Seasonal forecasts: needs and opportunities for international coordination

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From the beginning, I would like to underscore that this presentation will be applications-oriented rather than a more traditional scientific paper.

Scientific progress over the last decades has brought along a major promise of societal benefits, through the use and application of seasonal forecasting information. In particular, ensemble-based probabilistic seasonal forecasts are increasingly being used to support climate risk management.

About a third of the world population lives today in countries strongly influenced by climate variability. Many of them are developing countries with economies fundamentally dependent for subsistence on their agricultural and/or fishery sectors; however, the advantages offered by climate predictions may not always be fully realized, in part because of insufficient interaction between research and applications scientists and decision-makers.

These issues go beyond forecasting quality and product availability. Many of these countries may be Least-Developed Countries (LDCs) or Small-Island Developing States (SIDS) currently unable to benefit from scientific advances, for which they often lack the minimal infrastructure and human resources. The Global Framework for Climate Services (GFCS), which is being developed by WMO and its partners, holds the promise to considerably assist them in taking stock of the new possibilities.

Humanity has long recognized the implications of climate variability in terms of droughts, floods, heat and cold or wind, and developed coping strategies to manage the consequences of climate variability and to facilitate survival, although not all societies were equally successful at overcoming the challenges, and several even collapsed as a result.

Early coping strategies included migration, appropriation and storage. A number of societies also developed empirical knowledge to try to foresee or even to control adverse weather and climate elements, in particular to secure their water and food supplies.

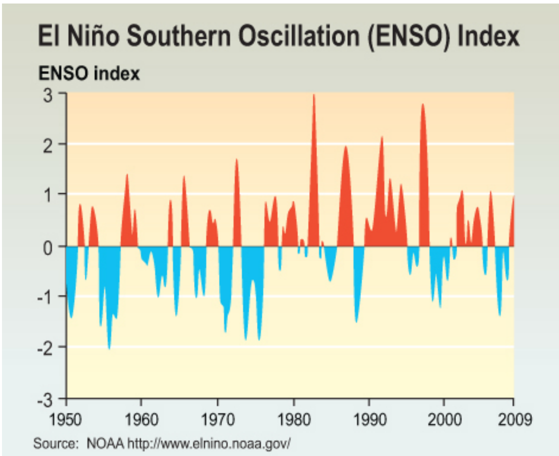
In the developed world, technological advances, including new crop cultivars, integrated water management, improved drugs and disease control methods, provide advantages in climate risk management, although not to the extent of offering full protection.

In many developing countries, however, climate variability is still a significant threat to life and can often pose insurmountable challenges in regard to economic development, since individual climate extremes may result in economic consequences of a magnitude comparable to the respective Gross Domestic Products (GDP), with years of re-development often necessary after major impacts.

Some of the technological advances that contributed significantly to weather and climate resilience in recent times are telecommunications, satellites and computers. WMO's Members have been at the leading edge of exploiting them from the early 1960s through the World Weather Watch, in parallel with the development of enhanced applications.

Technology has become a vital instrument in climate risk management and it will be even more so in the light of mounting anthropogenic climate change. Climate change is indeed a fundamental issue of our era, although the most immediate requirement for many countries may still be to manage the climate variability-related risks challenging their sustainable development.

In such a context, El Niño forecasting has been a prime example of the possibilities offered by seasonal climate forecasting. The story is well known of how anchovy fishermen around the Gulf of Guayaquil noticed that, every few years, fish seemed to disappear for months, with deleterious impacts on their food security. At about the same time, heavy rainfall would contribute to flooding of crops and settlements.



For decades, El Niño was little more than a scientific issue, even after in the early years of the 20th Century, Gilbert Walker uncovered the Southern Oscillation. It was an even larger step for science to recognize that the El Niño event not only affected Ecuadorian and Peruvian anchovy-fishing communities, but was also part of a much larger climate anomaly, occasionally impacting communities in remote regions, and that it was closely related to the Southern Oscillation. All of this led to major progress in our capacity to predict El Niño/La Niña several months to seasons in advance.

However, there are outstanding information gaps in parts of the developing world, so there is a pressing need to continue investing in in-situ observing systems. Climate change further complicates the picture, for the past is no longer a trustworthy indicator of the future, which furthermore also will depend on the ultimate predominance of alternative socioeconomic scenarios.

New paradigms are urgently required in climate variability and change risk reduction and adaptation for decision-making. Allow me to mention some of the most immediate potential beneficiaries of a global framework that would facilitate climate information and services for this purpose:

- Agriculture and food security;
- Disaster risk reduction;
- Energy production, transport and use;
- Finance and insurance;
- Health;
- Water quality and water resources management;
- Trade and commerce;
- Transport;
- Tourism;
- Urban development/management;
- Recreation and sports; ...and many more.

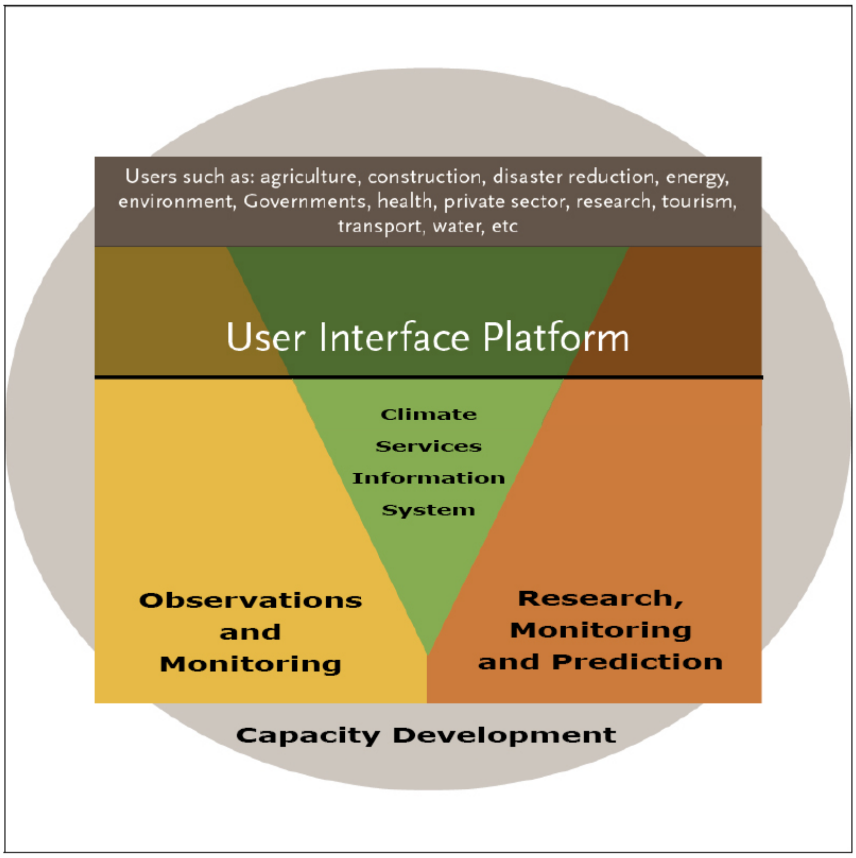
In 2009 WMO organized with partners the third World Climate Conference (WCC-3), in the same spirit of open cooperation as the previous two Conferences which WMO had convened in 1979 and 1990. WCC-3 unanimously agreed on the need for a Global Framework for Climate Services (GFCS), launching a process which included establishing a High-level Taskforce of independent experts mandated to prepare a report for the XVIth WMO Congress (May/June 2011).

The XVIth WMO Congress adopted Taskforce proposals and made a number of key decisions. In particular, it decided to establish a GFCS office in the WMO Secretariat and agreed on a number of GFCS guiding principles and 4 initial GFCS priority sectors: disaster risk reduction; water; food security and health.

Furthermore, the XVI Congress agreed to convene an unprecedented extraordinary session of WMO Congress in October 2012, to review and to adopt a GFCS implementation plan as well as GFCS terms of reference and rules of procedure.

- The GFCS model consists of 5 fundamental pillars:
- Observations and Monitoring;
- Research, Modeling and Prediction;
- Climate Services Information System;
- Capacity Development;
- User Interface Platform.

The first 4 are pre-existing elements which will be reinforced or reoriented as appropriate, while the 5th pillar is a new concept. The entire framework will rest upon a capacity development substrate, as a necessary prerequisite for the successful implementation of the other 4 components.



The **Observations and Monitoring** pillar will coordinate the acquisition of all climate observations required to meet users' needs. We can anticipate at least 3 challenges:

1. As already mentioned, information gaps in some parts of the developing world, demand investments in traditional observing systems;

2. The Global Climate Observing System (GCOS) will be a key GFCS element, but the Framework must also encompass non-physical data sources (such as demographic, socio-economic, health...);

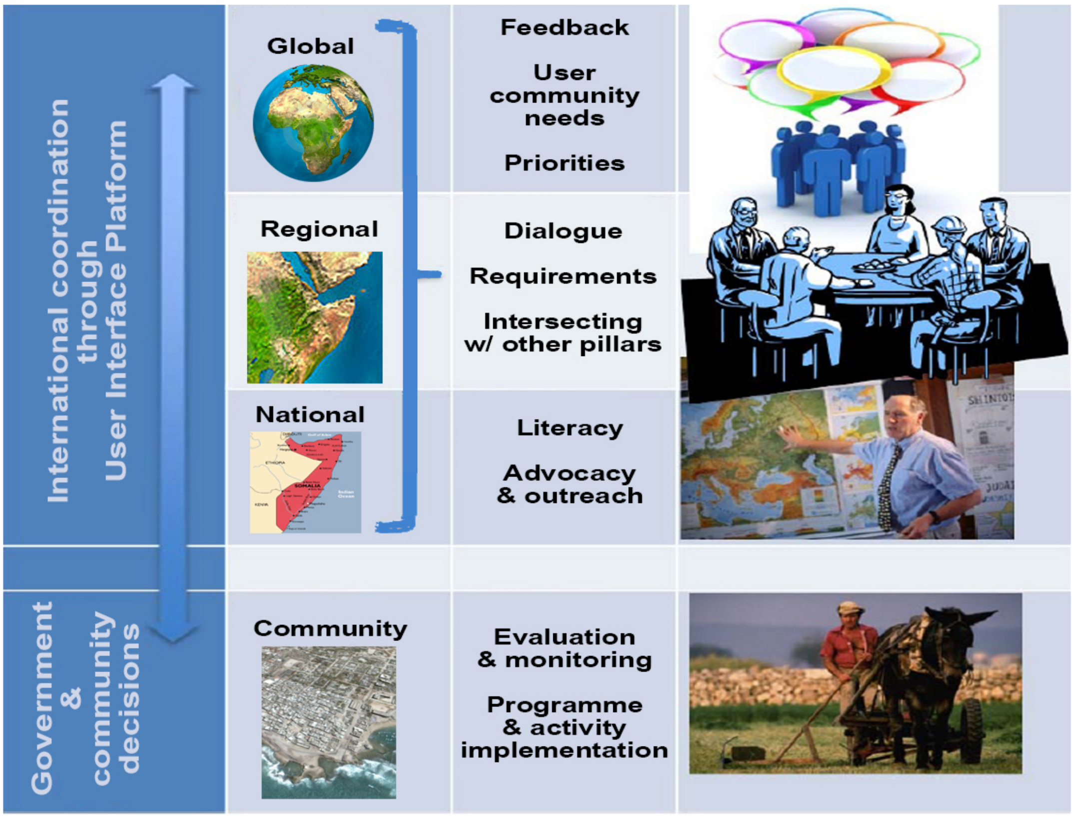
3. All essential information should be shared widely, in the traditional spirit of WMO, while complying with national and international policies.

The **Research, Modeling and Prediction** GFCS pillar will foster research oriented towards continually improving the scientific quality of climate information; providing an evidence-base on climate change and variability impacts; and promoting GFCS cost-effectiveness. It shall also support development of tools and methods to facilitate the transition from research to operational climate services and climate information for practical applications.

Several research strategies and programmes are already well-established and in operation, such as the World Climate Research Programme (WCRP), but as with observations, GFCS research will need to have a wider scope.

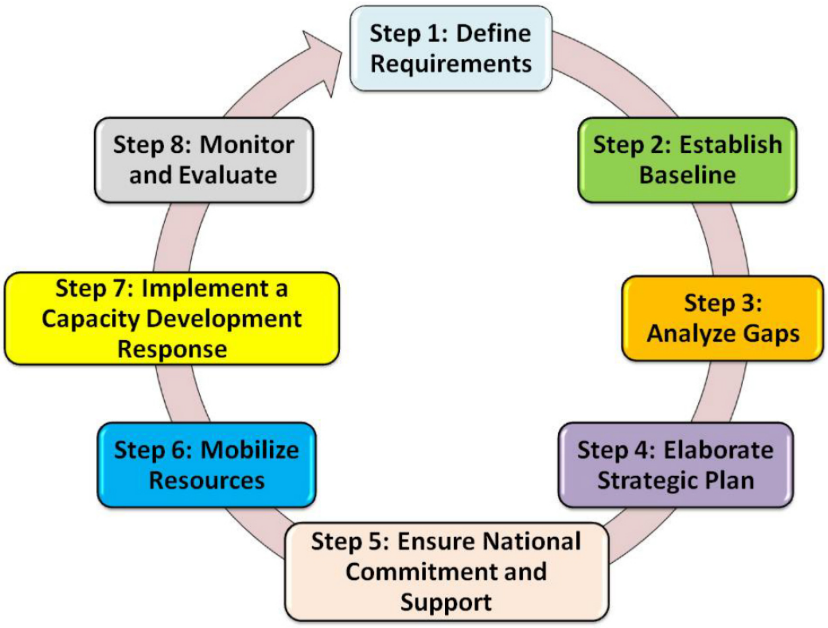
An additional challenge will be for deciders to manage the inherent limitations associated with uncertainties (physical and socio-economic), in particular since the space-time scales of weather and climate are often different from those of decision-making.

The information flow between providers and users will take place directly as well as through new mechanisms, to be identified and developed in the context of the GFCS **User Interface Platform** pillar (see next diagram).

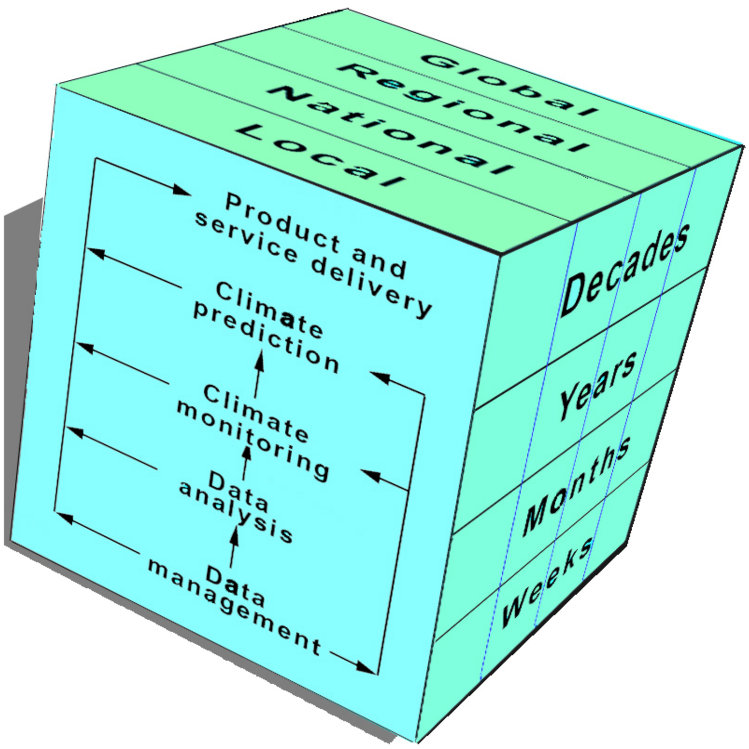


Capacity Development will be essential for the developing world to derive maximum benefits from the GFCS.

The capacity development cycle (see next diagram) will contribute to strengthen present capabilities and to develop newer ones in the areas of governance, decision-making, management, human resources development, leadership, partnership generation, scientific communication, services delivery, resources mobilization and infrastructure, which are also required to empower countries to manage climate risks more effectively.



The Climate Services Information System will be the principal mechanism through which information about past, present and future climate shall be routinely collected, stored and processed to generate products and services in support of informed decision-making across a wide range of climate sensitive activities. In brief, this GFCS Component includes the concept of a 3-way seamless structure (see next diagram) to manage and analyze climate data, to monitor and predict climate, and to deliver climate products and services at all temporal and spatial scales.



These are some of the conduits through which research outputs and technological developments shall make the transition towards enhanced operational climate information. The GFCS will comprise a physical infrastructure of institutions, computer capabilities, tools and operational practices which, together with the appropriate human resources, will contribute to develop, generate and distribute a wide range of climate information products and services at the global, regional, national and local scales.

Regional Climate Centres (RCCs) are centres of excellence assisting WMO Members to deliver better climate services and products in a given region, including regional long-range forecasts, as well as to strengthen their capabilities to meet their national climate information needs. RCCs are mandated to deliver climate services through the **National Meteorological and Hydrological Services (NMHSs)**, which are also the primary RCC users. RCC responsibilities are essentially regional, not duplicating nor replacing those of NMHSs, which retain their fundamental mandates and authority to liaise with national user groups and to issue alerts and warnings.

In practice, a number of existing centres are already carrying out some of these functions to varying degrees, but there is significant need to expand, coordinate and standardize their operations and products. In particular, the current infrastructure shall be strengthened to support and to further develop national climate information providers in countries which are currently incapable of providing even the most basic climate services.

The minimal target for the first GFCS development phase will be to promote these NMHSs currently offering "less than basic" services; but, hopefully, also many of those in other categories. This lack of capacity is most acute in several Least Developed Countries (LDCs) and Small Island Developing States (SIDS), where the capacity to effectively use climate information is known to be very weak.

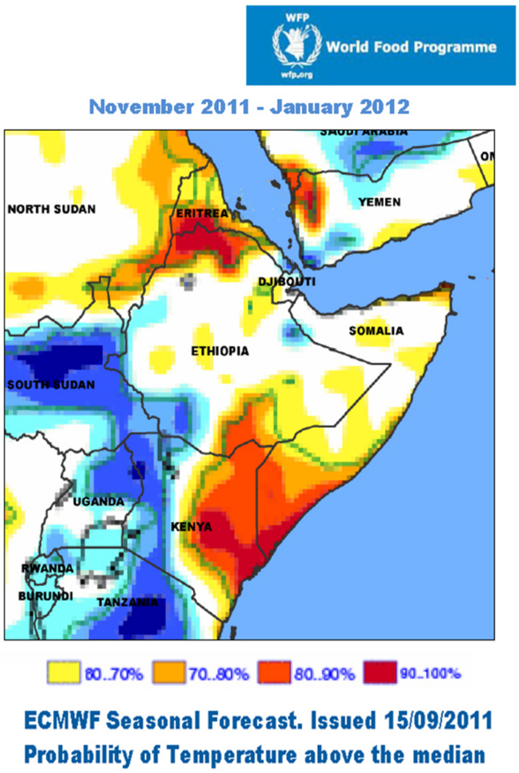
These countries, which are also among the most vulnerable, often have few mechanisms - if any - for potential users to interact with the mandated national climate services providers, as well as primitive observation networks, insufficient expertise in generating climate products and outlooks and, almost as a rule, insufficient resources.

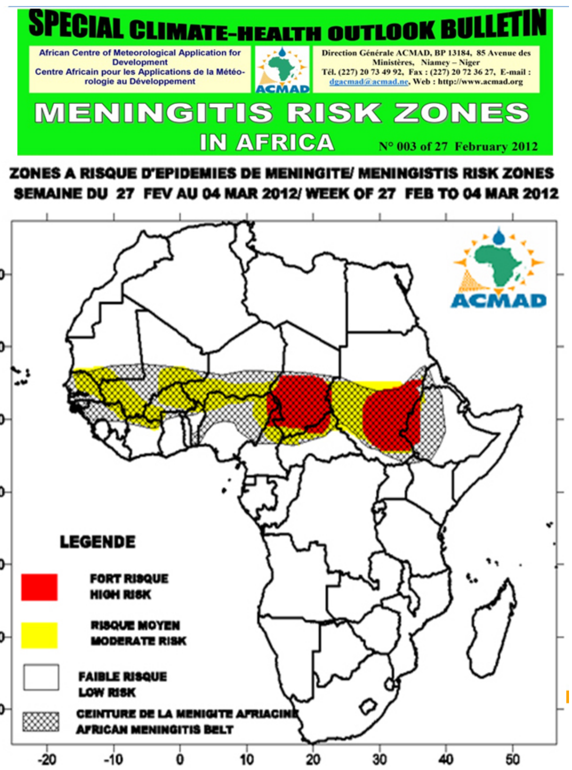
There are, however, several ongoing activities by WMO and its partners, with the potential to serve as the basis over which to erect future GFCS structures. A key example of this has been provided for almost two decades by **Regional Climate Outlook Forums (RCOFs)**, which have regularly convened groups of countries to produce consensus-driven predictions and outlooks at regional level.

A couple of well-established examples of these activities are provided in the next diagrams.

Example 1: The World Food Programme sponsors the issuing of ECMWF-generated updates on the expected weather conditions for the Horn of Africa during the growing season, based on seasonal forecasts.

Example 2: Consensus-based health bulletin on potential meningitis risk zones by the African Centre of Meteorological Application for Development (ACMAD), Niamey (Niger)





In addition, several activities & projects have already been initiated and more will be launched and intensified as extra-budgetary resources become available:

- Establishing a GFCS project office;
- Defining national mandates in climate services provision;
- Strengthening capabilities in disaster risk reduction;
- Improving communication among the climate, agriculture and food security communities;
- Enhancing partnerships between climate services and water resources management;

- Developing national working groups in climate and health;
- Improving decision-making in climate-related risks;
- Strengthening climate information regional infrastructure;
- Advancing in data recovery and digitizing;
- Launching pilot projects.

In concluding, I would like to underline that GFCS development will be a key opportunity for all countries, and that it has the potential to become another milestone, at the same level as the historic 1963 establishment of the WMO World Weather Watch.

The GFCS shall also contribute to facilitate the convergence of international actions to meet the challenges of 3 key global priorities, namely:

- Adaptation to climate variability and change;
- Disaster risk reduction;
- Sustainable development & societal benefits.

The requirements to advance in this promising direction should be seen as essential. They include:

- Reinforcing developing countries' adaptive capabilities;
- Multidisciplinary partnerships across wide sectors;
- Capacity building to be seen as an investment, rather than as an expenditure.

GFCS development is already in progress, so I look forward to your enthusiastic support in your various capacities.

Thank you.