

## World Meteorological Organization

### Input to the High-Level Political Forum on Sustainable Development 2024

#### **Background**

For more than a century, the World Meteorological Organization (WMO) has been providing 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 WMO vision is strongly aligned to the 2030 Agenda for Sustainable Development, and is stated in the [WMO Strategic Plan 2024-2027](#);

*“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.”*

The role of WMO is to support the activities of its Members in understanding the past, monitoring the present and predicting the future state and interactions of the atmosphere, hydrosphere and other vital elements of our planet, thereby enabling adequate and effective preparedness, adaptation and response to related natural hazards and disasters. Weather-, climate-, water- and related-environmental sciences and services play a crucial role in delivering substantial social, economic and environmental benefits, spanning the 17 Sustainable Development Goals (SDGs) at national, regional and global levels.

#### **WMO Responses to Questions Posed**

##### **A. Impacts of multiple crises on the implementation of SDGs 1, 2, 13, 16 and 17 from the vantage point of your intergovernmental body**

The science is clear - the planet is far off track from meeting its climate goals. Anthropogenic climate change has resulted in widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere, affecting many weather and climate extremes, with adverse impacts and related losses and damages to nature and people ([IPCC, 2023](#)). 2023 was the warmest year on record, by a huge margin ([WMO, 2024](#)), and extreme weather-, climate- and water-related events across the world had significant global impacts on human health, ecosystems, economies, energy, agriculture and water supplies. These impacts disproportionately affect the world's most vulnerable populations and threaten to reverse advances made over the past decades in socio-economic development. As a result, **SDG 13 - Climate Action** is crucial to achieve all the SDGs as noted in the recent WMO [Global Climate 2011-2020](#) report, which highlights how understanding the impacts of extreme events and climate change on sustainable development is critical not only to support adaptation efforts, but also to serve as a basis for stronger climate action to mitigate worsening events in the future.

Extreme weather has become an increasingly frequent occurrence in our warming climate. Between 1970 and 2021, there were 11 778 reported disasters attributed to weather, climate and water extremes, causing over 2 million deaths and US\$ 4.3 trillion in economic losses. Over 90% of these reported deaths and 60% of economic losses occurred in developing economies ([WMO, 2023](#)). The impacts of these extreme events intensify poverty by disrupting livelihoods, amplifying food and water scarcity, and

triggering economic instability, consequently presenting a significant challenge to achieving **SDG 1 - No Poverty**.

Additionally, these impacts are disrupting each pillar of food security (availability, access, utilization and stability), threatening rural small-scale producers, who are the backbone of global food security, and the achievement of **SDG 2 - Zero Hunger**. In particular, the agrifood value chain is highly exposed and vulnerable to extreme weather events as well as slow-onset changes, such as droughts, rising sea levels, ocean warming and ocean acidification. Additionally, heat and water stress conditions may result in food losses at the production stage for both crops and livestock, while excess rainfall may cause crop losses during the harvest and storage stages. Other hazards such as landslides caused by heavy rainfall may affect road infrastructure, hindering transportation and access to markets. As a result, food spoilage and waste may pose risks to food safety and consequently threaten food security.

The impacts of climate change and extreme weather events intersect with compounding social, economic and political pressures that increase the risk of conflict and threaten the implementation of **SDG 16 - Peace, Justice and Strong Institutions** ([ICRC, 2020](#)). For example, the impacts of climate change and extreme weather events threaten the food, water and economic security of vulnerable communities, particularly in areas already enduring protracted conflict and fragility.

**B. Three key areas where sustainable, resilient and innovative solutions for achieving the SDGs are being effectively delivered, especially related to the cluster of SDGs under review in 2024, considering the three dimensions of sustainable development and the interlinkages across the Goals and targets**

***Strengthening National Hydromet Services and Access to Best Available Climate Science Information***

Reliable, high-resolution and timely hydrometeorological information is a crucial input for decisions intended to safeguard all SDGs from climate change and extreme hydrometeorological events. National Meteorological and Hydrological Services (NMHSs) are the national authoritative sources of observed historical weather, water and climate data and are a critical resource for developing hydrometeorological (hydromet) and climate science information. The global hydromet community has a long history of strong and sustained international cooperation through the exchange of science and data and working collaboratively to deliver services that provide numerous social, economic and environmental benefits – an example of **SDG 17 - Partnerships for the Goals** in action. When NMHSs have the capacity to generate and utilize freely shared international data and climate science information, such as predictions, projections and knowledge, the hydromet services they provide have consistently been shown to provide significant return on investment, with benefit cost ratios ranging from 2:1 to 36:1 ([WMO, 2015](#)). Additionally, these services can turn commitments into actions and accelerate delivery across all the SDGs.

The recent WMO-led report, [United in Science 2023: Sustainable Development Edition](#) highlights the crucial role hydromet sciences and services play in supporting sustainable development. While not always recognized as poverty-reduction measures, hydromet services provide many essential, and often measurable, socioeconomic benefits that support implementation of **SDG 1 - No Poverty**. For example, climate projections help us understand future changes in climate to inform appropriate adaptation and development measures that improve livelihoods and reduce poverty. In the context of

**SDG 2 -Zero Hunger**, seasonal and sub-seasonal forecast services are essential for resilient agricultural planning – such as determining planting dates, crop selection and harvest times – to improve food security outcomes. Hydromet services are also crucial in the implementation of **SDG 13 - Climate Action**. For example, climate projections and information services inform appropriate and effective adaptation action and reduce the risk of maladaptation, which threatens sustainable development. Additionally, greenhouse gas monitoring, such as the [WMO Global Greenhouse Gas Watch](#), informs ambitious mitigation action and climate science, data and tools, including a guide on [Developing the Climate Science Information for Climate Action](#) developed by WMO in partnership with the Green Climate Fund (GCF) under the Global Framework for Climate Services (GFCS), provide an evidence-based approach to the mobilization of climate finance. Hydromet services also directly and indirectly support implementation of **SDG 16 - Peace, Justice and Strong Institutions**. For example, strengthening NHMHs and enhancing international cooperation and knowledge sharing directly supports Target 16.a while hydromet services indirectly reduce the risk of conflict triggered by insecurity by supporting the achievement of food, water, energy and health security ([WMO, 2023](#)).

### ***Enhancing Multi-Hazard Early Warning Systems***

The UN Secretary-General’s [Early Warnings for All](#) (EW4All) Initiative aims to ensure that everyone on Earth is protected from hazardous weather, climate and hydrological events through life-saving early warning systems by the end of 2027. With human-induced climate change leading to more extreme weather conditions, the need for multi-hazard early warning systems (MHEWS) is more crucial than ever. Advances in MHEWS have decreased mortality rates, and data show that just 24 hours’ notice of an impending hazardous event can reduce damage by 30% ([WMO, 2023](#)). Additionally, MHEWS support climate change adaptation, disaster risk reduction and sustainable development, providing cross-cutting benefits towards nearly all of the SDGs ([WMO, 2022](#)). EW4All is an example of **SDG 17 - Partnerships for the Goals** in action, requiring global collaboration and partnerships across UN entities, the scientific community, the private sector, financing institutions, governments, academia and others ([WMO, 2023](#)).

MHEWS provide tangible benefits in poverty reduction and support **SDG 1 - No Poverty** (in particular Target 1.5) by reducing the impacts of climate change on people’s livelihoods, helping them avoid damaging events and economic losses and building resilience of vulnerable populations. In the context of food security, MHEWS support **SDG 2 - Zero Hunger** (in particular, Target 2.4) by enabling anticipatory action to protect agricultural livelihoods and assets as well as identify potential areas of crop failure or livestock stress that may lead to emergencies. In Burkina Faso, for example, the WMO is [bringing early warning weather advisory services to local farmers](#) through the [Climate Risk and Early Warning Systems \(CREWS\)](#) Initiative – a joint collaborative mechanism that funds MHEWS in LDCs and SIDS and contributes to many SDGs, such as **SDGs 1 and 13**. Supported by 12 Member countries, CREWS is an example of **SDG - 17 Partnerships for the Goals** and is assisting more than 70 countries through country and regional projects that support a more coordinated approach for investing in MHEWS through the expertise and networks of its three Implementing Partners, the WMO, World Bank and the UNDRR. CREWS is also crucial in delivering the ambitions of the Early Warning for All Initiative, translating its principles into operational realities.

MHEWS are also a proven, effective and feasible climate adaptation measure that saves lives, reduces losses and damages and provides a near tenfold return on investment. As a result, MHEWS are a key tool to support implementation of **SDG 13 - Climate Action** and, in particular, Targets 13.1 and 13.3. And finally, EW4All also supports

implementation of **SDG 16 - Peace, Justice and Strong Institutions** (in particular, Target 16.a) by enhancing the effectiveness of national institutions in providing early warnings to citizens. And while the intersection between climate change and conflict is complex, MHEWS reduce the risk of conflict triggered by insecurity.

Overall, the EW4All Initiative will help accelerate progress towards achieving the SDGs. In an effort to track progress on this crucial initiative, the WMO and partner organizations developed the [EW4All Dashboard](#), containing data, sources and methodologies to support information sharing, enhanced coordination and strengthened accountability.

### ***Closing Critical Observation Data Gaps***

Observations are the basis for monitoring and prediction of weather and climate. For a forecast beyond a few days for any location on our planet, we need accurate data from across the globe to support effective decision-making. In October 2021, the World Meteorological Congress established the [Global Basic Observing Network](#) (GBON) - a new global standard for mandatory real time international data exchange of basic weather and climate observation to improve forecast products. Yet, today, LDCs, SIDS and Lower Middle-Income Countries generate and internationally exchange only seven percent of the internationally agreed and mandated GBON surface-based observation data ([SOFF, 2023](#)). Closing the observations data gap is essential not only for better weather forecasts but also for delivering enormous socio-economic benefits with a benefit-cost ratio of over 25:1.

The [Systematic Observations Financing Facility](#) (SOFF) is a specialized UN fund created by the WMO, the United Nations Development Programme (UNDP) and the United Nations Environmental Programme (UNEP) with an exclusive focus on supporting countries to achieve GBON compliance and maintaining their observations systems in the long term. With 28 peer advisors (advanced NMHSs providing technical assistance), 9 implementing entities (major multilateral development banks and UN organizations supporting project implementation) and WMO as the technical authority, SOFF is another example of **SDG 17 - Partnerships for the Goals** in action and has already supported 60 countries with readiness funding. Additionally, closing observation data gaps will enhance weather forecasting, climate prediction, and MHEWS, which will support achievement of all SDGs and, in particular, SDGs that are highly vulnerable to the impacts of extreme weather events and climate change, including, for example, **SDG 1 - No Poverty**, **SDG 2 - Zero Hunger** and **SDG 16 - Peace, Justice and Strong Institutions**. Closing observations data gaps is also crucial for **SDG 13 - Climate Action** as recognized by SOFF, the Adaptation Fund, the Climate Investment Funds, CREWS, the Global Environment Facility and the GCF, which signed a Framework for collaboration to for enhancing systematic observation and improving the use of basic weather and climate data for effective climate action at COP28 in 2023.

### **C. Three examples of specific actions, policies and measures that are most urgently needed to effectively deliver sustainable, resilient and innovative solutions to eradicate poverty and reinforce the 2030 Agenda, building on interlinkages and transformative pathways for achieving the SDGs**

#### ***Strengthen NMHS capacity and expand access to science, technology and innovation***

While progress is being made in strengthening NMHSs, challenges remain and many NMHSs in lower-income countries still lack the capacity to effectively utilize science,

technology and innovation to support the generation, use, tailoring and translation of climate science in support of climate action and sustainable development. Capacity needs include strengthening NMHS's capability to support climate-related planning, policy and project implementation, as well as improving data resources and availability relevant to climate-sensitive sectors. Actions that strengthen NMHS interoperability with WMO regional and global centres are particularly critical since the operational exchange of data and products with these centres can significantly enhance the data, information and services an NMHS can provide at the country level. Additionally, enhancing scientific capacity, especially in lower-income countries, will support innovation and improve the use of weather-, climate and water-related sciences to ensure national sustainable development policies, plans and actions are grounded in best-available science. And scaling up integrated weather-, climate- and water-related research will close existing knowledge gaps and advance emerging technologies, such as high-resolution modelling, artificial intelligence and nowcasting, that can support the SDGs when made accessible.

### ***Close the remaining observation and data gaps***

Despite important progress, global data gaps remain, particularly in the Pacific, Caribbean and Sub-Saharan Africa (WMO GBON Gap Analysis 2022). Scaling up investments in systematic observations and promoting the free and unrestricted exchange of data is crucial to enhancing our understanding of the Earth system and strengthening weather-, climate- and water-related sciences and services in support of achieving the SDGs. Additionally, fostering collaboration between NMHSs and other government agencies, including National Statistics Offices (NSOs), is a critical step toward enhancing impact data and better measuring how climate change is hindering development. The WMO [Global Climate 2011-2020](#) report found that disaster data are often reported annually and not disaggregated by event, thereby presenting a challenge in attributing impacts to a single specific event. In many cases, the diverse components of the SDGs meant that different agencies across state, national and regional levels are responsible for housing different types of impact data, therefore requiring a collaborative effort between agencies to combine the data. The report also found a need for high-quality, accessible, timely and reliable disaggregated impact data, and for strengthened international collaboration between NSOs, other government agencies and United Nations agencies. And finally, bridging gaps between hydromet and socioeconomic data, as highlighted by the WMO [Panel on Socioeconomic Benefits](#), is crucial to enhance understanding of the value of hydromet services and their contributions to climate action and the SDGs through the lens of statistics, analytics and advocacy.

### ***Unite diverse stakeholders and enhance participatory user-driven approaches to boost the impact of science***

Mobilizing multidisciplinary collaboration with diverse stakeholders – including scientists, the private sector, civil society, youth, local communities, governments and others – is essential to improve the effectiveness of weather-, climate- and water-related science and services across society and accelerate progress towards achieving the SDGs. Coordinating authoritative information from the global climate science information community and providing guidance on its use is vital to bridge the gap between climate information providers and those who need to use it, particularly in support of sustainable development. Additionally, enhancing participatory, inclusive and user-driven approaches, such as citizen science and co-production of climate science information and services, supports integration and legitimization of local, contextual and Indigenous knowledge. As a result, local communities are able to contribute meaningful perspectives and solutions to enhance on-the-ground impact for the SDGs.



**D. Recommendations and key messages for inclusion into the ministerial declaration of the 2024 HLPF**

**Recognize and empower NMHS knowledge, competencies and expertise as agents of change** in leading, supporting and contributing to national and international climate and sustainable development priorities, policies, strategies and investments.

**Enhance the climate science information and knowledge basis, including scientific and local knowledge across scales**, to develop inclusive, objective, transparent and situationally relevant knowledge in support of transformational action to achieve the SDGs.

**Establish or enhance existing vehicles for scientific coordination and multi-stakeholder partnerships** to synthesize best available climate science information across scales and implement crucial initiatives such as Early Warning for All, SOFF, CREWS and the GFCS, for example, that support implementation of the SDGs.