

SUMMARY OF THE UNFCCC EXPERT GROUP MEETING ON METHODS AND TOOLS AND ON DATA AND OBSERVATIONS UNDER THE NAIROBI WORK PROGRAMME: 4-7 MARCH 2008

The UN Framework Convention on Climate Change (UNFCCC) Expert Group Meeting on Methods and Tools and on Data and Observations under the Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change (NWP) was held from 4-7 March 2008 in Mexico City, Mexico. Approximately 102 participants were in attendance, representing governments, UN agencies and constituted bodies, academia, non-governmental organizations (NGOs) and those contributing as experts. The meeting aimed to identify specific practical actions and recommendations on methods and tools, and data and observations for addressing impacts, vulnerability and adaptation to climate change.

The workshop concluded with a number of recommendations for: assisting in the use and application, advancing dissemination and sharing experiences, and promoting development and improvement of methods and tools; and promoting implementation and improvements, improving capacity for collection of, management and use of, and exchange and access to data and observations.

The report of the workshop will be forwarded to the next session of the Subsidiary Body for Scientific and Technological Advice (SBSTA), scheduled to convene in June 2008. SBSTA 28 is expected to consider further activities, as well as appropriate timing and modalities for their inclusion in the next phase of the NWP based on the results of initial activities, information presented in the IPCC Fourth Assessment Report, and other new scientific information, as well as relevant activities carried out by international and regional institutions. A review and a report on the programme of work are expected at COP 16 in December 2010.

A BRIEF HISTORY OF ADAPTATION TO CLIMATE CHANGE UNDER THE UNFCCC

Climate change is considered to be one of the most serious threats to current and future sustainable development, with adverse impacts already observed on the environment, human health, food security, economic activity, natural resources and physical infrastructure. The international political response to climate change began with the adoption of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, which focused on controlling and responding to changes in the climate. Thus, the UNFCCC sets out a framework for action aimed at stabilizing atmospheric concentrations of greenhouse gases to avoid “dangerous anthropogenic interference” with the climate system. Along with mitigation of greenhouse gases, the UNFCCC also supports countries’ efforts to adapt to the impacts of climate change, through capacity building, technology transfer and funding to support adaptation assessments and projects. The UNFCCC entered into force on 21 March 1994, and now has 192 parties.

MITIGATION: In December 1997, delegates to the third meeting of the Conference of the Parties (COP 3) in Kyoto, Japan, adopted the Kyoto Protocol, which commits developed countries and countries making the transition to a market

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economy to achieve quantified reduction targets for their greenhouse gas emissions. These countries, known under the UNFCCC as Annex I parties, agreed to reduce their overall emissions of six greenhouse gases by an average of 5.2% below 1990 levels between 2008-2012 (the first commitment period), with specific targets varying from country to country. The Protocol also establishes three flexible mechanisms to assist Annex I parties in meeting their national targets: an emissions trading system; joint implementation of emissions-reduction projects between Annex I parties; and the Clean Development Mechanism, which allows for projects to be implemented in non-Annex I parties. To date, there are 177 parties to the Kyoto Protocol, including 38 Annex I parties. The Protocol entered into force on 16 February 2005.

ADAPTATION: Unlike mitigation of greenhouse gases, adaptation to the impacts of climate change is a cross-cutting theme under the UNFCCC. In particular, Convention Article 4.1 states that parties shall “formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to...facilitate adequate adaptation to climate change,” and “cooperate in preparing for adaptation to the impacts of climate change.” Convention Article 4.4 states that developed country parties shall “assist the developing country parties that are particularly vulnerable to the adverse effects of climate change in meeting the costs of adaptation to those adverse effects.” One of the most significant articles for adaptation is Convention Article 4.8, which says that “parties shall give full consideration to what actions are necessary under the Convention...to meet the specific needs and concerns of developing country parties arising from the adverse effects of climate change.” Negotiations under this article laid the groundwork for discussions on adaptation under the UNFCCC. While COP 1 in 1995 addressed funding for adaptation (decision 11/CP.1), it was not until the adoption of the Marrakesh Accords in 2001 that adaptation became a prominent area for action, as set out in decision 5/CP.7 (adverse effects of climate change).

Following consideration of the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), parties initiated a discussion on adaptation at COP 9 in December 2003. At that time, the COP requested the SBSTA to work on scientific, technical and socioeconomic aspects of, and vulnerability and adaptation to, climate change (decision 10/CP.9).

Parties reached a milestone in 2004 at COP 10 with decision 1/CP.10, known as the Buenos Aires Programme of Work on Adaptation and Response Measures. The programme of work was later elaborated on at a workshop in Bonn in October 2005. COP 10 set up two complementary tracks for adaptation: the development of a structured five-year programme of work on the scientific, technical and socioeconomic aspects of vulnerability and adaptation to climate change under SBSTA, which was adopted at COP 11 (decision 2/CP.11); and the improvement of information and methodologies, implementation of concrete adaptation activities, technology transfer and capacity building under the Subsidiary Body for Implementation (SBI). As part of the latter, at the request of the COP, three regional workshops and one expert meeting for small island developing states (SIDS)

were held to facilitate information exchange and integrated assessments to assist in identifying specific adaptation needs and concerns.

NAIROBI WORK PROGRAMME: In November 2006, COP 12 renamed the SBSTA five-year work programme the Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change (NWP). The work programme aims to assist countries, in particular developing countries, including the least developed countries and SIDS, to improve their understanding and assessment of impacts, vulnerability and adaptation, and in making informed decisions on practical adaptation actions and measures to respond to climate change on a sound, scientific, technical and socioeconomic basis, taking into account current and future climate change and variability. To achieve these aims, the NWP has nine areas of work: methods and tools; data and observations; climate modeling, scenarios and downscaling; climate-related risks and extreme events; socioeconomic information; adaptation planning and practices; research; technologies for adaptation; and economic diversification.

The expected outcomes of the NWP are:

- enhanced capacity at the international, regional, national, sectoral and local levels to further identify and understand impacts, vulnerability, and adaptation responses, and to select and implement practical, effective and high-priority adaptation actions;
- improved information and advice to the COP and its subsidiary bodies on the scientific, technical and socioeconomic aspects of impacts, vulnerability and adaptation;
- enhanced development, dissemination and use of knowledge from practical adaptation activities;
- enhanced cooperation among all actors, aimed at enhancing their ability to manage climate change risks; and
- enhanced integration of adaptation to climate change with sustainable development efforts.

A workshop on climate-related risks and extreme events was held from 18-20 June 2007, in Cairo, Egypt. A workshop on adaptation planning and practices was the second event of the nine focus areas of the NWP and was held from 10-12 September 2007, in Rome, Italy.

WORKSHOP REPORT

On Tuesday morning, SBSTA Chair Helen Plume, New Zealand, welcomed participants and thanked the Government of Mexico, the World Meteorological Organization (WMO) and the UNFCCC Secretariat for organizing the meeting. She stressed that advancing methods and tools and data and observations was important for advancing the Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change. Plume stated that the aim of the meeting was to identify specific practical actions and recommendations that can be taken by parties in the climate change negotiation process.

Amir Delju, WMO, highlighted that mitigation alone will not address climate challenges, that greater attention must be given to adaptation and that expert meetings encourage collaborative partnerships. Outlining WMO's two key messages,

he said it is essential that decision makers formulate policies based on the latest unbiased data, information and projections, and that awareness raising is most effective through enhanced partnerships.

Roberto Acosta, UNFCCC, explained that one of the NWP objectives is to increase the knowledge of assessment of vulnerability so that developing countries can take informed decisions on how to cope with climate change. In developing their recommendations, he urged participants to draw on their experiences and scientific knowledge, and to also consider the way in which recommendations could reach the people that need them.

Rodolfo Godínez, Ministry of Foreign Relations, Mexico, noted the importance of this meeting for decision makers, stating that any scientific input is valuable to the climate negotiating process.

Adrian Fernández Bramauntz, Institute of National Ecology, Ministry of Environment and Natural Resources, Mexico, stressed the need to improve observation systems and analysis, and planning scenarios, and said that even with existing uncertainties, actions must be undertaken. He also: stressed the need to strengthen national and regional capabilities; said adaptation measures must meet sustainable development objectives and goals, including poverty reduction and access to basic services; and urged timely development of information systems for forecasts and applying disaster prevention plans so communities can protect themselves.

The meeting addressed the issues of methods and tools on Tuesday and Wednesday and data and observations on Thursday and Friday. During the meeting, participants heard presentations and then convened in breakout groups to discuss recommendations. On Friday afternoon, participants reconvened in plenary to hear and discuss recommendations from each breakout group. This report is arranged according to the agenda of the meeting.

INTRODUCTION, SCOPE AND ORIENTATION

Chair Helen Plume introduced the first session on introduction, scope and orientation on Tuesday morning.

ADAPTATION – CURRENT AND FUTURE, WITHIN THE BROADER CONTEXT OF THE UNFCCC: Roberto Acosta identified the various adaptation activities and sources of funding under the UNFCCC. He stated that adaptation is growing in importance in the Convention process and is one of the four building blocks of the Bali Action Plan. Acosta elaborated the way forward for adaptation, stating that it is a process under which there are several concurrent activities, and emphasized that the various activities under the SBSTA, the Subsidiary Body for Implementation (SBI), and the *Ad-hoc* Working Groups on Further Commitments for Annex I Parties under the Kyoto Protocol and on Long-term Cooperative Action should complement one another for the benefit of all.

INTRODUCTION TO THE NWP AND OBJECTIVES AND EXPECTED OUTCOMES OF THE MEETING: Olga Pilifosova, UNFCCC, introduced the NWP, stating that its role is to provide the information basis for work on adaptation, and its main objective is to catalyze action on adaptation taking place “on the ground”. She identified the major goals of this meeting

as promoting the application, development and dissemination of methods and tools for impact, vulnerability and adaptation assessments, and identifying specific actions to achieve these goals, which build upon previous actions under the Convention.

Rocio Lichte, UNFCCC, stated that the expected outcomes on data and observations include: promotion of implementation and improvements of systematic observations; improved collection, management and use of data; and improved data exchange of and access to, observational data. Lichte noted the objectives for the meeting are to facilitate the sharing of information, identify ways to enhance activities, catalyze new actions, and identify barriers, gaps and priority needs.

BACKGROUND INFORMATION: María Gutiérrez, UNFCCC, introduced the content of the Baseline Paper intended to provide background information and facilitate discussions during the meeting. Gutiérrez also introduced a questionnaire for participants, to be used to focus implementation of the recommendations from the meeting.

INTRODUCTION OF THE AGENDA AND DISCUSSION: Chair Plume then introduced the meeting agenda. In the ensuing discussion, participants discussed working modalities and potential overlaps, and complements to other initiatives on impacts, vulnerability and adaptation. Participants said the meeting was an opportunity to learn, in order to ensure they were better informed for the NWP meeting to be held in Bangkok at the beginning of April. Roberto Acosta explained that the Bali Action Plan includes the NWP issues and that there are complementarities, as opposed to overlap, between the two initiatives.

METHODS AND TOOLS FOR IMPACT, VULNERABILITY AND ADAPTATION ASSESSMENT AND IMPROVEMENT OF ADAPTATION PLANNING, MEASURES AND ACTIONS

A. APPLICATION AND APPLICABILITY OF METHODS AND TOOLS

Framing presentation: Overview of different frameworks, methods and tools and their use: Joel Smith, Stratus Consulting, provided an overview of the use of frameworks, methods and tools. He stated that the analysis of vulnerability and adaptation must be appropriate for the questions being asked, such as whether a system, region or village is vulnerable to climate change, as well as how vulnerabilities can be reduced through adaptation. He highlighted differences between vulnerability and adaptation analyses, and discussed the importance of understanding what information is needed, and the necessary degree of accuracy. He discussed the pros and cons of top-down and bottom-up approaches and stressed that there is no right or wrong method. Smith concluded that while methods provide insight, they do not provide all the answers, but can effectively inform the process.

Experiences in application of different methods and tools and their adequate use: Balisi Gopolang, Botswana, discussed methods and tools used in Botswana. He said that in carrying out analyses, findings included that Botswana’s average temperature will increase by 1-3°C by 2050, and that rainfall would decrease. He noted that vulnerability assessments were carried out in various sectors including water, crops, health and forests, and gaps encountered included the need for technology transfer,

and downscaling due to coarse resolution, as well as failure to represent some vegetation types. He said the UNFCCC should assist institutions of excellence, create fellowships for model developers, and maintain a database of experts.

Ahmad Shaaban, Malaysia, discussed his country's experience in fine resolution regional climate projection for vulnerability assessment and adaptation in the wake of climate change. He discussed use of the Canadian Global Climate Model and stressed the downscaling of modeling to ensure finer resolution. He said Malaysia was working to further integrate climate change issues and impacts into national and local strategic and development plans. He illustrated results in validating and simulating precipitation with observed precipitation and provided examples in other areas as well, and demonstrated how users can access data and obtain future projections in specific areas, such as precipitation, evapotranspiration, soil water storage, surface temperature and stream flow.

Habiba Gitay, World Bank, presented the "Resources for Managing Adaptation to Climate Change", a system being developed by the World Bank to incorporate adaptation into development projects. The system, she explained, has six elements: country and regional data; location-specific information; a tool to screen projects for climate change sensitivity and identify levels of climate risk; a guide to web and literature resources; guidance notes to help project developers access relevant information quickly; and quick access to relevant projects within the Bank.

Plenary discussion: In the ensuing discussion, Cuba stressed that they do not have access to Google Earth or the World Bank's tool. Gitay responded that that World Bank Institute is aware of this and the tools being developed are on CD-ROM and will be distributed. The United Nations Development Programme (UNDP) highlighted the need to address discussions on uncertainty, as this drives the choice of adaptation methods. Gitay agreed, but said as there is some certainty, decisions must be taken based on what is known, in order to determine appropriate actions.

Smith urged participants to interpret information carefully, consider how much precision is necessary to take decisions, and take these decisions in a risk management paradigm. Highlighting that new scenarios are being developed, Gitay cautioned participants against investing significantly in existing scenario development. Shaaban noted the resource intensity of modeling, explaining that one year of future climate change takes one month to simulate. The Russian Federation noted the need to use various models concurrently and said his organization used a set of 16 models.

One participant also noted that vulnerability is an often forgotten component of the climate change equation. Another participant suggested working with stakeholders and decision makers to establish thresholds as an alternative method to address uncertainty. Austria highlighted the benefits of understanding the limitations of each approach, but noted that decisions on how and what to spend money on are inherently political.

The Stockholm Environment Institute (SEI) said both researchers and user communities should come together to ensure a learning-by-doing approach, and emphasized tools should inform rather than define choices. The Iberoamerican Network of Climate Change Offices (RIOCC) reiterated that no one single model would provide all the answers and that the model best suited for the specific context and country should be used. Gitay said scenarios have not been addressed and, noting that adaptation is closely linked to development, said that current thinking should include narratives for 20-year development plans. Smith said there will always be uncertainty and that sometimes decisions cannot be postponed. The UK emphasized that even when the models and scenarios are right, uncertainty for decision makers will still exist. The Global Climate Observing System (GCOS) said decisions made in the face of uncertainty may be inconsequential if problems associated with extreme events are dealt with.

The World Federation of Engineering Organizations (WFEO) emphasized the need to look beyond the climate perspective and develop tools that communities and governments can use. Argentina stressed that a participatory approach is key in applying an adaptation framework in order to gain social acceptance.

System Analysis Research and Training (START) highlighted existing gaps between the scientific and policy communities, particularly in developing countries, and urged identifying gaps especially in dissemination activities.

B. DEVELOPMENT OF METHODS AND TOOLS

Framing presentation: The need for further development and improvement of existing and emerging methods and tools: Daniel Murdiyarso, START, proposed a new approach for the development of methods and tools, describing it as a combination of top-down and bottom-up approaches: exploring a top-down approach while gathering information in a bottom-up fashion. Murdiyarso explained that this would involve more ecosystem-wide vulnerability assessments, resulting in assessments at all levels; and a focus on the most vulnerable groups, particularly the poor, through livelihood diversification resulting in increased resilience to climate change.

Experiences, gaps and solutions in the development and improvement of methods and tools: Iñigo Losada, Instituto de Hidraulica Ambiental, described a methodology for impact, vulnerability and adaptation assessment in coastal zones, developed for the climate change office in the Spanish Ministry of Environment. He stated that an accurate adaptation strategy is only possible if it is based on comprehensive vulnerability information, including: high resolution information about pressures, such as waves and storm surges at a local scale; new integrated indices beyond sea-level rise, such as flooding and sediment transport; and high resolution vulnerability information. Losada described the approaches of the methodology as an historical analysis of long-term trends and a projection to the 21st century, and provided examples of its use in different Spanish harbors and beaches to determine structure stability and identify adaptation needs.

Yvan Biot, UK, described the United Kingdom's experience of screening bilateral development programmes for climate change risk. He outlined the UK's "ORCHID" approach involving: initial screening; detailed climate risk assessment; selection of adaptation options; multi-criteria analysis; and cost-benefit analysis. Biot concluded that the UK found that portfolio risk screening, though useful, is an insufficient guide for adaptation planning, assisting at the operations level, or assisting partner countries. In light of the long-term uncertainty and limited short-term signal, Biot stressed the need to concentrate on: vulnerability to the current climate; the need to build capacity of partners to monitor, forecast and interpret; defining the adaptation roadmap; and starting with "no regret" options.

Plenary discussion: In the ensuing discussion, responding to Biot's presentation and citing different circumstances for different activities, Austria underscored the need to develop methods and tools in a sector specific context. Biot acknowledged the danger of drawing conclusions from limited samples and stressed that if in doubt, agencies should deal with disaster reduction.

United Nations Development Programme (UNDP) stressed that when addressing vulnerability, the overall trend in projections must be consistent with observed variability, with the Universidad Nacional Autónoma de México (UNAM) adding that it was important to look at trends of vulnerability and adaptation. Japan said that in bridging the gap between policy and science, the costs of climate change must be taken into account, including costs of taking adaptation measures. The Russian Federation discussed climate resources and quantifying their potential, and using this information for adaptation categories. The International Strategy for Disaster Reduction (ISDR) highlighted the need to address the management of droughts and other hazards and Stratus Consulting suggested that the UNFCCC focus on appropriate applications of tools for climate change. RIOCC said climate change impacts should be considered in the initial phases of project development. Jamaica hoped that developing countries, including small island developing states, would become more involved in developing tools.

The UK called attention to a Dutch/British study, coordinated by the World Bank, to provide adaptation practitioners with a guide on, *inter alia*, how to carry out cost-benefit analyses of adaptation measures.

Losada said human activities in coastal zones have increased vulnerability to climate change. The World Bank urged that information and work done at previous workshops not be lost in these discussions. Austria said there was a need for a more sectoral debate when it comes to methods and tools, and that cost-benefit analysis was not the only criterion for decision making. The Center for International Forestry Research (CIFOR) advocated using an ecosystem approach for adaptation and pointing out linkages between the two meetings. The UN Food and Agriculture Organization (FAO) said good methods and tools cannot be developed without good data and observations.

C. DISSEMINATION OF METHODS AND SHARING EXPERIENCES

Chair Plume introduced discussion on this topic on Wednesday morning.

Framing presentation: existing practices in dissemination of methods and tools and sharing experiences: Xianfu Lu, UNDP, outlined some of the means used by organizations to disseminate methods and tools, which include: compendia and guide books, such as by the UNFCCC and United Nations Environment Programme (UNEP); online resource centers, such as the Adaptation Learning Mechanism; and practitioners' guides, such as those produced by the UK Department for the Environment, Food and Rural Affairs. She concluded by identifying gaps and priority needs, including the need: for more information on strengths, limitations and intended purposes of available methods and tools; to promote the use and standardization of common methods and tools; and for increased documentation and dissemination of good practices and lessons learned in the application of methods and tools.

Existing dissemination practices, sharing experiences and promotion of good practices on methods and tools used by the climate change community, as well as by different sectoral communities and the disaster risk reduction community: José Ramón Picatoste Ruggeroni, RIOCC, introduced RIOCC's work on adaptation, carried out through the Iberoamerican Plan for Adaptation to Climate Change (PIACC), created to strengthen the assessment of impacts, vulnerability and adaptation, and the development and implementation of adaptation strategies in Iberoamerica. He explained that the PIACC is implemented through: sharing information on national adaptation strategies, plans and projects; identifying capacity needs and priorities, and strengthening capacities; identifying and financing the elaboration and implementation of adaptation projects; and enhancing synergies with the various institutions in the region that work on adaptation. He concluded with examples of PIACC's achievements, including the development of training courses, with the next to be held in Bogotá, Colombia, in late March 2008, the production of outreach materials, and the ongoing development of a dedicated website.

Donyelle Numa, Cook Islands, described the practices of dissemination and experience sharing in the Cook Islands and explained that information is translated into Cook Islands Maori. She explained that traditional knowledge, such as noting the number of birds in the sky and the orientation of banana leaves, is used extensively as a tool to foresee tropical disturbances in many communities. Numa underscored that the government aimed to provide insight to communities, but not answers. In describing gaps and barriers, Numa cited the lack of baseline data as a barrier and said scenario-based approaches do not work for SIDS. She highlighted some success in increasing resilience to climate change impacts, achieved through working with disaster management agencies, taking a holistic approach to disaster management and using visual representations, including geographic information systems (GIS).

Plenary discussion: In the ensuing discussion, in response to questions on the documentation of traditional knowledge, Numa explained it is seldom documented due to lack of funds.

Indonesia stressed the role of religious leaders in disseminating adaptation methods, and Numa highlighted the role of the tribal system in disseminating information at the community level.

Responding to queries, Lu explained that UNDP has developed platforms for community feedback, including online forums, but acknowledged that the agency also needs to be more creative in developing new ways for people to provide feedback. Ramón explained RIOCC's financial resources are provided by a network of training centers and explained that they are also applying to multilateral programmes.

Pakistan asked about similar networks to RIOCC in other regions, and suggested that the UNFCCC promote the establishment of such networks. RIOCC asked what the Cook Islands learned after the 2005 cyclone and Numa responded it seemed little was learned as in some cases people rebuilt in the same places. She pointed to restrictions on land use and lack of capacity as barriers to change.

START asked about scaling down the science-policy dialogue and Lu responded that UNDP is working closely with its regional coordinating units, country offices and field staff on this issue.

Regarding local, regional and international approaches presented, the UK advocated identifying strengths, roles and responsibilities of each approach. He also proposed developing centers of excellence. Stratus Consulting suggested convening an annual conference where adaptation practitioners could share experiences. Responding to the World Bank's query about involvement of the private sector, community organizations and NGOs in RIOCC, Ramón said other sectors do participate in the network. The United Nations Institute for Training and Research (UNITAR) called attention to its Climate Change Capacity Development (C3D) Programme, an initiative to enhance capacity of regional centers. The World Bank discussed an adaptation marketplace, building on the idea of the Development Marketplace. Although recognizing the critical role they play, Numa noted government "fatigue" with international and regional organizations due to the time required for meeting representatives at the country level. She said donors should avoid duplication between programmes and also lamented a loss of human capacity through migration of people to regional organizations.

Kazakhstan emphasized the need to have not only compendia of methods but for these compendia to contain evaluations of different methods to enable users to take informed decisions on their application. Mexico shared its approach of supporting the development and implementation of methods and tools at the local level. Other participants commented on: the need to transfer global climate modeling technology to developing countries and to train developing country staff on its use; the rapid increase in the number of climate change adaptation practitioners at all levels and across sectors and the need for increased experience and knowledge sharing among practitioners; and the need in Central Asia for additional work to develop networks to help users share experiences.

ISDR highlighted the Hyogo Framework for Action and the need to analyze not only meteorological data, but the hazard itself. Japan stated that it is looking to develop partnerships with Latin American countries and to fund work under the NWP.

Cuba reflected on its experience of using two different climate change scenarios in two sectors and cautioned against following this approach. Highlighting the dangers associated with taking decisions without consulting stakeholders, the International Trade Union Confederation (ITUC) said his organization was ready to work in partnership with governments.

D. GAPS, OPPORTUNITIES, RECOMMENDATIONS

On Wednesday afternoon, participants convened in three breakout groups on: assisting in the use and application of methods and tools; advancing dissemination and sharing experiences; and promoting development and improvement.

Group 1: Assisting in the use and application of methods and tools: Habiba Gitay, World Bank, facilitated the group and invited participants to reflect on the discussions and identify ways to assist parties in the use and application of methods and tools. Participants identified the following examples of methods and tools: trend analysis; participatory process; aggregating existing data; determining specific impacts; training local governments on identifying, understanding and reacting to climate risks; differentiating between climate change impacts and natural weather variability, including guidance to the mass media on how to best communicate this to the public; planning and information; and remote sensing.

Cuba shared their experience collaborating with the Hadley Centre for Climate Prediction and Research in the Caribbean region, and discussed the training workshop system developed as part of this collaboration, dedicated to training people on use of impact models identified as the most advanced and useful for assessment in the agriculture, human health and water resources sectors.

Participants broke into three smaller groups and discussed challenges, tools or methods that could be used to address these potential activities and actors, gaps and expected outcomes. The groups identified the following challenges and potential means of addressing them:

- a lack of understanding of specific issues relating to climate change and suggested training target groups;
- a general lack of knowledge in non-Annex I countries of sophisticated impact tools for agricultural assessment, such as crop models, and identified actions that must be taken to address this problem, including training on the use of these models; and
- a lack of proper communication across sectors, and proposed a pooling of knowledge among the sectors, the development of common indices to address common problems and an internet based clearinghouse on tools.

Group 2: Advancing dissemination and sharing experiences: Carlos Fuller, Caribbean Community Climate Change Centre (CCCCC), chaired the discussion group. Noting the need to review and build upon, as opposed to replicate, the recommendations from the Rome and Cairo NWP workshops, he opened discussion on improving dissemination and sharing experiences on methods and tools. The UK suggested considering how the Rome and Cairo recommendations could be implemented, and underscored the need for a strong and ongoing feedback mechanism for tools and methods.

Supporting a dialogue between providers and users, Coastal Zone Management (CZM) stressed the need for feedback to be independent and focused on user experiences.

Jamaica explained there was no “one size fits all” methodology, but that it would be useful to refine one or two methodologies and suggested holding a technical workshop on specific tools and methods. Some participants suggested the UNFCCC could provide a clearinghouse facility. The UNFCCC explained they have a compendium of tools and several participants suggested this be further developed to include evaluation of usefulness of methods and tools in different situations. RIOCC suggested a chart of comparisons of key areas would be useful for decision makers and Jamaica and CZM underscored the need for better communication between method and tool users and developers or experts.

The International Institute for Sustainable Development (IISD) explained the development of the Community-based Risk Screening Tool – Adaptation and Livelihoods (CRiSTAL), which aims to integrate climate change risk into decisions on project activities. She noted keys to its successful development included the iterative process that incorporated feedback into the tool, as well as the identification of champions.

CZM stressed that two-way dissemination is necessary to ensure information reaches the grassroots level and that practitioners provide feedback to policy makers. The UK noted the challenge of providing information and expertise on climate change adaptation to people without internet access or telephones. Ethiopia explained that in his country, once people receive training, they often obtain find more gainful employment abroad.

Group 3: Promoting development and improvement: This breakout group, facilitated by Cecilia Conde, UNAM, began with an icebreaking activity called the “cobweb game”, where a ball of yarn was thrown around the room to each participant who then introduced themselves and conveyed their expectations for the session.

Participants then identified which methods and tools they use, how these can be better developed and improved, and existing gaps. Participants raised issues related to:

- making workplaces greener;
- demand driven development of methods and tools;
- improving guidelines to better understand impacts, vulnerabilities and adaptation through better dialogue between scientists and policy makers;
- the need for intersectoral integrated assessments; offering a broad range of approaches, from simple to complex; bridging gaps between the scientific and policy communities;
- more communication between users and developers, and capturing and accommodating diverse interests so users feel a sense of ownership;
- learning from history to help avoid similar problems in the future;
- the importance of integrating climatic with non-climatic stressors in assessing vulnerability;
- standardized description of methods and tools;
- the possibility of misusing regional models; and
- communicating uncertainties to decision makers.

Austria advocated: investigating ways to change behavior, including through raising awareness, receiving information on what to do, having the means to do it, and receiving feedback; and criteria to assess adaptation options, and developing a matrix to identify the pros and cons of adaptation options. He also highlighted difficulties in preparing cost-benefit analyses for adaptation. Participants also suggested the UNFCCC improve national communications guidelines. The Russian Federation emphasized the important role the mass media plays in shaping behavior.

Participants also raised issues related to:

- combining top-down and bottom-up approaches and the need for methods to bridge these two approaches;
- addressing adaptation in the context of sustainable development;
- limits or thresholds of interventions;
- the need for participatory approaches;
- complexity of vulnerability and lack of agreement on its definition and criteria;
- improving resilience of systems against climate change impacts;
- the usefulness of an ecosystem approach to address indirect impacts;
- the challenges in exchanging information efficiently, due to large amount of information; and
- the need to cooperate with information experts who know how to manage diverse information and make it available in a user friendly way.

Plenary discussion on the work of breakout groups:

Participants heard reports from the breakout groups and Roberto Acosta noted that all three breakout groups mentioned the need for guidance on how to select the most appropriate methods and tools among the large number of existing ones, suggested a small group convene to suggest a process aimed at elaborating on this guidance and develop a structured proposal.

DATA AND OBSERVATIONS RELEVANT TO IMPACTS AND VULNERABILITY ASSESSMENTS

On Thursday morning, Chair Plume opened the session and noted the agenda was arranged according to the objectives for data and observations under the NWP.

A. PROMOTING IMPLEMENTATION AND IMPROVEMENTS OF OBSERVATIONS, INCLUDING THE MONITORING OF CLIMATE VARIABILITY

Overview presentation: Current activities and main achievements on systematic observations for climate change: William Westermeyer, GCOS, stated GCOS aims to ensure that climate data required to meet the needs of users is obtained and made available. Explaining that GCOS should be considered a system of systems, Westermeyer said GCOS was responsive to the needs of the UNFCCC in developing the GCOS Implementation Plan. He outlined the GCOS regional workshop programme aimed to identify gaps and deficiencies in developing countries and to assist regions, through regional action plans. Westermeyer also described the Climate Development in Africa Programme that is being developed and GCOS implementation in Central America, Mexico and the Caribbean.

Work that contributes to improved understanding of current and historical climate variability and its impacts:

Amir Delju, WMO, described the history, activities and involvement of the WMO in the UN system's work on climate change and said his organization's emphasis is on improving science-based decision making. Noting that accurate climate prediction is an ongoing challenge, he underscored the importance of historic climate data and said this was an important input to Intergovernmental Panel on Climate Change (IPCC) reports. Delju explained that the climate system is a continuous process and that the knowledge of the past and current climate can lead to more accurate predictions about the future. Highlighting the risk of data loss, he said meteorological services required funding to digitize data and should be considered an integral part of the adaptation community.

Joseph Intsiful, Hadley Centre, provided an overview of the PRECIS modeling system. He emphasized that regional climate models simulate extreme events better and at a higher resolution than global climate models and, noting high costs of generating high resolution data, said the Hadley Centre was assisting developing countries with regional climate models. Intsiful said current outputs from PRECIS include: comprehensive data for atmosphere and land surface; detailed climate scenarios that can be used in all regions; estimates and quantifications of uncertainties and future projections; advice on using scenarios in impact assessments; and capacity building and technology transfer to enable climate change mitigation and adaptation activities worldwide. He said the Hadley Centre had trained 200 scientists and users from over 60 countries, established projects, regional focal points, and links with international agencies, and developed training materials that assist users of the PRECIS system.

Plenary discussion: Cuba called for strengthening the WMO's ability to maintain data quality and expressed concern about the scarcity of global solar radiation data, which has historically been neglected. Delju responded that one of WMO's objectives is capacity building, and said solar radiation data is not only relevant to agriculture and meteorology, but is a major external forcing source. Responding to Austria's query regarding difficulties in closing gaps in data and observations and uncertainties, Westermeyer said that gaps would be filled and funding enables improvements and continuing operations. The CCCC suggested that the WMO-sponsored Third World Climate Conference (WCC 3), to be held in 2009, agree to convene an annual adaptation practitioners meeting. He also emphasized that PRECIS and other models should feed into the policy making process to inform decision making. Delju said adaptation would be a major component of WCC 3's science segment.

Responding to a query on the availability of new funding, Westermeyer said while there would be new funding, funding was not the issue, and stressed the importance of leadership for undertaking implementation activities. Westermeyer said GCOS hoped to contribute to the NWP in collaboration with the Hadley Centre. Pakistan requested GCOS convene regional workshops, and asked about future programmes and processes to improve

and select climate stations. Westermeyer explained the selection process for stations and said GCOS is just beginning to grapple with observations at the regional level.

Pakistan said boundary conditions under PRECIS may constrain capacity building of researchers, to which Intsiful responded that often models are used incorrectly. Intsiful said introducing more advanced ways of representing climate processes would help reduce uncertainties, and emphasized the importance of acquiring inexpensive new skills, as well as retraining, and partnering with universities, particularly with physicists and computer scientists.

Responding to France's question about making information available to climate decision makers, Delju said WMO has prepared several documents, including the position paper "The WMO's Contribution to Improved Decision Making for Climate Adaptation." Noting the large number of action plans, including for Central Asia, the Russian Federation asked Westermeyer about progress in implementing these plans, and WMO asked about developing such plans for South America. In response, Westermeyer said there has been some progress with implementation, but that GCOS's role is to facilitate development, not implementation of the plans. He said that GCOS had tried to work with South America to develop similar plans, but had not identified much regional interest. When asked about the awareness and use of the PRECIS model in Africa, Intsiful responded that the model has been extensively applied in the region. Responding to UNAM about tools for measuring and analyzing thresholds of extreme events, Intsiful responded that these tools are available in the PRECIS package, and WMO added they have an expert team that develops tools for calculating climate extremes and changes.

B. COLLECTION, MANAGEMENT AND USE OF OBSERVATIONAL DATA

Overview presentation: Ongoing activities and key issues for improvement: Constanta Boroneant, Romania, presented ongoing data collection and observation in Romania. She explained Romania uses both automated and classic weather stations, highlighted the differences in results of the two types of stations, and said this was due to a combination of human and technical issues. Boroneant highlighted the need for quality control and said Romania homogenized monthly seasonal and annual data. She also provided an overview of methods and tools used in Romania, including dynamic and statistical downscaling and impact studies on crop yields.

National perspective: Mamadou Diallo, Mali, explained that Mali has 20 primary and 50 secondary meteorological stations and said there were fewer located in the north of Mali. He described a pilot programme to assess the changing climate characteristics in Mali to help farmers with drought resistance and increasing agricultural production. Diallo said the objective was to help farmers manage activities using meteorological data. He concluded that: the development of meteorological services in Mali is due to successful cooperation with partners like the WMO; continued cooperation is essential; and climate data should be used more effectively for development planning.

Abel Afouda, University of Abomey-Calavi, Benin, discussed initiatives on data collection management and use, highlighting the African Monsoon Multidisciplinary Analysis, which aims to improve understanding of the African monsoon, so as to provide guidance on methodologies, tools and approaches for adaptation. Regarding the current state of data collection at the national level, he lamented, *inter alia*, a decline in size and quality of hydrological services, poor dissemination of data, and repetition of data acquisition. He called for, among other things, strengthening and consolidating the capacity of conventional hydrological data collection systems, and integrating adaptation to climate change into primary and secondary school curricula.

Plenary discussion: Regarding rehabilitation of meteorological stations, Afouda said funds are often lacking, and when funds are available, technological advice is often needed. Diallo noted new stations are being constructed every year in Mali.

Several participants said adaptation is used as one rationale for governments to fund stations. Austria advocated a robust governance structure to obtain data, particularly concerning transboundary resources, and suggested independent bodies collect the data. Boroneant said operating with meteorological service specialists would ensure quality control of data. Afouda recommended the WMO assist in strengthening links between hydrological and meteorological services.

Access to data and associated difficulties were discussed at length, with Ethiopia stating that data is provided free of charge, except for the purposes of commercial research. Pakistan explained that national meteorological services provide data to the WMO, and that access to data is free of charge to researchers and NGOs, except in cases where data is not yet computerized. Indonesia said meteorological offices should focus on increasing data quality to improve predictions, and said the WMO should give guidance relating to adaptation to avoid overlap. The WMO cited resolutions that mandate free exchange and access of essential data, but that a country may charge for some additional value-added data such as quality control or WMO standardized data. The International Oceanographic Commission (IOC) highlighted the need to collect regional and sectoral-based data, and suggested identifying what can be done through the NWP to collect this data.

C. EXCHANGE AND ACCESS TO OBSERVATIONAL DATA AND INFORMATION

Overview presentation: Ongoing activities and key issues for improvements: Francis Zwiers, Canada, stated that for adaptation, past and current climate data is required, and emphasized daily data enables the assessment of frequency of climate extremes and determination of future extremes. He said data increases in value with use and should therefore be openly disseminated and probed, tested and validated. Zwiers also discussed data collection approaches, including the GCOS Surface Network (GSN) and an alternative approach, a joint expert team on climate detection and indices.

National level and national hydro-met services perspective: Ambassador Qamar-Uz-Zaman Chaudhry, WMO and Pakistan, outlined Pakistan's weather and climate observational systems. He said there were over 100 weather stations, of which 26 are

climate change GCOS stations, satellites for data acquisition and national and regional drought and environment monitoring and early warning centers. Chaudhry stated Pakistan is installing 300 automatic weather stations, to be gradually increased to 500. He gave examples of successful forecasts, including flood warnings issued by the Flood Forecasting Division in Lahore in 1997, which through early warning prevented significant financial loss. Chaudhry highlighted some shortfalls and said needs included: capacity building; new tools and technologies for quick utilization and processing of data; outreach to end users; and effective dissemination and maintaining of data quality.

Cecilia Conde, presenting on behalf of the IPCC Task Group on Data and Scenario Support for Impact and Climate Analysis, said the mandate of the group was to facilitate availability of climate change data and information across the three IPCC Working Groups. She explained the Data Distribution Center provides datasets on observations, model projections and socioeconomic variables, as well as climate scenarios, data on monthly means and on 20- and 30-year averages. Conde drew attention to forthcoming guidance, which includes sea level scenarios and application of socioeconomic scenarios.

Plenary discussion: Cuba questioned if monthly or daily data was more useful and Zwiers and Conde explained usefulness was dependent on the climatic event being analyzed, providing the example that for analyzing frosts, daily data was needed, but for droughts, monthly data would be more suitable. The ITUC asked if farmers can access climate data and Chaudhry explained that data on rainfall expectations was provided through the media including radio and television. RIOCC suggested that the Data Distribution Center could be expanded to focus on regional needs, UNDP explained that regional scenarios, compatible with the IPCC Fourth Assessment Report, were under development, and Zwiers underscored the challenge of obtaining information on performance of regional climate models.

D. GAPS AND DEFICIENCIES IN DATA AND OBSERVATIONS, OPPORTUNITIES AND RECOMMENDATIONS

Data, capacity and user needs for impacts and vulnerability assessment in support of adaptation, especially at the regional and national levels: Carlos Fuller, CCCCC, described the Mainstreaming Adaptation to Climate Change Project, as a second stage adaptation project with observing components. He explained downscaling was undertaken using the PRECIS model and Japan's Earth Simulator. Fuller cited challenges including the need to enhance national capacities and to get national meteorological service staff involved. He said pilot vulnerability assessments were undertaken and consultancy services provided to Guyana after serious flooding. Fuller described the outstanding needs in the region as data rescue, recovery and management. He highlighted current opportunities for donors, including the opportunity to assist in the establishment of a regional climate center.

Manola Brunet, University Rovira i Virgili, Spain, emphasized the need for the development of high quality and high resolution climate data sets to improve knowledge of historical climate variability and change, reduce uncertainties, and ensure more robust and reliable climate scenarios. She said data needs to

be long term and homogenous, as well as available at national, subregional and regional levels to enable adoption of the best adaptation strategies. She outlined several WMO initiatives for recovering and developing homogenous data and making it available, including the WMO/Mediterranean Data Rescue Climate Initiative (MEDARE), which aims to develop high quality, long-term data sets for the greater Mediterranean region.

Lyudmila Skripnikova, Uzbekistan, discussed gaps and needs in vulnerability and adaptation assessments of climatic systems and water resources in Uzbekistan, including the lack of monitoring of transboundary water resources, out of date equipment at some meteorological and hydrological stations, uncertainty in water use estimation, and lack of reliable non-climatic data for vulnerability assessments. She stressed the importance of developing insurance systems for extreme weather events, and the creation of regional web based databases on specific data for vulnerability assessments. She said assistance from international processes and the NWP is needed to gain experience in collection and use of specific climatic and non-climatic data.

Roger Rivero, Cuba, presented Cuba's vulnerability and adaptation assessment needs in the agriculture sector, and identified tools used for assessments in agriculture and water resources, including climatic and bioclimatic indices and process-based crop models. Regarding crop models, he identified the following data needs: maximum and minimum temperature; precipitation; wind speed; global solar radiation; CO₂ atmospheric concentration; and mean sea level. On training, Rivero described a joint Caribbean initiative to organize sectoral hands-on training workshops, addressing identified constraints and providing recommended tools, workbooks and follow-up activities by the trainers.

Plenary discussion: In the ensuing discussion, the UK asked Fuller about CCCC's funding and the development of links with governments. Fuller responded that CCCC has worked with countries such as Guyana, Dominica, Saint Lucia and Saint Vincent, and explained that for funding CCCC relies on execution fees for implemented projects, and has also established a trust fund. Austria commented on the need to show decision makers the impact of using poor datasets; Westermeyer commented that GCOS requires regional champions to implement GCOS regional action plans; and UNDP noted the importance of considering non-climatic drivers of variability modeling. Responding to RIOCC's question on the length of historical datasets needed to conduct vulnerability and adaptation assessments, Brunet said as long as possible, as these lead to better assessments, and Skripnikova specified a minimum of 50 years of datasets, but said 100 years would be preferable.

DISCUSSION IN BREAKOUT GROUPS: On Friday morning participants convened in three breakout groups on: promoting implementation and improvements in data and observations; improving capacity for collection, management and use of observational data; and exchange and access to observational data and information, including stakeholder needs.

Promoting implementation and improvements in data and observations: Wim Monna, the Netherlands, and Julia Martínez, Mexico, chaired the group. Monna opened the discussion by

explaining the group's task was to convert the views expressed during the discussions on data and observations into specific, action-oriented recommendations. GCOS stressed the need to produce recommendations that influence or enable parties to take action on data and observations, relating to adaptation. Participants discussed the need to improve national and regional level data, which contributes to global networks; the Russian Federation stressed the importance of homogeneity so that data is comparable among countries; and Ethiopia highlighted the need for high quality data. Noting the move toward automation of observation stations and the varied quality of these systems, Pakistan said quality needs to be assured and equipment regularly calibrated. Other participants mentioned the need to increase the number of monitoring stations. RIOCC stressed that decisions on adaptation activities are made nationally and that each country should improve quantity and quality of data.

ITUC highlighted that decisions made by the COP are used by NGOs to put pressure on governments for action and GCOS underscored the need to make governments aware that improving national level networks is beneficial for their own development.

GCOS cited an outcome from the IPCC Fourth Assessment Report on the need to identify an authoritative set of information needs for adaptation policies and, supported by Pakistan and Canada, suggested the group build on this in its recommendation. RIOCC suggested using cost-benefit analysis to inform decisions on increasing the number of stations.

Improving capacity for collection, management and use of observational data: Balisi Gopolang, Botswana, and Francis Zwiers, Canada, chaired the group and discussions focused on improving data collection, management and observation. FAO, supported by CIFOR and Japan, emphasized the need to consider not just climatic, but also non-climatic data, with CIFOR adding that documentation of local knowledge and non-climatic data should be encouraged and facilitated. Romania disagreed, stating the focus should be on climate data, and that non-climatic data is widely available. Pakistan identified the need to define minimum datasets required. Most participants noted the need to translate scientific data into user-friendly formats easily understood by decision makers, in order to convince them of the need to take action on adaptation. Zwiers expressed reluctance in identifying this as a recommendation, stating it meant countries must have active adaptation research activity, which is a long-term goal and not a "low-hanging fruit".

Romania advocated setting up expert interdisciplinary teams at the national level to facilitate collection of both climatic and non-climatic data. Cuba identified lack of funding to build data collection facilities, stating neither the WMO nor most national governments are willing to provide this funding. Argentina said in his country, the private sector now invests in data collection facilities to collect local data for their own use, but do not make it available to others. Cuba, Botswana, Japan and Argentina said more training is needed, and Romania emphasized the importance of infrastructure. France highlighted the need for data collection and management to be determined by intended use and users; and participants identified potential users such as modelers, scientists, decision makers and economists. FAO said information should also be tailored toward answering

questions decision and policy makers have. Several participants noted difficulty with communicating uncertainty in data to non-scientists, and the World Health Organization (WHO) said uncertainty should not prevent immediate action. Zwiers stated that decision makers and the private sector need to be aware of uncertainty when making decisions.

Exchange and access to observational data and information, including stakeholder needs: Albert Fischer, IOC, and Clifford Mahlung, Jamaica, co-chaired this group. Fischer asked participants to provide their perspective on the issue of exchange and access to data, problems encountered and a vision for the short and long term.

WFE0 highlighted gaps between NWP activities and input from the engineering community, and said an understanding of where engineering data fits in, particularly related to infrastructure issues, is important, as well as further exploring communications between engineers and policy makers.

Pakistan pointed out bureaucratic difficulties in obtaining data from meteorological services, and said the use of satellite data was needed, particularly in monitoring glaciers. The CCCCC suggested partnerships with meteorological services to facilitate access to high quality data, and, calling attention to the recent collaboration by UN agencies on climate change, emphasized the importance of also working from the international to the local level.

The SEI discussed public/private partnerships to fund the downscaling process and recover costs of developing data so it can be provided free of charge. She emphasized difficulties in translating data into a usable format, and the need for a knowledge platform to freely exchange experiences with different datasets.

The WMO differentiated between essential data and data that have been refined, processed and passed through quality control, for which there is often a cost, and said governments should share essential data free of charge. He also underscored that meteorological services not only observe and produce data, but are also responsible for saving lives and protecting property.

Participants also discussed issues relating to:

- the importance of data and information, which usually have a monetary value attached;
- possible national communications on vulnerability, as is done for emissions;
- the need for standards for measuring, processing and archiving data;
- the necessity of regional data;
- the role of data in assessing success of adaptation measures;
- varying sectoral and regional data needs;
- enforcing links between users and providers;
- establishment of a water knowledge hub for climate change in the Asia-Pacific region;
- encouraging a data collection culture within countries as historical data is often not available;
- encouraging regional centers based on models used in the Caribbean;
- lack of mandate to provide historical data;
- grassroots organizations working on impacts and adaptation;
- lack of mandate of some agencies to release data; and

- necessity of communicating data needs to meteorological offices.

Participants then discussed three general problems identified by the group and elaborated impediments and recommendations for each one: identification of data and information, and sustained observations for impacts, vulnerability and adaptation work; data and information exchange; and awareness of available data.

CONCLUSIONS AND RECOMMENDATIONS

Chair Plume introduced this session on Friday afternoon. During the session participants heard presentations on the results and recommendations developed by the breakout groups on methods and tools and on data and observations. They also heard a presentation from the informal group on recommendations regarding guidance on how to select the most appropriate methods and tools and interventions from organizations elaborating on their work and action pledges to support the NWP.

PRESENTATION OF RESULTS AND RECOMMENDATIONS ON METHODS AND TOOLS

Assisting in the use and application of methods and tools: Batu Krishna Uprety, Nepal, reported on recommendations of the breakout group. He said assistance was required to apply the tools for: participatory processes; trend analysis; aggregating existing data, including climate and ecosystem data; historical analysis of climatic extremes and responses; prediction; targeting specific stakeholders; determining options or responses; understanding risk and risk perception; identifying the problem and target audience to communicate climate change risks; and prioritization.

Uprety said further development of methods and tools was required for: remote sensing and GIS to help with monitoring changes in critical areas; using results of impact assessments to convince decision makers to take action; planning responses to impacts such as water management and urban planning; and awareness raising.

To address the challenges and needs identified, the group recommended the following actions:

- build partnerships for structured and coordinated assistance in using, modifying and/or further developing methods and tools, for example with NWP partner organizations;
- develop guidance, possibly in the form of an internet-based clearinghouse, to provide users with an interactive way to share information;
- determine what methods and tools exist and highlight those that can be modified for climate change adaptation, such as strategic environmental assessment and environmental impact assessment;
- provide guidance on when to use specific tools or models;
- emphasize usefulness of application, for different areas and questions or tasks;
- organize events such as conferences and workshops at national, regional and international levels, to raise awareness of climate change and its impacts;
- increase dialogue between climate change, sectoral and disaster risk reduction communities to bring in potential tools and methods for developing climate change adaptation responses; and

- provide guidance for the media, including television weather presenters, on linkages between climate change and weather events.

Advancing dissemination of methods and tools: Kunihiro Shimada, Japan, presented the group's specific recommendations that:

- developers should: better publicize their tools, and explain how and when they should be used; submit tools to the UNFCCC Secretariat for inclusion in the compendium; and respond to the needs of their users through user networks;
- UN agencies should disseminate information of importance of the NWP through their constituencies at the regional and national level, taking into account the experiences and expertise accumulated outside of the climate change communities;
- the UNFCCC process should encourage, support and strengthen networks;
- the UNFCCC should regularly update the compendium; and
- centers of excellence and regional centers should disseminate and conduct surveys to obtain tools and provide feedback to support updating of the UNFCCC compendium.

He also elaborated on the group's general recommendations to:

- establish user networks to share expertise and experiences in the application of tools and methods;
- establish mechanisms to enable inter-comparison of methods and tools;
- undertake surveys on the usage of tools by parties and their constituencies;
- convene regular international workshops on tools and methods, in particular on the usage of the tools, including an in-session SBSTA workshop;
- use different formats and modes for dissemination, including: web-based seminar (Webner) and video-conferencing; webportal and web-based training; CD-ROMs; a search engine function to map tools required in regions; radio and other forms of media; printed materials such as guidebooks; and workshops; and
- integrate methods and tools into early planning stages at the national level, such as through the environmental impact assessment process.

Promoting development and improvement: Cecilia Conde highlighted the recommendations the group had agreed on, including the need for:

- vulnerability and adaptive capacity assessments;
- demand and stakeholder driven development of methods and tools;
- more communication between users and developers;
- more demand-driven approaches that can increase ownership;
- research on the history of adaptation (and maladaptation) and vulnerability; and
- clarifying the concept of vulnerability and operationalizing and quantifying vulnerability, if possible.

She also highlighted the need for more guidance on the proper use of methods and tools, including:

- limitations, potential users, examples of case studies, lessons learned and failures;
- a tiered approach, from simple to sophisticated approaches;

- a standardized description to avoid misinterpretation; and
- guidance on thresholds.

Regarding approaches, she emphasized:

- the importance of integrating climate and non-climate stressors on vulnerability and adaptation assessments;
- the usefulness of an ecosystem approach in addressing direct and indirect impacts; and
- inter-sectoral integrated assessments, and sharing experiences on criteria and decision making in different sectors.

PRESENTATION OF RESULTS AND RECOMMENDATIONS ON DATA AND OBSERVATIONS

Promoting implementation and improvements in data and observations: Wim Monna, the Netherlands, presented the following recommendations:

- reinforce the IPCC Fourth Assessment Report workshop recommendation to define an authoritative set of data and information needs for adaptation;
- encourage governments to commit to the adoption of a minimum network, specifically for adaptation;
- ensure that climate system data and observation is linked with socioeconomic information;
- involve stakeholders at municipal and state levels, and across sectors, including the private sector, to ensure ownership at the local levels;
- incorporate local and indigenous knowledge, and knowledge from local forecasters;
- raise awareness among policy makers of the benefits of strengthening data and observations;
- include in national communications to the UNFCCC a national inventory of meteorological services activities and needs for adaptation;
- encourage the use of the Open Source Initiative for access to free software and cost-effective equipment;
- encourage recovery of data;
- encourage regions/parties with regional action plans to implement them and the GCOS Implementation Plan;
- develop regionally-agreed proposals that can be used to increase chances of accessing funding for supporting individual developing countries; and
- emphasize that better observations have been requested by the UNFCCC.

Improving capacity for collection, management and the use of observational data: Francis Zwiers, Canada, said the group identified that to facilitate adaptation, high quality climatic and non-climatic data was required, and recommended that countries should:

- catalogue and evaluate their climatic and non-climatic data holdings, to assess: the adequacy of networks; the practicality of collecting, organizing and documenting local and traditional knowledge; the efficacy of data collection, quality control and documentation systems; the accessibility of data to users; and the extent to which datasets "talk" to each other (that is, the ease with which multidisciplinary teams using this data can access and interlink various types of data needed for adaptation);

- use their assessments to develop integrated management and collection systems that can provide the information needed for adaptation;
- train multidisciplinary teams of experts in the data and observations needed for adaptation and on interpreting and communicating this data to policy and decision makers, and other users;
- ensure a continuing dialogue between the scientific adaptation research and development community and the policy and decision makers;
- ensure that their data and information systems include assessment and documentation of uncertainties; and
- when communicating information obtained from observations, communicate information that is deemed essentially free of uncertainty, which can then be used to inform adaptation decisions.

Exchange and access to observational data and information, including stakeholder needs: Albert Fischer, Intergovernmental Oceanographic Commission, presented the group's recommendations.

Regarding data and information exchange, which is necessary at all levels, he identified, as impediments, the fact that mandates of institutions that hold data are not necessarily aligned with the needs of users, and that some data is privately held. He said the group recommends providing high-level political impetus to improve exchange through:

- development of a legal framework for exchanging data and information, as current national regulations often act as barriers to exchange;
- using regional centers to overcome barriers;
- using partner organizations to leverage accessibility to data;
- providing free access to data needed under the Convention and, under the NWP, identifying essential data needs and barriers to dissemination;
- identifying agencies to take the lead in addressing these barriers;
- ensuring stakeholders' needs are identified;
- identifying costs of "free exchange"; and
- ensuring data is user friendly and accessible to non-experts.

Regarding promoting partnerships between data users and providers, he stressed: partnerships with meteorological services and other data holders, and among agencies that hold data; and highlighting, under the NWP, countries with best practices.

Regarding identification of data and information and sustained observations needed for impacts/vulnerability and adaptation work, he stressed: the need to identify data and observations valuable to the objectives of the NWP; the need for a strong link with the methods and tools used, in order to build an adaptation framework; close consultations with users of data; and the fact that needs are often sectoral and regional, which acts as an impediment to sustained and coordinated observations.

He said recommendations regarding identification of data included:

- defining the essential variables (climate, ecosystems, economic and social), specifically for impacts, vulnerability and adaptation, through: a process of consultation with providers and users of data; possibly an adequacy report; and

- a compendium of data providers, linked to the compendium on methods and tools;
 - a regular process to monitor flow of data/information and identify impediments;
 - improving communications between providers and users; and
 - establishing standards for observations and data exchange.
- Regarding awareness of available data, the group recommended highlighting data, information and tools for access that are already available, and establishing a forum to share user experiences to promote learning about data and information, how it is used and applied, and possibly providing data electronically or through knowledge markets.

Informal group on guidance: Maria Fernanda Zermoglio, SEI, reported on conclusions of the informal group on improving the knowledge of available methods and tools for informed decision making. She noted consensus that selecting the most appropriate methods and tools for a given context is a formidable and recurrent challenge, that more guidance on the proper use of methods and tools is needed, and sharing experiences on methods and tools is useful. In addressing the challenge and gaps, she described the following recommendations to: develop and carry out a survey to find out who users are, what tools are they using, and why and how and in what context they are being used; and establish a collaborative space to organize, share and disseminate user feedback.

She said the results of the output survey could help organize user feedback, and suggested a database for online dissemination be housed at the UNFCCC Secretariat in either an interactive or wiki format. She said expected contributions included: a survey of tools being used; dissemination of user experiences on the application of these tools as a means to better identify gaps and needs of the user community; and facilitating development of tools and process of tool selection. She concluded that the two specific responses build on knowledge, experience and availability of low-cost approaches.

DISCUSSION ON METHODS AND TOOLS AND DATA AND OBSERVATIONS AND CROSS-CUTTING ISSUES: Chair Plume then invited general comments on the recommendations. The CCCC drew attention to the recommendation on rescuing data and, clarifying that data storage continually evolves, said the cost is not always a one-off. Austria, supported by the Netherlands, reminded participants of the need to integrate actions with the Global Earth Observation System initiative. Malaysia emphasized the need to extend assistance to developing countries for dynamic downscaling to country and river basin levels. The Cook Islands commented on the need to deal with adaptation and methods and tools without looking at infrastructure, which is most relevant to Pacific island states, and said ways should be explored to deal with this, possibly as a future agenda item, to which Chair Plume replied that this could be addressed when looking at future NWP activities.

PANEL OF ORGANIZATIONS ON POSSIBLE ACTIONS TO ADDRESS RECOMMENDATIONS: Chair Plume invited representatives of international organizations to present short interventions on actions to address the recommendations.

UNDP outlined the two broad ways in which it supports the NWP objectives: through the Adaptation Learning Mechanism, an online, open platform, and through provision of technical and policy support to parties at the national level. She explained this work includes: supporting countries in formulating their National Adaptation Plan of Action and national communications; development of guidance documents to support the use of methods and tools; and developing country-level climate profiles in partnership with the UK Department for International Development (DFID).

UNEP/GRID-Arendal elaborated a recommendation to hold a workshop on integrating indigenous knowledge in climate change adaptation and suggested this could examine work undertaken in the Arctic. He highlighted two of his organization's activities, including the Many Strong Voices Programme and a project providing Arctic hunters with real-time data on ice conditions, using a combination of traditional knowledge and science.

WFEO noted his organization is a member of the methods and tools users community and said WFEO would, for the first time, hold a side event during the June 2008 SBSTA meeting.

RIOCC explained his organization was drafting an action pledge structured according to the nine areas of work under the NWP and detailing RIOCC's actions in each area.

WMO said the organization would continue to streamline and disseminate data and report back to, and follow up with, the Secretariat regularly.

GCOS introduced a proposal based on the recognition that reliable and detailed regional climate information is essential in the design of effective strategies. He said GCOS was proposing three linked workshops, with the objective of ensuring attention is given by countries to data and observation needs, and to demonstrate the use and value of regional models. He said that GCOS had received funding from the World Bank to test the idea, and that the pilot project would be undertaken in Africa.

The FAO Global Terrestrial Observing System reaffirmed support to the UNFCCC and mentioned his organization's activities to support the NWP which include supporting terrestrial networks, undertaking assessments of standards, methods and protocols, and developing a terrestrial framework mechanism.

IOC/UNESCO noted IOC's work on adaptation to climate change in West Africa through developing methods and tools to prevent coastal erosion. He said UNESCO was developing grassroots observation for impacts of climate change and adaptation for indigenous knowledge based on the Small Island Voices Initiative.

UNITAR highlighted its three-year programme for regional centers based in developing countries, noting the number of centers would increase to five this coming summer. Highlighting the importance of field work, she also discussed 19 pilot actions for implementation, developed hand-in-hand with local teams, which provide the opportunity to test methods and tools and listen to views of the target populations. She said they would keep the UNFCCC Secretariat well informed, reflect on the best way to disseminate results, and are expanding their online newsletter.

The WHO said climate change is on the agenda of the upcoming World Health Assembly and that health was at the center of the climate change discussions. She said that 2008 World Health Day, to be held on 7 April 2008, would focus on "Protecting Health from Climate Change."

OVERALL CONCLUSIONS: In her concluding remarks, Chair Plume commended the constructive and enthusiastic discussions, which she said had identified valuable recommendations, goals and specific actions. She said the results of the workshop would be presented to SBSTA 28, and would contribute to the summary report reviewing the first two years of implementation of the NWP. She expressed confidence that recommendations and analyses would contribute to the NWP's objectives, and said the workshop had provided a forum for exchange of information and good practices from a wide array of backgrounds, and enhanced cooperation between different agencies and institutions within countries. She said this type of workshop provided an appropriate environment to exchange ideas, which were healthy for the overall process, and could be drawn on in the negotiations. She thanked the Mexican government for hosting the conference and closed the meeting at 4:20 pm.

UPCOMING MEETINGS

UNFCCC EXPERT MEETING ON SOCIOECONOMIC INFORMATION UNDER THE NAIROBI WORK

PROGRAMME: This meeting will convene from 10-12 March 2008, in Port of Spain, Trinidad and Tobago. This event will focus on the socioeconomic aspects of the NWP. 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/adaptation/sbsta_agenda_item_adaptation/items/4265.php

TRAINING COURSE ON DOWNSCALING TECHNIQUES FOR GENERATION OF REGIONAL CLIMATE CHANGE SCENARIOS: This course will convene from 30 March - 3 April 2008, in Bogotá, Colombia. This course is organized under the Iberoamerican Conference of Directors of National Meteorological and Hydrological Services in collaboration with the Iberoamerican Network of Climate Change Offices. This training course is aimed at training relevant stakeholders within the Iberoamerican region on downscaling techniques for generating regional climate change scenarios. For more information, contact: José Ramón Picatoste Ruggeroni; tel: +34-91-436-1496; fax: +34-91-436-1501.

FIRST SESSION OF THE AD HOC WORKING GROUP ON LONG-TERM COOPERATIVE ACTION UNDER THE UNFCCC AND THE FIFTH SESSION OF THE AWG UNDER THE KYOTO PROTOCOL: These meetings will convene from 31 March - 4 April 2008, 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/meetings/intersessional/awg-lca_1_and_awg-kp_5/items/4288.php

WORLD HEALTH DAY 2008: PROTECTING HEALTH FROM CLIMATE CHANGE: World Health Day will be held on 7 April 2008. The aims of World Health Day are to raise

awareness, advocate for partnerships on health and climate change, demonstrate the role of the health community in climate change and to spark commitment and action. For more information, contact: WHO Secretariat; tel: +41-22-791-5526; fax: +41-22-791-4127; e-mail: whd2008@who.int; internet: <http://www.who.int/world-health-day/en>

UNFCCC INFORMAL MEETING OF REPRESENTATIVES FROM PARTIES ON THE OUTCOMES OF COMPLETED ACTIVITIES UNDER THE NWP: This meeting will convene from 7-9 April 2008, in Bangkok, Thailand. It will bring together representatives of parties alongside experts and representatives of relevant organizations to consider the outcomes of the activities of the NWP completed prior to the meeting. 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/adaptation/sbsta_agenda_item_adaptation/items/4290.php

INTERNATIONAL GEF WORKSHOP ON EVALUATING CLIMATE CHANGE AND DEVELOPMENT: RESULTS, METHODS AND CAPACITIES: This meeting will convene from 10-13 May 2008, in Alexandria, Egypt. The GEF Evaluation Office is organizing this workshop, which will permit sharing of experiences in evaluating projects and programmes aimed at the nexus between climate change and development. Special attention will be paid to the results reported and whether there is convergence in findings throughout agencies. The workshop aims to realize the potential of evaluations to contribute to climate change mitigation and adaptation. For more information, contact the Secretariat; tel: +1-202-458-8537; fax: +1-202-522-1691; e-mail: IntWorkshop@thegef.org; internet: <http://www.esdevaluation.org>

28TH SESSIONS OF THE UNFCCC SUBSIDIARY BODIES: The 28th sessions of the Subsidiary Bodies of the UNFCCC – the SBI and the SBSTA – are scheduled to take place from 2-13 June 2008, in Bonn, Germany. In addition, the second meeting of the *Ad Hoc* Working Group on Long-Term Cooperative Action and the resumed fifth session of the *Ad Hoc* Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol are also scheduled to be held. 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>

THIRD SESSION OF THE AD HOC WORKING GROUP ON LONG-TERM COOPERATIVE ACTION UNDER THE UNFCCC AND SIXTH SESSION OF THE AWG UNDER THE KYOTO PROTOCOL: The third meeting of the Ad Hoc Working Group on Long-Term Cooperative Action is expected to take place in August/September 2008, at a location and date to be determined. The sixth session of the AWG on Further Commitments for Annex I Parties under the Protocol will also take place at the same time. 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>

INTERNATIONAL CONFERENCE: ADAPTATION OF FORESTS AND FOREST MANAGEMENT TO CHANGING CLIMATE WITH EMPHASIS ON FOREST HEALTH: A REVIEW OF SCIENCE, POLICIES, AND PRACTICES: This meeting will convene from 25-28 August 2008, in Umeå, Sweden. The meeting will be co-hosted by the FAO, the International Union of Forest Research Organizations (IUFRO) and the Swedish University of Agricultural Sciences and will focus on the current state of knowledge of ongoing changes in climatic conditions in different regions of the world, and the implications of these changes for forest health, forest management and conservation. For more information, contact: Alexander Buck, IUFRO; tel: +43-1-877015113; e-mail: buck@iufro.org; internet: <http://www.forestadaptation2008.net/home/en/>

FOURTEENTH CONFERENCE OF THE PARTIES TO THE UNFCCC AND FOURTH MEETING OF THE PARTIES TO THE KYOTO PROTOCOL: UNFCCC COP 14 and Kyoto Protocol COP/MOP 4 are scheduled to take place from 1-12 December 2008 in Poznan, Poland. These meetings will coincide with the 29th meetings of the UNFCCC's subsidiary bodies. 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/>

GLOSSARY

CCCCC	Caribbean Community Climate Change Centre
CIFOR	Center for International Forestry Research
GCOS	Global Climate Observing System
IPCC	Intergovernmental Panel on Climate Change
ITUC	International Trade Union Confederation
NWP	Nairobi Work Programme
PIACC	Iberoamerican Plan for Adaptation to Climate Change
RIOCC	Iberoamerican Network of Climate Change Officers
SBSTA	Subsidiary Body for Scientific and Technological Advice
SEI	Stockholm Environment Institute
START	System Analysis Research and Training
UNAM	Universidad Nacional Autónoma de Mexico
UNFCCC	United Nations Framework Convention on Climate Change
WFEO	World Federation of Engineering Organizations
WMO	World Meteorological Organization