WORLD METEOROLOGICAL ORGANIZATION

GFCS GLOBAL FRAMEWORK FOR CLIMATE SERVICES

CONCEPT NOTE

FAST-TRACKING CLIMATE SERVICES DEVELOPMENT AT THE NATIONAL LEVEL FOR CLIMATE CHANGE ADAPTATION AND RISK MANAGEMENT

RATIONALE

Recent decades have witnessed widespread impacts of climate variability and change on natural and human systems (IPCC, 2014). Climate services can play a crucial role in supporting decision-making in climate sensitive sectors, for example, allowing disaster risk managers to prepare more effectively for droughts and floods; empowering farmers to select the appropriate cultivars and marketing strategies based on seasonal climate forecasts; assisting public health services to target vaccine and other prevention campaigns to limit climate-related disease outbreaks such as malaria and meningitis; and helping improve the management of water resources and energy.

Today, climate services availability and application are weakest in the places that need them most – climate-vulnerable developing countries. About 70 countries around the world do not yet have the necessary basic capabilities to provide sustainable access to climate information and services. Data records, which in some cases are inadequate or non-existent, and lack of human and technical capacities, are among the underlining factors limiting the capacity of those 70 countries in developing and delivering tailored climate services for policy and decision-making, as highlighted by a survey conducted by WMO in 2010 and by the projects and activities being implemented through the GFCS.

Regional Climate Centers (RCCs), that have been set-up by WMO as centers of excellence to support regional and national activities and thereby strengthen capacity of WMO Members in a given region to deliver the best climate services to national users, are not yet up-to-speed to provide such support in every region, and particularly in those regions where support is most needed. Although progress has been made through the Regional Climate Outlook Forums (RCOFs), started by WMO in the late 1990s that have allowed provision of information that to some extent has contributed to contingency planning in disaster risk reduction and agriculture, recognized weaknesses of the RCOF process relate to: lack of detail at the impact level (e.g., river catchments, administrative units, etc.) not inspiring users to take decisions based on the information; and sub-optimal availability and utilization of global and regional-scale data and products such as those from WMO Global Producing Centres of Long Range Forecasts (GPCLRFs) and RCCs that has limited growth of capacities to process data by NMHSs and the ability to include the data objectively in the generation of tailored climate products and services.

This concept note proposes an approach to fast-track the development and enhancement of climate services capabilities in countries where such capacities are currently lacking, as a basis for the development of a *proof of concept* for the expansion of climate services worldwide. The approach

hinges on maximizing the potential of existing knowledge and infrastructure among NMHSs by tapping into the capacities of advanced NMHSs willing to provide a suite of data, products and the needed technical support services to enable their effective application by less capable NMHSs. The approach will use twining arrangements, peer-to-peer support among NMHSs and provision of surrogate products and services as innovative means for building and strengthening capacities, while at the same time ensuring sustainability by laying the ground work for long-term capacity development needed to generate such services locally through the formulation and support for implementation of long-term NMHSs development plans (5 to 10 years). This approach could lead to immediate and tangible benefits over a relatively short period of time (1 to 5 years) with relatively modest financial requirements.

OBJECTIVES

1. To provide a conduit for technology transfer to ensure that less capable NMHSs have access to the most up-to-date, reliable and consistent climate data, information and products that they can use to meet at least the basic needs of climate sensitive sectors (with focus on agriculture and food security, disaster risk reduction, energy, health and water), as well as access to the latest methodologies, techniques and tools;

2. To provide capacity development for national applications of data and products through twining arrangements (North-South and South-South), enabling placement of experts/mentor-scientists in less capable NMHSs, visiting expert exchange for training and research, and on-the-job training. Once the twining period is over, remote technical support would be continued.

PROPOSED INTERVENTION AND OUTPUTS

Objective 1: To maximize the potential of existing knowledge, capabilities and infrastructure available in some countries, activities under this objective would focus on leveraging the capacities of a number of advanced NMHSs and other international institutions (including some GPCLRFs and RCCs) able to generate high resolution historical climate datasets, climate monitoring products, sub-seasonal to seasonal forecasts, climate watches for early warning of extremes, interannual and decadal predictions (where feasible) and climate change projections, to generate a set of data and products to be utilized by the less capable NMHSs to deliver at least basic operational products and services (as identified by the erstwhile Commission of Climatology Expert Team on Climate Services Information System (ET-CSIS)) to meet end user needs identified through extensive consultations in the process of development of the implementation plan of the GFCS and activities being carried out through the GFCS (Table). This would require missions to countries to assess NMHSs capacities (institutional, infrastructural, human resource and procedural); data and product's needs, as well as capacity development needs that would inform identification of the nature of twining and the partner(s) to deliver the products and support needed. Outputs would include:

- Output1: Easy online access to pre-processed high resolution, real time operational climate monitoring/ forecast/projection data and products;

- Output 2: Data services for gathering, assembling, digitizing and managing the data necessary for climate services delivery (climate database management systems, data rescue, data mining);

- Output 3: Monitoring services (historical reference climatologies, real-time monitoring products and climate diagnostics, climate watch advisories, thresholds, indices, extremes);

- Output 4: Sub-seasonal to seasonal, interannual, decadal predictions at the impact level (where skill permits) and climate change projections;

- Output 5: Tailored products and services for sectors utilizing the new data streams;

- Output 6: Dedicated web-based platform for the transfer of data and products to less capable NMHSs with limited internet bandwidth (including creation of intranet data portals within the beneficiary NMHS).

Objective 2: Capacity development interventions will be based on twining that has been recognized as an effective mechanism to mentor, enhance expertise and overcomes operational bottlenecks. The nature of the twining activities will depend on the NMHSs capacities, which would need to be assessed as part of Objective 1 to enable the identification of the twining partner to provide the needed support to the NMHS. Outputs would include:

- Output 1: Operational mechanism for downloading, downscaling, tailoring, interpreting and communicating information and services to stakeholders including through regular conduct of National Climate Outlook Forums (NCOFs) and National Climate Forums (NCFs);
- Output 2: Tools for expert handling of data and products available through the new data streams and effective contribution of the beneficiary NMHS to the respective RCOF process;
- Output 3: Placement of experts to facilitate on-the-job training on application, interpretation and calibration of model outputs (bias correction of the downloaded data and products), tailoring of products to address user needs, evaluation and provision of feedback to the provider NMHSs on the forecast products made available to enable further refinement of the data and products;
- Output 4: Exchange visits of experts from less capable NMHSs to advanced NMHSs including GPCs and RCCs;
- Support for the formulation of Long-term development plans (5-10 years).

BENEFITS

WMO Members will be able to access data and products they can effectively use, based on improved capability for model output interpretation and use of tools, techniques and methodologies to generate climate products and services that will support climate risk management in climate sensitive sectors and adaptation to climate change.

IMPLEMENTATION

NMHSs would be invited to make proposals that would facilitate fast-tracking climate services development and applications in Least Developed Countries (LDCs) and Small Island Developing States (SIDS) using the approach outlined in this concept note. Successful NMHSs or consortia of NMHSs would propose a detailed workplan for implementation with deliverables based on specific ToR contained in the invitation for proposals.

RESOURCES REQUIREMENTS

The resources requirements identified here are based on an estimation of support to an average of 10 countries per year for a period of 5 years. This would include initial investments of USD $3000 000 to set up the operational mechanism for gathering, processing the data to generate products and services and the platform for the transfer of the data to NMHSs with limited internet bandwidth. Additional resources in the order of USD $1500 000 per year would be needed to ensure a systematic capacity development exercise over a period of 5 years.

BASIC NEEDS FOR WEATHER AND CLIMATE DATA AND SERVICES ACROSS THE PRIORITY AREAS OF THE GFCS

- Historical and real time datasets of in situ, satellite-based and modeled parameters (rainfall, temperature, humidity, atmospheric pressure, wind speed, etc.)
- Evapotranspiration
- NDVI
- Air quality information
- Forecasts of rainfall, temperature and their extremes from the next minute to decades
- Climate change projections
- Early warning of weather and climate extremes with different lead times (e.g., heat waves, dust storms, etc.)
- Forecasts of seasonal climate variables targeted to particular risks (e.g., dry spells, start and end of the rainy season, etc.)
- Historical variability of climate variables
- Agro-meteorological advisories, crop calendars, crop yield forecasts/outlooks
- Early warning bulletins for pests and diseases
- Health advisories
- Hydrological/hydrometeorological monitoring
- Flood forecast
- Seasonal stream flow predictions
- Hydrological impact modeling
- Scenario-based impact modeling
- Site specific forecasts and predictions (e.g., catchment areas)
- Monitoring and early warning information
- Risk information (e.g., flood risk maps, drought risk maps, etc.)
- Historical disaster-related data, including loss and damage
- Tailored data-sets to specific energy sectors applications (e.g. heating and cooling degree days, wind gusts, water temperature and river flows)
- Uncertainty estimates of resource and risk estimations for energy and water
- Development of tailored climate values for energy systems codes, standards, best practices and guidelines
- Statistical properties, including extreme event probabilities of resource and its risks
- Guidance on climate change trends and projections for future energy yield and risks
- Predictions of energy demand with meteorology/climate as a driver/predictor at various time scales from minutes to years to decades
- Analysis and forecasts of probabilities of extreme events from short-range to sub-seasonal to decadal range (e.g. to plan energy infrastructure to meet future trends in demand)
- Assessment of historical performance of short-term to seasonal forecasts
- Probabilistic post-processing of forecasts
- Decision-support climatic scenarios data for use in the energy sector
- Multi-year prospective climatologies for the energy sector
- Seasonal forecasting for hydropower production
- Seasonal forecasting for energy demand
- Observations and reanalysis data for energy

For more information, please contact:

Global Framework for Climate Services Office

7 bis, avenue de la Paix | P.O. Box 2300 | CH-1211 Geneva 2 | Switzerland

Johannes Cullmann at jcullmanm@wmo.int and/or Filipe Lúcio at flucio@wmo.int | **www.gfcs-climate.org**

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