



A Summary Report of the World Climate Conference-3 (WCC-3)

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SUMMARY OF THE WORLD CLIMATE CONFERENCE-3: 31 AUGUST - 4 SEPTEMBER 2009

The World Climate Conference-3 (WCC-3) convened at the Geneva International Conference Centre in Geneva, Switzerland, from 31 August - 4 September 2009, under the theme “Better climate information for a better future.” The conference was attended by more than 2000 participants, including delegates from 165 countries, comprising seven heads of state and scores of ministers, as well as heads and representatives of international organizations, science and academia, and members of civil society.

Participants attended plenary, parallel and roundtable sessions on a variety of topics, including on: meeting user needs; climate risk management; economic and social benefits of climate information; advancing climate prediction science; climate and human health; climate and sustainable energy; seasonal-to-interannual climate variability; climate and water; climate, transportation and tourism; climate and communities; climate adaptation and the Copenhagen process; climate extremes, warning systems, and disaster risk reduction; mainstreaming climate information; climate and biodiversity and natural resource management; climate and more sustainable cities; business and industry; climate and food security; climate of oceans and coasts; regional climate information for risk management; and communicating climate information.

During the high-level segment participants approved, by acclamation, a conference declaration deciding to establish a Global Framework for Climate Services, to strengthen production, availability, delivery and application of science-based climate prediction services.

This report consists of a brief history of the WCC meetings followed by a summary of the conference proceedings.

BRIEF HISTORY

FIRST WORLD CLIMATE CONFERENCE: This conference, sponsored by the World Meteorological Organization (WMO) and a number of other international bodies, was held from 12-23 February 1979, in Geneva, Switzerland. The conference focused mostly on how climate change might impact human activities. It examined the possible impacts on specific activities such as agriculture, fishing, forestry, hydrology, and urban planning. The conference declaration identified the leading cause of global warming as increased atmospheric concentrations of carbon dioxide resulting from the burning of fossil fuels, deforestation, and changes in land use, and was instrumental in the establishment of the Intergovernmental Panel on Climate Change (IPCC), the World Climate Programme, and the World Climate Research Programme.

SECOND WORLD CLIMATE CONFERENCE: This conference, sponsored by WMO and other international bodies, was held from 29 October – 7 November 1990, in Geneva, Switzerland. The conference declaration called for the establishment of a climate convention, adding momentum to international efforts that resulted in the UN Framework Convention on Climate Change (UNFCCC). It also led to the establishment of the Global Climate Observing System and to recommendations for future activities of the World Climate Programme.

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FIFTEENTH WORLD METEOROLOGICAL CONGRESS:

During its fifteenth quadrennial congress, held from 7 – 25 May 2007, in Geneva, Switzerland, the WMO approved the organization of WCC-3, in collaboration with other UN system agencies and partners, which was scheduled to take place in 2009 – 30 years after the first World Climate Conference.

BALI ROADMAP: The Thirteenth Conference of the Parties (COP13) of the UNFCCC took place in December 2007, in Bali, Indonesia. The focus of the Bali conference was on long-term issues. These negotiations resulted in the adoption of the Bali Action Plan, focusing on four key elements of long-term cooperation: mitigation, adaptation, finance and technology. The Bali conference also resulted in an agreement on a two-year process, the Bali Roadmap, which set a deadline for concluding the negotiations at COP15, to be held in Copenhagen in December 2009.

REPORT OF WCC-3

The World Climate Conference-3 (WCC-3) was held in Geneva, Switzerland, from 31 August - 4 September 2009. On Monday, the conference opened and participants attended a plenary session on meeting user needs and a roundtable on climate risk management.

On Tuesday morning, two plenary sessions were held on the economic and social benefits of climate information and on advancing climate prediction science. In the afternoon there were six parallel working groups on: climate and human health; climate and sustainable energy; seasonal-to-interannual climate variability; climate and water; climate, transportation and tourism; and climate observations. Two forum sessions were also held on gender and climate, and climate and communities, as well as two sessions on implementing climate services, titled “from observations to predictions” and “research engagement.” The day ended with a roundtable on climate adaptation and the Copenhagen process.

On Wednesday morning, two plenary sessions were held on climate extremes, warning systems and disaster risk reduction, and mainstreaming climate information. In the afternoon there were six parallel working groups on: climate and biodiversity and natural resource management; climate and more sustainable cities; decadal climate variability; climate and food security; climate of oceans and coasts; and regional climate information for risk management. Two forum sessions were also held on business and industry, and capacity-building, education and training, as well as a session on implementing climate services in nations and regions. The day concluded with a roundtable on communicating climate information.

From Thursday morning through Friday afternoon participants attended the high-level segment. On Thursday morning the high-level segment adopted by acclamation a conference declaration deciding to establish a Global Framework for Climate Services (GFCS).

This summary summarizes all the plenary and a number of the parallel session held during the conference.

OPENING CEREMONY

Michel Jarraud, Secretary-General of the World Meteorological Organization (WMO), opened the WCC-3. He stressed the historic importance of previous WCCs, noting that WCC-1 led to the formation of the Intergovernmental Panel on Climate Change (IPCC), and WCC-2 helped establish the



L-R: Kofi Annan, President of the Global Humanitarian Forum; Michel Jarraud, Secretary General, WMO; and Hans-Rudolph Merz, President of Switzerland

United Nations Framework Convention on Climate Change (UNFCCC). He highlighted an increased awareness in society of the need to adapt to and mitigate climate change, and said a global framework for climate services will facilitate the improvement of climate services, capacity building and effective dialogue.

Hans-Rudolph Merz, President of Switzerland and President of WCC-3, expressed concern over the humanitarian effects of adverse climate events, and noted that short-term weather forecasts, hazard maps and early warning systems were needed for timely action. He highlighted Switzerland’s wish to implement a carbon dioxide levy, using the polluter pays principle, to fund adaptation measures.

Alexander Bedritsky, President of the WMO, outlined the Organization’s work on climate research. He said the impetus for WCC-3 was based on the need for improved climate services for applications related to food, water and energy. He underscored that the GFCS would be developed during the expert segment and considered during the high-level segment. He noted the strength of partnerships among UN institutions, and said that investing in prediction is the best way to address climate variability and risk.

Gro Harlem Brundtland, UN Secretary-General’s Special Envoy on Climate Change, highlighted that political action must be based on sound science. She called for participation of all nations to increase credibility of scientific results. She noted the increased risk of climate change impacts for Least Developed Countries (LDCs) and Small Island Developing States (SIDS), said the poor are frequently left out of the dialogue, and stressed that women must be empowered to become drivers of adaptation. She underscored the need to mobilize political will at all levels and called for a unified approach for collection, analysis and use of climate information.

Kofi Annan, President of the Global Humanitarian Forum, emphasized that WCC-3’s deliberations must provide extra impetus to reach an agreement at the UN Climate Change Conference in Copenhagen, Denmark. He underscored the need for an agreement to be radical and legally binding, and have climate justice at its core. He stressed that the world’s poor will be most affected by climate change, and that developed economies must accept dramatic cuts in greenhouse gases, and provide aid in technology transfer and capacity building. He noted WMO’s focus on knowledge gaps on climate change, and called for initiatives to provide timely information to those stakeholders who require it.



L-R: Expert Segment Chair Alexander Bedritsky, President of WMO; Julia Marton-Lefèvre, Director General, IUCN; Jean Jaques Dordain, Director General, ESA; Houlin Zhao, Deputy Secretary-General, ITU; and Joseph Alcamo, UNEP

OPENING OF THE EXPERT SEGMENT: The expert segment opened on Monday morning, chaired by Alexander Bedritsky. Highlighting that climate change does not respect national sovereignty, Walter Erdelen, United Nations Educational, Scientific and Cultural Organization (UNESCO), underscored the need to improve capacity to implement effective strategies at the local level. He noted the need to generate long-term public awareness of climate change and foster lifestyle changes for mitigation. Houlin Zhao, Deputy Secretary-General of International Telecommunications Union (ITU), highlighted ITU's role in global monitoring activities, including its cooperation with WMO. He suggested that information and communication technology can serve as a key enabler for climate services and reduce energy requirements of telecommunications by 40% through more efficient networks and trafficking.

Manzoor Ahmad, Food and Agriculture Organization (FAO), noted the decline in global aid investment for agriculture and underscored the challenge in increasing the interaction between forecasters and agricultural producers. Joseph Alcamo, United Nations Environment Programme (UNEP), mentioned the urgency of closing the science-policy gap and highlighted the need for actionable information. He said a global framework must include systems for: the synthesis of observations; the provision of actionable information; assessment of vulnerabilities; assessment of exposure of sectors to climate change impacts; and the provision of options available for action.

Deliang Chen, Executive Director of the International Council for Science, said two components of the global climate services framework already exist, observation and prediction, but emphasized that they need strengthening. He highlighted the need to create information systems for climate risk and services. Julia Marton-Lefèvre, Director General of IUCN,

stressed the importance of nature-based solutions for mitigation of and adaptation to climate change, including, disaster risk reduction, watershed management, and agricultural management utilizing local knowledge. Jean-Jacques Dordain, Director General of the European Space Agency (ESA), noted that earth sciences have been a priority for the ESA over the last three decades. He highlighted activities under this program including data collection, monitoring of climate events, and the dissemination of information, including to non-member states. Reid Basher, International Strategy for Disaster Reduction (UNISDR), noted that WCC-3 highlights the impacts of climate change, as well as actions that need to be undertaken. He stressed that disaster risk increases with, amongst others, ecosystem decline and human population vulnerability.

Thomas Stocker, Co-Chair IPCC Working Group I (the physical science basis of climate change), highlighted issues requiring further research, including uncertainties on sea-level prediction, regional climate impact predictions, carbon cycle feedbacks, particularly soil and vegetation carbon fluxes, and ocean acidification. John Zillman, Chair of the WCC-3 Organizing Committee, outlined the structure and expected outcome of the conference.

SHARED CHALLENGE OF MEETING USER NEEDS

The plenary session was held on Monday morning and afternoon, chaired by Martin Visbeck, IFM-GEOMAR. He noted that there are sophisticated methods to assess the current climate system, and that real time data and current technology allow for more accurate climate forecasting. He said future climate risk can be better managed through increasing data collection, dissemination and more constructive dialogue. Highlighting scientific progress over the last century, Guy Brasseur, University Corporation for Atmospheric Research, noted new challenges, including: improvement of the understanding of climate systems and their interactions; provision of high resolution models; and the development of broad, integrated knowledge systems with a regional focus to inform options for mitigation and adaptation strategies. Sherburne Abbott, Executive Office of the President, US, said all countries are vulnerable to climate change. Noting heat waves and floods in Europe, and Hurricane Katrina in the US, she said developed countries also need to address their



L-R: Thomas Stocker, Co-Chair IPCC Working Group I, and Manzoor Ahmad, FAO



Sherburne Abbott, Office of Science and Technology, Executive Office of the President, US



L-R: Carlo Scaramella, WFP; Letitia Obeng, Global Water Partnership, Session Chair Martin Visbeck, IFM-Geomar, Germany; Sherburne Abbott, Office of Science and Technology, Executive Office of the President, US; and Peter Høppe, Munich Re

evolving vulnerabilities. She underscored that observations and data systems must be based on the principles of free and open exchange.

Carlo Scaramella, World Food Programme (WFP), stressed actionable climate information as a resource for the WFP. He said better climate information enhances community resilience and has a key role in saving lives and protecting livelihoods. Letitia Obeng, Global Water Partnership, underscored the challenge of integrating water management into the climate change adaptation agenda, noting that water is both a part of the problem and the solution for climate change adaptation. On partnerships for adaptation, she highlighted the need for climate change experts to interact with experts on integrated water management. Peter Høppe, Munich Re, discussed the central role of climate change for the insurance sector. He said that the sector shares data on economic losses related to weather events, provides transparent risk calculations, and offers solutions to address risk through new products. He highlighted efforts of the Munich Climate Insurance Initiative to develop products in developing countries. He described the Initiative's goal to develop a tool to address preventive measures, alongside climate insurance for five to ten year events and 100-year events. He suggested that this approach could be adequately financed with a fund requiring a US\$10 billion annual contribution.

In the ensuing discussion, delegates addressed the role of micro-insurance as an agent for social change in the climate change arena. Delegates also noted that more assistance was needed to encourage authorities to improve capacity, technical knowledge and empower local institutions to mitigate the impacts of climate change.

CLIMATE RISK MANAGEMENT

Heidi Cullen, Climate Central, chaired this roundtable session held on Monday afternoon. Steve Zebiak, International Research Institute for Climate and Society (IRI), noted that many barriers exist to creating changes for addressing climate change, including: lack of access to data; lack of awareness; policies that do not utilize available knowledge; and inadequate investment to ensure continued progress at the science-policy interface. Kuniyoshi Takeuchi, International Centre for Water Hazard and Risk Management, stressed the importance of local ownership of climate information and threat forecasts. He lamented that even though prediction and forecast tools are available, many are not suitable for use at the local level as they lack sufficient detail. Daniel Keuerleber, MeteoSwiss, highlighted the importance of a framework that is specific and directly meets the needs of its users. He noted the need for sustained national awareness of climate change and its associated risks, and continued information dissemination.

Shourong Wang, China Meteorological Administration (CMA), underscored the need to, among other things, improve the accuracy of climate predictions and enhance the capability for risk management. He said early warning systems are key for risk management, and underscored the proposed GFCS as providing an unprecedented capacity in dealing with risk. José Achache, Executive Director of the Group on Earth Observations (GEO), underscored the need for more observations and better science, including the need to measure large time scales. He said climate change is only one component of risk management, noting that water and food scarcity, or natural disasters, are nothing new.

Vicky Pope, UK Met Office Hadley Centre, stressed advances in providing seamless models across temporal and spatial scales for weather forecasting and climate prediction. She underscored the need for communication between users and forecasters to provide relevant information. She expressed concern regarding scientists' ability to communicate probabilistic information to the general public. Thomas Rosswall, Challenge Program on Climate Change, Agriculture and Food Security, noted the lack of communication between the IPCC and the Millennium Ecosystem Assessment, and highlighted the need for national level discussions to complement and promote international cooperation, stressing the need to engage civil society and the private sector. He said terrestrial monitoring systems lag behind atmospheric monitoring.

During the ensuing discussions, on data sharing, Achache noted that GEO has been influential in making data publicly available, but highlighted the dangers of moving backwards, particularly in oceanographic data. Wang underscored the need for not only accurate but also useful predictions. On the type of information provided, Pope said that scientists need to understand what users require.

On opportunities and risks presented by adverse climate events, Zebiak noted that the management of risks and opportunities is essential and is a developmental matter. Takeuchi said resource and hazard management actions should act upon more concrete forecasts, and stressed the need for continued interdisciplinary work. Rosswall said that continued public outreach would ensure the inclusion of climate change on the political agenda.

On the need for education to increase capacity, Wang emphasized the need for specialized training and outreach programs to be included in the GFCS, in addition to the development of "special products" for the public. Rosswall stressed that school science programs must be strengthened. Participants also noted that continued adverse climate events could render some communities uninsurable, and stressed the importance of continued cooperation to ensure that these communities adapt to adverse climate events.



The conference hall was filled to capacity during Tuesday's plenary sessions

ECONOMIC AND SOCIAL BENEFITS OF CLIMATE INFORMATION

Gordon McBean, Institute for Catastrophic Loss Reduction, chaired this plenary session, held on Tuesday morning. He noted that future work on climate information should be interdisciplinary to understand the socioeconomic effects of adverse climate events on people and communities.

Don Gunasekera, Commonwealth Scientific and Research Organisation (CSIRO), noted that climate information is used in decision making under conditions of uncertainty, and emphasized that the value of information increases with quality, accuracy and timeliness. He identified impediments to using climate information, including low accuracy and institutional constraints.

Holger Meinke, Wageningen University, the Netherlands, said adaptation science is the knowledge component behind enabling technologies for adaptation. He stressed that users are exposed to large amounts of unfiltered, irrelevant data disguised as information, and emphasized the need to correctly scale information. He said the legitimacy of information should be ensured by having no undeclared interests. Matthias Ruth, University of Maryland, said all sectors are affected by climate change and that those impacts are already draining public resources. He highlighted climate change as a threat magnifier, and underscored the benefits of climate information. He said there is no silver bullet technology solution, but rather that a silver "buckshot" is needed.

Mohammed Sadeck Boulahya, ClimDevAfrica, stressed that there should be an emphasis on implementation of data analysis, rather than data collection, and noted that climate information is essential for development programs undertaken in Africa. He questioned how information could be communicated to final users, and how stakeholders could be effectively mobilized. Akimasa Sumi, University of Tokyo, stressed the importance of time scales in climate information. He noted that although there is a plethora of information,



L-R: Discussants Vladimir Tsirkunov, World Bank; Akimasa Sumi, University of Tokyo; and Mohammed Sadeck Boulahya, ClimDevAfrica

accessing all the information is difficult and common open access may be necessary. Vladimir Tsirkunov, World Bank, emphasized that those most affected by adverse climate events are often not able to receive climate information. In the ensuing discussion, McBean noted that climate events themselves are not drivers of disaster, but rather that disasters are driven by the vulnerabilities of affected populations. Ruth noted the lack of sufficient, readily available socioeconomic data.

ADVANCING CLIMATE PREDICTION SCIENCE

John Mitchell, UK Met Office, chaired this plenary session held on Tuesday morning. He highlighted the challenge of combining the science of long-term forecasting based on anthropogenic forcing with interannual predictions based on an understanding of initial values to create decadal predictions. Tim Palmer, European Centre for Medium-Range Weather Forecasts (ECMWF), noted that seasonal forecasting can act as an important tool for adaptation and described advances in El Niño modeling. He cautioned that the use of model outputs in applied models, such as for agriculture and health, requires post-processing and understanding of biases. Mojib Latif, IFM-GEOMAR, underscored the challenges of initializing climate models, reducing biases and better representing small-scale processes, like the Gulf Stream. He stressed the need for a coordinated scientific program under the World Climate Research Programme (WCRP) to realize the predictability potential of decadal models.

Jerry Meehl, National Center for Atmospheric Research, US, said climate services are dictated by societal needs and that science must be part of any organized climate services system. He noted a paradigm shift for climate change science, with the IPCC Fourth Assessment report marking the end of a 20-year period of non-mitigation scenarios. He stressed the need to convey limitations and uncertainties of models through climate services. Arun Kumar, National Center for Environmental Prediction, US, elaborated on the current status, limitations and expected advances for climate predictions. He said limitations include scientific understanding, tools and natural limits of predictability, and said he expected advances to include better scientific understanding, computing capability and institutional coordination.

Ghassem Asrar, WCRP, highlighted the need for shorter transition times between knowledge development and use, and the challenge of bringing applied science to regional and local levels to address specific user needs. He said scientists should take advantage of existing networks by feeding their work into the UN system.

Decadal variations in Atlantic hurricane activity





The dais during the working session on "Climate and Human Health"

CLIMATE AND HUMAN HEALTH

Roberto Bertollini, World Health Organization (WHO), chaired this working session on Tuesday afternoon. Maria Neira, WHO, said the potential for a climate-informed health sector is not fully utilized. Judy Omumbo, IRI, noted the need for tropical climate and disease monitoring stations at relevant temporal and spatial scales. Participants questioned the quality of health data and the ability to identify relevant partners. David Rogers, Health and Climate Foundation, presented early warning health system priorities, such as a global malaria plan and heat wave predictions. He stressed that the distinction between weather and climate is disappearing in modeling. Giampiero Renzoni, National Planning Department, Colombia, outlined efforts to integrate climate and health ministries at national, regional and local levels. Saying "if you can't measure it, you can't manage it," Glenn McGregor, University of Auckland, stressed the need for integrated health and climate data systems. Ellie Hopkins, Global Changemaker (youth), suggested young people are not aware of the relationship between health and climate change, and stressed the need for personal links to motivate action.

CLIMATE AND SUSTAINABLE ENERGY

Lučka Kajfež Bogataj, University of Ljubljana, Slovenia, chaired this working session on Tuesday afternoon. Christopher Oludhe, University of Nairobi, Kenya, stressed the need for tailored climate information to ensure efficient production and consumption of energy. Ivan Vera, UN Department of Economic and Social Affairs (UNDESA), noted the vulnerability of the energy sector to climate change due to its aging infrastructure. Dolf Gielen, UN Industrial Development Organization (UNIDO), stressed that adaptation information needs to include location choice, changing resource availability, and correct technical data. Vladimir Tsirkunov observed that the energy sector needs strong climate services, including long-range weather forecasts and satellite imagery.



Participants during the session on "Climate and Sustainable Energy"



Participants during the session on "Seasonal-to-Interannual Climate Variability"

Ashraf Ramadan, Kuwait Institute for Scientific Research, noted a greater momentum in Kuwait for utilizing renewable energy technologies. Alberto Troccoli, CSIRO, noted that information gaps in the energy sector include vulnerabilities to extreme weather events, long-term climate observations, and consistency between observation-based products and prediction models. Amare Abebaw, Global Changemaker, noted the need for technical and financial support for the establishment of renewable energy technologies in Africa.

Participants discussed the availability of historic climate data, and energy efficiency.

SEASONAL-TO-INTERANNUAL CLIMATE VARIABILITY

Christof Appenzeller, MeteoSwiss, chaired this working session on Tuesday afternoon. Tim Stockdale, ECMWF, said the quality of information produced is critically dependent on the quality of models, and only when model errors are reduced are the benefits of improved observation realized. Lisa Goddard, IRI, defined climate information users as not just climate risk managers and decision makers, but also sectoral, health, energy and disaster experts, climate scientists, the media and the general public. She highlighted the need for climate information to be communicated with appropriate timeliness, at a spatial scale with the specificity needed to render it useful.

In-Sik Kang, Seoul National University, Korea, highlighted the need for high-resolution data to reduce parameterization, and underscored the need for international cooperation and a scientific climate equivalent to the European Organization for Nuclear Research (CERN). Leonard Njau, African Centre of Meteorological Application and Development, said modeling alone is not the solution, and that other predictors and indices should be considered. Jagadish Shukla, George Mason University, US, emphasized the need for climate justice, and open and free access to the best forecasting available worldwide. He urged sustained effort for model development. In summarizing the session, Ben Kirtman, University of Miami, US, highlighted scale, improved seasonal prediction, introduction of new sources of predictability, and the need for better parameterization.

CLIMATE AND WATER

Pavel Kabat, Wageningen University, Netherlands, chaired this working session on Tuesday afternoon. Eugene Stakhiv, Institute for Water Resources, noted that socioeconomic factors, land use, conflict and population dynamics will dominate future conditions for adaptation. Kapil Dev Sharma, National Rainfed Area Authority, India, stressed that robust solutions should be encouraged for adapting to climate change. Igor Shiklomanov, State Hydrological Institute, the Russian Federation, noted the wealth of experience available in water management that could be applied to adaptation and mitigation.

options. Cecilia Tortajada, Third World Centre for Water Management, stressed that climate change issues should be at the core of efficient water resource management. Ziniou Xiao, CMA, stressed that the response of the water sector to climate change should be given more attention. Upmanu Lall, Columbia Water Center, said that the water sector is the medium through which most individuals suffer climate change, yet it is also a tool for climate change adaptation options.

Participants discussed the need for interdisciplinary work between the water and climate sectors and the usefulness of current climate modeling in the water sector.

CLIMATE, TRANSPORTATION AND TOURISM

This working session took place on Tuesday afternoon. On tourism, Daniel Scott, UN World Tourism Organization (UNWTO), said climate change is the greatest 21st century challenge to sustainable tourism. He noted that the Internet and smart phones are revolutionizing methods of obtaining climate and weather information. Jean-Paul Ceron, National Center for Scientific Research, France, questioned how much meteorological information is needed, noting that we can live with a certain degree of uncertainty. Alain Dupeyras, Organization for Economic Cooperation and Development, stressed the need to integrate climate considerations into tourism policies. Ulrich Trotz, Caribbean Community Climate Change Centre, highlighted the need to bridge the gap between the climate information providers and the user community.

On transport, Geoffrey Love, WMO, elaborated on mitigation options for the sector and the effects of extreme hydro-meteorological events. He said the sector requires climate information services on short-term weather and on long-term climate scenarios. Sibylle Rupperecht, International Road Federation, said services should facilitate the consideration of climate change for better land-use planning. Jean Ândrey, University of Waterloo, Canada, said adaptation and mitigation are equally important measures in the transport sector. Margrethe Sagevick, International Union of Railways, said the establishment of sustainable transport systems should consider different transport modes jointly. Carolina Figueroa, Global Changemaker, underscored the costs of climate information services and said the poor should not be burdened with these costs.

CLIMATE AND COMMUNITIES

Maarten Van Aalst, International Federation of Red Cross/Red Crescent, chaired this forum on Tuesday afternoon. Maksha Ram Maharjan, CARE Nepal, highlighted the success of community forestry in Nepal. He stressed the challenge of integrating local knowledge into national level plans.

Roger Street, UK Climate Impacts Programme, described the importance of trust in partnership development. He stressed the need for a better understanding of decision-making processes under uncertainty. Felipe Lucio, WMO, highlighted that: information is generally too technical for user groups; information providers often lack understanding of local decision making; and providers need to manage expectations of users regarding products and capabilities. Arame Tall, Red Cross/Red Crescent, presented examples of early actions to mobilize resources, based on forecasts, in West Africa. She highlighted bottlenecks in implementation, including communication barriers, transmission barriers, non-salience of information and mistrust. On trust, a participant underscored the potentially positive roles of neighbors in information provision.

CLIMATE ADAPTATION AND THE COPENHAGEN PROCESS

Helen Plume, Chair of the UNFCCC Subsidiary Body for Scientific and Technological Advice, chaired the roundtable discussion on Tuesday afternoon. She raised questions on: how UNFCCC's needs feed into the GFCS; how GFCS can support the UNFCCC; and what support is needed for the framework implementation. Ko Barrett, US National Oceanic and Atmospheric Administration, stressed a need for adaptation action, particularly investment in monitoring and research, open data policies, and solution identification. Richard Muyungi, Government of Tanzania, underscored the importance of links between international, national and regional levels in the framework implementation. He suggested the lack of implementation of National Adaptation Programmes of Action is due, in part, to funding constraints. Minoru Kuriki, Foundation of River & Basin Integrated Communications, stressed the usefulness of information on extreme events rather than averages for user groups. Avinash Tyagi, WMO, underscored the need for international support, institutionally supported service information systems, satellite and terrestrial monitoring, and new approaches to modeling. Jian Liu, UNEP, highlighted the importance of a user/supplier interface. Alain Lambert, UN Development Programme, suggested that financing would likely be contingent on governance commitments.

Roberto Acosta, UNFCCC, said political will to address mitigation is currently higher than in 1997, when the Kyoto Protocol was agreed. Plume and Barrett highlighted that a climate services framework would be complementary to, and informed by, the Nairobi Work Programme on adaptation. Liu proposed that the IPCC create a vulnerability index. Jean-Pascal van Ypersele, IPCC Work Group 2 Vice-Chair, said vulnerability is based on value judgments. Muyungi



L-R: Avinash Tyagi, WMO; Richard Muyungi, Office of the Vice-President, Tanzania; Ko Barrett, US National Oceanic and Atmospheric Administration; Minoru Kuriki, Foundation of River and Basin Integrated Communications, Japan; and Session Chair Helen Plume, Chair of the Subsidiary Body for Scientific and Technological Advice under the UNFCCC



A view of the dais during the session on "Climate Extremes, Warning Systems and Disaster Risk Reduction"

said vulnerabilities are already well known and, with Tyagi, highlighting the need for national governments to feel ownership of the framework implementation.

CLIMATE EXTREMES, WARNING SYSTEMS AND DISASTER RISK REDUCTION

Margareta Wahlström, UNISDR, chaired the plenary session on Wednesday morning. She asked the panel to identify the role of climate information in reducing risks, challenges and constraints in climate information, and risk reduction mechanisms. Paulo Zucula, Minister of Transport and Communication, Mozambique, underscored the importance of a people-centered early warning system for vulnerable populations and stressed the goal of looking at natural disasters as opportunities. Hasan Mahmud, State Minister for Foreign Affairs, Bangladesh, highlighted government measures on disasters including a shift from relief-based to vulnerability-reduction approaches. He called for increased climate change adaptation funding.

Maxx Dilley, UNDP, said history is a good first approach to forecasting, but climate change has challenged the principle of stationarity to risk management, since it is not known anymore if a 50-year flood will begin occurring, for instance, once every ten years. He stressed that other drivers of risk, such as population and urbanization are also changing very rapidly. Madeleen Helmer, Red Cross/Red Crescent, said climate change is eroding traditional weather knowledge. She underscored the challenge of bringing climate knowledge from satellites and capitals to isolated communities.

Ulrich Hess, WFP, underscored the viability of weather-index insurance to rural communities for disasters, the importance of using weather indices to lower costs and reduce moral hazard, and the need for increased data. Walter Baethgen, IRI, called for providers of climate service information to target existing chains of information rather than end users, to provide actionable information, and to document success stories. Lianchun Song, CMA, highlighted the need for: spatial vulnerability analyses; increased use of media for hazard awareness; and better provision of information for decision makers. Maryam Golnaraghi, WMO, said a risk reduction program has three components: risk assessment; tools for risk reduction; and utilization of financial risk markets. She stressed product development should be driven by sectoral needs.

The ensuing discussion considered, among other things, how to: link scientific data with social and economic data; scale up pilots; and bring climate insurance to countries with few meteorological observations.



Ulrich Hess, WFP

MAINSTREAMING CLIMATE INFORMATION

Martin Parry, Imperial College of London, UK, chaired the plenary session on Wednesday morning. He underscored



Martin Parry, Imperial College of London, UK

that the scale of the adaptation challenge is dependent on when mitigation options are undertaken. Thomas Downing, Stockholm Environment Institute, said the value of climate information is in reducing uncertainty for decision making. He stressed that adaptation is a socio-institutional process, rather than a specific capacity or outcome. He called for a community of practice with

validated experiences for adaptation, and highlighted the challenge of building institutional capacity. Laban Ogallo, Intergovernmental Authority on Development, noted that without mainstreaming climate information into development policies, goals such as regional cooperation, food security and economic strength cannot be achieved. Underscoring the need for increased capacity amongst sector experts, he stressed that continued partnership and collaboration was necessary.

Questioning what information is needed and what action can be taken now, Amadou Gaye, University of Dakar, Senegal, highlighted the priority of addressing current vulnerabilities. Jürgen Lefevere, European Commission (EC), said the impact of mitigation efforts is not adequately understood and that adaptation is not a process, but a decision. He highlighted the importance of institutional commitments and said addressing funding questions will be a prerequisite to progress in Copenhagen. Anand Patwardhan, Indian Institute of Technology, noted that the terms data, information, services and knowledge, while quite distinct in meaning, are being used indistinctly. Tara Shine, Irish Aid, said adaptation is a process that will be long and difficult. She stressed that information for adaptation will have to evolve over time.

CLIMATE AND BIODIVERSITY AND NATURAL RESOURCE MANAGEMENT

Anne Larigauderie, DIVERSITAS, chaired this working session on Wednesday afternoon. Brendan Mackey, Australian National University, highlighted the two-way relationship between climate and biodiversity, and called for finely-tuned biodiversity monitoring data. Eduard Müller, University for International Cooperation, Costa Rica, highlighted that the impacts of climate change on biodiversity include fewer pollinators, loss of habitat connectivity, changing species distributions, and invasive species. Jian Liu, UNEP, stressed the critical role of ecosystems for both adaptation and mitigation. Lynda Chambers, Centre for Australian Weather and Climate Research, underscored spatial variation in quality



Working session on "Climate and Biodiversity and Natural Resource Management." L-R: Brendan Mackey, Australian National University; Eduard Müller, University for International Cooperation, Costa Rica; Jian Liu, UNEP; and Lynda Chambers, Centre for Australian Weather and Climate Research.

and availability of data, stressing the potential role of citizen scientists. Mike Rivington, Macaulay Land Use Research Institute, highlighted the challenge of management for multiple objectives. David Lawless, Global Changemaker, called for ecosystem-based management to be part of a Copenhagen agreement. Eugene Takle, Iowa State University, US, said it is often unknown how ecosystems work until they malfunction, and identified biodiversity-relevant indicators that could be useful to monitor.

Group recommendations included a better representation of functional roles of biodiversity, the development of biodiversity monitoring networks, integration of local community knowledge, and the facilitation of shared information.

CLIMATE AND MORE SUSTAINABLE CITIES

Matthias Roth, National University of Singapore, chaired this working session on Wednesday afternoon. Gerald Mills, University College Dublin, Ireland, said cities are not and cannot be sustainable. Noting that global models are not applicable for cities, he stressed the need for guidelines based upon evidence and supported by real world examples. Sue Grimmon, King's College London, UK, underscored the need to develop city-scale models and tools that accommodate the wide differences in data availability. She underscored the need for more urban observations and vertical data.

Tim Oke, University of British Columbia, Canada, said the implications of global change on cities have been inadequately assessed and knowledge transfer into design of sustainable cities has been ineffective. Yinka Adebayo, WMO, underscored the lack of information on tropical cities. Paola Deda, UN Economic Commission for Europe (UNECE), underscored the need for climate models that can be used and understood by urban planners, as well as a checklist of sustainable practices. Noting that city planning and management is a dynamic process involving many actors, Michael Hebbert, University of Manchester, UK, said information should target not only architects and designers, but also politicians, construction business and the informal sector. Zifa Wang, Institute of Atmospheric Physics, China, underscored the climate

information needs of arid and semi-arid cities. Mathias Rotach, MeteoSwiss, said high-resolution models should consider the physical properties of urban areas appropriately.

BUSINESS AND INDUSTRY

Jacqueline Coté, International Chamber of Commerce, Switzerland, chaired this forum on Wednesday afternoon. Juan Carlos Castilla-Rubio, CISCO, noted that businesses can mobilize large-scale capital flows that may be necessary for mitigation and adaptation. Jean-Yves Caneill, Electricité de France, noted that EU regulations mean most European businesses now have mitigation programs. He stressed that his company has a large research and development program for adaption to climate change. Juan Gonzalez-Valero, Syngenta, stressed that climate models need to focus on very long-term aspects, as the business sector considers strategies and options on that time scale. Christophe Nuttall, UNDP, underscored enabling environments, good governance and collaboration within the private sector as essential for a low-carbon business sector that can meet adaptation and mitigation challenges. Participants discussed the greenhouse gas contribution of petroleum companies, the strategies business use to approach climate change problems, and a policy initiative, the UN Global Compact, for business to create environmentally sustainable and socially responsible practices.

CLIMATE AND FOOD SECURITY

Alexander Müller, FAO, chaired this working session on Wednesday afternoon. Jerry Hatfield, US Department of Agriculture, noted that growing food demand, coupled with increased land competition, will require more efficient production in the agricultural sector. On key information needs, Pramod Kumar Aggarwal, Indian Agricultural Research Institute, stressed the need to strengthen research to understand the complexities of all risks faced. René Gommès, FAO, noted that human capacity, scientific understanding and methodologies in agriculture have improved over the previous decades. Jim Salinger, University of Auckland, New Zealand, highlighted the need for changing climate forecasts and strategies for using these in the face of climate change. Giampero Maracchi, Institute of Biometeorology, Italy, underscored that more local production is needed to decrease agriculture's carbon footprint. Juan Gonzales-Valero, outlined available technologies such as crop growth regulation, which can help adapt to a changing climate. Beatriz Lozada, National Institute for Agricultural Research, Venezuela, stressed food availability and prices as food security issues for Latin America. Jan Delbaere, WFP, emphasized timely climate and vulnerability information as essential for strengthening food security.



A forum session on "Business and Industry." L-R: Juan Carlos Castilla-Rubio, CISCO; Jean-Yves Caneill, Electricité de France; Christophe Nuttall, UNDP; Moderator Jacqueline Coté, International Chamber of Commerce, Switzerland; and Juan Gonzalez-Valero, Syngenta.



Working session on "Climate of Oceans and Coasts." L-R: Poul Degnbol, Institute for Fisheries Management and Coastal Community Development; Isabelle Niang, University of Dakar, Senegal; Ralph Rayner, Institute of Marine Engineering, Science and Technology; Session Chair Ed Hill, National Oceanography Centre, UK; Martin Visbeck, IFM-Geomar; Nathan Bindoff, University of Tasmania, Australia; and Thomas Malone, University of Maryland, US.

Participants discussed the use of traditional knowledge in developing strategies for food security, the strengthening of food security on the political agenda, and the role of alternative food sources.

CLIMATE OF OCEANS AND COASTS

Ed Hill, National Oceanography Centre, UK, chaired this working session on Wednesday afternoon. Thomas Malone, University of Maryland, US, presented on the need for repeated monitoring of quantitative indicators. He presented priorities, and highlighted the need to establish regional efforts and support capacity building. Nathan Bindoff, University of Tasmania, Australia, highlighted recent advances in global ocean monitoring, while noting the limitations of satellite monitoring. Ralph Rayner, Institute of Marine Engineering, Science and Technology, highlighted the likely future regulatory role of oceanographic monitoring. Isabelle Niang-Diop, University of Dakar, Senegal, underscored the importance of the ocean for coastal populations, and the need to include developing country scientists in monitoring. Poul Degnbol, EC, focused on the user perspective, highlighting that many users are located inland. He called for greater public access to data. Keith Alverson, UNESCO, called for increased engagement and funding, and for broader agency involvement. Martin Visbeck, summarized recommendations by highlighting the importance of oceans in a climate services framework, and the need for a strengthened observation system alongside capacity building.

REGIONAL CLIMATE INFORMATION FOR RISK MANAGEMENT

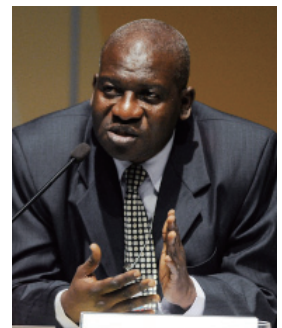
Kok Seng Yap, Malaysian Meteorological Department, chaired this working session on Wednesday afternoon. Edwin Aldrian, Agency for the Assessment and Application of

Technology, Indonesia, underscored the Regional Climate Outlook Forums (RCOFs). He highlighted the need for historical databases of sectoral impacts, regional cooperation, and translating forecasts into actionable information. Rodney Martínez, International Research Centre on El Niño, Ecuador, said early warning is successful when it triggers a stakeholder response. Noting that climate change scenarios are not appropriate for planning, he stressed the need for decadal-scale information. He highlighted the needs for innovative information dissemination, regional adjustments of El Niño predictions, and free access to information.

Kiyoharu Takano, Japan Meteorological Agency, said it is necessary to continuously improve technology capability. Christopher Cunningham, Centre for Weather Forecast and Climate Studies, Brazil, said all real-time and historical data should be made freely available by the institution in charge of the climate GFCS. Richard Graham, UK Met Office, underscored the need to strengthen the relationship between global and local forecasters. Abdellah Mokssit, National Centre of Meteorological Research, Morocco, underscored the role of climate center managers in dealing with policymakers and the sustainability of meteorological infrastructure. Joanna Wibig, University of Lodz, Poland, said it is time to include the feedbacks between the climate and the biosphere in models.

COMMUNICATING CLIMATE INFORMATION

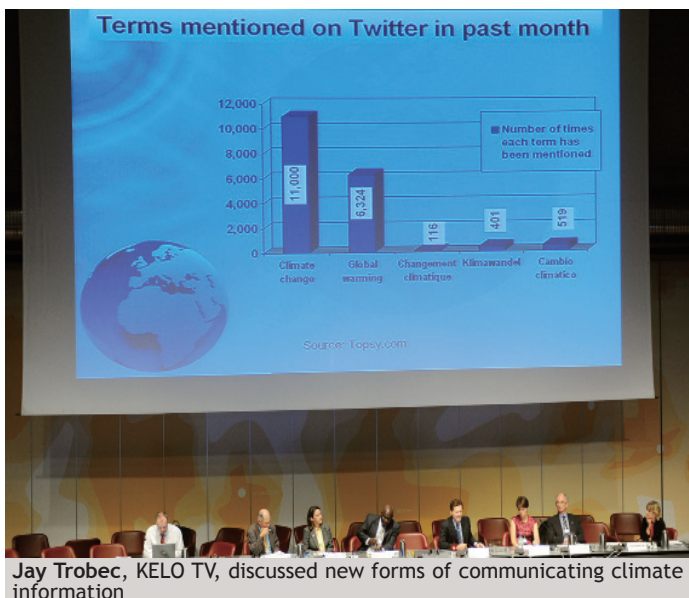
Claire Martin, CBC News, Canada, chaired the roundtable discussion on Wednesday afternoon. Gordon McBean discussed the role of media in conveying climate change information. He questioned the use of "naysayers" by journalists, and suggested reframing the issue to depict the crosscutting nature of climate change. Susan Powell, BBC, noted that new forms of media are now available, allowing additional programming on climate change that might otherwise not have been aired. Jay Trobec, KELO TV, underscored the large amount of climate information communicated by social media. He stressed that social media allows opinions to be broadcasted that may be incorrect. Patrick Luganda, Farmers Media Link Ltd, noted that a middle ground needs to be established between climate scientists and journalists. He stressed that there are information gaps in the knowledge base due to lack of operational infrastructure. Donna Charlevoix, GLOBE Program, emphasized the inclusion of the youth perspective when creating policies and strategies for climate



Patrick Luganda, Farmers Media Link Ltd



Working session on "Regional Climate Information for Risk Management." L-R: Kiyoharu Takano, Japan Meteorological Agency; Joanna Wibig, University of Lodz, Poland; Abdellah Mokssit, National Centre of Meteorological Research, Morocco; Richard Graham, UK Met Office; Christopher Cunningham, Centre for Weather Forecast and Climate Studies, Brazil; and Session Chair Yap Kok Seng, Malaysian Meteorological Department.



change. Daniel Wermus, Media 21, said that journalism was still necessary to allow for clarity and criticism when broadcasting climate information.

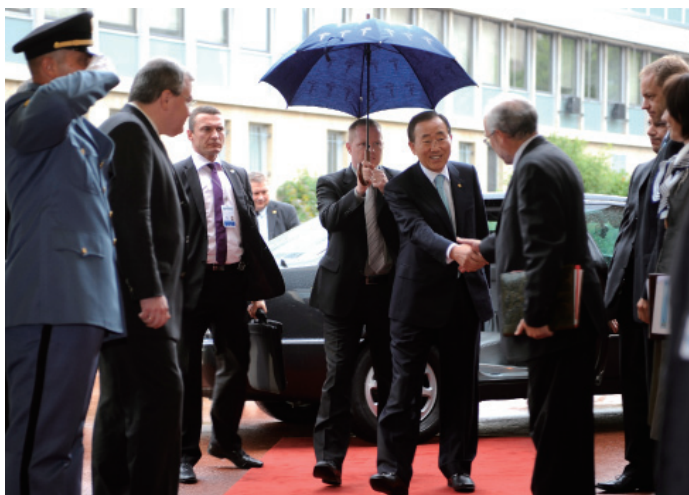
Participants discussed, among other things, the media's preference for entertainment over journalism, the need for explaining climate change messages in order for them to be understood across all ages and levels of understanding, and opportunities that can be exploited between sectors.

HIGH-LEVEL SEGMENT

The high-level segment opened on Thursday morning and lasted through Friday afternoon. On Thursday morning the high-level segment adopted, by acclamation, a conference declaration deciding to establish the GFCS. A conference statement was also presented.

OPENING OF HIGH-LEVEL SEGMENT: Moritz Leuenberger, Minister of Transportation, Energy, Communications and the Environment, Switzerland, underscored the conference's goal of developing the GFCS and called for an entry into a century of climate enlightenment.

UN Secretary-General Ban Ki-moon stressed the need for an ambitious, comprehensive and fair agreement in Copenhagen based on sound science, and underscored that only 15 negotiating days remain before COP15. Highlighting that investment to meet climate targets represents 2% of global GDP between now and 2030, he said the answers lie in policy that



UN Secretary-General Ban Ki-moon arrived for the opening of the High-level Segment

puts a price on carbon, global public programs for renewable energy, and creative solutions to protect forests and ecosystems. He called for action in the following areas: adaptation to impacts of climate change with fast-tracked funding for LDCs and SIDS; ambitious mid-term targets by developed countries; action by developing countries to slow emissions growth; predictable financial and technical support; and institutional relationships to address developing country needs.



UN Secretary-General Ban Ki-moon

Noting that IPCC's work is supported by data and information, Rajendra Pachauri, IPCC Chair, stressed that climate information and observations need more detail and should be broader in focus. He also highlighted the need for continuous data, as well as monitoring climate impacts. He said the co-benefits of embarking on mitigation programs as soon as possible would include increased energy security, lower air pollution, and increased employment. Alexander Bedritsky stressed the need for the establishment of linkages at the local, national and international levels, continued capacity building, and outreach to the public. Participants adopted the conference declaration by acclamation.



Rajendra Pachauri, IPCC Chair

Declaration: In the conference declaration, the heads of state, ministers and heads of delegation present at WCC-3, *inter alia*: decide to establish a global framework for climate services to strengthen production, availability, delivery and application of science-based climate prediction services; request WMO to convene an intergovernmental meeting within four months to approve the terms of reference and approve the composition of a high-level task force, and decide that the task force shall prepare a report on the development and implementation of the framework, to be considered by the 2011 WMO Congress.

Statement: The statement highlights the urgent need for closer partnerships between the users and providers of climate services in order to take advantage of existing climate information; supports the development of the Global Framework for Climate Services; and calls for strengthening the Global Climate Observing System, the World Climate Research Programme, sector-oriented information to support adaptation, interface mechanisms to disseminate climate information, and efficient and enduring capacity building.

ADDRESSES BY HEADS OF STATE AND GOVERNMENT: Armando Emilio Guebuza, President of Mozambique, stressed the importance of strengthening early warning systems and improving water management. He urged developed countries to fulfill all relevant international commitments.

Emomalii Rakhmon, President of Tajikistan, highlighted climate change impacts on water resources, particularly in central Asia. He stressed the need for an international effort to "save glaciers," and for greater use of hydropower to meet energy needs. Prince Albert II of Monaco noted the many advances made by science have allowed for an expanded knowledge base for Copenhagen. Girma Wolde Giorgis, President of Ethiopia, noted areas for action, including the



L-R: Girma Wolde Giorgis, President of Ethiopia; Prince Albert II, Head of State of Monaco; Michel Jarraud, WMO Secretary-General; Moritz Leuenberger, Federal Councillor and former President of Switzerland; Armando Emilio Guebuza, President of Mozambique; UN Secretary-General Ban Ki-moon; Hui Liangyu, Vice-Premier of China; Ali Mohamed Shein, Vice-President of Tanzania; Sheikh Hasina, Prime Minister of Bangladesh; Toke Talagi, Premier of Niue; Jim Marurai, Prime Minister of the Cook Islands; Emomali Rakhmon, President of Tajikistan; Alexander Bedritsky, WMO President; and Sergei Ordzhonikidze, Director-General of UN Office at Geneva

establishment of adaptation and mitigation efforts, and the preparation of already formulated national action plans. He stressed the need for effective communication of extreme weather events and capacity building. Danilo Türk, President of Slovenia, stressed accurate and timely information and called for users' needs to drive the systems for addressing climate change. He noted that strong commitment and cooperation amongst stakeholders was imperative. Ali Mohamed Shein, Vice President of Tanzania, said that the impact of disasters highlights the importance of climate services, and he called for increasing the number of meteorological stations, developing capacity and creating interaction between providers and users.

Sheikh Hasina, Prime Minister of Bangladesh, highlighted the advantages that could be brought by enhancing the technological delivery and capacity of climate services, particularly in LDCs. She said US\$2 billion is needed for LDC adaptation funds over next five years and highlighted the lack of benefits from the Clean Development Mechanism. Hui Liangyu, Vice Premier of China, stressed the need to improve climate service capabilities and systems. Emphasizing commitment to the UNFCCC, he underscored the principle of common but differentiated responsibilities. Toke Talagi, Premier of Niue, highlighted the urgent need for the Pacific Island states already facing increased sea levels to obtain adaptation funds. He also expressed concern for the future of Pacific Islanders, as many are dependent on the sea for their livelihoods. Jim Marurai, Prime Minister, Cook Islands, noted that SIDS need an urgent commitment to reducing greenhouse gases. He called for the GFCS to address the vulnerability of SIDS to extreme climate events.

ADDRESSES BY HEADS OF INTERNATIONAL ORGANIZATIONS: Michel Jarraud highlighted the need to provide decision makers with the climate tools they require to make decisions for effective action against climate change. Koichiro Matsuura, Director-General of UNESCO, stressed that a key outcome of a GFCS should be the dissemination of climate information to enable effective action against climate change. He also emphasized the importance of

capacity building. Achim Steiner, Executive Director of UNEP, highlighted the role of science in informing management and decision making. Alexander Müller, Assistant Director-General of FAO, noted the significant mitigation options offered by agriculture and highlighted the benefits agriculture can receive from enhanced climate services. Catherine Bréchnac, President of the International Council for Science, emphasized the need for North-South cooperation in establishing the GFCS.

Margaret Chan, Director-General of WHO, stressed the adverse health effects that climate change will have on humans, particularly those in marginalized communities. Helen Clark, UNDP Administrator, said the UNDP believes it is necessary to bring climate challenges into the heart of development strategies. Otaviano Canuto, Vice President of the World Bank, noted that investment in knowledge improvement is most important as it greatly reduces uncertainties in climate prediction. Efthimios Mitropoulos, Secretary-General of the International Maritime Organization, noted that melting polar ice caps are both an advantage through increased tourism, transport and trade, and a disadvantage as the increased sea levels may adversely affect vital shipping lines. Francis Gurry, Director General of the World Intellectual Property Organization, stressed that intellectual property is a part of the solution for addressing climate change, not the problem.

Hamadoun Touré, Secretary-General of ITU, noted that their work on digital broadcasting and next-generation networks would aid the fight against climate change through reduced power consumption and increased efficiency. Yasemin Aysan, Under Secretary General of the International Federation of Red Cross and Red Crescent Societies, noted that preparedness to hazardous climate events is created through helping communities to understand the problem, trust the information provided and know how best to react. Taleb Rifai, Secretary-General, UNWTO, said that the tourism sector has to acknowledge its contribution to climate change. Ján Kubiš, Executive Secretary of UNECE, highlighted that in assisting the establishment of the GFCS, UNECE has legal instruments that can contribute to the timely access of information.



L-R: Jane Lubchenco, US Under Secretary of Commerce for Oceans and Atmosphere and Administrator of the National Oceanic and Atmospheric Administration; and Sheikh Hasina, Prime Minister of Bangladesh

Harsha Singh, Deputy Director-General of the World Trade Organization, underscored the importance of multilateral cooperation in combating climate change.

Anada Tiéga, Secretary General of the Ramsar Convention, said that a better understanding of wetlands will contribute to climate prediction and modeling activities. Ahmed Djoghla, Executive Secretary of UN Convention on Biological Diversity, called for a greater understanding of climate change's interaction with biodiversity loss, and the associated feedbacks. Grégoire de Kalbermatten, Deputy Executive Secretary of UN Convention to Combat Desertification (UNCCD), noted that UNCCD will contribute to GFCS through their thematic programme at the regional level, and establishing desertification monitoring centers.

ADDRESSES BY CONFERENCE SPONSORS: Jane Lubchenco, US Under-Secretary of Commerce for Oceans and Atmosphere, noted that improving the development and delivery of climate services offers benefits to society including health, economic development and food security. Åsa-Britt Karlsson, State Secretary for Environment, Sweden, on behalf of the European Union, welcomed the adoption of the GFCS and highlighted the need for information provision to be driven by user needs, requiring coordination between agencies. Håkon Gulbrandsen, State Secretary for International Development, Norway, noted that efforts to address climate change should take a multi-sectoral approach. Gernot Erler, Minister of State at the Federal Foreign Office, Germany, stressed the need for a consensus on goals, and noted the potential for a follow-up conference in Germany.

Paavo Väyrynen, Minister for Foreign Trade and Development, Finland, underscored the need for climate services to enable long-term development and natural disaster



L-R: Teresa Ribera Rodríguez, Secretary of State for Climate Change, Spain; and Robert Persaud, Minister of Agriculture, Guyana

preparation. He highlighted Finland's responsibility of sharing climate service knowledge. Roberto Menia, Under Secretary of State for the Ministry of Environment, Italy, called for maintaining momentum to make the GFCS operational as soon as possible. Kunio Sakurai, Director-General, Japan Meteorological Agency, noted that the GFCS will promote the application of counter measures against adverse climate events.

Teresa Ribera Rodríguez, Secretary of State for Climate Change, Spain, stressed the link between addressing climate change and reaching the Millennium Development Goals (MDGs) and highlighted that a Copenhagen agreement should be effective, equitable and flexible. Shailesh Nayak, Ministry of Earth Sciences, India, noted that his country had taken steps to improve its land network for climate observation. Brian Gray, Science and Technology Branch, Environment Canada, stressed the importance of building stronger international linkages between the providers and users of climate information. Ashfaq Ahmad, Minister of State, Pakistan, said there was an urgent need to address the lack of climate information in the region. Gary Foley, the permanent representative of Australia to the WMO, noted that the objective of an effective climate service would be to ensure that correct information reaches the correct users for effective decision making.

John Njoroge Michuki, Minister for Environment and Mineral Resources, Kenya, called upon the international community to support global atmospheric weather stations, early warning systems, programs for enhancing forest cover, and development of national climate change strategies in developing countries. Amb. Jean-Baptiste Mattéi, France, stressed the need of financing for national adaptation strategies and for observation and monitoring. Alexander Bedritsky, Head of Roshydromet, the Russian Federation, highlighted that the GFCS will act as the basis for specifying opportunities and risks for political decisions. Amb. Peter Gooderham, UK, noted that engagement between the users and providers of climate information would lead to the availability of new products. Ιωάννης Ζιώμας, Chairman of the National Center for Environment and Sustainable Development, Greece, suggested that adoption of sectoral targets may be realistic short-term approaches for Annex I countries, and stressed the need to strengthen financing and technology transfer for mitigation and adaptation.

ADDRESSES BY MINISTERS: Antouman Saho, Minister of Fisheries, Water Resources and National Assembly Matters, the Gambia, stressed that adaptation measures are a right for all people. Pierre Hele, Minister of Environment and Protection of Nature, Cameroon, highlighted Africa's vulnerability to climate change impacts and called for more financing for the support of technological innovations for conservation. Ayikoe Kossivi, Minister of Environment and Forestry Resources, Togo, noted the challenges of accessing effective observation equipment. Humberto Rosa, Secretary of State for Environment, Portugal, stressed the need for long-term adaptation financing, as well as accurate meteorological data, as an outcome of the Copenhagen COP. Paul Magnette, Minister for Climate and Energy, Belgium, underscored that an agreement in Copenhagen should not be perceived as a burden or constraint but as an opportunity. Robert Persaud, Minister of Agriculture, Guyana, called for holistic approaches that strengthen climate services, increase adaptation, protect ecosystems and realize economic development, highlighting incentives to avoid deforestation. Rhoda Peace Tumusiime,

Commissioner for Rural Economy and Agriculture, African Union, underscored the vulnerability of Africa and highlighted the decision for Africa to speak with one voice at COP15.

Heherson Alvarez, Presidential Advisor on Global Warming and Climate Change, Philippines, said adaptation will only be feasible if there is an agreement on mitigation. Mahinda Samarasinghe, Minister of Disaster Management and Human Rights, Sri Lanka, highlighted that the multi-stakeholder approach encouraged by the GFCS will encourage a wide range of inputs that improve eventual outcomes. Jan Dusik, Deputy Minister of Environment, Czech Republic, noted the phased approach to establishing an adaptation framework adopted by the EU in 2009. John Odey, Minister of Environment, Nigeria, stressed the need to: mainstream climate change into development policies; increase climate data from Africa; and strengthen centers of excellence. Kawkab al-Sabah Dayeh, Minister of State for Environmental Affairs, Syria, called for sustainable development, but stressed that developing countries cannot be asked to sacrifice their growth for the environment.

Carlos Costa Posada, Minister of Environment, Housing, and Territorial Development, Colombia, called for more cost-effective measures to address climate change. Narmin Barziny, Minister of Environment, Iraq, described plans to establish a national meteorological service and highlighted the need for financial and technical support. Maria Evarista de Sousa, Minister of Agriculture and Rural Development, Guinea-Bissau, called for strategic policies for sustainable development that are based on low environmental impact and the use of appropriate technology. Tibor Farago, State Secretary, Hungary, noted that public awareness and the will to combat climate change have become global. Amb. Maria Nazareth Farani Azevêdo, Brazil, said her country was prepared to engage in efforts at the local, national and international levels to improve climate information. Amb. Dian Triansyah Djani, Indonesia, stressed that concerted efforts were needed to address long-term adaptation programs for coastal areas.

El-Hadj Mamady Kaba, Minister of Transport, Guinea, stressed the adverse impacts of climate change on African agriculture. Nicolae Nemirschi, Minister of Environment, Romania, highlighted the importance of the GFCS in bridging the gap between science, users, and policy makers. Khamis bin Mubarak bin Isa Al-Alawi, Minister of Transport and Communications, Oman, noted the GFCS should boost current efforts, capabilities and research for combating climate change. Nicholas Tasunungurwa Goche, Minister of Transport, Communications and Infrastructural Development, Zimbabwe, noted the need to shore up efforts to bridge the information

and awareness gaps that exist between the users and providers of climate information. Tan Yong Soon, Ministry of the Environment and Water Resources, Singapore, stressed that the GFCS will aid countries in building up their knowledge bases, and enabling more informed decisions and policies.

Catherine Namugala, Minister of Tourism, Environment and Natural Resources, Zambia, noted that in Africa, timely climate information can be the difference between life or death. Amb. Rahma Salih Elobied, Sudan, highlighted mechanisms to enhance African and Arab coordination on climate change research and action. Eldana Sadvakasova, Vice-Minister for Environment Protection, Kazakhstan, underscored the importance of coordination and the utility of a road map for climate services. Siniša Stanković, Deputy Minister of Tourism and Environment, Montenegro, expressed a readiness to offer concrete contributions to abating negative consequences of climate change and support for the GFCS. Nikola Ruzinski, State Secretary, Croatia, highlighted the principle of common but differentiated responsibility and action based on respective capabilities.

Lyonpo Pema Gyamtsho, Minister of Agriculture, Bhutan, questioned Bhutan's capacity to adapt to climate impacts without assistance. Jessica Eriyo, Minister of State for Environment, Uganda, highlighted that a lack of climate data has led to greater uncertainty on climate forecasts for developing countries than the rest of the world. Khomoatsana Tau, Ministry of Natural Resources, Lesotho, underscored a limited ability to adapt to climate change without outside aid. Rashed Ahmed ben Fahd, Minister of the Environment and Water, United Arab Emirates, noted the cross-sectoral risks from climate change and adverse climate events. Nadhir Hamada, Minister of Environment and Sustainable Development, Tunisia, stressed that global initiatives undertaken for adaptation to climate change should place particular emphasis on developing countries. Sharifah Zarah Syed Ahmad, Ministry of Science, Technology and Innovation, Malaysia, noted that Malaysia has mainstreamed climate information into their sectoral planning.

Gibert Noël Ouedraogo, Minister of Transport, Burkina Faso, underscored the importance of information and noted that African countries have taken steps to emphasize this in their policies. Mohammed Yahya Zniber, Secretary General of the Ministry of Water and Environment, Morocco, stressed the importance of national strategies for climate change and water and called for mechanisms for national meteorological services to be integrated into regional and international efforts. Gideon Quarcoo, Deputy Minister of Communications, Ghana, highlighted that addressing climate change requires global cooperation. Thomas Becker, Ministry of the Environment, Denmark, said his country is eager to see the task force of the GFCS begin its work. Frits Brouwer, the Netherlands, highlighted international cooperation on information for policy making and underscored the need for global climate monitoring. Amb. Julian Baez, Paraguay, called for cooperation to improve data handling and services to achieve the goal of better climate prediction for users. Amb. Selma Ashipala-Musavyi, Namibia, stressed that the gender dimension of the impacts of climate change should not be overlooked.



Catherine Namugala, Minister of Tourism, Environment and Natural Resources, Zambia



Local musicians performed at WCC-3



Laurent Corbier, World Business Council for Sustainable Development



Amb. Marie-Louise Overvad, Denmark

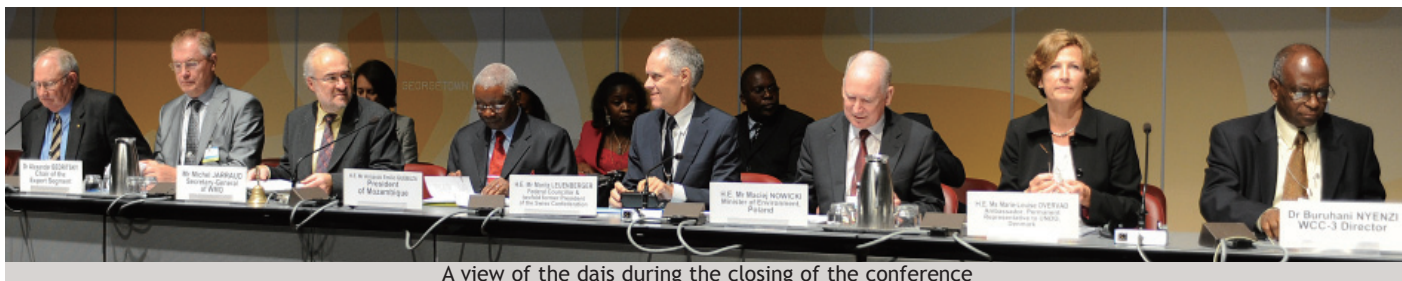
Jose Manuel Silva Rodriguez, Director-General of Research, EC, stressed that the common understanding of the changes and impacts of climate change need to be improved significantly for society to be prepared. Lormus Bundhoo, Minister of Environment and National Development, Mauritius, said the impacts of climate change are already evident in Mauritius, and underscored the need to consolidate RCOF, particularly in Southern Africa. Emile Ouosso, Minister of Transport and Civil Aviation, Congo, underscored the role of forests for climate change, and said ensuring the preservation of the Congo Basin forest requires funding of US\$25 billion. Tiémoko Sangare, Minister of Environment and Sanitation, Mali, emphasized the role for technology transfer in the implementation of climate strategies. Jean Marie Claude Germain, Minister of Environment, Haiti, reminded that his country was hit by four tropical cyclones in 2008, and stressed that the financial crisis is affecting the capability of countries to respond to mounting climate impacts. Antoine Karam, Minister of Environment, Lebanon, said climate change affects all, and there is a need for all to make an exceptional effort in the medium term. Amb. Glaudine Mtshali, South Africa, noted that many developing country policies aim to deliver basic services, but that these are being persistently undermined by the short, medium and long term impacts of climate change.

Maged George Elias Ghattas, Minister of State for Environmental Affairs, Egypt, highlighted regional vulnerabilities and offered to host a regional climate center. Ali-Mohammad Noorian, Vice-Minister of Roads and Transportation, Iran, called on GFCS to address predictions for managing climate-related risk, as well as benefits from the financial and technical support. Nantsag Batsuuri, State Secretary of Nature, Environment and Tourism, Mongolia, highlighted efforts to coordinate high-level meetings of East Asian nations on climate change. Nguyen Van Duc, Vice-Minister of Natural Resources and Environment, Vietnam, highlighted the role of cooperation in creating a successful GFCS. Amb. Idriss Jazairy, Algeria, said the implementation of the GFCS will enhance the level of regional climate modeling, and hoped there is sufficient funding for the GFCS.

ADDRESSES BY INTERNATIONAL

ORGANIZATIONS: Laurent Corbier, World Business Council for Sustainable Development, called for an agreement at COP15 so that business has a clear framework within which to make investment decisions. George Deikun, UN Habitat, noted the importance of recognizing that cities and urban residents are not just victims but one of the causes of climate change, and they should also be a part of the solution. Roberto Acosta, UNFCCC, noted that the GFCS can further develop climate models and predictions especially at the regional level. Gonzalo Pereira, Secretary General of the Comisión Permanente del Pacífico Sur, underscored his organization's program on the study of El Niño. Rene Dändliker, Council of Academies of Engineering and Technological Sciences, urged for free exchange of climate data and information.

CLOSING OF THE HIGH-LEVEL SEGMENT: Maciej Nowicki, Minister of Environment, Poland, highlighted the scientific contributions of the conference and the importance of the GFCS as a tool for connecting user groups to science. He called for delegates to do all they can to reach an effective agreement in Copenhagen. Amb. Marie-Louise Overvad, Denmark, underscored the role of the GFCS to provide tools to empower people to assess vulnerability, understand risk and make well-informed decisions. She called for global leadership to realize an ambitious climate agreement. John Zillman explained that the conference was organized to bring about a paradigm shift towards delivering user-oriented climate information and services. He stressed the strong support from governments and international organizations for the GFCS. Michel Jarraud stressed that the declaration adopted at the meeting was concise, with a clear path forward for establishing the GFCS. He noted that the tools and services to be provided by the GFCS were cross-sectoral and would contribute to the achievement the MDGs. Moritz Leuenberger noted that the adopted declaration allowed for a structure that will enhance the ability to provide information to meet current needs. Armando Emilio Guebuza said the GFCS acts as a demonstration of commitment to address climate change and capacity building in developing countries. He highlighted



A view of the dais during the closing of the conference



WMO Secretary-General Michel Jarraud bids farewell to Armando Emilio Guebuza, President of Mozambique, after the adjournment of WCC-3

that it contributed to the international commitment to reach the MDGs and that it will be an important building block for a Copenhagen agreement. He closed the conference at 4:09 pm.

UPCOMING MEETINGS

UN HIGH-LEVEL EVENT ON CLIMATE CHANGE:

UN Secretary-General Ban Ki-moon will host an all-day high-level event on climate change for Heads of State and Government at United Nations Headquarters on 22 September 2009 at UN Headquarters in New York. For more information, see <http://www.un.org/en/events/>

INTERNATIONAL SYMPOSIUM ON CLIMATE CHANGE AT THE EVE OF THE SECOND DECADE OF THE CENTURY: This meeting will take place from 22-25 September 2009 in Belgrade, Serbia. The symposium will review: global climate change; recent developments in paleoclimate; the use of paleodata to assess the future climate under various greenhouse gas scenarios; and regional climate change. For more information, contact Djordje Sijacki; e-mail: Milankovic09@sanu.ac.rs; Internet: <http://www.sanu.ac.rs/English/Milankovic2009/Milankovic.aspx>

INTERNATIONAL SYMPOSIUM ON ICTS AND CLIMATE CHANGE: This symposium on information and communication technology and climate change will take place on 23 September 2009 in Seoul, Republic of Korea. The symposium will be webcast and participants can participate remotely. For more information, contact: Arthur Levin, International Telecommunication Union; tel: +41-22-730-6113; fax: +41-22-730-5853; e-mail: Arthur.levin@itu.int; Internet: <http://www.itu.int/ITU-T/worksem/climatechange/200909/index.html>

AWG-LCA 7 AND AWG-KP 9: The seventh meeting of the AWG-LCA and the ninth session of the AWG-KP are scheduled to take place from 28 September-9 October 2009 in Bangkok, Thailand. For more information, contact: UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.int; Internet: <http://unfccc.int/>

HIGH-LEVEL MEETING ON AVIATION AND CLIMATE CHANGE: This meeting, organized by International Civil Aviation Organization (ICAO), will meet from 7-9 October 2009 in Montreal, Canada. The meeting will review the Programme of Action recommended by the Group on International Aviation and Climate Change (GIACC). For more information, contact: Environment Section, tel: +1-514-954-8022; fax: +1-514-954-6769; e-mail: envhlm@icao.int; Internet: <http://www.icao.int/HighLevel2009/>

13TH WORLD FORESTRY CONGRESS: This meeting will take place from 18-23 October 2009 in Buenos Aires, Argentina. The meeting's focus is "Forests in development: a vital balance," and will have a day devoted to "Forests and climate change: to Copenhagen and beyond." For more information, contact: Mr. Leopold Martes, Secretary General of World Forestry Congress; tel: +54-11-4349-2104; e-mail: lmontes@cfm2009.org; Internet: <http://www.cfm2009.org>

31ST SESSION OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE: This meeting will take place from 26-28 October 2009 in Bali, Indonesia. Prior to the meeting, Working Groups I, II and III will approve their respective outlines for the Fifth Assessment Report. For more information, contact: the IPCC Secretariat; tel: +41-22-730-8208; fax: +41-22-730-8025; email: ipcc-sec@wmo.int; Internet: <http://www.ipcc.ch>

RESUMED AWG-LCA 7 AND AWG-KP 9: A resumed seventh session of the AWG-LCA and the resumed ninth session of the AWG-KP are scheduled to take place from 2-6 November 2009 in Barcelona, Spain. For more information, contact: UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.int; Internet: <http://unfccc.int/>

CONFERENCE ON AVIATION AND ALTERNATIVE FUELS: This conference, organized by ICAO, will take place from 16-18 November 2009 in Rio de Janeiro, Brazil. This conference will showcase the state of the art in aviation alternative fuels and potential implementation. For more information, contact: ICAO Air Transport Bureau; tel: +1-514-954-8219, ext. 6321; e-mail: envcaaf@icao.int; Internet: <http://www.icao.int/CAAF2009/>

COMMISSION FOR ATMOSPHERIC SCIENCES 15TH SESSION: This meeting will take place from 18-25 November 2009 in Incheon, Republic of Korea. For more information, contact: Michel Beland; tel: +1-514-421-4771; fax: +1-514-421-2106; e-mail: michel.beland@ec.gc.ca; Internet: http://www.wmo.int/pages/prog/arep/cas/index_en.html

UNFCCC COP 15 AND KYOTO PROTOCOL COP/MOP 5: The fifteenth Conference of the Parties to the UNFCCC and fifth Meeting of the Parties to the Kyoto Protocol are scheduled to take place from 7-18 December 2009 in Copenhagen, Denmark. These meetings will coincide with the 31st meetings of the UNFCCC's subsidiary bodies. Under the "roadmap" agreed at the UN Climate Change Conference in Bali in December 2007, COP15 and COP/MOP 5 are expected to finalize an agreement on a framework for combating climate change post-2012 (when the Kyoto Protocol's first commitment period ends). For more information, contact: UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.int; Internet: <http://unfccc.int/>



A mural painted for WCC-3