technical documentation | SERCOMINFCOM | S/DMPSI/WIPPS | Update to the Manual and the designation of new centres or new functions to existing centres | Low | 2027 |
| 10 | Meteorological/synoptic* Tropical cyclones and Extra-tropical storms
* Heatwaves
* Cold waves
 | B6 - Region-specific TC Operational Plans/ManualMarine Meteorology Manual an associated GuidesB8 – 30-year heatwave hazard climatology for a. temperature, b. thermal indices and c. heatwave-intensity indices.  | Technical documentsTechnical documentsData curation | RA, INFCOM, SERCOMSERCOMSERCOM | S/DMPSS/MARS/ | ManualsManualsClimatologies | HighMediumMedium | 202420272025 |
| 11 | Extended range* Drought/dry spells
 | B4 - HydroSOS Hydrological Status and Outlook System | HydroSOS portal | HCP, SERCOM, INFCOM | I/ESM, S/HWC | HydroSOS portal | *High* | Continuous (5 countries per year added) |
| 12 | Cross-domain* Coastal inundation/storm surge
* Cryosphere
* Emerging hazards
 | RSMC Global Numerical Storm Surge Prediction products IF-EWS Guide Sea Ice Information and Services Guide  | IF-EWS Guide  Sea Ice Information and Services Guide  | SERCOMSERCOMSERCOM | S/MARS/MARS/MAR | Numerical guidance products Guidance on Coastal Inundation Guidance on Sea Ice  | High  High  Medium  | 202520252026 |
|

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| --- |
| **Global numerical weather prediction (NWP)** |

 |
| 13 | Non-hazard specific/cross-cutting | C1.1 - WMCs and cascading by RSMCs TC C1.2 - *Update of the mandatory/recommended products from RSMCs for global NWP* C1.3 - *Establishment of a new WIPPS activity for Climate Reanalysis and designation of new RSMC*C1.4 - Update of WIPPS Web Portal C1.5 - *Demonstration of WIPPS Rolling Review of user Requirements process* C1.8 - WIPPS pilot project on the provision of high-resolution as LBCs C1.9 - Collect available training materials from WMCs and consolidate as education on the access and use of WIPPS products  |  Products exchangedTechnical regulations/ manual WIPPSTechnical regulation/manual WIPPInformation for membersUser requirements gatheringData provisionDocument preparation | INFCOMINFCOMINFCOMINFCOMINFCOMINFCOMINFCOM, CDP | I/WIPPSI/WIPPSI/WIPPSI/WIPPSI/WIPPSI/WIPPSI/WIPPS | Products delivered ManualManualWebsite, metadataRequirementsData feeds to membersTraining materials | LowHighHighMediumMediumLowHigh | 2027202620272024202520272024 |
| 14 | Hydrological* Flash floods
* Riverine floods
 | C5 - Catalogue global flood modelling capabilities, pilot the function as WIPPS centre C5.2 - RSHCs for global riverine flood prediction | Investigation, pilot projectTechnical Regulations | INFCOM, HCPINFCOM | I/WIPPSI/WIPPS | Document, pilot projectManual, designations of centres  | MediumLow | 20252027 |
| 15 | Meteorological/ nowcasting* Thunderstorms/ squall lines
 | C7 - WMCs and RSMCs NWC and cascading by RSMCs SWF and regional SWF centres  | Technical regulations | INFCOMSERCOMRA | I/WIPPS | Manual, designation of centres | Medium | 2025 |
| 16 | Meteorological/synoptic* Tropical cyclones and extra-tropical storms
* Heatwaves
* Cold waves
 | C6.2 - WMCs and cascading by RSMCs TC, ensemble forecasting, with longer lead time, etc.C6.1 - WMCs and cascading by TC RSMCs, ensemble forecasting, etc C6.2 – Definition and provision of Tropical low/cyclone vortices variables C8.1 – Identification of impact-related indices (e.g. Heatwave-intensity Index and thermal indices) C8.2 – MMO/CLI revision of WMO No. 1131 Climate Data Management System Specifications F8.1 – Possible establishment of Global/Regional Centres on Heatwaves  | Investigation and developmentTechnical regulations added to WIPPS manual SERCOM provides specifications INFCOM provides data availability, Technical documentsTechnical documentsTechnical regulations | SERCOM and RB (INFCOM involved after testing)SERCOMINFCOMSERCOM,INFCOMSERCOM, INFCOMSERCOMINFCOM | S/DMPSI/WIPPSS/DMPSI/WIPPSS/DMPSI/WIPPSS/CS, S/MARI/WIPPSI/WIPPSS/ACS, S/SMPS | Forecast range extendedProbabilistic product development Manual, Guide, Inclusion in WIPPS manual ReportGuide, specificationsManual, WIPPS manual designation of centres and definition/change of function | MediumMediumMediumHighHighHigh | 202620252025202420272027 |
| 17 | Extended range* Drought/dry spells
 | C4.1 - Identification of impact-related indices (e.g. SPI, SPEI) C4.2 - Identification and designation of RSHCs for snow cover predictionC4 - Provision of impact-related indices (e.g. SPI) F4 – Possible establishment of Global/Regional Centres on Drought Monitoring | InvestigationTechnical regulationsTechnical regulationsTechnical regulations | SERCOMINFCOMINFCOMINFCOM, SERCOM | S/CS, S/ACSI/WIPPSI/WIPPSI/WIPPS, S/ACS | ReportManual, designation of centresManual updateManual, designation of centres | HighMediumLowMedium | 2024202420272027 |
| 18 | Cross-domain* Coastal inundation/storm surge
* Cryosphere
* Emerging hazards
 | D6.3 – CIFI Coastal Inundation Forecasting Initiativesupport to RSMCs for Numerical Ocean Prediction and Global Numerical Storm Surge PredictionG9 - Establishment of Regional Hydrological Centers on snow cover prediction under WIPPS banner | Tech Regulations and Guidance Technical regulations | SERCOM and INFCOMINFCOM,  | S/MMOI/WIPPS | Manual and guidance Manual, Guide updates | HighLow | 20252027 |
|  | **Limited area NWP** |
| 19 | Non-hazard specific/cross-cutting | D1.2 - Update of the mandatory/recommended products from RSMCs for limited-area NWP D1.3 - Identification of potential RSMCs for limited-area NWP  | Regulatory materialInvestigation | SERCOM, INFCOMINFCOM, RA | S/DMPS; I/WIPPSI/WIPPS | Manual and GuideReport | HighHigh | 20242024 |
| 20 | Hydrological* Flash floods
* Riverine floods
 | D3 - RSHCs for flash flood forecasting | Regulatory material | SERCOM | S/HWC | Manual, designation of centres | Medium | 2026 |
| 21 | Meteorological/nowcasting* Thunderstorms/squall lines
 | D7 - SWFP coordinated regional and supporting to run fine LAM models resolving thunderstorms. RSMCs high resolution NWP RSMCs for nowcasting | Technical regulations,  | INFCOM SERCOM, RAs | S/DMPS | Manual, Guide | Medium | 2026 |
| 22 | Meteorological/synoptic* Tropical cyclones and extra-tropical storms
* Heatwaves
* Cold waves
 | D 6.2 SWF RSMCs high-resolution NWP and RSMCs SWF issue guidance products for heat waves as feasibleD6.1 - TC RSMCs and NMCs running LAM models with higher resolution and longer lead time.D8 - Improved resolution of humidity and wind fields for extreme heat, thermal, temperature indices.E6.1 - Tropical Cyclone - Probabilistic Forecast Products (TC-PFP) | Extended coverage and heat and cold wave guidance incorporated identification of recommended practicesModel developmentCapacity development materialsResearch | SERCOMSERCOM, INFCOM, RAsSERCOM INFCOMResearch Board | S/DMPSS/DMPSS/DMPSI/WIPPSSI/WWRP | D.6.2 WIPPS manual updatedModel updatesTechnical regulations Capacity development materialsEnhanced Earth system science and improved products | MediumHighHighMedium | 2026202420242026 |
| 23 | Extended range* Drought/dry spells
 | D4 - Regional Climate Centers | Possible establishment of Global/Regional Centres on Drought Monitoring | SERCOM | S/CS, S/ACS | Workshops and reports | Medium  |  2026 |
| 24 | Cross-domain* Coastal inundation/storm surge
* Forest fires
* Cryosphere
* Emerging hazards
 | D6.3 – Coastal Inundation Forecasting InitiativeD9 - Scaling up and leveraging SWFP, Sand and Dust Storm Warning Advisory and Assessment System (SDS- WAS), Vegetation Fire and Smoke Pollution warning and assessment system (VFSP-WAS), Global Air Quality Forecasting and Information System (GAFIS) Polar Coupled Analysis and Prediction for Services (PCAPS)Urban Prediction Project  | GuidanceDesignations and guidanceResearchResearch | SERCOMSERCOM, RB, RAs, INFCOMResearch BoardResearch Board | S/MARSI/GAWSI/WWRPSI/WWRP | Products  Gather requirements and advice on service design for emerging hazards (including forest fires, sand and dust storms and air pollutionEnhanced Earth system science and capacity development | MediumLowMediumMedium | 2027202720272027 |
|  | **Nowcasting** |
| 25 | Non-hazard specific/cross-cutting | N/A |  |  |  |  |  |  |
| 26 | Hydrological* Flash floods
* Riverine floods
 | F3.1 - Catalogue nowcasting products/applications both surface- and space- basedF3.2 – Identification and demonstration of potential RSMCs for nowcasting and RSHCs for flash flood forecastingF3.3 - designation of RSHCs for flash flood forecasting | InvestigationInvestigationTechnical regulations | SERCOMSERCOMSERCOM | S/HWCS/HWCS/HWC | ReportReportManual, Guide, designation of centres | HighHighHigh | 202420242027 |
| 27 | Meteorological/nowcasting* Thunderstorms/squall lines
 | F7.1 - Catalogue nowcasting products/applications both surface- and space-basedF7.2 - Identification of potential RSMCs for nowcasting (RSMCs NWC) | InvestigationInvestigation | SERCOMINFCOM, SERCOM, RAs | S/DMPSI/WIPPS; S/DMPS | ReportReport | HighMedium | 20242025 |
| 28 | Meteorological/synoptic* Tropical cyclones and extra-tropical storms
 | F6 – six hourly updating by RSMCs TC and NMCs, up to five days for each region (seven days by 2027). | Technical regulations | SERCOM | S/DMPS | Manual | High | 2024 (2027) |
| 30 | Cross-domain* Coastal inundation/storm surge
 | N/A |  |  |  |  |  |  |

| **Item** | **Hazard Category** | **Implementation Tasks** | **Type of Activity** | **Constituent Body Lead** | **Secretariat Lead** | **Deliverables** | **Urgency** | **Time-line** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Local data processing, forecast, guidance products (human intervention)** |
| 31 | Non-hazard specific/cross-cutting | G1.1 - Train-the-trainers focused on access, processing, visualization, and interpretation of satellite data | Development of specific training material for IT and forecasting experts | CDP, INFCOM, SERCOM  | MS, I/WIGOS,  | Training events and materials | High | 2024 |
| 32 | Hydrological* Flash floods
* Riverine floods
 | G3 - Establishment of Regional Hydrological Centers on flash flood under WIPPS bannerG3.1 – FFGSG5.1 - Community of Practice on flood forecastingG5.2 - Inventory of models and platforms for flood forecastingE3.1 - WWRP: Integrated Prediction of Precipitation and Hydrology for Early Actions (InPRHA)  | Technical regulationsDevelopment of training materials, Implementation and improvement of the system Conducting the workshops and training including gender mainstreaming, stakeholders and communitiesCollection of models and platforms, technical materialsResearch | SERCOMSERCOMSERCOMSERCOMResearch Board | S/HWCS/HWC S/HWCS/HWCSI/WWRP | Manual, Guide, designation of centresTraining workshops, materials, system Report, manual, toolWorkshopsReport, websiteWorkshops, capacity development, enhanced earth system science | MediumHighHighHighMedium | 20272027202720242026 |
| 33 | Meteorological/nowcasting* Thunderstorms/squall lines
 | G7.1 - SWFP develop improved guidance products as feasible with support from satellite operating centres and RSMCs for nowcasting  | Guidance materials, development, technical regulations | SERCOM | S/DMPS | Manual, Guide, additional data feeds | Medium | 2025 |
| 34 | Meteorological/synoptic* Tropical cyclones and extra-tropical storms
* Heatwaves
* Cold waves
 | G6.1 - RSMCs TC for regional advisory products and NMCs for national forecasting and warningsG8.1 - Training Members on Heat-Early Warning System Guidance, etc.F8 - Identification of potential RSMCs for heatwaves centres in product support and train the trainer for extreme heat product suite. | Capacity developmentCapacity developmentInvestigation, development/consolidation of materials | SERCOMCDP, SERCOMSERCOM, RAs, INFCOM | S/DMPSS/DMPS, MS/ETRS/CS | Competency for staff at RSMCs and NMCs maintained qualitatively and quantitatively to support business continuityTraining materialsScoping paper/Training materials | HighHighHigh | 202420242024 |
| 35 | Extended range* Drought/dry spells
 | G4.1 – HydroSOSG4.2 - Dynamic Water resources Assessment Tool (DWAT)G4.3 - Training Members on National Drought EWSF4 Identifications of potential RSMCs drought monitoring  | Global/Regional/National Implementation and technical developmentImplementation and improvement of the tool Development of training materialInvestigation  | SERCOM, HCPSERCOM, HCPCDP, SERCOMSERCOM | S/HWCS/HWCMSS/CS, S/ACSS/CS, S/ACS | Technical guidelines, portal global workshopupdated manual and toolTraining eventsReport | HighHighHighHigh | 2027202420242024 |
| 36 | Cross-domain* Coastal inundation/storm surge
 | G1.2 – CIFI Surge Model Intercomparison and Surge Climate (SurgeMIP);Guide to Storm Surge Forecasting – Complete revisionWMO Marine Services Course – progress rollout across regions and languagesG6 - The application of the Competency assessment implementation (Toolkit)-progress;IMO Mariner model courses - Updates to meteorological trainingG9.2 - Consolidation of WMO position and efforts to support members working in tsunami  | InvestigationTechnical documentationTraining materialsAssessmentTraining materialsInvestigation, consultation | SERCOMSERCOMSERCOMSERCOMSERCOMSERCOM, JCB | S/MMOS/MMOS/MMOS/MMOS/MMOS/MMO | ReportGuideTraining materialsReportTraining materialsReport | MediumMediumMediumLowLowLow | 202520252027202720272027 |
|  | **Producing impact- and risk-based forecast and warnings** |
| 37 | Non-hazard specific/cross-cutting | H1.1 - Impact-based Forecast and Warning Services (IBFWS) eCourse expanded to include priority hazards IBFWS online Ecosystem established, maintained and updated IBFWS competencies reviewedH1.2 - WMO Cataloguing of Hazardous Events (CHE)  | Training material developmentSystem developmentInvestigation and reviewExpanded list of hazards developed Technical documentation and operational guidance developed | CDP, SERCOMCDP, SERCOMCDP, SERCOMSERCOM | S/DMPS. MS/ETRS/DMPS, MS/ETRS/DMPSS/DMPS | Course materialsWebsiteReportUpdated technical regulations and guidance materials for implementation | HighHighHighHigh  | 2024202420242025 |
| 38 | Hydrological* Flash floods
* Riverine floods
 | H3.1 - Guidelines on IBF for floods and droughts H3.1 - Training materials on the Guidelines on IBF for floods and droughtsH3.2 - Guiding principles for engagement of the private sector to support flood-and drought related EWS and risk management | Technical documentationDevelopment of training materialPilot studies  | SERCOMCDP, SERCOMSERCOM | S/HWCMS/ETRS/HWC | GuidelinesTraining materials and eventsReport | MediumMediumMedium | 202620272027 |
| 39 | Meteorological/nowcasting* Thunderstorms/squall lines
 | H7 - Tailored guidance products developed  | Development of products  | SERCOM,RB | DMPS | Products developed | Medium | 2026 |
| 40 | Meteorological/synoptic* Tropical cyclones and extra-tropical storms
* Heatwaves
* Cold waves
 | H6 - RSMCs TC are leading to developing IBF products with risk information, including impacting areas, utilities and communities for actionsH8.1 - Training Members on good practices for the health and all other heat-impacted essential service sectors H8.2 - SWFP regional subprogrammes RSMCs SWF cascade WMCs’s heat related products and indices to NMHSs as/when available RSMCs SWF develop specific guidance products in addition to the current hazards  | Technical documentationDevelopment of training materials and deliveryTechnical documentationTechnical documentationSupport to RSMCs SWF as feasible | SERCOMSERCOM, CDPSERCOMSERCOMSERCOM | S/DMPSS/ACSS/DMPSS/DMPSS/DMPS | Updates to Manual and Guides Training materials and eventsTraining materials and eventsUpdates to Manual and GuideUpdates to Manual and Guide | HighMediumHighHighMedium | 20262025202420242025 |
| 41 | Extended range* Drought/dry spells
 | H4.1 – HydroSOSH4.2 - Framework for the evaluation of gaps and needs with respect to national drought forecasting and early warning systemsH4.2 – WAMISH4.3 - climate and hydrological prediction servicesH4.4 - Training Members on developing National Drought Plans and PoliciesH4.3 - Guidance on Flash drought | Technical documentation and HydroSOS portal trainingInvestigationUpdating website, Training materials ReportCapacity development, development of training materialsTechnical documents | HCP, RAs, SERCOM, INFCOMSERCOMSERCOMCDP, SERCOMSERCOMSERCOM | S/HWC, S/HWC, S/ACSS/ACSS/ACSS/HWC S/CS, S/ACS S/CS, S/ACS | Guidance and training materialReportTraining materials and websiteTraining materials and eventsTraining materials and eventsGuidance material | HighMediumMediumMediumHighMediumMedium | Continuously (2 countries per year) 20252024202520252025 |
| 42 | Cross-domain* Coastal inundation/storm surge
 | H9 - Develop an impacts catalogue, based on cataloguing of hazardous sites, for reference in assessing future risks  | Investigation | SERCOM | S/DRR | Report | Low | 2027 |
|  | **Warning dissemination** |
| 43 | Non-hazard specific/cross-cutting | I1.1 - Common Alerting Protocol (CAP) - WMO e-learning courses updated; CAP editor tool integrated into WIS 2.0 in a box;WMO-RAA Incorporated into the technical regulations; WMO RAA Interface updated; Progressing EW4All Oriented to Partnerships and Local Engagement (PEOPLE) | Development of training materialSystems integrationTechnical documentationAesthetic updates to the user interface to enhance functionality Research | SERCOM, CDPSERCOM, INFCOMSERCOMSERCOMResearch Board | ETR, S/DRRS/DRR, I/WISS/DRRS/DRRSI/WWRP | Training portalDelivered systemUpdated Manual and GuideUpdate of the PWS guideWorkshops, reports, training and enhanced social science | HighHighHighHighMedium | 20242024202420252026 |
| 44 | Hydrological* Flash floods
* Riverine floods
 | I3 - Guidelines on communication for hydrological information with respect to forecasting results and related risksI3 - Training materials on Guidelines on communication for hydrological information with respect to forecasting results and related risks | Technical documentationDevelopment of training materials | SERCOMSERCOM, CDP | S/HWCS/HWC | GuideTraining materials and events | MediumLow | 20262027 |
| 45 | Meteorological/nowcasting* Thunderstorms/squall lines
 | I7 - Implementation of Iridium SafetyCast across all METAREAS | Implementation | SERCOM, RA | S/MAR | Update Manual and Guide, designation of centres | Medium | 2025 |
| 46 | Meteorological/synoptic* Tropical cyclones and extra-tropical storms
* Heatwaves
* Cold waves
 | I6 - Regional Specialized Meteorological Centers for tropical cyclone and with good coordination on marine meteorologyI6.1 - coordinated standard operating procedures for Tropical Cyclones at regional and national levelsI8 - Guidelines on communicating severity classes for warnings. Co-designed hazard/impact studies guide development of heat action plans.Training in CAP for temperature, thermal and heatwave-intensity extreme heat warnings. | Technical documentationTechnical documentationTechnical documentation, investigation | SERCOMSERCOMSERCOM | S/DMPSS/ DMPSS/DMPS | Updated Manual and Guide, designation of centresUpdated Manual and GuideGuidance material, training events | MediumHighLow | 202520242027 |
| 47 | Extended range* Drought/dry spells
 | I4.2 -Guidelines on Communicating Drought InformationI5 - Training materials on Guidelines on communication for hydrological information with respect to forecasting results and related risksI4.2 CAP  | Technical documentationDevelopment of training materialsInvestigation, Report | SERCOMSERCOM, CDPSERCOM | S/ACSS/HWCS/ACS, S/DRR | GuideTraining materials and eventsReport and Guidance Materials | MediumLowMedium | 202520272027 |
| 48 | Cross-domain | I8.2 - Training in multi-hazard linkages between drought, dust, heatwave, fire, smoke and flash flood.  | Development of training materials, delivery | SERCOM, CDP | S/DRR | Training materials and events | Medium | 2026 |
|  | **Support to decision-making** |
|  | Non-hazard specific/cross-cutting | J1.1 - Global Multi-hazard Alert System (GMAS) - CAP guidance updatedJ1.2 - CAP helpdesk prototyped and preoperationalJ1.6 - Drafting of Business Continuity Guidance to sustain MHEWS J1.7 - DRR related standards and technical regulations J2 - Catalogue of Hazardous eventsProgressing EW4All Oriented to Partnerships and Local Engagement (PEOPLE)  | Technical documentationSystem and capability developmentGuidance material development Technical documentationInvestigation, technical documentationResearch report | SERCOM INFCOMSERCOM,INFCOMSERCOMSERCOMSERCOMRB | S/DRRS/DMPSS/DRRS/DRRS/DRRSI/WWRP | Guide and ManualHelpdesk operatingGuideManual and GuideReport, catalogue, Manual and GuideWorkshops, reports, training and enhanced social science | HighHighHighHighHighLow | 202420242024202420242027 |
|  | Hydrological* Flash floods
* Riverine floods
 | J 3.1 - APFM HelpDesk on Integrated Flood ManagementJ5 – APFM Guidelines on Transboundary flood risk managementJ-5 – APFM Training materials on Guidelines on Transboundary flood risk management | Operating the HelpDesk with Support Based PartnersDeveloping the technical guidelinesDeveloping the training materials | SERCOMSERCOMSERCOM | S/HWCS/HWCS/HWC | Annual report, Helpdesk operating, Capacity DevelopmentGuidelinesTraining materials | HighMediumMedium | 202720262027 |
|  | Meteorological/nowcasting* Thunderstorms/squall lines
 | J7 - SWFP to support national – subnational decision making in DRR response. | Issuance of guidance products by RSMCs NWC and RSMCs SWF  | SERCOM | S/DRR |  Guidance product | Medium | 2026 |
|  | Meteorological/synoptic* Tropical cyclones and extra-tropical storms
* Heatwaves
* Cold waves
 | J6 - Support national DRR decisions to have a synergized response to tropical cyclones | Technical documentation | SERCOM | S/DRR | Guide | Medium | 2026 |
|  | Extended range* Drought/dry spells
 | J4.1 IDMP Helpdesk on Integrated Drought ManagementJ4.2 HydroSOSJ4 IDMP - Guidance for water use, allocation and accounting in the Water Energy Food Ecosystems nexus | Training and Guidance MaterialsTraining and Guidance materialsGuidance Materials | SERCOMSERCOMSERCOM | S/CS, S/ACSS/HWCS/CS | Training Events and guidance materialsTraining Events and guidance materialsGuidance Materials | MediumMediumMedium | 202620262025 |
|  | Cross-domain* Coastal inundation/storm surge
 | J8 - Marine Emergency Response Guide | Technical documentation | SERCOM | S/MMO | Guide | High | 2024 |

**WMO EW4All Roadmap**

**Part II – Coordination and Project Activities**

| **Item** | **Activity** | **Implementation Tasks** | **Type of Activity** | **Constituent Body Lead** | **Secretariat Lead** | **Deliverables** | **Urgency** | **Timeline** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Communications** |
| ***1*** | EW4All communication support package for Members | Develop communications strategy for EW4AllDevelop slide deck and key messages with EW4All global interpillar technical leads and communications focal points  | Guidance with templates | PAC/EC | CSG/Comms | EW4All communications strategyPpt slide deckKey messages | High | 2024 |
| ***2*** | EW4All campaigns and campaigns on main events/political moments | Campaign materials developed (to be used globally) in support of key political moments | Communication campaigns | PAC/EC | CSG/Comms | Overarching communications campaign  | High | 2024 |
| ***3*** | Engagement in relevant events, led by CSG, and underpinned by the development of a communication strategy | Advocacy, knowledge exchange | Events | PAC/EC | CSG | Campaigns key political moments | High | 2024 |
|  | **Coordination – Development / humanitarian Partners, Private Sector, Donors** |
| ***4*** | EW4All Advisory Panel | Develop background materials | Event | PAC/EC | CSG | Meeting reports with high-level guidance | Medium | 2024-2027 |
| ***5*** | Interpillar technical coordination and Artificial Intelligence Subgroup (global and regional level) | Tools, partner guidance and support to national EW4All roll out countries | Meetings | PAC/EC | S/DMPS | Action items/ toolkits  | High | 2024-2027 |
| **6** | Pillar coordination | Update, joint work planning with partners | Meetings | PAC/EC | S/DMPS; CSG | Action items/ workplans available | High | 2024-2027 |
| ***7*** | UN Development Coordination Office, NYC | Agenda setting of regional structures and Resident Coordinators  | Meetings | PAC/EC | CSG | Coordination  | High | 2024-2027 |
| ***8*** | UN Resident Coordinators | National support in EW4All roll-out and implementation  | Meetings | PAC/EC | MS/RTC; S/DMPS | Integration of EW4All into national cooperation frameworks | High | 2024-2027 |
| ***9*** | MDBs, donors | MeetingsProposal submissionsPooled funding agreements  | Resource mobilization  | PAC/EC | MS/RMDP | Resources available to implement activities  | High | 2024-2027 |
| ***10*** | CREWS Steering Committee  | Meetings | Resource mobilization  | PAC/EC | CREWS Secretariat | Programme portfolio aligned to WMO EW4All IP | High | 2024-2027 |
| ***11*** | SOFF Steering Committee  | Meetings | Resource mobilization | PAC/EC | SOFF Secretariat | Programme portfolio aligned to WMO EW4All IP | High | 2024-2027 |
| ***12*** | Private Sector Engagement  | Agreements in place to test innovative ideas presenting promise to yield high-impact benefits to WMO Members  | Partnership | PAC/EC | CSG/PPE | PPE agreements in place | High | 2024 |
| ***13*** | WMO UNDRR Centre of Excellence  | Think space on complex and cascading risk  | Partnership  | PAC/EC | S/DMPS | Publications and solution packages | Low | 2024 |
| ***14*** | Coordinated disaster risk reduction legislation and advocacy  | National legislation data collected, confirmed and shared among MembersAdvocacy campaigns designed and supported to promote good models of effective DRR legislation | Partnership | PAC/EC | MS, S/DMPS, CSG | Members supported with models for national legislation which place NMHS as the authoritative voice on weather, water and climate | High | 2024-2027 |
| ***15*** | Multi-stakeholder cooperation on socio-economic benefit (SEB) data and analysis, including development of the SEB toolkit and training package tailored for NMHS and National Disaster Management Organizations  | Repository of good practices SEB toolbox and training related materials  | Partnership | PAC/EC | CSG, S/DMPS | Members capacitated on SEB analysis related to inform on the benefits of early warning systems in support of UN SG’s EW4All | Medium | 2024 |
|  | **Monitoring and Evaluation (M and E)**  |
| ***16*** | Co-chair WMO UNDRR EW4All M and E subgroup | Theory of changeResults framework Dashboard | Partnership | PAC/EC | CSG/MERP | Annual progress report to COP | Medium | 2024-2027 |
| ***17*** | Aggregation of data from Community Platform, Hydromet diagnostics, etc. to enhance visualization of data analytics Member needs (e.g. capacity assessments and financial analytics) | Revise the result framework based on feedback from SERCOM and INFCOM on the rapid assessmentAggregate data from different Departments aligned with competency measures agreed by SERCOM and INFCOMAssess independent data sources for validation of self-reporting  | Monitoring and Evaluation | PAC/EC | CSG/MERP | Dashboards  | High | 2025 |
|  | **Decision support, communities of practice/advocacy and knowledge management**  |
| ***18*** | EW4All national roll-out status visualized and documentation accessible  | EW4All workshops support and documentation available online | Knowledge management | PAC/EC | S/DMPS | Documents available for EW4All dashboard | High | 2024 |
| ***19*** | WMO Coordination Mechanism | WMO Member and expert advice regularly available to humanitarian agencies Training strategy and materials available  | Decision support | PAC/EC | S/DMPS | Humanitarian agencies have access to WMO Member’s authoritative information  | High  | 2024 |
| ***20***  | Communities of practice / advocacy bodies  | Convene meetings to exchange knowledge and good practice identified by SERCOM and INFCOM with partners;Develop joint advocacy messages | Knowledge management, advocacy  | PAC/EC | S/DMPS;S/ACS; S/HYD;  | Good practice discoverable and available across hazard and value cycle domains | Low | 2024-2027 |
|  | Integrated Drought Management Programme |
| Global Heat Health Information Network |
| Associated Programme on Flood Management |
| International Network for Multi-Hazard Early Warning System  |
| Tropical Cyclone Programme  |
| Panel on Polar and High Mountain Observations, Research and Services (PHORS) |
| Panel on Socioeconomic Benefits (PSB) |
|  | **Capacity Development** |
| ***21*** | Training priorities identified by RA supported through the Regional Training Centers | Conduct trainings based on regional priorities  | Capacity development | PAC/CDP | MS/ETR | Capacity enhanced | High | 2024-2027 |
| **22** | Strengthened capacity of tropical cyclone forecasters in terms of specialized skills and competencies | Trainings | Capacity development | PAC/CDP | MS/ETR; S/DMPS | Strengthened capacity of tropical cyclone forecasters in terms of specialized skills and competencies | High | 2024-2027 |
| **23** | E1.1 - Sowing Seeds of Innovation: workshops in regions to be held, hazard focus | Organise series of XB funded workshops across Regions | Capacity development | Research Board | SI | Workshops to build linkages between Research Board and Regional Associations | Medium | 2025 |

**Refer to extrabudgetary portfolio excel spreadsheets for all WMO capacity development support (Appendix to EC-78/INF 3.1(1)**

1. UNDRR leads Pillar 1: Risk Knowledge and Management; WMO leads Pillar 2: Observations and Forecasting; the International Telecommunication Union (ITU) leads Pillar 3: Dissemination and Communication; and the International Federation of Red Cross and Red Crescent Societies (IFRC) leads Pillar 4: Preparedness to Respond. [↑](#footnote-ref-2)
2. The CHD has been developed by the Alliance for Hydromet Development under WMO leadership and with the guidance of a multi-party Working Group. It is based on a peer approach where advanced NMHSs from both developed and developing countries undertake the diagnostics, following the standardized methodology. CHD provides a maturity assessment of NMHS operations along 10 elements of the hydrometeorological value chain. Behind each element sit various indicators, which are informed by data sources and by direct interviews and observation for validation purposes. [↑](#footnote-ref-3)
3. Pillar 1: Risk Knowledge and Management (led by UNDRR); Pillar 2: Observations and Forecasting (led by WMO); Pillar 3: Dissemination and Communication (led by ITU); Pillar 4: Preparedness to Respond (led by IFRC). [↑](#footnote-ref-4)