

Baseline paper\*

**Nairobi work programme on impacts, vulnerability and adaptation  
to climate change**

**Expert meeting on Methods and Tools and on Data and Observations**

Mexico City, 4–7 February 2008

**I. Introduction**

1. This paper presents a brief overview of the most relevant work recently undertaken in the areas of methods and tools and data and observations of the Nairobi work programme. It complements major background information to the expert meeting presented in miscellaneous documents, including submissions by Parties and relevant organizations on methods and tools for impact, vulnerability and adaptation assessments (FCCC/SBSTA/2007/MISC.12 and Add.1 and FCCC/SBSTA/2007/MISC.13) and synthesis report (FCCC/SBSTA/2007/8), and submissions from the World Meteorological Organization and its member States and other relevant organizations on work that could contribute to the improved understanding of current and historical climate and its impacts (FCCC/SBSTA/2007/MISC.23).<sup>1</sup> Its purpose is to provide input to the discussion at the expert meeting in order to:

- (a) Avoid repetition but build upon recommendations identified as a result of recent activities under the UNFCCC; and
- (b) Focus the discussion on practical actions and identify strategic directions for future work.

**A. Scope**

2. This paper summarizes information and lessons learned from work undertaken under the UNFCCC in recent years that is relevant to the methods and tools and the data and observations themes of the Nairobi work programme, with a particular focus on needs and recommendations identified by Parties and organizations in the various workshops undertaken under decision 1/CP.10 and under the Nairobi work programme.

3. In addition, this paper includes information and examples of relevant activities on methods and tools and on data and observations carried out by partner organizations of the Nairobi work programme. While a large number of activities and work relevant to methods and tools and to data and observations are being undertaken by a wide array of organizations, including activities undertaken before the launch of the Nairobi work programme, this paper limits itself to information on initiatives provided to the UNFCCC secretariat, mainly in the form of action pledges or concept papers.<sup>2</sup> For ease of use, this information is presented in annex I (for methods and tools) and annex II (for data and observations) to this paper.

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\* This paper has not been subjected to formal editing. It has been prepared for the purpose of providing background information and facilitating discussions at the expert meeting.

<sup>1</sup> See: <<http://unfccc.int/4259.php>>.

<sup>2</sup> See: <<http://unfccc.int/3996.php>> for action pledges, and <<http://unfccc.int/3967.php>> for concept papers and information on other relevant activities by partner organizations.

## II. Methods and tools

### A. Work under the UNFCCC

4. Work on methods and tools under the UNFCCC extends from the experiences in preparing National communications and developing National Adaptation Programmes of Action (NAPAs),<sup>3</sup> to specific work on methods and tools and workshops and expert meetings undertaken since 1999. This paper focuses on recent activities and discussions under the Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body for Implementation (SBI). Under the SBI, it focuses on the relevant outputs from the regional workshops and expert meetings mandated by decision 1/CP.10. Under SBSTA, it draws attention to: (a) the UNFCCC Compendium on methods and tools; (b) the in-session workshop at SBSTA 23 and key points included in a background paper on the application of methods and tools for assessing impacts and vulnerability and for developing adaptation responses; and (c) needs identified as part of discussions under other areas and outcomes of the Nairobi work programme, including Calls for Actions.

#### 1. Relevant work under SBSTA

##### *The UNFCCC Compendium*

5. Parties to the UNFCCC have an obligation to assess national-level impacts of climate change and their efforts to adapt to these impacts as inputs for their national communications. Parties need to select from a daunting array of potentially applicable methods and tools for making these assessments, and from various sources of information concerning their use. New methods and tools are constantly being developed and the application of those that are already in use is gradually being refined. There is therefore a need for a centralized source of information that can be maintained and regularly updated.

6. Responding to a mandate given by the SBSTA several years ago, the UNFCCC Secretariat took a number of steps towards disseminating information on methods and tools, and produced a *Compendium of methods and tools to evaluate impacts of, and vulnerability and adaptation to, climate change* in 2004 and updated it in 2007. The current revision of the compendium was undertaken as part of the Nairobi work programme and incorporates information on M&Ts submitted by Parties and organisations in their submissions under this area of work.

7. The compendium was designed to be used as a reference document to identify available frameworks and tools for assessing vulnerability and adaptation. It provides users with key information about available frameworks and tools, special features of each framework or tool, and information about how to obtain documentation, training, or publications supporting each tool. This is not a manual describing how to implement each tool, but rather a survey of possible tools that can be applied to a broad spectrum of situations and a map to point users to additional sources of information.

8. Each framework or tool is described in a summary table that outlines its key features and potential applications. With these tables as a reference, users can decide which frameworks and tools they want to use and can obtain further documentation from the listed contact to fully evaluate each option. The compendium thus allows users to identify which tools may be most appropriate to analyze adaptation options in light of available resources and the individual needs of the project.

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<sup>3</sup> This includes training materials prepared by the Consultative Groups of Experts (CGE) to be used as a tool kit for vulnerability and adaptation assessments in Non Annex I National Communications.

*In-session workshop on the application of methods and tools for assessing impacts and vulnerability and developing adaptation responses.*

9. As part of its work on the consideration of the IPCC Third Assessment Report (which eventually lead to adopting the five year work programme on impacts, vulnerability and adaptation – later renamed the Nairobi work programme), the SBSTA, at its twentieth session, requested the secretariat to organize an in-session workshop at COP 10 on the application of methods and tools, including regional models, for assessing impacts and vulnerability and adaptation; and on the linkages between adaptation and sustainable development. To facilitate discussions at such a workshop, the secretariat prepared a background paper covering types of approaches, experiences in applying methods and tools, limitations associated with the use of different methodologies, and the types of questions such methods and tools can address and those that they cannot (FCCC/SBSTA/2004/INF.13).

10. Key points emerging from this work include:

- The usefulness of applying a vulnerability-driven approach in parallel with a scenario-driven approach to guide actions for strengthening adaptive capacity to current climate risks while addressing long-term vulnerability, and the good fit of this combination with sustainable development considerations and planning;
- The need for proper information and guidance on available methods, including associated uncertainties and limitations; and
- The importance of learning more about methods and experiences used in other research/policy communities –in particular the disaster risk management community.

2. Outcomes of regional workshops and expert meeting for SIDS on adaptation under decision 1/CP.10 of relevance to methods and tools<sup>4</sup>

11. In response to a call by COP 10, three regional workshops and one expert meeting for SIDS (held in two parts) were organized between April 2006 and February 2007, to facilitate information exchange and integrated assessments and thus assist in identifying specific adaptation needs and concerns. Overall, around 70 percent of all developing country Parties were represented at the events.

12. During the discussions, consensus emerged on the need for capacity-building and training in integrated assessments, and for technical support and follow-up through regional centres of excellence. Other areas of agreement included the following:

- On further **development** of methods and tools, discussions highlighted the usefulness of the NAPA process for mainstreaming adaptation into national planning, given that the methodology entails integration of existing priorities – including those articulated in communications to other conventions as well as in national poverty reduction strategy papers and other sustainable development strategies. Discussions also highlighted the need for integration of bottom-up and top-down approaches, for including socio-economic assessments, and for better quantification of the costs and benefits of adaptation.
- In regards to **application** of methods and tools, discussions highlighted the need for technical documentation on adaptation (including methods and tools) in languages other than English, and the need for participatory approaches for effective assessment

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<sup>4</sup> See documents FCCC/SBI/2007/14 and FCCC/SBI/2006/19, FCCC/SBI/2007/2, FCCC/SBI/2007/11 and FCCC/SBI/2007/13.

of adaptation measures, since buy-in from stakeholders is necessary, especially where adaptation measures face difficulties in gaining social acceptance.

- In regards to **dissemination**, Parties and organizations stressed the importance of promoting interregional and intraregional cooperation on modelling, economic valuation and adaptation assessments.

### 3. Needs identified under other areas of the Nairobi work programme

13. Various specific needs related to methods and tools have been identified as part of discussions under other areas of work of the Nairobi work programme. For example:

- (a) In discussing **climate related risks and extreme events**,<sup>5</sup> Parties and organizations pointed to, *inter alia*, the need to develop methods and tools that better communicate the many uncertainties in predicting climate variability and extreme events.
- (b) Recommendations on **adaptation planning and practices**<sup>6</sup> included: developing a “how to” document to provide guidance on integration and integrated planning tools to assess possible trade-offs; facilitating the development of national regulatory frameworks for adaptation by preparing a handbook or set of guidelines with case examples; developing a country-driven, indicator-based monitoring and evaluation system for adaptation in different sectors; and expanding the NAPA process to non-LDC countries.<sup>7</sup>
- (c) In submissions on **research needs**,<sup>8</sup> Parties and organizations highlighted, *inter alia*: the need for methods and tools for assessing the costs of impacts and adaptation (particularly in regards to energy demand, water resources and transport) under various scenarios; assessment methods that include social equity considerations; and methodologies or guidance on incorporating local and traditional knowledge into national assessments and adaptation practice.
- (d) In submissions on **technologies for adaptation**,<sup>9</sup> recommendations included developing risk atlases, multi-hazard early warning systems, and templates for climate-related outreach products to disseminate climate information more effectively in the tourism sector for example.
- (e) In submissions on **economic diversification**,<sup>10</sup> Parties and organizations stressed the need for improved tools and models to assess sectoral vulnerability (linking predictions of physical impacts to input-output models for example).

14. Specific needs expressed in various fora are also presented in so-called Calls for Action, which the secretariat, under the guidance of the Chair of the SBSTA, has begun producing. The idea is to widely disseminate needs identified at workshops and meetings in

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<sup>5</sup> FCCC/SBSTA/2007/7.

<sup>6</sup> FCCC/SBSTA/2007/15.

<sup>7</sup> It is worthy of note that, as a result of discussions under the Nairobi work programme, the LDC Expert Group (LEG), which was set up originally to provide guidance and advice on the preparation and implementation strategy for NAPAs, has offered to extend this assistance to other non-LDCs. For more information on NAPAs, see: <<http://unfccc.int/2679.php>>.

<sup>8</sup> FCCC/SBSTA/2007/12.

<sup>9</sup> FCCC/SBSTA/2007/6.

<sup>10</sup> FCCC/SBSTA/2007/14.

order to reach those in a position to address them.<sup>11</sup> Needs identified so far in these Calls for Action that specifically relate to methods and tools include:

- Developing, upgrading and disseminating risk assessment methods and tools to identify the most significant gaps in health adaptation, particularly as it relates to vector- and water-borne diseases, extreme weather events and malnutrition;
- Providing guidance on the kinds of adaptation assessments, methodologies, tools, approaches, policies and technologies used at the basin level and in transboundary water systems;
- Developing methods and tools to map vulnerability in urban areas and assess probability (for example flood zones), consequences (assets and population at risk), and vulnerability (including warning time, ability to respond and assets of critical importance); and
- Providing guidance on understanding thresholds in vulnerability assessments.

#### **B. Relevant work undertaken by organisations and institutions**

15. Numerous organisations and institutions worldwide are engaged in various efforts to promote the application, development and dissemination of methods and tools for adaptation, and to make available data and information products at the global, regional and national levels and through sectoral and disaster reduction communities. Many of these organisations, as partners of the Nairobi work programme, have submitted information to the UNFCCC secretariat in response to its effort to engage others in advancing work on adaptation. This engagement has taken the form of action pledges and/or concept papers,<sup>12</sup> which detail how an organisation can contribute to advancing the objectives of the Nairobi work programme under specific areas of work. These action pledges or concept papers respond to the needs identified under the mandated activities of the Nairobi work programme, including in some cases to the abovementioned Calls for Action, and are undertaken by the organisations as part of their scope of work, but aligned with the objectives of the Nairobi work programme. Examples of such activities relating to methods and tools are presented in annex I to this paper.

### **III. Data and observations**

#### **A. Work under the UNFCCC**

##### 1. Activities undertaken in response to the SBSTA and the COP

16. The Conference of Parties (COP) to the UNFCCC and its subsidiary bodies, in particular the SBSTA, have repeatedly considered matters relevant to systematic observation at their sessions, adopting a number of important decisions aimed at strengthening the global observing systems for climate. Concern that the number and quality of atmospheric data were declining and that actions would need to be taken to reverse the trend, particularly in developing countries, have prompted the COP to endorse several major initiatives since COP 5 (1999). These include:

- Organizing regional workshops by the Global Climate Observing System (GCOS) secretariat which would help develop specific proposals to address deficiencies in the climate observing networks and identify the capacity-building needs and resources required in developing countries to enable them to collect, exchange and utilize data

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<sup>11</sup> More information on Calls for Action is found at: <<http://unfccc.int/4087.php>>.

<sup>12</sup> See: <<http://unfccc.int/3996.php>> and <<http://unfccc.int/3967.php>>.

on a continuous basis in pursuance of the Convention goals; as a response, the GCOS developed and implemented a regional workshop programme, which was completed in 2006;<sup>13</sup> these regional workshops resulted in the development of Regional Action Plans, some of which are in the process of being implemented;

- Inviting Parties to develop and submit separate reports on global climate observing systems in conjunction with their national communications;
- Endorsing the preparation of an Adequacy Report on the global climate observing system by the GCOS and its sponsoring agencies to help guide the efficient expenditure of scarce resources, and which would provide a framework for further work to improve global monitoring systems and help achieving an integrated approach to global observations which would facilitate identification of observed trends and changes in the global system and inform policy. This Adequacy Report was considered by COP 9.<sup>14</sup>
- Asking for an Implementation Plan<sup>15</sup> for an integrated global observing systems for climate by the GCOS secretariat, based on, inter alia, the Adequacy Report and taking into account existing relevant programmes, plans and initiatives, with the aim of identifying implementation priorities for action. Since then, the GCOS has provided in regular intervals information to the SBSTA on progress with the actions identified in the implementation plan. In June 2009 the GCOS is expected to provide a comprehensive report on progress with implementation of this plan, using information to be provided by Parties by September 2008.

2. Outcomes of regional workshops and expert meeting for SIDS on adaptation under decision 1/CP.10 of relevance to Data and Observations<sup>16</sup>

17. As noted in paragraph 11 above, three regional workshops and one expert meeting for SIDS were organized between April 2006 and February 2007 to facilitate information exchange and integrated assessments and thus assist in identifying specific adaptation needs and concerns. The main messages emerging from these discussions that are of relevance to data and observations include:

- The importance of properly functioning climate observing systems and networks for providing a better understanding of the climate system and supporting adaptation;
- The usefulness of the GCOS regional workshop programme in developing Regional Action Plans and the need to further support these plans;
- The general understanding that the major constraint is not necessarily establishing an observation network, but rather maintaining it and organizing and sharing the resulting data once external funding is terminated;
- The need to raise awareness among governments about the importance of networks in order to receive public funding and to enhance user access, and the importance of greater collaboration between providers of climate information and the sectoral users of such information for adaptation to climate change;
- The importance of sharing data collection and of information networking; and

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<sup>13</sup> The report on the results of this programme is available in FCCC/SBSTA/2006/MISC.13.

<sup>14</sup> Available as report no. GCOS-82 at <http://www.wmo.ch/web/gcos/gcoshome.html>.

<sup>15</sup> Available as report no. GCOS-92 at <http://www.wmo.ch/web/gcos/gcoshome.html>.

<sup>16</sup> See documents FCCC/SBI/2007/14 and FCCC/SBI/2006/19, FCCC/SBI/2007/2, FCCC/SBI/2007/11 and FCCC/SBI/2007/13.

- The need to take stock of available climate information in order to gauge where systematic observation needs are most pressing.

### 3. Needs identified under other areas of the Nairobi work programme

18. General needs frequently identified by Parties and organizations in relation to data and observations as part of discussions under the Nairobi work programme, including in workshop reports and related documents, include:

- Supporting data collection and recovery in developing countries;
- Improving the observation network and expanding coverage, particularly in developing countries;
- Improving the collection, management and use of data at the regional level;
- Enhancing access to global, regional and national data;
- Promoting understanding of model limitations;
- Addressing user needs and enhancing collaboration between the climate community and other sectors (particularly agriculture, coastal zones and health);
- Raising awareness amongst policymakers of the need for sustained systematic observation and monitoring systems for use in understanding climate change impacts and the need to strengthen National Meteorological and Hydrological Services (NMHS); and
- Building human capacity in data analysis and generation through training and education programmes.

19. In addition, a number of specific needs and recommendations were identified under the various areas of work of the Nairobi work programme, as follows:

- (a) Discussions on **climate related risks and extreme events**<sup>17</sup> highlighted the need to:
- Improve understanding of the links between climate variability and change with increasing risks;
  - Advance research in integrated risk assessment involving NMHS and relevant sectoral experts and practitioners, including by enhancing collaboration and dialogue through agricultural and food security outlook forums or health outlook forums (especially for malaria); and
  - Improve coherence in the applicability of data to the relevant risk assessment effort and promote multi-hazard warnings.
- (b) Recommendations under **adaptation planning and practices**<sup>18</sup> included:
- Rehabilitating deteriorating observational networks and linking weather databases with hydrological monitoring;
  - Institutional strengthening of NMHS with WMO and FAO;
  - Increasing local level data gathering;

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<sup>17</sup> FCCC/SBSTA/2007/7.

<sup>18</sup> FCCC/SBSTA/2007/15.

- Improving collection of hydrological data at the river basin scale, especially for distributed elements (rain, snow), in order to promote watershed management; and
  - Facilitating access to data and tools by linking geospatial data/modelling portals, including those of FAO, WMO (regional climate centres and Climate Outlook Forums), the Met Office Hadley Centre of the UK and the IPCC Data Distribution Centre.
- (c) Recommendations under **research needs**<sup>19</sup> included:
- Advancing research on specific phenomena and impacts (such as ice coverage, ocean acidity and related impacts on the ecosystems) for use in integrated assessment; and
  - Providing assistance to SIDS to locate and access historical information on the physical, environmental, financial and social and economic effects of extreme weather events (for example by creating easily accessible databases on historical climate variability, extreme events and their impacts).
- (d) Discussions on **technologies for adaptation**<sup>20</sup> highlighted the need to:
- Strengthen the Global Sea Level Observing System (GLOSS) and install global positioning systems at all appropriate GLOSS tide gauge stations to determine changes in global and regional sea level;
  - Link national and global systems for the development and/or improvement of multi-hazard early warning systems (e.g. the World Weather Watch, the Global Terrestrial Observing System, and AGROMET);
  - Increase land cover, land-cover change and other environmental data needed to develop adequate policy;
  - Develop and adopt common standards and compatible data sets; and
  - Ensure access to global climate prediction products.

## B. Relevant work undertaken by organisations and institutions

20. As noted earlier, many organisations, as partners of the Nairobi work programme, have submitted information to the UNFCCC secretariat on how they can contribute to advancing the objectives of the Nairobi work programme under specific areas of work. This has taken the form of action pledges and/or concept papers,<sup>21</sup> which respond to the needs identified under the mandated activities of the Nairobi work programme, including in some cases to the abovementioned Calls for Action, and are undertaken by the organisations as part of their scope of work, but aligned with the objectives of the Nairobi work programme. Examples of such activities relating to data and observations are presented in annex II to this paper.

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<sup>19</sup> FCCC/SBSTA/2007/12.

<sup>20</sup> FCCC/SBSTA/2007/6.

<sup>21</sup> See: <<http://unfccc.int/3996.php>> and <<http://unfccc.int/3967.php>>.



## Annex I

### Examples of activities undertaken by NWP partner organizations in the area of methods and tools

Organization	Promoting/supporting proper application of existing methods and tools	Dissemination of methods and tools	Development of new or existing methods and tools
The Asian Development Bank (ADB)	Work with governments of the Asia-Pacific region in identifying priority adaptation activities and priority needs, and develop these into sectoral strategies, for example, providing technical assistance to create practical guidelines on climate proofing of infrastructure.		Initiatives under the new adaptation programme include the development of a Geographic Information System to map areas at risk of typhoons in Vietnam and a “Regional Stern Report” for decision-makers.
Food and Agriculture Organization of the UN (FAO)	Agro-Ecological Zoning for analysis of land productivity, crop intensification, food production and sustainability under Climate Change. Decision-maker support. Downloadable and usable by regional and national decision-makers.	Downloadable software package (FTP) plus online instructions for global, regional and in some cases country level.	Local area land use planning.
International Institute for Sustainable Development (IISD)	Field test reports from Mali, Bangladesh, Tanzania, Nicaragua and Sri Lanka used for fine-tuning CRiSTAL tool.	Excel-tool (CRiSTAL) made available via IISD website, as well as user manual. Training workshops in cooperation with CARE.	Developed the CRiSTAL tool, which highlights linkages between livelihoods and climate change and is now in its second phase focussing on concrete applications. It ensures adaptation and livelihood projects are mutually reinforcing.
Intergovernmental Panel on Climate Change (IPCC)	Task Group on Data and Scenario Support for Impacts and Climate Analysis (TGICA) supports better use of scenarios in impact, adaptation and vulnerability assessments, the application of dynamical downscaling methods, socio-economic scenarios and the assessment of sea-level rise impacts.	Technical Guidelines, disseminated via the Data Distribution Centre (DDC).	
International Strategy for Disaster Reduction (ISDR)	Global survey of capacities and needs for early warning systems and guidance on incorporating risk reduction strategies into national development planning.	Through Hyogo Framework for Action 2005-2015, which commits parties to establishing governmental channels for early warning, with dissemination via inter-ministerial committees and national platforms for risk reduction for	Scale up the use of existing tools applicable to resilience to climate-induced disasters, such as vulnerability and risk assessments, early warning systems, land-use planning and building code regulation.

Organization	Promoting/supporting proper application of existing methods and tools	Dissemination of methods and tools	Development of new or existing methods and tools
		inter-sectoral and multi-stakeholder coordination (for example establishing stakeholder “early warning groups.”)	
Sahara and Sahel Observatory (OSS)	The Maghreb Drought Early Warning System consolidates existing indicators on climatic and human pressure, as well as environmental monitoring instruments to allow countries of the Maghreb group early warning in excess of existing indicators at national level. Information is mainstreamed into national planning. Examples include the construction of a cartographic drought server.	Extensive consultations with national governments, synthesizing existing databases, cartographic server, websites, brochures and videos.	Collective strategy for the sub-region.
Red Cross / Red Crescent	The “Preparedness for Climate Change Program” systematically trains Red Cross volunteers and staff for adverse effects of climate change and builds national knowledge of likely impacts and vulnerabilities.	Four-step process carried out by national society but with logistical and financial support by RC/RC, via dissemination and capacity building workshops, background documents, and building networks with partner organisations.	
Ibero-American Programme of Impacts Assessment, Vulnerability and Adaptation to Climate Change (PIACC)		Through workshops and meetings in conjunction with sessions of the IberoAmerican Network of Climate Change Offices (RIOCC)	Development and application of an analysis tool to evaluate adaptation priorities, capacities and experiences amongst country members of the RIOCC
Stockholm Environment Institute (SEI) /WeAdapt	Pooling and distribution of methods, tools and expertise.	Through wikiADAPT, a flexible, accessible, interactive online space for enhancing the knowledge base of the climate adaptation community and provide guidance to aid adaptation planning and implementation.	
System for Analysis, Research and Training (START)	Three pilot projects to create/define a sustainable system for generating and communicating climate risk information. Funded 24 regional study teams	Through the Assessment of Impacts and Adaptations to Climate Change project (AIAAC)/ UNEP, via workshops and	Development of a Decision Support for Climate Change Adaptation.

Organization	Promoting/supporting proper application of existing methods and tools	Dissemination of methods and tools	Development of new or existing methods and tools
	for 3-year investigations.	publications.	
UN Development Programme – UN Environment Programme (UNDP, UNEP)	Technical and policy support for drafting national communications to the UNFCCC.	Through technical consultations, technical backstopping, guidance documents, workshops, and knowledge networks (roster of experts).	
World Health Organization (WHO)		WHO Department of Public Health and Environment organized 10 regional workshops to discuss health and climate assessments; results were published by WHO. Dissemination also via the International Year of Sanitation 2008: improving stakeholder access to information (“Sanitation Connection” web portal) and enhancing partnerships.	Assessing health risks from climate change and variability, and defining the strategic approach and specific interventions most suitable for protecting health under a changing climate.
World Meteorological Organization (WMO)	<ul style="list-style-type: none"> <li>• Climate Watches uses the WMO World Climate Data Management Programme (WCDMP) as well as the Disaster Prevention and Mitigation (DPM) to bring forewarnings and advisories to regional and national levels, especially in developing countries.</li> <li>• Regional Climate Outlook Forums form part of WMO’s Climate and Prediction Services (CLIPS) and aim to identify relevant climate issues at local and sectoral level to stimulate national decisions.</li> <li>• Natural Disaster Prevention and Mitigation (DPM) Programme supports the full implementation of the Hyogo Framework for Action 2005-2015 in the complete cycle of disaster risk management, including prevention and mitigation as well as emergency preparedness, response, recovery and reconstruction at national and international levels.</li> </ul>	<ul style="list-style-type: none"> <li>• Regional climate watch bulletins in collaboration with NMHSs and many other institutions, as well as the establishment of climate watch systems at national level.</li> <li>• Stakeholder fora which bring information to relevant policy-makers.</li> <li>• Public outreach materials, strengthening education and training programs offered by NMHSs, strengthening meteorological capacities in planning and operationalization, and mainstreaming into national disaster risk reduction plans, legislations and development planning.</li> </ul>	<ul style="list-style-type: none"> <li>• Outreach to decision-makers, involvement of other organizations, including for funding.</li> <li>• Usage of climate scenarios developed for the IPCC AR4, expanded usage of currently available tools (PRECIS, MAGIC); enabling NMHSs to contribute to national communications to UNFCCC and support improved regional cooperation.</li> </ul>

## Annex II

### Examples of activities undertaken by NWP partner organizations in the area of data and observations

Organization	Collection, management, use, access and exchange of observational data	Improvements of observations	Improvements in capacity
Water Centre for the Humid Tropics of Latin America and the Caribbean (CATHALAC)	Regional Visualization and Monitoring System with support from NASA and USAID, on forest fires, disaster management, adaptation planning.		Regional Visualization and Monitoring System disseminated to decision-makers. CATHALAC designated <i>Latin American Centre for Emerging Environmental Problems and Climate Change</i> by Ibero-American Forum of Environmental Ministers.
Global Land Ice Measurements from Space (GLIMS)	Providing data, models and views on glacier change and its role as a signpost of climate change as well as on the impacts of glacier change on human life, water resources, infrastructure, ecological habitat evolution, and biodiversity.		
International Institute for Applied Systems Analysis (IIASA)			Guidance paper on usage of data and observations in planning of adaptive actions.
Intergovernmental Panel on Climate Change (IPCC)	<ul style="list-style-type: none"> <li>• Tailoring data available on the Data Distribution Centre (DDC) and expanding the services of the Task Group on Data and Scenario Support for Impacts and Climate Analysis (TGICA).</li> <li>• DDC provides climatology of observed surface temperature, precipitation, water, vapour pressure, cloud cover, wind speed, solar radiation, and the number of wet days or frost days per month.</li> </ul>	<ul style="list-style-type: none"> <li>• Training in the use of DDC data.</li> <li>• Creating simple data sets and products for use in computationally-limited countries.</li> </ul>	
International Water Management Institute (IWMI)	Quantification of drought risks and low flows in Iran; climate change-induced impacts on irrigation schemes in Morocco; global		

Organization	Collection, management, use, access and exchange of observational data	Improvements of observations	Improvements in capacity
	mapping of drought-related indicators which reflect various aspects of drought – from drought hazard and vulnerability of water resources systems to drought to indicators of drought preparedness. Available online.		
Sahara and Sahel Observatory (OSS)	ROSELT/OSS collects long-term socio-economic and biophysical aspects in Northern, Western and Eastern Africa.	Observation and Environmental Monitoring Device collects information gathered for Northern, Western and Eastern Africa.	
System for Analysis, Research and Training (START)	<ul style="list-style-type: none"> <li>• Climate Systems Analysis Group (CSAG) develops database of long-term weather observations across sub-Saharan Africa (University of Capetown).</li> <li>• The Temperate East Asia START Regional Center (TEA-START), maintains climatological data for the monsoon Asia region in support of the Monsoon Asia Integrated Regional Study (MAIRS), ACCCA and other projects.</li> </ul>		<ul style="list-style-type: none"> <li>• Assessment of Impacts and Adaptation to Climate Change (AIACC).</li> <li>• Advanced Study Institutes, with a focus on agriculture.</li> <li>• Works with NASA to facilitate the participation of developing country scientists in the Global Observation of Forest and Land Cover Dynamics (GOFC/GOLD) project.</li> </ul>
UN Development Programme (UNDP)		Indicator framework for adaptation fully linked with poverty reduction work.	
UN Educational, Scientific and Cultural Organization (UNESCO)	Local and Indigenous Knowledge Systems programme (LINKS), to include the development of a global grassroots observatory on climate change impacts and coping strategies.		
World Food Programme (WFP)	<ul style="list-style-type: none"> <li>• Comprehensive food security and vulnerability analysis.</li> <li>• Food security monitoring and early warning.</li> <li>• Food Security Needs Assessment.</li> </ul>		

Organization	Collection, management, use, access and exchange of observational data	Improvements of observations	Improvements in capacity
	<ul style="list-style-type: none"> <li>• Operational Planning.</li> <li>• Food Security Outlook Forum at regional level (IGAD, SADC and CILSS).</li> </ul>		
World Meteorological Organization	<ul style="list-style-type: none"> <li>• Data rescue activities.</li> <li>• Annual statements on status of global climate.</li> <li>• World Weather Watch System and regional weather watch.</li> <li>• Making IPCC Model Data “backbone” publicly available.</li> <li>• WCRP project to underpin definition of “dangerous interference with the climate” to allow scientifically informed political targets.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop climate change detection tools to compute indices that give best national estimates in cooperation with NMHSs.</li> <li>• Regional Action Plans to eliminate gaps and deficiencies in atmospheric, oceanic, and terrestrial climate observing networks and improve related data management and telecommunications functions.</li> </ul>	<ul style="list-style-type: none"> <li>• Dissemination of newest knowledge and software to SIDS and LDCs to assist reporting to UNFCCC and IPCC.</li> <li>• Building capacity of LDCs and SIDS to use IPCC model data.</li> </ul>

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