

WMO STRATEGIC PLAN

2024–2027



WORLD
METEOROLOGICAL
ORGANIZATION

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Foreword

Four years ago, the World Meteorological Organization (WMO) adopted an ambitious 2030 long-term strategy designed to pursue the Earth system approach in addressing the growing demand for authoritative science-based information, help societies build resilience and adapt to a changing climate, capitalize on unprecedented advances in science and technology, and close the gap between developed and less developed countries in terms of infrastructure and capabilities. The strategy was fully aligned to the 2030 Sustainable Development Agenda, the Sendai Framework for Disaster Risk Reduction and the Paris Agreement of the United Nations Framework Convention on Climate Change in terms of timeline and goals.

Based on this strategy, WMO then implemented a historic reform which involved a complete overhaul of its governing bodies and alignment to the Strategic Plan. All structures were streamlined and mobilized towards the attainment of the strategic objectives. WMO further set out to engage in broader partnerships, including with the private sector and academia, and pursue a more heterogeneous membership in its expert network as a way of ensuring the human and financial capital required to implement the Strategy.

The Strategic Plan 2024–2027 that the nineteenth session of the World Meteorological Congress adopted is a continuation of these endeavours. It is a stepping stone towards WMO's Vision 2030 and reaffirms Members' commitment and unwavering determination in pursuing the Organization's mission and long-term objectives. It also reaffirms its overarching priorities:

- Enhance preparedness and reduce loss of life, critical infrastructure and livelihood from hydrometeorological extremes;
- Support climate-smart decision making for building or enhancing the adaptive capacity and resilience to climate risk; and
- Enhance the socioeconomic value of weather, climate, hydrological and related environmental services.

The new Strategic Plan takes the aspirations related to these priorities to a higher level by setting about upscaling and expanding the scope of major initiatives which are designed to accelerate implementation:

- *Early Warnings for All*: Members unequivocally endorsed this UN initiative co-led by WMO, which aspires to ensure that everyone on Earth is protected by early warnings by 2027. The outcomes and outputs that WMO has committed to deliver in terms of hydrometeorological observations and forecasting have been fully embedded and accorded the highest priority in the Strategic Plan 2024–2027.
- *Global Greenhouse Gas Watch*: WMO will build on its long-standing activities in greenhouse gas monitoring and research to strengthen the scientific underpinning of mitigation actions under the Paris Agreement. The Initiative is expected to fill critical information gaps and provide an integrated, operational framework that brings under one roof all space-based and surface-based observing systems, as well as modelling and data assimilation capabilities.
- *Global and regional impacts of changes in the cryosphere*: a new Strategic Objective was created, which incorporates high-level priorities and actions aimed at strengthening the capacity of Members to prepare and respond to impacts from the changing cryosphere in polar and high mountain regions as well as in downstream and lowland regions and the ocean.

- *Hydrology*: the implementation of the WMO Plan of Action for Hydrology is another element that was reinforced in the Strategic Plan 2024–2027. The core components include strengthened flood forecasting, integrated drought management and improved water resource monitoring and management through the Hydrological Status and Outlook System (HydroSOS) and the Global Hydrometry Support Facility (HydroHub).

We are confident that this Plan will be realized in strong collaboration among all WMO Members through modern global and regional structures, accelerated transfer of scientific and technological advancement into operations, inclusive cooperation mechanisms, and strong partnerships for the benefit of all Members. We are further convinced that WMO will continue being a strong, reliable, highly visible and effective actor in fostering sustainable development globally as well as in addressing the weather-, water- and climate-related challenges of the 21st century.



Dr A. Al Mandous
President



Prof. Petteri Taalas
Secretary-General



Our Vision

By 2030, we see a world where all nations, especially the most vulnerable, are more resilient to the socioeconomic consequences of extreme weather, climate, water and other environmental events;¹ and underpin their sustainable development through the best possible services, whether over land, at sea or in the air.

Our Mission

Our Mission is outlined under Article 2 of the WMO Convention as to facilitate worldwide cooperation on monitoring and predicting changes in weather, climate, water and other environmental conditions through the exchange of data, information and services, standardization, application, research and training.

WMO is a specialized agency and an authoritative voice of the United Nations

WMO Member States and Member Territories (hereunder referred as “Members”) own and operate the scientific infrastructure required for providing the weather, climate, water and related environmental services, and primarily delivered through their national meteorological and hydrological organizations.

WMO enables the performance of its Members in the provision of their monitoring, forecasting and warning services, leads and informs the global agenda where it best serves their interest through the provision of credible information, reports and assessment at global, regional scales, channels their scientific expertise to address emerging issues such as climate change, and fosters effective and strategic partnerships.

For more than a century, WMO has been providing the essential worldwide leadership and coordination in support of nations’ responsibilities to provide weather, climate, water and related environmental services that protect lives, property and livelihoods. The cross-border nature of the weather, water and climate phenomena requires close coordination among all WMO Members States and Territories in building highly standardized systems for their monitoring, analysis and prediction. WMO, through its various bodies and programmes, has established and facilitated an unprecedented global scientific and operational cooperation, encompassing Members’ National Meteorological and Hydrological Services (NMHSs), academic and research institutions, business partners, communities and individuals.

¹ In the context of this Strategic Plan, the term “**weather**” refers to short-term variations in the state of the atmosphere and their phenomena or effects, including wind, cloud, rain, snow, fog, cold spells, heat waves, drought, sand and dust storms and atmospheric composition, as well as tropical and extratropical cyclones, storms, gales, the state of the sea (e.g. wind-generated waves), sea ice, coastal storm surges, etc. “**Climate**” refers to longer-term aspects of the atmosphere-ocean-land surface systems. “**Water**” includes freshwater above and below the land surfaces of the Earth, including snow and ice, its occurrence, circulation and distribution, both in time and space. Related “**environmental**” issues refer to surrounding conditions affecting human beings and living resources, for example the quality of air, soil and water, as well as “space weather” - the physical and phenomenological state of the natural space environment, including the Sun and the interplanetary and planetary environments.

The role of WMO will remain to support the activities of its Members in understanding the past, monitoring the present and predicting the future state and interactions of the atmosphere, the hydrosphere and other vital elements of our planet, enabling adequate and effective preparedness, adaptation and response to related natural hazards and disasters. This will require further enhancement of coordinated and interoperable networks and systems for data collection and processing, improvement of predictive skill through advanced science and computational technologies, and finally highly innovative approaches of service delivery that will ensure that accurate, fit-for-purpose information will reach its users on time for making their weather-, water- and climate-informed decisions.

Our Core Values

WMO recognizes, above all, in fulfilling its mandate, the principles of striving to ensure that “no Member State or Territory should be left behind”, and to sustain the public trust and confidence in the science underpinnings and the authoritative voice of the Organization and its Members. As WMO works to translate its vision into results, the Organization will be guided by the following values:

- (1) Accountability for results and transparency.** To serve as an authoritative voice and a global leader in its field of work, WMO decisions and actions must be characterized by adherence to the highest scientific and technical standards, integrity, professionalism, capacity to perform and effectiveness. WMO sets clearly defined objectives and assumes responsibility for delivering high-quality results. In so doing, WMO remains mindful of the need for quality management and cost-effectiveness;
- (2) Collaboration and partnership.** Collaboration lies at the foundation of WMO mandate. WMO recognizes the importance of partnerships among Members, multilateral and bilateral development partners and other relevant actors, including the private sector, academia and other non-state players, to leverage investment, enhance capability and performance of NMHSs, and deliver improved outcomes for society. WMO would expect that any such partners uphold the highest standards of ethical behaviour;
- (3) Inclusiveness and diversity.** WMO is committed to support all Members and narrow the capacity gaps among them in the delivery of services by sustaining government support, international cooperation, catalysing investment and targeted assistance. Based on the priorities identified by its regional bodies, WMO will ensure the coordination and implementation of its programmes, strategies and activities and facilitate the transfer of knowledge within and across regions to better serve the needs of its Members. WMO will also pursue gender equality and effective participation of women and men in governance, scientific cooperation and decision-making in the implementation of the WMO Gender Equality Policy and UN criteria. These developments contribute to achieving all relevant sustainable development goals.

The WMO Core Values also guide the behaviour of Secretariat staff. As custodians of the Organization’s image and reputation, they are expected to uphold a commitment to the highest standards of ethical behaviour as expressed in the WMO Code of Ethics and the Standards of Conduct for the International Civil Service.



Key Drivers

Global agenda creating unprecedented demand for actionable, accessible and authoritative science-based information

The 2030 Agenda for Sustainable Development, the Paris Agreement on climate change, and the Sendai Framework for Disaster Risk Reduction serve as the centrepieces for national and international policymaking and action. Their implementation increasingly demands actionable, accessible and authoritative information and services on the changing states of the entire Earth system.²

As governments, organizations and international bodies strive to progress in their development within these frameworks, WMO and NMHSs in particular, have enormous roles to play in supporting implementation. The concomitant decisions at all levels will continue to be contingent upon a better understanding of the changing threat levels from natural hazards, weather, water and climate extremes and climate change. The measurements and reports of the WMO community in these areas currently serve as the backbone of Earth system monitoring and prediction services. Global Earth system observations provide a basis for meeting the demand for increasing seamless prediction capability from weather to climate scales based on a unified modelling approach and WMO Unified Data Policy.

² In this context, the Earth system is being considered as an integrated system of atmosphere, ocean, cryosphere, hydrosphere, biosphere and geosphere, which informs policies and decisions based on a deeper understanding of the physical, chemical, biological and human interactions that determine the past, current and future states of the Earth.



Meteorological and hydrological information and services provided through Members' institutions are essential to achieve the Sustainable Development Goals.

WMO contribution to climate action: major products and initiatives

Action



Services



2023 State of Climate Services **HEALTH**

Coming soon



Science



Modelling

Observations



As new technologies emerge, and new applications of Earth system measurements and predictions become more sophisticated, the reliance on WMO through its Members for this authoritative information will only increase. Furthermore, advancing the global observation and numerical modelling system will provide a foundation for addressing the increasing requirements for impact decisions related to a wide range of applications from public safety to agriculture, energy, health, and water resource management and relevance to climate change.

This means that the quality of these decisions depends to a greater extent on the ability of WMO to properly measure and report on and project future changes in the climate and in the availability of water resources, to assess and communicate weather, climate, water and related environmental risks and to provide effective multi-hazard, extended range, impact-based forecasts and early warnings. Governments, organizations, and international bodies would increasingly rely on information from WMO and NMHSs as they pursue their sustainable development goals on land, at sea and in the air.

The provision of weather, climate, hydrological and other related environmental services at all levels for economic sectors in support of energy, water, health, and food production among others, along with greenhouse gas monitoring data, will be vital in building a low-carbon and climate-resilient economy, providing solid science basis to support international policies and actions, including National Adaptation Plans, and progress towards updating and achieving Nationally Determined Contributions.

To address these growing demands for actionable scientific information, Members' NMHSs need targeted investments, scientific and technical development and strategic partnerships.

Increasing threats of extreme weather, water and climate urge action for resilience, mitigation and adaptation

Climate change is already affecting every region on Earth, in multiple ways. Extreme and high-impact weather, water and climate extremes have devastating consequences for the safety of people, national economies, urban and rural environments, and food and water security. Extreme hydrometeorological³ hazards accounted for more than 90% of the world's disasters⁴, which increased fivefold over the last 50 years. According to the Intergovernmental Panel on Climate Change, these extremes are expected to occur with greater frequency and severity as greenhouse gas concentrations continue to rise. Moreover, sea level rise is accelerating, driven by accelerated melting of the cryosphere⁵ and ocean warming, thus increasing the threat to the world's population who are living in coastal regions. Society's exposure and vulnerabilities to these hazards will be further exacerbated due to population growth, reaching more than 9 billion by 2050; further urbanization and growth of mega cities worldwide, particularly in flood plains and coastal zones; significant expansion of built environments and critical infrastructure to service human needs; and the relocation of vulnerable populations.

³ Hydrometeorological hazards are of atmospheric, hydrological or oceanographic origin

⁴ [CRED/UNISDR, Economic losses, poverty and disasters 1998–2017 \(2018\)](#)

⁵ Cryosphere is a component of the Earth system that contains ice, including solid precipitation, snow, glaciers and ice caps, ice sheets, ice shelves, icebergs, sea ice, lake ice, river ice, permafrost, and seasonally frozen ground, or even "dry" material in the case of permafrost. The cryosphere includes elements on or beneath the Earth's surface or that are measured at the surface in the case of solid precipitation. It therefore excludes ice clouds. ([Definitions Technical Regulations, Volume I: General Meteorological Standards and Recommended Practices](#) (WMO-No. 49)).

First three most severe global risks identified by the World Economic Forum for the next 10 years are: (1) failure to mitigate climate change, (2) Failure of climate change adaptation, (3) Natural disasters and extreme weather events⁶.

Early Warning Systems are a proven, effective, and feasible climate adaptation measure, that save lives⁷, and provide a tenfold return on investment⁸. And yet, only half of countries globally have reported being covered by multi-hazard early warning systems with coverage especially low in Small Island Developing States, Least Developed Countries and in Africa⁹. The UN Early Warnings for All initiative, launched during the World Leaders Summit at the UN 2022 Climate Change Conference, calls for initial new targeted investments of US\$ 3.1 billion to ensure that everyone on Earth is protected by life-saving warnings against increasingly extreme weather in the next five years. This initiative will require the commitment of all governments and the collective and collaborative support of a range of stakeholders including development partners, funding agencies and the academic and private sector. The NMHSs and national disaster risk management agencies, as the national relevant authoritative providers, will be central for enabling implementation at the national level. WMO Members will contribute to this initiative through its implementation of the Strategic Plan, and play a key role in technical implementation, building on the standards and guidance provided by its technical commissions and other relevant bodies.

Growing capacity gap threatens global infrastructure and services

All WMO Members collectively contribute to the global meteorological and hydrological infrastructure and facilities. While this collective global system is a public good that benefits all, the contribution and service performance among the Members continues to be uneven. Many NMHSs are facing substantial development needs and capability gaps in providing the weather, climate, water and related environmental information and services to meet national, regional and global requirements. The typical challenges centre around maintaining sustainable infrastructure, human resources, and the ability to benefit from the advances in science and technology.

Such deficiencies are often present in those countries that are particularly vulnerable to natural hazards. These could jeopardize effective protection of life and property and slow down socioeconomic recovery. Moreover, globalization and the interdependence of critical infrastructure may further contribute to widening capacity gaps among NMHSs and related agencies. Narrowing the capacity gaps by sustaining government support, international cooperation, catalysing investment and targeted assistance is more important than ever in view of the increasing frequency and intensity of weather, climate, water and related environmental extremes.

To support national agendas for disaster risk reduction and climate adaptation, WMO fosters the production and delivery of accessible and authoritative meteorological and hydrological information and services. This information is critical to strengthening resilience to the impacts of weather, climate and water extremes. It provides an essential underpinning to support the development and implementation of National Adaptation Plans under the Paris Agreement.

⁶ [The Global Risks Report 2023 \(18th edition\), World Economic Forum \(2023\)](#)

⁷ [WMO Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes \(1970–2019\) \(2021\)](#)

⁸ [Adapt now: a global call for leadership on climate resilience, Global Commission on Adaptation \(2019\)](#)

⁹ [UNDRR/WMO Global Status of Early Warning Systems: Target G report \(2022\)](#)

Members' governments must support their NMHSs to better and readily adapt to this dynamic changing environment, while WMO must elaborate the means to strengthen cooperation, mutual reinforcement and complementarity among state and non-state actors. It is important to advocate for the essential role of NMHSs in providing the critical infrastructure, competence and authoritative services for serving their governments' fundamental public good function for protecting life and property.

Rapid advancements in science and technology and changing landscape of data and service delivery urge for innovative partnerships

Rapid progress in science and technology provides the opportunity to greatly improve services and to make them more accessible. Advanced services from weather, climate, hydrology and related environmental sciences contribute to timely and effective decisions, saving lives and benefiting society. The contribution of science and technology is further enhanced by supporting and accelerating the science-to-services cycle in all fields.

There are increasing demands from users for more timely, authoritative and salient services, with a greater focus on risks and impacts. These drive the need for further integration between disciplines, including social and economic sciences. But there are challenges. Critical gaps remain in our understanding and ability to simulate key processes, feedbacks and linkages. The big data revolution with increasing quantities of data of variable density, quality and type requires new approaches. The integration of social and economic sciences tests the boundaries of disciplinary silos. The increasing role of the private sector prompts new modes of collaboration. And a global move towards a carbon net zero economy calls for new information from science as well as new approaches to scientific infrastructure.

The importance of ensuring that future advances in global science can be translated into services with local impact cannot be over-emphasized, especially for low-income countries. Science is critical for understanding both the human forcing of the climate system and the impacts of ongoing climate change. As governments consider how best to mitigate risks from climate change, there are growing debates regarding pathways and policies for carbon net zero futures. Understanding risk profiles and developing rapid attributions of impactful weather, climate and water events in the context of anthropogenic climate change is expected to be a growing requirement of governments worldwide.

Rapidly advancing computing technologies at the exascale level, and beyond, will offer unprecedented opportunity to improve Earth system modelling spatial resolution and uncertainty estimation. Higher spatial and temporal resolution of observations will be needed to fully capitalize on these emerging capabilities. In addition, the rapidly developing science underpinning machine learning and artificial intelligence will enable an unprecedented exploitation of both traditional, and new, sources of data relevant to environmental prediction. These new technologies and capabilities offer the opportunity to greatly increase our ability to provide earlier warning of hazardous events, increase the resiliency of communities and infrastructure, and enable greater adaptation to a changing climate in all economic sectors.

Exa-scale computing and artificial intelligence are key future capabilities that can be exploited through international cooperation to meet future demands for improved information, whether through the refinement of existing numerical Earth system weather and climate prediction systems, or the development of entirely new approaches for decision-relevant scientific information. All these developments will transform the value cycle for services, with global access to infrastructure potentially removing some of the barriers for scientists across every region.

To capitalize on these exciting technology advances there is a need to accelerate global collaboration on their exploitation in new ways. Building on WMO's solid foundation of

global operational and scientific collaborative mechanisms, new technology partnerships with the private sector, academia and other partners will drive innovation faster.

Investment in a quantum leap in global science and technology must take into consideration equity to minimize perpetuating and enhancing the disparity in service provision between high and low-income countries. Our global science endeavours must lead to positive impacts in services in all countries and bridge the gap between developing global science, using emerging technologies, and delivering local impacts.

The enabling of international cooperation in the field of weather, climate and water is considered one of WMO's primary strengths and will be an essential strategy for delivering the benefits of global science advances to all. WMO will elaborate the means to strengthen collaboration, mutual reinforcement and complementarity among scientists in NMHSs, academia, specialized research organizations, and private partners. In so doing, WMO will continue to play a major role in amplifying the transfer of emerging scientific insights and technological breakthroughs between developed and developing countries to enable all to fully benefit from the new information era and to create the enabling conditions for capacity development and equity in the global scientific community.

Overarching Priorities

The Strategic Plan sets out long-term goals for 2030 horizon and strategic objectives, focused on addressing the most pressing developments and needs during the 2024–2027 planning cycle of the Organization. The Plan articulates expected outcomes expressing clear benefits to Members. As we translate these goals and objectives into detailed plans, we will focus our resources in accordance with three overarching priorities:

- (1) Enhancing preparedness and reducing loss of life, critical infrastructure and livelihood from hydrometeorological extremes;
- (2) Supporting climate-smart decision-making to build or enhance adaptive capacity or resilience to climate risk;
- (3) Enhancing socioeconomic value of weather, climate, hydrological and related environmental services.

Reflecting on these key priorities, there will be a need to involve a broad set of stakeholders and multidisciplinary expertise to address the current and future challenges facing society as a consequence of changing weather, climate and water patterns worldwide. To be effective, WMO fosters collaborative mechanisms to better align interests, build community and engage stakeholders and experts under weather, climate and water.



Early Warnings for All (EW4All)

The UN Global Initiative for the Implementation of Climate Adaptation

Early Warning Systems (EWS) are a proven effective and feasible climate adaptation measure which enhances the benefits of other adaptation measures when combined. The UN Secretary-General entrusted WMO to lead the UN effort to spearhead a global initiative and to present at the UN Climate Change Conference in Sharm El-Sheikh (COP27) an action plan to meet the ambitious goal of every person on Earth being covered by early warning systems by 2027, building on existing partnerships and contributing to the global climate adaptation agenda.

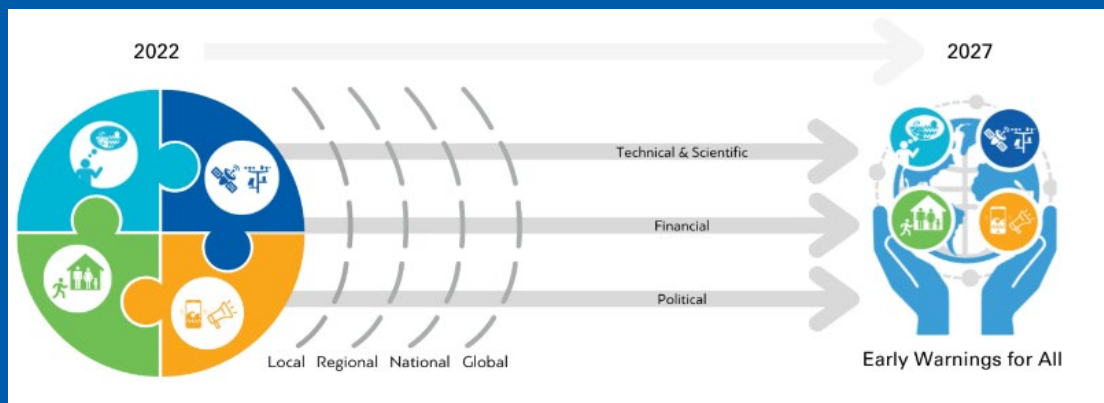
The Sharm el-Sheikh Implementation Plan adopted by COP27 "emphasized the need to address existing gaps in the global climate observing system, particularly in developing countries, and recognized that one third of the world, including sixty per cent of Africa, does not have access to early warning and climate information services, as well as the need to enhance coordination of activities by the systematic observation community and the ability to provide useful and actionable climate information for mitigation, adaptation and early warning systems, as well as information to enable the understanding of adaptation limits and of attribution of extreme events.

It welcomed and reiterated the United Nations Secretary-General's call made on World Meteorological Day on 23 March 2022 to protect everyone on Earth through universal coverage of early warning systems against extreme weather and climate change within the next five years and invites development partners, international financial institutions and the operating entities of the Financial Mechanism to provide support for implementation of the Early Warnings for All initiative."

The Executive Action Plan launched at COP27 summarizes actions to achieve this goal broken down into four pillars of a multi-hazard early warning system.

Delivering on this goal requires global collaboration. There has already been significant work between many UN entities, the private sector and financing institutions in the lead-up to COP27. Several agencies are leading the work on the four individual pillars of the Executive Action Plan, namely for Pillar 1: UNDRR and WMO; Pillar 2: WMO, UNDP, UNESCO and UN Environment Programme; Pillar 3: ITU, IFRC UNDP and WMO; and Pillar 4: IFRC, REAP, OCHA, FAO and WFP. Continued and scaled-up collaboration will be required over the next five years.

The Systematic Observations Financing Facility (SOFF), the Climate Risk and Early Warning Systems (CREWS) Initiative and the Water and Climate Coalition will be foundational elements across the hydrometeorological value cycle of the UN global EWS initiative.



Long-term Goals and Strategic Objectives

Goal 1: Better serve societal needs: delivering, authoritative, accessible, user-oriented and fit-for-purpose information and services

Long-term outcome: Enhanced capability of Members to develop, access and utilize accurate, reliable and fit-for-purpose weather, climate, water and related environmental impact-based services to best support the policymaking and actions that implement sustainable development and mitigate weather, climate and water-related risks¹⁰.



Inter-relationships across the value cycle

In the context of an already changing climate, services depend heavily on a sustained quality observations network and operational exchange of data and products between NMHSs, regional centres, and global producing centres. These services provide historical data, short- and longer-term predictions, and climate change projections in support of early warning services and improved decisions for managing climate sensitive sectors prioritized in countries’ Nationally Determined Contributions to the Paris Agreement. These priority services drive the requirements for infrastructure and systems (LTG2), science support for service delivery (LTG3) and capacity development support to our Members (LTG4) with the best available tools for consideration while adhering to international norms, standards and expectations (LTG5) of the Organization.

¹⁰ The symbols indicate primary contribution/relevance to SDGs, WMO overarching priorities and cross-cutting aspects, such as Early Warnings for all, climate adaptation & mitigation, water ambitions, socioeconomic benefits, capacity development, gender equality, green WMO, public-private engagement

Objective 1.1 Strengthen national multi-hazard early warning/alert systems and extend reach to better enable an effective response to the associated risks



Warnings on weather, climate, water and other environmental extreme events are essential for the safety of lives and livelihoods, recognized under the UN Global Agenda and foundational to all governments’ NMHSs’ mandates. In many countries, capacity to deliver warnings and expert support to first responders, emergency management authorities and communities both ahead of and during the event, and in post event response, recovery and rebuilding phases is lacking and will be addressed, particularly through focused action in the most vulnerable least developed countries, land-locked developing countries and Small Island Developing States.



Focus in 2024–2027:

- A. Better preparedness, response to and recovery from environment-related hazardous events
- B. Enhanced impact- and risk-based extended forecast and warning products and services
- C. Enhanced access to official national Earth system related information, forecasts and warnings

Objective 1.2 Broaden the provision of policy- and decision-supporting climate information and services



The Global Framework for Climate Services (GFCS) provides a unique platform for guiding and supporting activities across the value cycle for climate services, which contribute to adaptation, mitigation and reduction of loss and damage. Availability and access to these products will be expanded and broadened to benefit all Members.



Focus in 2024–2027:

- A. Improved Members’ production and delivery of authoritative national climate information products and services in GFCS priority areas in support of climate adaptation and climate-resilient development
- B. Member climate services enhanced through operational climate service information system
- C. WMO methodologies and products supporting climate adaptation and mitigation actions adopted as official science basis for international climate-related policy implementation and UN system action

Objective 1.3 Develop hydrological services for sustainable water management and adaptation



To reduce related risks and subsequent losses, improved access to reliable global, regional, national and basin-wide information on the current status and future conditions of water resources is critical. WMO will implement its Plan of Action for Hydrology including the Hydrological Status and Outlook System (HydroSOS) and improving hydrological forecasting to enhance Members capacity to generate such information and enable easy access to such essential water resources data and information to support informed policies and decisions based on current and future hydrological conditions.



Focus in 2024–2027:

- A. Free and unrestricted exchange of information, products and reports facilitated
- B. Members are enabled to provide enhanced hydrological services for water resources management
- C. Strengthened cooperation through interoperable service delivery, policy development and institutional advancements

Implementation of WMO Vision and Strategy for Hydrology and Associated Action Plan

The eight long-term ambitions approved by the WMO Extraordinary Congress (2021) will continue to guide the Organization’s initiatives relevant to hydrology:

- (i) No one is surprised by a flood;
- (ii) Everyone is prepared for drought;
- (iii) Hydro-climate and meteorological data support the food security agenda;
- (iv) High-quality data supports science;
- (v) Science provides a sound basis for operational hydrology;
- (vi) We have a thorough knowledge of the water resources of our world;
- (vii) Sustainable development is supported by information covering the full hydrological cycle; and
- (viii) Water quality is known.

Concerted effort will also be placed on mobilizing action on the commitments outlined in the WMO Water Declaration 2021, aimed to accelerate implementation of SDG6.

Objective 1.4 Enhance the value of and innovate in the provision of decision-supporting weather information and services

Weather-informed decision-making for all modes of transport (aviation, maritime, land), energy, agriculture, health, tourism, urban and other sectors will be raised to new levels, resulting in substantial productivity gains and positive environmental impacts. Service delivery approaches will be innovated to build Members’ capacity to provide modern, fit-for-purpose and high-quality services.



Focus in 2024–2027:

- A. Enhanced weather services and information through increased user engagement
- B. Sustained benefits building on policy and funding mechanisms
- C. Enhanced user-specific weather services building on international standards and good practice

Objective 1.5 Accelerate the development of integrated systems and services to address global risks associated with irreversible changes in the cryosphere and downstream impacts on water resources and sea level rise



The cryosphere on every continent and over oceans is being impacted rapidly by changes in climate. The changing cryosphere is affecting people globally, from polar and high mountain areas to downstream communities and all the way to coastal regions and Small Island Developing States

(SIDS). Irreversible changes in snow, glaciers, permafrost, sea ice, and ice sheets are significant challenges to the sustainability of water supply and are increasing the risk of (flash) floods and droughts; they are amplifying the effect of natural hazards such as avalanches, landslides, glacier-related floods, coastal erosion, being a critical factor in increasing climate variability and extreme events at all latitudes; they are contributing to the sea level rise and to the release of carbon in the atmosphere from permafrost melt. These impacts affect critical sectors such as food production, energy security, transportation systems, infrastructure design, ecosystems, biodiversity and human life.

To build resilient communities, globally, with access to early warning systems and informed climate change adaptation and mitigation decisions and policies, a focused approach is needed to the sustained and integrated monitoring of the cryosphere (in situ and space-based) and data sharing, coupled with advances in predictive capacity and modelling of climate scenarios that advance the understanding of how the Earth system globally is being altered by the rapid regional changes in the cryosphere.



Focus in 2024–2027:

- A. Emerging risks are identified and cross-cutting actions across the value cycle are charted
- B. Collaborative mechanisms are optimized to promote innovation, and research to service actions

C. Partnerships and collaborations with external stakeholders amplify existing capacity to deliver services



Goal 2: Enhance Earth system observations and predictions: Strengthening the technical foundation for the future

Long-term outcome: An integrated Earth system observational network, including on hydrology, ocean and cryosphere, increasingly automated and optimized to ensure effective and sustainable global coverage. High-quality fit-for-purpose traceable measurements feeding a continuous free and unrestricted global data exchange in accordance with the WMO Unified Data Policy and underpinned by data management and data processing mechanisms.



Inter-relationships across the value cycle

Through WMO Infrastructure (WIGOS, WIS, WIPPS), LTG2 provides the data products required to underpin service delivery under LTG1. Requirements for operational products are fed from LTG1 to LTG2 to ensure that both are user driven. Research and development under LTG3, through research to operations, enhances the quality and scope of data products across the value cycle. Research requirements are also a consideration in planning of LTG2 activities. Capacity development and coordination under LTG4 required for implementation of LTG2.

WMO unified data policy

The WMO Unified Policy for the International Exchange of Earth System Data

Resolution 1 (Cg-Ext(2021)), was a comprehensive update of the international agreements guiding the exchange of weather, climate and related Earth system data between the 193 Member States and Territories of WMO. It establishes the scope of WMO's policy on the international exchange of those Earth system data that are necessary for our efforts to monitor, understand and predict the weather and climate — including the hydrological cycle, the atmospheric environment and space weather. It reaffirmed the commitment of WMO Members to a free and unrestricted exchange of these data as a prerequisite for these efforts.

Full implementation of the WMO Unified Data Policy holds the promise of large benefits for all WMO stakeholders and the entire global community. Once it is fully implemented, the landmark Unified Data Policy will help all WMO Members to significantly expand and improve their monitoring and prediction capabilities, which will benefit the population of the entire globe. A key innovative feature of the policy is its focus on ensuring that developing country WMO Members will also be able to reap the full benefits of the improved model products that will result from the increased exchange of observational data.

Members agreed to maintain a two-tiered approach to the international provision and exchange of Earth system data, with core data that shall be provided on a free and unrestricted basis, and recommended data required to support Earth system monitoring and prediction activities.

Implementation of Resolution 1 is a priority for WMO, with roles for Members, WMO governing bodies, the Infrastructure Commission, and the entire WMO Community. Concrete implementation is taking place with the establishment of the Global Basic Observing Network (GBON), contributing to meeting the requirements of Global Numerical Weather Prediction and climate reanalysis, and the establishment of the SOFF to provide technical and financial support for the implementation and sustained operation of GBON in Least Developed Countries and Small Island Developing States.

Objective 2.1 Optimize the acquisition of Earth system observation data through the WMO Integrated Global Observing System (WIGOS)

All in situ and space-based observing programmes of WMO are being consolidated in a single integrated system, WIGOS, which became operational in 2020. Worldwide implementation of WMO standards, principles and tools will enable Members to optimize their observing networks. It will allow Members to leverage observing systems operated by all relevant government agencies, research entities, non-profit organizations and private companies, including also non-traditional data acquisition vehicles such as crowd sourcing and the Internet of Things.



Focus in 2024–2027:

- A. The availability and scope of observational data increased
- B. Observations across domains into WIGOS integrated
- C. Observations to support climate adaptation and mitigation coordinated
- D. New technologies brought into operations
- E. Environmentally sustainable design of WMO observing programmes ensured

Objective 2.2 Improve and increase access to, exchange and management of current and past Earth system observation data and derived products through the WMO Information System

The useful shelf life for observations accessed through the WMO Information System (WIS) is unlimited. Atmospheric composition, climate, hydrological, cryospheric, and oceanographic observations from all times will need to be continuously available and accessible for research, climate monitoring, re-analysis and other applications. Therefore, WMO will streamline and coordinate all WMO data management systems.



Focus in 2024–2027:

- A. Data discovery and accessibility improved
- B. Data exchange across the Earth system enabled
- C. Long-term stewardship of Earth system data ensured
- D. Member-focused software platforms enhanced and sustained

Objective 2.3 Enable access to and use of numerical analysis and Earth system prediction products at all temporal and spatial scales from the WMO Integrated Processing and Prediction System

Major weather patterns are routinely predicted more than a week ahead, tropical cyclone landfalls are predicted accurately several days ahead, and even small-scale severe weather with high local impact is often forecasted with enough lead-time to mitigate its impact. WMO will further promote the development of Earth system prediction, facilitate the use of a cascading seamless system of numerical models operated by centres around the world and coordinated through WMO to enhance national forecasting capabilities of all Members.

Focus in 2024–2027:

- A. The availability of model and analysis products for Members across all Earth system domains increased
- B. Interoperability and interconnectedness across the domains of the Earth system built
- C. Availability, quality, accessibility, and usage of data products to support adaptation and mitigation enhanced
- D. The implementation of new technologies, especially Artificial Intelligence (AI), encouraged
- E. Data products are fit-for-purpose and targeted at user needs



Goal 3: Advance targeted research: Leveraging leadership in science to improve understanding of the Earth system for enhanced services

Long-term outcome: Leveraged global interdisciplinary research community resulting in fundamental advances in the understanding of the Earth system, leading to improved policy-relevant information and predictive skills at all time and space scales in a seamless way. This will result in the strengthened forecast and warning performance of all Members as research, science, technology and operations coalesce to apply the best available science to all components of the service value cycle.



Inter-relationships across the value cycle

This LTG supports the global climate adaptation agenda by advancing Earth system knowledge with respect to weather, water and climate systems, prediction and projection of spatio-temporally high-resolution weather, water and climate extremes, attribution of observations, predictive warning capabilities, assessment of risk, and science-informed communication (LTG1). Increasing computational resources, data volumes and methodologies in machine learning and AI have created an imperative for WMO Members to navigate new opportunities and challenges. Thus, important research foci in support of LTG1 include advances in data assimilation, innovative computational methodologies, including machine learning and AI, component coupling approaches, and intercalibration of remote and in situ data. Critical to emerging AI opportunities and challenges in research and operations are the development of guidance and standards for data and tool sets, management of disruptions in workforce and workflow, as well as a transparent evaluation of methods and production chains. LTG3 supports the WMO Research Strategy for Operational Hydrology which envisions building capacities and capabilities of the national service providers (LTG4) in areas where additional scientific research is needed to improve the tools and approaches for advancing operational hydrology and water services. LTG3 further contributes to LTG2 through an enhanced understanding of the global carbon cycle and through advancements in technologies for GHG monitoring and budgeting to support mitigation efforts. Further elements include advances in data-modelling techniques in order to develop assimilation climatologies for source and sink estimation.

Objective 3.1 Advance scientific knowledge of the Earth system

WMO is uniquely placed to address the challenges and opportunities associated with fundamental Earth system science and will lead a global research effort that draws on the best scientific expertise within NMHSs, academia and research institutions.



Focus in 2024–2027:

- A. Overarching challenges in Earth system scientific research, modelling, prediction, analysis and observations identified
- B. Overarching challenges incorporated into science strategies and research implementation plans
- C. Innovative research methods and associated standards and principles developed and communicated to Members
- D. A new generation of leadership in science fostered

Objective 3.2 Enhance the science-for-service value cycle ensuring scientific and technological advances improve predictive capabilities and analysis

WMO demonstrates the value of enhancing operational services by translating relevant scientific advances into societal benefits. Considering the strong increase in the expectations of users and stakeholders for improved predictive capabilities and socioeconomic relevance, WMO will work towards ensuring an effective science-for-service transition by fostering collaboration and interaction between research, operations and services for society. This objective will develop and promote adherence to good practice guidance for the adoption of novel and emerging scientific methods, including AI, into operational arenas.



Focus in 2024–2027:

- A. Capabilities for Earth system prediction and projection on all time and space scales improved including, but not limited to, emerging new methods and tools, including AI
- B. Research to evaluate and support user products and services enhanced
- C. Earth system analysis and re-analysis products developed
- D. User community for co-design and development of services engaged and entrained

Objective 3.3 Advance and contribute to policy-relevant science



Over the coming years science will develop and provide tools and solutions related to the implementation of national and international policies and actions. WMO key research initiatives, working closely with partners, will advance scientific assessments and climate projections and predictions, authoritative global reports on greenhouse gases and other atmospheric constituents, and new technologies to better quantify the carbon, energy and water cycles as well as narrow associated uncertainties.



Focus in 2024–2027:

- A. The scientific basis to accelerate climate action strengthened
- B. Knowledge base for relevant environmental conventions and coalitions provided
- C. The knowledge base to advance Sendai Framework for DRR objectives enhanced



Goal 4: Close the capacity gap on weather, climate, hydrological and related environmental services: Enhancing service delivery capacity of developing countries to ensure availability of essential information and services needed by governments, economic sectors and citizens

Long-term outcome: Improved access to regional and global monitoring and prediction systems and utilization of weather, climate and water information and services bringing tangible benefits to developing Members, in particular least developed countries, SIDS and Member Island territories. This will be achieved through strategic investments, technology transfer, knowledge and experience sharing, and by taking due account of social inclusion and gender factors.



Inter-relationships across the value cycle

There is the need to ensure that capacity development in various areas is attained through promotion of existing strategies in areas of technological infrastructure, service delivery, issues relating to research, science and innovation as an essential basis for attainment of desired objectives (LTG1–3). Key matters to address include those relating to policy and legislative measures, review of existing gaps and causal effects, facilitation of twinning arrangements and other innovative bilateral cooperation, resource mobilization and promotion of partnerships, Public-Private Engagement and multilateral and bilateral collaboration with development partners (LTG5). All these will be addressed through the means of education and training, support to development of leadership, enhancement of communications, outreach promotion, as well as advocacy efforts to governments, end-users, decision makers on the socioeconomic benefits of investment in NMHSs.

Objective 4.1 Address the needs of developing countries to enable them to provide and utilize essential weather, climate, hydrological and related environmental services



The increasing vulnerability of many societies and economies to natural hazards and extreme weather events and the gaps in the capabilities of NMHSs to deliver adequate services — particularly those of developing countries, least developed countries and SIDS and Member island territories — require WMO to strengthen its capacity development efforts, building upon existing capacities in NMHSs, taking advantage of the capacity of developed country NMHSs in twinning and other arrangements, and leveraging the investments of the UN system and other development partners towards this goal.



Focus in 2024–2027:

- A. Improved understanding of the technical, institutional and human resources
- B. NMHSs with strengthened capacities to develop long-term strategies, including science and ICT
- C. Increased relevance and effectiveness of NMHSs, more specifically in LDCs and SIDS

Objective 4.2 Develop and sustain core competencies and expertise



There is a growing deficit in the capability and numbers of adequately educated and trained staff needed to provide weather, climate, hydrological and related environmental services in many countries and territories. Additionally, rapid advances in scientific innovation and technological developments and means for public communication require corresponding and continuous training of NMHS personnel. WMO will increase its training and long-term education activities to help Members to obtain and maintain the competencies needed.



Focus in 2024–2027:

- A. Strengthened qualifications and competencies of NMHSs and related institutions for effective service delivery
- B. Regional and national training institutions reinforced, including through inter- and intraregional cooperation
- C. Talent development strategies at NMHSs nourished, including young professionals and women

Objective 4.3 Scale up effective partnerships for investment in sustainable and cost-efficient infrastructure and service delivery

D. Effective resource mobilization for implementation of NMHS activities addressing most pressing needs of Members all



Enhance the full spectrum of weather, climate and hydrological services delivery to support the protection of life, property and the environment and the security of food production, energy and water resources. Scale up partnership investments to minimize cost and maximize the opportunity for the networks to be sustainable long beyond the lifetime of donor funded projects.



Focus in 2024–2027:

- A. Cross-regional and Member-to-Member partnerships and alliances strengthened, including with the private sector and academia, to share knowledge, technology and expertise
- B. Strategic, functional and mutually beneficial development partnerships and alliances with key relevant UN, intergovernmental and non-governmental organizations, development agencies, the private sector and academia
- C. Leadership in promoting the principles on which global hydrometeorology and climatology are built, emphasizing authoritative voice, common standards, data and product sharing, and educational outreach

Goal 5: Strategic realignment of WMO structure and programmes for effective policy- and decision-making and implementation

Long-term outcome: Improved relevance, effectiveness and efficiency of the constituent bodies and implementation of this Strategic Plan through closer alignment of structures and processes with the strategic goals of the Organization.



Inter-relationships across the value cycle

LTG5 cuts across all LTGs in setting up the structural and procedural arrangements that enable the Organization to work in an aligned, coordinated and inclusive manner, with optimal use of human and financial resources. It further facilitates the implementation of LTG1–4 through strategic partnerships, legislation, advocacy, and the use of socioeconomic benefit analysis. It also highlights the environmental sustainability element that is embedded across all strategic objectives.

Objective 5.1 Optimize WMO constituent body structure for more effective decision-making



Ensure the effective and efficient use of resources, including those of Members, through a more strategic focus of WMO’s action, and constituent body constructs, structures and processes adapted to implement the Strategic Plan.



Focus in 2024–2027:

- A. The full potential of WMO governance bodies achieved in terms of effectiveness, synergies and coordination

Objective 5.2 Nurture WMO strategic partnerships



Bring stakeholders together by fostering dialogue among the public and private sectors and academia as well as by facilitating cooperation among meteorological services, hydrological services, civil protection authorities and others. Reinforce the role of NMHSs through national legislation and showcasing the socioeconomic benefits of meteorological and hydrological services.



Focus in 2024–2027:

- A. WMO, the authoritative voice on weather, water, climate and related environmental issues amplified at global, regional and national levels

Objective 5.3 Advance equal, effective and inclusive participation in governance, scientific cooperation and decision-making



Organizations that respect diversity and value gender equality demonstrate better governance, improved performance and higher levels of creativity. Gender equality and the empowerment of women are further key to scientific excellence and essential to meeting the challenges of climate change, disaster risk reduction and sustainable development, particularly Sustainable Development Goal 5. Ensuring inclusive participation of all scientific disciplines in WMO constituent bodies is also key to ensuring the full scope of expertise necessary, especially in hydrology.



Focus in 2024–2027:

- A. Balanced geographical, gender and expertise representation and enhanced representation of developing Members

Objective 5.4 Environmental sustainability



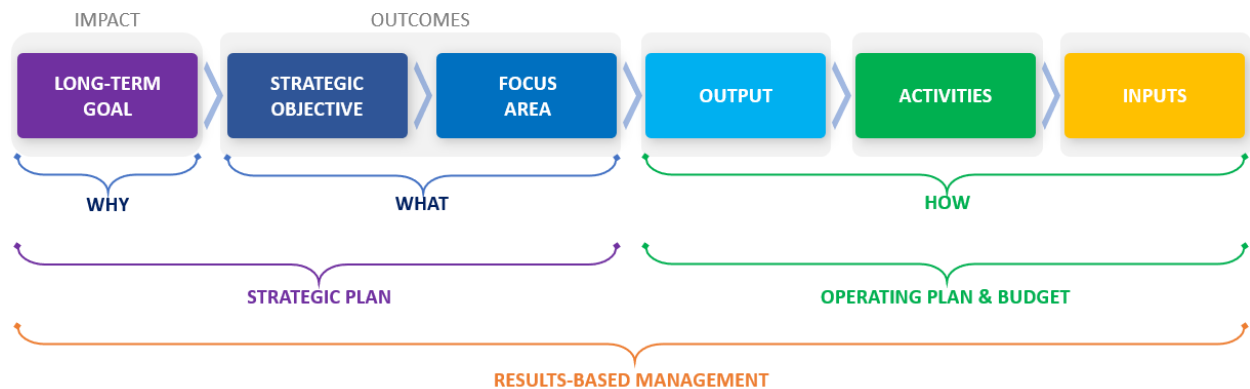
WMO reconfirms its commitment to achieving a sustainable, net zero and resilient world for all, including an environmentally sustainable approach to weather and climate. To this end, it will lead by example and develop a plan to achieve Net Zero by further reducing the carbon and environmental footprint of its operations and advancing recommendations to reduce the environmental impact of observing technologies and practices, supporting its Members to adopt cleaner and more sustainable approaches to operations. This will support Members' NMHSs in their move towards Net Zero.

Focus in 2024–2027:

Develop, publish and initiate implementation of a plan to achieve Net Zero, to include green and effective travel, green building, green IT and green supply chains.

Implementation of the Strategic Plan

This Strategic Plan will guide the decisions and activities of WMO in helping to realize its 2030 vision and will serve as the focus for the upcoming financial period 2024–2027, bringing the greatest benefits to Members, particularly those struggling most to establish effective multi-hazard early warning systems. Its implementation contributes to the UN Early Warnings for All initiative and the achievement of the Sustainable Development Goals, the Paris Agreement and the Sendai Framework for Disaster Risk Reduction.



Whereas the Strategic Plan outlines the societal needs and drivers (the “why”) as well as the specific impacts and outcomes to be achieved (the “what”), the WMO Operating Plan 2024–2027 lays out the way in which they are expected to be accomplished (the “how”). It specifies the outputs to be produced and the metrics to measure in tracking progress (Key Performance Indicators and milestones). It further forms the basis for the resource allocation, and identifies the WMO governance bodies (technical commissions, the Research Board and regional associations) which will contribute to implementation. For each Strategic Objective, risks and opportunities are identified and assessed.

This integrated approach to planning is intended to ensure that the efforts of all parts of the Organization are harnessed and channelled toward a single objective: the implementation of the WMO Strategic Plan.

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