

WMO Submission to the UNFCCC Adaptation Activities
February 2021

This submission concerns the call for reporting on “Methodologies for Adaptation Needs and Assessment”, para. 19, Decision 11/CMA.1, which invites the World Meteorological Organization, through its Global Framework for Climate Services, with a view to facilitating the development and application of methodologies for assessing adaptation needs, to regularly inform the Subsidiary Body for Scientific and Technological Advice about its activities aimed at improving the availability and accessibility of comprehensive climate information, including observational data, and about how it facilitates the provision and dissemination of the most up-to-date climate model predictions and projections.

1- Capacity development for the competency of technical human resources

1.1 In December 2020, the Korea Meteorological Administration (KMA) and the World Meteorological Organization (WMO) signed an Agreement to commit funds with the objective to develop capacities for climate services provision, particularly in the developing and least developed countries. The training package on “Strengthening the Delivery of Global and Regional Climate Services” will enable current and potential climate service providers such as National Meteorological and Hydrological Services (NMHSs), to improve the efficiency of their climate services delivery, specifically in the area of adaptation. This will enhance their response to the increasing demand for actionable climate information and tools in face of an increased frequency and severity of climate impacts through integrated data management system to policy development and implementation at the national, regional and global levels.

The WMO-KMA training package’s development and delivery will build on existing WMO learning material developed, such as:

- (ii) [Integrating Climate Risks Information into NAPs](#) – online course available in English, French and Spanish (WMO-GFCS, 2019). This course will be customized to include online expert facilitation.
- (iii) [Climpact](#) (WMO, 2020) – a tool to characterize the climate variability and trends from historical data (observations, models and reanalysis) and future projections.

A dedicated online module on Climpact will be complemented by two interactive webinars, covering the topic of Integrating Climate Risks Information for Climate Services Delivery, and face-to-face/virtual regional workshops, accompanied by region specific toolkits relevant to Regional Associations I (Africa) and II (Asia) and featuring context-specific climate indicators.

The training package is planned to be delivered by the second half of 2021.

1.2 The first WMO Online Training Workshop on Quality Management Systems for Climate Services, which is planned for the Hydrometeorological Service of the Republic of Azerbaijan, rolled out on 8 February 2021. The Bureau of Meteorology of Australia (BoM) and Turkish State Meteorological Service are major co-sponsors of this event which have provided instructors.

WMO Member states frequently emphasize capacity development as a pivotal requirement for enhancing the competency of the staff in providing standardized weather and climate data and information products needed in their countries. This particular workshop is especially useful in that regard because it focuses on quality management across the full value chain of climate services delivery.

Quality management is a fundamental process that ensures that hydrometeorological services of all kinds meet the highest international standards. WMO is increasingly seen as the authoritative voice on climate, including by the United Nations Framework Convention on Climate Change (UNFCCC) Conference of Parties and the Green Climate Fund and other climate finance sources. Quality management procedures, and certification, will position NMHSs to be understood as authoritative sources of climate information and services in their own countries.

The workshop will position the participating National Meteorological and Hydrological Services (NMHSs) to seek certification in climate services delivery by and enhanced engagement with the user community. It will further facilitate the establishment of a National Framework for Climate Services (NFCS) in countries and enhance the provision of information to decision-makers across a wide range of climate-sensitive sectors.

2- Climate science support (best available science and methodologies)

Noting that the Paris Agreement calls for “Strengthening scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems, in a manner that informs climate services and supports decision-making (Article 7, paragraph 7 (c))”, in October 2018 the World Meteorological Organization (WMO) and the Green Climate Fund (GCF) initiated cooperation on methods and tools for enhancing the climate science basis of GCF funded activities. A technical guidance document describing a scientific methodology, data, tools and associated technical resources for developing the climate science basis for GCF funded projects, activities and National Adaptation Plans (NAPs) is currently being finalized.

The technical guide includes two annexes: a) Annex I provides a resource for accessing data, methods, and tools, structured in line with the scientific framework of the methodology. It also provides steps and criteria for assessing data requirements and data adequacy; b) Annex II provides examples of how the methodology described in the guide has been implemented in four countries to develop a climate science basis for a range of climate actions across a wide variety of sectors and geographies. The methodology is underpinned by a web-based [Climate Information Platform \(CIP\)](#) developed by the Swedish Meteorological and Hydrological Institute (SMHI) and WCRP, which assembles and provides access to the most reliable hydro-climatic data and technical resources for climate science inputs relevant for GCF submissions, including NAP Readiness proposals.

The guide, methodology and related resources are expected to be released in the course of 2021.

3- Institutional support to the design and implementation of National Adaptation Plans (NAPs)

WMO is active member of the NAP Global Support Program (NAP-GSP) that assist LDCs and non-LDCs developing countries to design and implement NAPs. In September 2020, WMO was approached by the NAP-GSP as to backstop the development of Initial NAPs in six LDCs in Africa (Burundi, Central African Republic, Democratic Republic of Congo, Chad, Sierra Leone, South Sudan). The request for support aimed at facilitating the integration of climate science into the NAPs and an analysis of capacity gaps and needs in respect to national climate and hydro-met services for adaptation planning and decision-making.

Six country factsheets of 10 pages each with information relevant for each specific country on the issue of capacity needs and gaps on climate services were produced. Technical specialists affiliated with WMO technical expert commissions provided technical scientific support to develop Climpack indexes. These kinds of indexes are highly required for the formulation of adaptation project proposals because they show the temperature or precipitation anomalies which help to establish thresholds and probabilities of occurrence for specific climate-related hazards on specific sectors (agriculture, health, water, etc.). The material produced under the WMO support includes tailored technical and scientific inputs on the sections related to capacity needs and gaps for Meteorological services as well as a basic climate science basis. In particular:

- (i) Technical inputs related to specific references that were important to include;
- (ii) Climographs and historical climate profiles;
- (iii) Plots and narratives for temperature changes;
- (iv) Projections obtained from bias corrected CORDEX Africa ensemble median for temperature;
- (v) Climpack indices plots;
- (vi) Maps for precipitation projections;
- (vii) Analysis and interpretation of country capacity checklist derived from WMO Country Profile Database (September 2019).

When data at the local level were not available, indexes were generated using alternative data sources (CRU or KNMI). For the projections, the [Climate Information Platform](#) (CIP) was deployed. The material produced was delivered to the NAP-GSP experts that are directly supporting the six countries.

4- Observational Data

The value of basic observation systems cannot be over-emphasized - terrestrial and radiosonde observations (e.g. those supported by WMO Integrated Global Observing System, WIGOS, and the Global Basic Observing Network, GBON) are an important part of the Global Climate Observing System (GCOS) Implementation Plan. Putting the data into international systems leads to increased accuracy of weather and climate models which, in turn, leads to improved forecasting and climate services.

Systematic observation of the Earth's climate is a global common good that supports the implementation of the Paris Agreement, in the context of sustainable development and

efforts to eradicate poverty. Many observations, made at high spatial and temporal density, support local forecasting and warning applications. They support numerical weather prediction (NWP), in turn supporting early warning systems and climate modelling and predictions. Global systematic upper air observations and other ground-based measurements are needed, especially for any forecast of more than a day or two.

The Joint GCOS-WIGOS Workshop for the Pacific Small Island Developing States (2017) noted that, due to the unique geography of the region – vast swathes of ocean surface with relatively little land mass distributed over some 20 small island states with modest-size populations and correspondingly modest GDPs – the maintenance and operation of systematic observation networks can be too expensive for countries in this region. WMO has developed the regulatory material of the GBON and is working on the development of its associated financing mechanism, the Systematic Observations Financing Facility (SOFF), to provide this support. However, the SOFF will not, at least in the short term, support other observations needed for climate.

GCOS has identified a set of 54 Essential Climate Variables (ECVs) that are needed globally: local issues may need other observations as well. GCOS is currently preparing a Status Report on the state of the global climate observing system for publication in 2021, to be followed by a revised Implementation Plan in 2022.

Other issues restricting the sustainability of long-term observation systems were also identified in subsequent workshops in East Africa and the Caribbean. These include lack of training, poor staff retention, lack of institutional capacity, little or no long-term planning, and absence of any assured sustainable resources to maintain observational systems.

Sustainability of observations, following the GCOS monitoring principles, is required to support climate monitoring and climate-change decision making. The most important need is to support unbroken long-term data acquisition not new systems. Maintaining, strengthening, upgrading, and improving existing systems is needed (e.g. supplying spare parts): Mostly issues that are relatively low cost.

As there are many users of climate data providing a range of climate services, all observation data should be freely and openly shared for countries to receive the maximum benefit. This includes current observations, historic archives and rescued data.

5 - Climate Model Predictions and Projections

5.1 In July 2020 WMO released its Global Annual to Decadal Climate Update (GADCU) for 2020-2023. The GADCU, led by the United Kingdom's Met Office, originally developed through WCRP, provides a climate outlook for the next five years, updated annually. It harnesses the expertise of internationally acclaimed climate scientists and the best computer models from leading climate centres around the world to produce actionable information for decision-makers. According to this most recent release, the annual mean global temperature is likely to be at least 1° Celsius above pre-industrial levels (1850-1900) in each of the five years from 2020-2024 and there is a 20% chance that it will exceed 1.5°C in at least one year. An update will be released later in 2021.

5.2 In September 2020 the WMO Executive Council adopted Decision 9 (EC-72) on operationalization of objective seasonal forecasts and tailored products on sub-regional scales. The Decision puts into practice WMO Guidance on Operational Practices for

Objective Seasonal Forecasting (WMO-No. 1246), also published in 2020. The Decision will foster a transition from the currently subjective and consensus-based seasonal outlook generation practices of Regional Climate Outlook Forums (RCOFs) into traceable, reproducible and verifiable objective seasonal predictions, based on multi-model ensembles from dynamical climate models. Implementation of the Decision will enhance country-level capacity for addressing national and sub-regional priority adaptation needs identified in Parties' NDCs and NAPs, by promoting the operational delivery of an increasingly diverse array of tailored products designed to inform decision-making in climate sensitive sectors.

5.3 CMIP, a flagship project of the World Climate Research Programme (WCRP) is now well into its 6th phase with more than 300 separate experiments, and 20 Pb of curated data already distributed through the Earth System Grid Federation (ESFG), including climate scenario simulations covering a range of representative concentration pathways. A WMO resolution has recognized the critical role CMIP plays on the international climate agenda and the need to institutionalize key elements of its value chain to meet the growing expectation of the policy and service stakeholders. In this context, a dedicated CMIP International Project Office is also being established to strengthen the support to the community. A community consultation will be initiated soon to take stock of CMIP6 lessons learned and to identify emerging needs and priorities so as to develop plans for CMIP7.

5.4 CORDEX is gearing up its CMIP6 regional downscaling effort to tailor climate information at higher resolution with an updated experimental protocol. A Climate Information data access platform (<https://climateinformation.org/>), supported by the Green Climate Fund (GCF) and implemented by SMHI in collaboration with WCRP, has been developed to provide the scientific basis for adaptation and mitigation efforts, leveraging both CMIP and CORDEX products. Many of the WCRP CMIP and CORDEX products are also being gradually ingested and served through the Copernicus Climate Change Service (C3S) Data Store.

6- Publications

6.1 In October 2020, WMO and 17 partners organizations released the [2020 State of Climate Services Report](#). The WMO report highlights progress made in Early Warning Systems (EWS) implementation globally and identifies where and how governments can invest in effective EWS to strengthen countries' resilience to multiple weather, climate and water-related hazards. The report provides an analysis of top climate change adaptation priorities expressed by least developed countries (LDCs) and small island developing states (SIDSs) in their Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs) submitted to UNFCCC. The report shows, for example, that most countries, including 88% of LDCs and SIDSs, have identified disaster risk reduction (DRR) and EWS as a climate change adaptation "top priority" in their NDCs and NAPs. The report also highlights the critical role of NMHSs for achieving effective adaptation considering that the vast majority of disasters are triggered by hydro-meteorological hazards, for which weather, climate and hydrological services are provided by NMHSs and their partners.

6.2 On 26 October, WMO released a State of the Climate in Africa 2019 report, a multi-agency publication at a ministerial launch event. The report, a joint collaboration coordinated by WMO, provides a snapshot of current and future climate trends and associated impacts in key sensitive sectors like agriculture. It highlights lessons for

adaptation action in Africa and identifies pathways for addressing critical gaps and challenges.

6.3 In 2020, WMO initiated the revision and update of the supplement to the NAP Technical Guidelines developed by WMO-GCFS in 2016 “Climate Services for Supporting Climate Change Adaptation”. The focus of the revised supplement is on the role of science in support to NAPs, building on the experience and lessons learnt developed under the GCF-WMO led project Enhancing the Climate Science Basis of GCF-funded activities, NAPs and NDCs. The supplement is planned to be released in the course of 2021.
