WCC · 3

A Global Framework for Climate Services?

WORLD CLIMATE NEWS

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A GLOBAL FRAMEWORK FOR CLIMATE SERVICES?

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World Meteorological Organization
Weather • Climate • Water

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Foreword

WMO and other UN System Agencies organized the First World Climate Conference in 1979 and the Second World Climate Conference in 1990, which were key milestones in the development of climate knowledge as an issue of international importance. Additionally, a number of major advances have been achieved during the last decade in our climate understanding and predicting capabilities extending over periods from a month to a season or a year and sometimes even longer.

Several socio-economic sectors have benefited from the applications of these enhanced capabilities. Some developing countries are, however, highly susceptible to climate extremes which have the potential to wipe out, in one stroke, the cumulative benefits of years of developmental efforts while, at the same time, their capacity to utilize climate information is often very limited.

In response to these challenges, WMO established in 1995 the Climate Information and Prediction Services (CLIPS) programme as a renewed paradigm for climate services. This and other WMO efforts have contributed over the years to develop a range of capabilities to provide user-targeted climate services and the time is now ripe to consolidate all ongoing efforts through a globally coordinated approach to satisfy climate information needs at all levels.

The World Climate Conference-3 (WCC-3) is being organized by WMO in collaboration with partners, to be held in Geneva from 31 August to 4 September 2009 under the theme "Climate prediction and information for decision-making". The Conference aims to strengthen actions being undertaken in response to climate-related risks and opportunities that are critical to the well-being of society and sustainable development. Among the outcomes will be a Global Framework for Climate Services, linking science-based climate predictions and information with climate risk management and adaptation to climate variability and change throughout the world, in support of poverty alleviation efforts and sustainable development. I am confident that WCC-3 will be a significant UN System-wide contribution to all initiatives aimed at improving livelihoods worldwide.

(Michel Jarraud)
Secretary-General

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World Climate Conference-3 – and after: a Global Framework for Climate Services?

World Climate Conference-3 (WCC-3) opens in Geneva on 31 August 2009. It will focus on how humankind can benefit from the huge advances in climate prediction and information to establish services enabling decision-makers to better manage the risks related to current climate variability and imminent climate change. Improvements in the management of risks associated with extreme climate conditions allow communities to become more resilient in adapting to long-term climate change. By laying down an international framework to develop climate services, WCC-3 will contribute to the 15th session of the Conference of the Parties to the United Nations Framework Convention on Climate Change, to be held in Copenhagen, Denmark, in December 2009.

WCC-3 is also expected to provide direction in tackling climate-related risks, such as drought, floods, heat waves, famine and outbreaks of certain diseases, which affect the availability of essential social needs such as food, water and energy.

Theme

The theme of the Conference is "Climate prediction and information for decision-making". This theme focuses on the potential contribution of advances in climate prediction and information services to reducing the risks associated with climate variability and change, and their incorporation into the management of sectors such as agriculture and food security, energy, water, health, transportation and tourism. The Conference will also discuss the contributions of climate prediction and information services to the management of natural resources and biodiversity, and the development and management of urban settlements. In addition, it will describe advances in climate prediction and put forward proposals aimed at boosting capacities for sustainable development.

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Vision

The World Climate Conference-3 will establish an international framework to guide the development of climate services linking science-based climate predictions and information with climate risk management and adaptation to climate variability and change throughout the world.

Objectives

The main objective is to initiate global action to address climate risks affecting the well-being of society and the achievement of sustainable socio-economic development. Other objectives include:

- Setting the stage for nations, as well as organizations, to identify the needs of end-users;
- Proposing solutions to address these needs so as to enable end-users to benefit from improved climate prediction and information services;
- Mobilizing climate science globally and advancing seasonal to multidecadal climate predictions;
- Demonstrating the current state of knowledge, as well as capacity;
- Negotiating principles and discussing mechanisms to share new advances in science and information through global infrastructure; and
- Deciding on a process that would facilitate global action to reduce the risks associated with current climate variability and imminent climate change.

Meeting these objectives would help:

- Empower vulnerable communities to adapt to the climate of today and better prepare for the climate of tomorrow;
- Improve climate prediction and information for the protection of lives, livelihoods and property, and tap natural resources in support of poverty reduction worldwide;

Detailed information about WCC-3 is available on the Conference Website hosted by WMO:

http://www.wmo.int/wcc3

Ensure equitable sharing of timely user-defined climate prediction and information; and
- Increase adaptive capacity, economic efficiency and social well-being by mainstreaming near-term climate predictions.

The Global Framework for Climate Services

The climate challenge is enormous and requires a comprehensive and coordinated response from the world community. In the tradition of the two earlier World Climate Conferences, WCC-3 is expected to create a mechanism to provide "better climate information for a better future". Considerable work has already been done in formulating a Global Framework for Climate Services (GFCS) to achieve exactly this.

The GFCS is the special subject of this issue of *World Climate News*. The articles that follow outline:

- Why we need a GFCS;
- What the Framework will comprise;
- Who will participate in the Framework; and
- What steps need to be taken to develop the Framework.

The development of this Framework is expected to contribute to the achievement of the United Nations Millennium Development Goals, the United Nations Framework Convention on Climate Change Bali Action Plan and the Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters. It will also help bridge the gap between the Intergovernmental Panel on Climate Change assessment reports and the services required to adapt to climate variability and change at the regional and national levels.

"Climate knowledge is the foundation for the development of an effective response to the climate change challenge. The UN System plays a central role in this area, bringing together global resources for observation and analysis of climate change trends. It is committed to reinforcing its efforts to provide sound and unbiased scientific information and climate services to enable evidence-based policy and decision making at all levels."

Source: *Acting on Climate Change: The UN System Delivering as One*

UN System Chief Executive Board for Coordination at COP 14, Poznan, Poland, 2008

Why we need a Global Framework for Climate Services

Hunched over a hand-held radio just after dawn, a group of farmers in Mali survey the field they are waiting to plant. Will today be the day? Will the rain follow soon enough to germinate the seed they are about to scatter? A dedicated farmers' information service is about to be broadcast to them, bringing detailed meteorological information about the area they live in.

On the high seas, to the north of the Hebrides, a trawler captain is waiting to hear the soothing words that have been broadcast daily for decades. "From Cape Wrath to Rattray Head including Orkney 24 hour forecast: southerly backing southeasterly 3 or 4, increasing 5, but occasionally 6 later near Rattray Head. Mainly fair. Moderate or good. Slight, but moderate becoming rough in northwest." So fishing can continue.

And in the Swiss Alps, the organizers of an international downhill slalom are planning their day, alarmed by massing clouds and falling temperatures. Powder snow is much loved by skiing amateurs but hated by the professionals because it adds seconds to every descent. Can the slalom continue? Fortunately a detailed mountain forecast will soon make it clear.

These are just three examples of how climate services are serving specialized needs for meteorological information. They are not new. But times are changing. For one thing, meteorological knowledge has grown vigorously over recent decades. Where once the 24-hour forecast was the best that could be provided, now we have not only three-day forecasts but also 5-, 10- and even 15-day forecasts. Where once such forecasts covered only large areas, today they can focus down to the level of individual towns and farming areas. And, as timescales lengthen, meteorology blends into climatology.

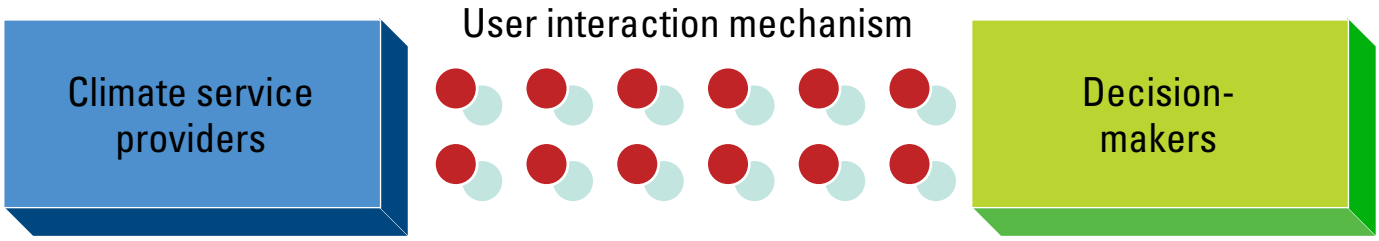
There are added complications. Knowledge of the El Niño effect influences individual forecasts over much longer periods of several months. The continuing effects of climate

change and natural climate variability add largely unknown distortions to traditional weather patterns. No longer is it just a question of when farmers should plant their crops. Should they be planting their traditional crops at all—or should they be adapting to changing conditions, experimenting with new strains or even crops that are better adapted to warmer, wetter conditions?

The sharp rise in economic, social and environmental damage in recent decades due to weather and climate extremes is, in part, a testimony to our lack of understanding and our current inability to prepare for adaptation to climate, including its extremes. The way we are able to adapt, or not, to changing or extreme weather and climate conditions, contributes to the sustainability of our human and social development.

All communities, especially the poor and the most vulnerable, are struggling to adapt to the growing risks from the changing climate. Decision-makers in many climate-sensitive sectors—such as water, agriculture, fisheries, health, forestry, transport, tourism, energy, disaster risk management—are increasingly concerned by the adverse impacts of climate change but are ill-equipped to make effective use of the available climate information. A good deal of relevant information is now available, particularly at the global scale. In addition, climate monitoring information, and climate forecasts for future seasons and even years are produced at several centres. A new approach is needed to improve communication between the providers and the users of climate services.

Both public and private sector institutions are looking for ways of improving climate risk management. Many of the world's development institutions are reviewing their programmes from the perspective of climate-related risk assessment and climate risk management. Similarly, national governments and regional and local policy makers are asking how they can better manage climate-related risks and opportunities.



To this end, WMO and its partner organizations which are co-sponsoring WCC-3 propose the establishment of a Global Framework for Climate Services with the goal of "enabling climate adaptation and climate risk management through the incorporation of science-based climate information and prediction into policy and practice at all levels".

What this means in practice is revolutionary in its implications. Somehow, the whole complex world of meteorological and climate research and application must be closely linked to all those whose job it is to manage a world inevitably affected by changes in the weather and the climate. Furthermore, this must be done at a time when our understanding of the weather and climate system is far from perfect.

The science of climate prediction is so complex that the institutions that deal with such matters will need much strengthening – which basically means finding more and better qualified staff and installing better computer systems.

The ability to predict changes in the climate over years or even decades would have a profound effect on how we manage our lives. The ability to tailor such forecasts to the exact needs of those who need the information would have even more radical effects. All this

"Delivering as one"

In response to the Bali Action Plan, a UN System-wide coordination of climate activities has been launched to address the global response to climate change. The "UN: Delivering as One" initiative notes that building the individual and collective capacity of countries to monitor climate change, enhance climate science and services, and utilize climate predictions is crucial for effective adaptation and mitigation strategies. Recognizing that knowledge is the foundation for the development of an effective response to the climate change challenge, the United Nations Chief Executives Board for Coordination has identified a cross-cutting area of activities—Climate knowledge: science, assessment, monitoring and early warning—and assigned WMO and the United Nations Educational, Scientific and Cultural Organization (UNESCO) to coordinate the activities. As a joint effort of all UN Agencies, the Global Framework for Climate Service will form the nucleus of the knowledge base.

clearly requires a global framework, embracing observations, research and the generation of climate information, to improve the link between providers and users (see figure).

Technological progress and international collaboration are sweeping climate science. As understanding of the climate system grows and society becomes more aware of the potential opportunities of this knowledge, demand is developing for new and better climate services. WCC-3, with the theme "climate prediction and information for decision-making", is designed to respond to the growing climate information needs of users and sectors worldwide.

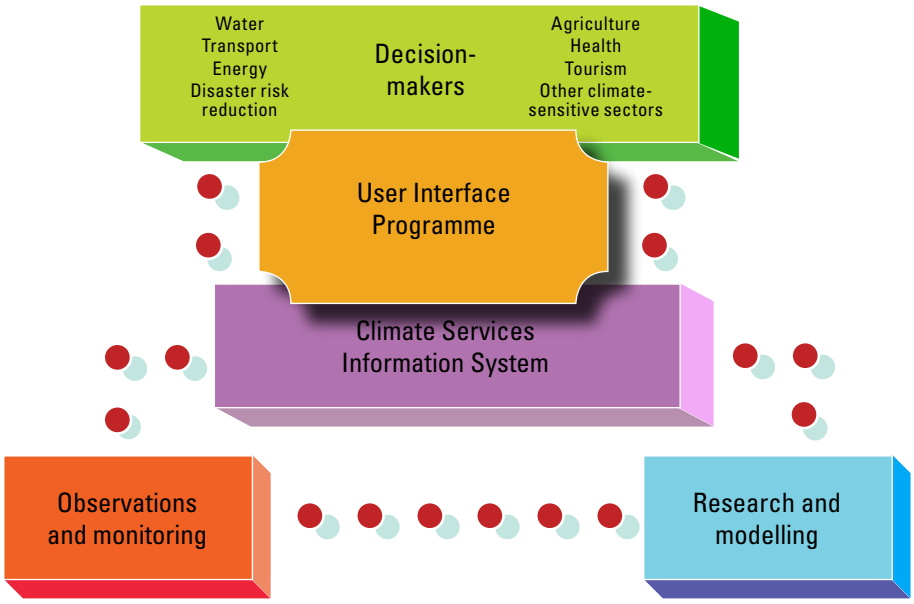
How a Global Framework for Climate Services would work

A GFCS would need four major components:

- Observation and monitoring;
- Research and modelling;
- A Climate Services Information System; and
- A User Interface Programme.

The first two are already well established but are in need of strengthening. The latter two would be substantially new concepts.

The Climate Services Information System (CSIS) would ensure the development of climate information and prediction services and the flow of information from global to local scales. It would build on programmes such as the World Climate Programme and would streamline existing institutions. The User Interface Programme (UIP) would bridge the gap between the information being developed by climate scientists and service providers on the one hand and the needs of users on the other.



Observations and monitoring

The systematic gathering of basic climate data is vital to understanding how climate works and how it changes. Many data are collected by National Meteorological and Hydrological Services (NMHSs) but overall management is in the hands of the Global Climate Observing System (GCOS), which has identified the variables to be studied and developed principles to guide climate observations.

However, not all the observational requirements are yet clear and not all the requirements of users have been taken into account. Observing programmes need further development, particularly in remote regions, and many NMHSs need help in implementing and sustaining even the most basic observing systems. In fact, the coverage of climate observing networks has deteriorated since the 1990s and existing networks are capable neither of documenting regional and local climate change nor of providing the inputs needed by regional climate models. These networks need to be greatly improved to ensure that the essential climate variables are measured as widely and as effectively as possible around the world. This would be a high priority for the Framework.

In addition, decision-makers need access to high-quality socio-economic, environmental and biodiversity data to conduct impact studies and assess adaptation options. Efforts would be needed to develop collaboration with the groups developing those datasets and for merging data for joint studies on impacts and vulnerabilities.

Research and modelling

The 20th century witnessed remarkable progress in understanding the climate system. The World Climate Research

Programme (WCRP) helps promote and coordinate climate research and has made major contributions to climate science and to the Intergovernmental Panel on Climate Change assessment process. However, many details have still to be fully unravelled. Current climate models have many limitations and are subject to a number of biases and errors. Better climate prediction and modelling will require extensive research, particularly for regional detail. Because climate-related risks are likely to increase in size and frequency, there is an urgent need to improve monitoring of extremes and the models needed for prediction and projection.

The ability of science to estimate climate-related risks at the global level is very promising but it is limited at regional and local levels by technical factors and a lack of capacity. Priorities include:

- Better means of assessing climate impacts on natural and human systems;
- Improved models of climate risk and climate prediction, particularly at the regional level;
- Improvements in the way that climate models represent the complexity of the real world;
- A better understanding of the linkages between climatic regimes and the severity and frequency of extreme events; and
- Improvements in the ability of national centres to make operational climate predictions and streamline the linkages between research and operational service providers.

As the timescales for weather forecasting lengthen, weather and climate prediction begin to merge to form an effective continuum. To this continuum should eventually be added a range of chemical, hydrological and biological processes that should be incorporated into weather and climate models; these processes include air quality, flooding, sand- and duststorms, and changes in vegetation. WMO study groups have called this an Enhanced Climate, Weather, Water and Environmental Prediction Framework. Of course, models incorporating all these factors are beyond the reach of even today's most advanced systems. The World Modelling Summit recently recommended computing systems at least 1 000 times more powerful than those currently available to provide a more accurate representation of critical small-scale processes.

Climate prediction is among the most computationally demanding problems in science. No single nation has the capabilities and scientific expertise needed to address the problem and a concerted international effort is called for. This will require facilities with adequate staff and computational infrastructure, appropriate training and capacity-building, especially for young scientists and in developing countries.

User Interface Programme

Few governments have climate services that serve national needs effectively. Many of those involved in water resources, agriculture, health, finance and other key sectors do not see climate risk management as something they can act on. They increasingly worry about climate risk but remain at a loss as to what to do about it in practice. Fundamentally, there is a gap in engagement and communication between service provision and service application. Research continues but is not being taken up by potential users.

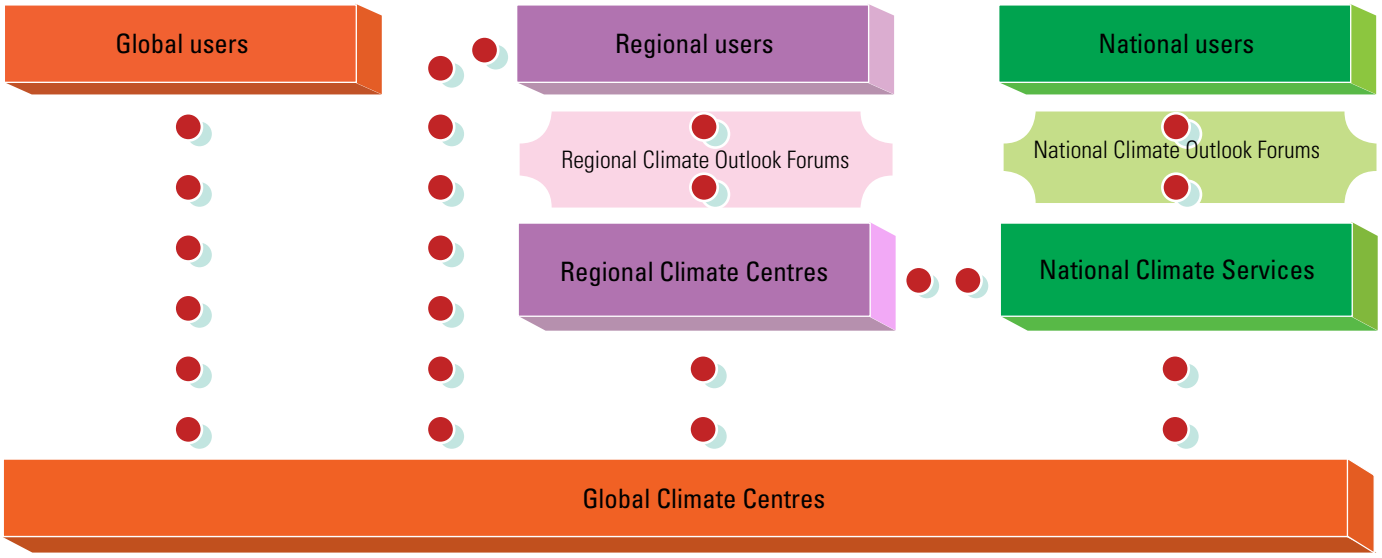
The needs of the user community are diverse and complex. Understanding them requires more research and closer interaction of climate scientists with experts from other areas.

The User Interface Programme would:

- Promote the research and development needed to understand the sensitivity of activities to climate variability and change;
- Identify user requirements for climate information, and give them priority in future development work;
- Demonstrate the utility of research in practical settings and contribute to improved policy in managing climate risk;
- Help users profit from climate information; and
- Build up capacity to use climate knowledge effectively.

While some of the mechanisms, particularly at regional and national level, do exist they need to be strengthened and turned into a part of the decision-making processes. Some of the institutions whose role would be critical in developing service applications and user interaction are shown in the table below.

Global	UN system International climate research institutions Sectoral research institutes Universities NGOs
Regional	Regional development institutions Regional climate centres Universities NGOs
National	National development ministries National research institutions NMHSs and other climate-related agencies Universities NGOs



Climate Services Information System

The Climate Services Information System (CSIS) would depend on a network of the global, regional and national institutions that currently develop and provide climate information. Existing structures and mechanisms would be developed as the key elements.

National Climate Centres would be at the forefront of CSIS activities. At national level, climate activities are undertaken by a range agencies including government and non-government institutions, universities and national research institutes. However, the NMHSs would form the nucleus of a system that would:

- Exchange climate data and operational products with regional and global centres;
- Downscale global and regional climate information for national relevance;
- Monitor climate, conduct climate watches and issue weather warnings to support national early warning systems and disaster risk reduction activities; and
- Develop climate services at the national level for different sectors.

Regional climate centres (RCCs) would, with the new knowledge and tools developed through applied climate research, generate regional and subregional products. RCCs would provide on-line access to their products and services for national climate centres and other regional users. Typically, RCCs would:

- Downscale, interpret and assess prediction products from global centres;
- Monitor regional climate variability and extremes;
- Implement and conduct climate watches;
- Develop quality-controlled regional climate datasets;
- Share regional and subregional products and information; and
- Downscale climate change scenarios.

The network would include all important global climate centres. Most are already committed to providing probability information on temperatures over land, sea-surface temperatures and precipitation. These activities could be extended to cover other selected surface and upper-air parameters and to longer than seasonal timescales.

A number of other data centres cover specialized data in fields such as meteorology, oceanography, radiation, remote-sensing and atmospheric chemistry. Reanalysis of this historical data has helped make such records more homogeneous and useful. These data centres would form an integral part of the network.

The CSIS would place high priority on developing climate information that addresses sector-specific requirements and on increasing the capacity of users to understand and apply climate information in their decision-making processes. In collaboration with the User Interface Programme, it is proposed to extend the Regional Climate Outlook Forum process to vulnerable regions throughout the world.

The relationship between global, regional and national institutions is shown diagrammatically above.

Who will participate in the Global Framework for Climate Services?

The short answer is, wherever possible, institutions that already exist or that are being created. Many of the jobs that face the GFCS can be carried out by existing institutions, though in most cases these institutions will need strengthening in one way or another—for example through the addition of increased funding, more and better trained staff or improved equipment.

In some cases, existing institutes could be incorporated simply by slightly re-orientating the stated goals or by re-training existing staff.

More specifically, a GFCS would require strengthening of the 11 existing Global Producing Centres of Long-range Forecasts (GPCs, see box above). These are already well-funded institutions with highly trained staff, and incorporation into a GFCS might involve little more than a refining of future goals.

Establishing a worldwide network of Regional Climate Centres (RCCs) would need more effort. WMO has put in place the designation criteria for RCCs, specifying a set of mandatory functions RCCs would have to fulfil. As of now only two centres—Beijing (China) and Tokyo (Japan)—have been formally designated as WMO RCCs. While there are many other regional/national institutions capable of taking on the role of RCCs, they need to enhance their capacities or re-orientate their activities to become WMO RCCs. Efforts to do this are already under way in some regions. The establishment of RCCs in developing countries would need substantial support. RCCs have an important role in interpreting global climate information in a regional context and in facilitating the exchange of information and common understanding among the countries they serve. Regional Climate Outlook Forums (RCOFs), active in many parts of the world for more than 10 years, are also very effective in regional networking of climate information providers and user interaction. RCCs and RCOFs would thus play a critical role in the implementation of GFCS, facilitating a smooth flow of climate information from global to local scales.

National Meteorological Services, with decades of experience in delivering weather services, are well placed to deliver climate services as well. They require strengthening, however. To provide climate information on a regular basis, with appropriate access to global and regional products, would require NMHSs to have the ability to share large amounts of data with global and regional centres. For this, they would need better computational capacities, Internet technology and improved telecommunication facilities. The Framework would aim to strengthen the capacity of NMHSs to deliver a complete suite of products to national sectoral agencies and to mainstream such climate information in development decision-making.

Adequate financial support for maintaining and strengthening the capacity of NMHSs and implementing and strengthening national, regional and global climate centres, would have to come, as always, from individual countries. Countries themselves, in other words, must accept a share of the challenge of implementation of the GFCS, and strengthen their own capacity. Developed and developing countries alike would be required to maintain their national observing networks and establish and maintain national and regional climate institutions.

Countries that are able to help others, particularly Organization for Economic Cooperation and Development Members, can do so through bilateral arrangements, and through WMO and other UN initiatives. The Framework would ask governments to give high priority to financing the communication technologies and other needs of NMHSs.

Particular emphasis would be placed on the needs of developing and Least Developed Countries, including vulnerable regions such as Africa, as highlighted by the United Nations Framework Convention on Climate Change (UNFCCC) and its Bali Action Plan.

Human skills in accessing global and regional climate products would be developed through the provision of training, manuals, guidance documents, technical papers and workshops, among others. Universities would be encouraged and helped to collaborate with NMHSs to achieve this sustainability.

To establish interfaces with climate information users in various sectors, UN agencies, particularly specialized agencies such as the Food and Agriculture Organization of the United Nations, the World Health Organization, the World Trade Organization and WMO, would have to play a crucial role. Closer collaboration would be established with implementing and financing agencies such as the World Bank, regional development banks, the European

Commission, United Nations Development Programme, Global Environmental Facility and other bilateral development agencies. Collaboration and partnerships would be sought with regional economic groupings including the African Economic Commission, the Association of South-East Asian Nations, the International Group of Research Funding Agencies and other national agencies with funding capacity. Alignment would be sought with institutional programmes related to climate such as the ClimDev Action Plan for Africa being developed by the UN Economic Commission for Africa, the African Union Commission and the African Development Bank.

Since the Bali Action Plan was adopted at COP-13, adaptation has been given a prominent role in the UNFCCC process. Until now the technology transfer debate has been largely confined to the transfer of technology for mitigation of the effects of climate change. A GFCS would serve as the vehicle through which the products resulting from technology-intensive observations and research would be made available to all UNFCCC parties.

In the final analysis, a GFCS would have one over-riding characteristic: it would essentially be, as this article has made clear, a capacity development mechanism.

Next steps for the Global Framework for Climate Services

World Climate Conference-3 provides a wonderful opportunity from which to launch the Global Framework for Climate Services (GFCS) and obtain broad agreement among the high-level delegates as to how it would be implemented, how it would be financed and how long the initial steps would take. To this end, a draft agreement has been prepared ready for presentation to delegates at WCC-3. The operational part of this text is summarized in the box below.

Financial support for the implementation of the GFCS will need to be established through a range of mechanisms. The expectation is that specific commitments and support will be required from both developing and developed countries. The developed countries would be expected to facilitate participation of developing countries and Least Developed Countries and as both service providers and users.

If WCC-3 endorses the concept of GFCS, a task force of independent advisers, supported by a broad-based group of experts, will develop the Framework in consultation with all relevant partners within nine months of WCC-3. Within the same timeframe, it would develop an action plan for GFCS

Seven steps towards the GFCS

The Draft High-level Declaration to be debated at CCC-3 contains a set of concrete actions that would launch the GFCS. They ask delegates to:

- Decide to develop the GFCS to strengthen climate forecasting in timeframes from seasons to several decades and to create a climate information network to serve as an effective interface between information providers and decision makers;
- Request the Secretary-General of WMO to convene an ad hoc high-level taskforce of independent advisers to further develop the proposed GFCS within nine months of WCC-3;
- Ask this taskforce to develop an action plan, measurable indicators, resource implications and timeline for the establishment and implementation of GFCS;
- Urge governments, organizations and institutions to support GFCS;
- Urge developed countries to facilitate the participation of developing countries in the GFCS as service providers and users;
- Recommend governments, organizations and institutions to strengthen user-oriented climate services by supporting climate observation, research, modelling and prediction; and
- Urge governments to note the outcome of the World Climate Conference-3 in informing the discussions at the 15th Conference of the Parties (COP 15) to the UNFCCC and other similar processes.

implementation that would include measurable indicators of progress and a timeline for the implementation of the Framework.

By strengthening the development, provision and application of climate services, GFCS will support poverty alleviation and disaster risk management, and help to achieve agreed goals, including the Millennium Development Goals. Seasonal to decadal predictions will guide farmers on when and how best to plan their crops; climate predictions will provide early warning of climate extremes; and communities will have climate information to plan their resource allocation for water, food, medication and other core services. Enhanced climate services will empower communities everywhere to manage and plan for emerging climate risks and opportunities. Preparations for such a future are already under way—see the findings of the recent review panel of the World Climate Research Programme in the box on the right.

Thus, even the Global Framework for Climate Services should be seen as just a first step in a long evolutionary process that will eventually integrate all the physical factors that affect human well-being and future development. The journey may be long but August 2009 may well come to be regarded as the first milestone on the road to a more visionary concept of climate and to a long-term perspective that will finally empower science to fulfil its full potential.

World Climate Research Programme review

A review of the World Climate Research Programme (WCRP) has been carried out by a Review Panel appointed by its sponsors—the International Council for Science, WMO and the Intergovernmental Oceanographic Commission of UNESCO—and the International Group of Funding Agencies for Global Change Research. The report has three chapters: an introduction, findings and recommendations.

The Panel concludes that WCRP can play a significant role in helping society meet the challenges of global climate change. But WCRP currently lacks the focus, planning and funding to meet these challenges. WCRP must focus its projects and connect with partners and users in strategic ways, and it will need new resources to do so. The Panel's recommendations are aimed at building the necessary focus and connections into WCRP and its partnerships.

WCRP should:

- Focus the 2005 WCRP Strategic Framework to better capture the WCRP role in providing the science that underpins research on climate predictability, adaptation and mitigation, thus strengthening the links with key user groups;
- Rapidly implement its focused Strategic Framework, paying special attention to social needs while maintaining its science-driven approach;
- Introduce clear priorities to WCRP as a whole, collaborating with other global environmental change programmes to take into account urgent science required for IPCC and other social demands;
- Lead the initiative on Earth system modelling utilizing the full richness of relevant disciplines, and explicitly addressing scientific problems that lie at the interfaces with these disciplines;
- Consolidate and strengthen its focus as a user and promoter of observations, as well as its support of the components of the Global Climate Observing System;
- Set specific strategy and goals for building its scientific capacity in diversity of age and gender and for participation of developing country scientists in planning and research;
- Build its resource capacity by enhancing support for coordination and advocacy for research and infrastructure needs; and
- Expand its strategic outreach activities to target greater visibility and better uptake and utilization of WCRP outputs by the climate research community, the policy world and private sector, and more broadly to the general public.

Recently issued

World Climate Conference-3 Third announcement (May 2009)
[E]
[F] [R] [S] in preparation
www.wmo.int/wcc3/documents/wcc3_3rd_annoucement_EN.pdf

Better climate information for a better future (WCC-3)—Benefits to society
[E/F/S multilingual)
2009, 12 pp
www.wmo.int/wcc3/documents/wcc3_S1_Benefits.pdf

WMO Bulletin Volume 58(2) April 2009—Meteorological services for transportation
[E] (F, R and S in preparation)

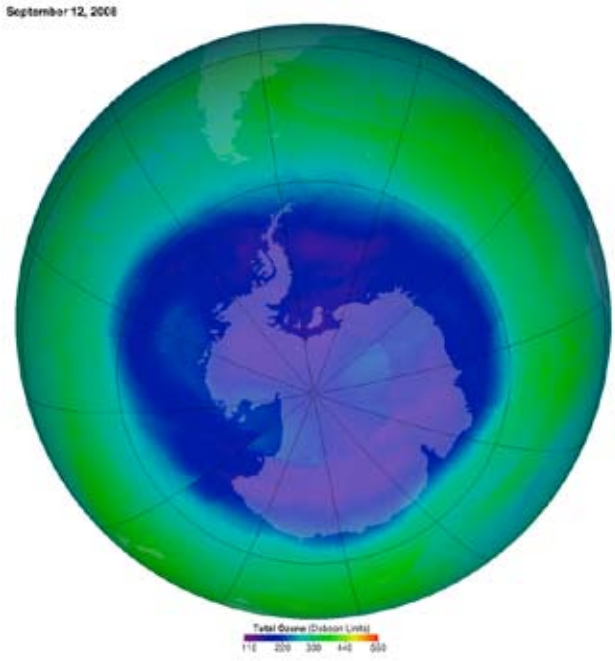
WMO Bulletin Volume 58(1) January 2009—Weather, climate and the air we breathe
[E] [F] (R and S in preparation)

Aerodrome reports and forecasts—a users' handbook to the codes
WMO-No. 782
[E-F-R]
2008, 81 pp

Secure and sustainable living: Findings of the International Conference on Secure and Sustainable Living: Social and Economic Benefits of Weather, Climate and Water Services
WMO-No. 1034
[E - R] (F in preparation)
2008, 101 pp

Ozone may increase Antarctic ice

Increasing ice in the Antarctic is not a sign that the Earth is actually cooling instead of warming as some climate change sceptics have attested. Recent research suggests that the growth in Antarctic ice over the past 30 years is actually due to shifting weather patterns caused by the hole in the ozone layer. Researchers predict that eventually global warming will catch up in the Antarctic, leading to overall melting as it has in the Arctic.



The Antarctic ozone hole reached its maximum size for the year on 12 September 2008, when it was the second largest ever recorded. Represented by blues and purples in this image from the Ozone Monitoring Instrument (OMI) on NASA's Aura *satellite, the ozone hole covered about 27 million square kilometres, making it larger than North America. The record size of ozone hole was in 2006.*

Courtesy NASA's Ozone Hole Watch

"Our results show the complexity of climate change across the Earth. While there is increasing evidence that the loss of sea ice in the Arctic has occurred due to human activity, in the Antarctic human influence through the ozone hole has had the reverse effect and resulted in more ice," says lead author John Turner from the British Antarctic Survey (BAS). "Although the ozone hole is in many ways holding back the effects of greenhouse gas increases on the Antarctic, this will not last, as we expect ozone levels to recover by the end of the 21st century. By then, there is likely to be around one-third less Antarctic sea ice."

Published in *Geophysical Research Letter* (23 April 2009), the study by scientists from NASA and BAS found that the hole in the ozone layer strengthened surface winds in the Antarctic, while deepening storms in the South Pacific, leading to more cold air over the western Antarctic, which, in turn has caused an increase in ice production.

Satellites have revealed that ice loss and production in Antarctica is highly variable, with some regions experiencing warming and loss of ice while other regions are undergoing reverse effects due to the ozone hole. Since the 1970s, satellite images have shown that Antarctic ice has increased by about 100 000 km^2 per decade. This increase is equivalent to only about 0.97 per cent per decade.

"Understanding how polar sea ice responds to global change—whether human-induced or as part of a natural process—is really important if we are to make accurate predictions about the Earth's future climate," Turner adds. "This new research helps us solve some of the puzzle of why sea ice is shrinking is some areas and growing in others."

Source: http://news.mongabay.com/2009/0423-hance_antarcticice.html