

WORLD METEOROLOGICAL ORGANIZATION



WMO PARTICIPATION IN THE NAIROBI PROGRAMME OF WORK

Specific topic:
Adaptation planning and practices

Geneva, Switzerland

July 2007

Scope of adaptation action
Regional level

*Type of adaptation action	Title of adaptation action, including projects	Status of adaptation action - Ongoing - Under implementation - Under development - Under consideration	Needs in order to successfully implement the adaptation action	Concerns/Barriers	Experiences/Lesson learned	References i.e. publications, websites etc.
Approaches/strategies	Climate Applications and Services Partnership building, vulnerability assessment and capacity building in key socio-economic sectors including health, energy, tourism and urban design and management, joint development of Early Warning Systems for individual sectoral issues, such as for heat waves as a health problem; joint development of information (brochures, notes, and other publications) aimed at the public and the media, and reports and Technical Notes aimed at professionals; and establishment of a global network of CLIPS Focal Points along with relevant capacity building through professional training.	Under implementation	International and Regional	Lack of enough resources		

Please be aware of the degree of adaptation within activities:

- Some activities are undertaken specifically to adapt to climate change, e.g. increased water storage capacity, development of new crop varieties.
- Some activities include a component of climate change adaptation, e.g. infrastructure replacement incorporating higher flood standards
- Some activities are not carried out for adaptation but have other objectives such as preserving biodiversity, however they can offer adaptation co-benefits, e.g. restored wetlands protect against storm surges.

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Practices	Climate Applications and Services Support adaptation including development of Guidance documents aimed at ensuring that NMHSs implement and operate best practices in their work and educate the climate and sectoral, Regional Climate Outlook Forums (RCOFs), held in various parts of the world, climate specialists and user groups for any relevant sector come together to review climate conditions and to develop and discuss upcoming patterns. Another effective practice is multidisciplinary workshops and training events that focus on local participation in development of tailored products for sectors such as health and agriculture.	Under implementation				
Technologies	Climate Applications and Services, Climate Data Management Provision of climate data and use of new Climate data management systems, analysis, prediction and advising on implications of climate change, technical analyses and advice to those developing such technologies	Under implementation				

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Approaches/ strategies	Public Weather Services Improving early warning services and products Establishing and promoting best practices in information dissemination Researching and providing information on social and economic aspects of weather services	Under implementation	International and Regional			
Practices	Public Weather Services Publication of guidelines which equip NMHSs with knowledge necessary in achieving the PWS objectives mentioned above; Organizing training workshops and seminars; and Facilitating consultative meetings between experts. Establishment of Expert Team on Services and Products Improvement (ET/SPI); the Expert Team in Support of Disaster Prevention and Mitigation (ET-DPM) and; the Expert Team on Communications Aspects of PWS (ET-COM). Continuous improvement of the “World Weather Information Service (WWIS)” and the “Severe Weather Information Centre (SWIC)” web sites. The SWIC web site provides information on tropical cyclones, rainfall, thunderstorms and heavy rainfall. The WWIS provides weather forecasts and climate data for cities of the world	Ongoing				Strategy for Developing Public Education & Outreach (PWS-1354); Guidelines on Integrat. Severe Weather Warnings into Disaster Risk Management (PWS-13); Guidelines on Weather Broadcasting & the Use of Radio for the Delivery of Weather Information (PWS-12); Guidelines on Cross-Border Exchange of Warnings (PWS-9); Guide on Improving Public Understand. of & Response to Warnings

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Practices (continued)	Public Weather Services					(PWS-8); Guidelines on Improvement of NMSs-Media Relations & Ensuring use of Official Consistent Information (PWS-3); Weather on the Internet & Other New Technol. (PWS-2). Guidelines on 'Communicating Forecast Uncertainty & Confidence' which will be very useful in getting users to better understand forecasts & warnings, & how to apply them in decision-making. http://www.wmo.int/web/ao/pwsp/publicationsguidelines.htm http://www.wmo.int/web/ao/pwsp/downloads/WWIS_WebsiteHosts_%20Rpt_2007_HGK.pdf
Technologies						

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Approaches/strategies	World Weather Watch					
Practices	World Weather Watch Global Observing System (GOS) provides earth and space based observations and information to prepare weather analysis, forecasts, advisories and warnings. WMO Information System (WIS) to improve and expand GTS operation for monitoring and prediction of hazardous events, tsunamis, geo-hazards, earthquake and nuclear accidents.	Under implementation				
Technologies	World Weather Watch Global Observing System (GOS) Global Telecommunication System (GTS) Global Data-Processing and forecasting System (GDPFS) Environmental Emergency Response Activities Programme					

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Approaches/strategies	<p>Global Climate Observing System Facilitate development and implementation of the Climate for Development in Africa Programme, an important objective of which is to assist adaptation to climate change in Africa</p> <p>Global Climate Observing System Assist generally in the improvement of observing networks for climate at global, regional, and national scales to support sustainable development and adaptation</p> <p>Global Climate Observing System Facilitate implementation of GCOS Regional Action Plans</p>	<p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p>	<p>Leadership in Africa; engagement of key institutions; assistance from donors; links to other sectors</p> <p>Effective collaboration between met services and users and also between WMO & other international organizations</p> <p>Leadership at the regional level</p>	<p>Funds needed</p> <p>Funds needed</p> <p>Funds needed</p>	<p>Endorsement by regional, intl organizations needed; regional champions very important; assistance by the international donor community essential</p>	<p>Climate Information for Development Needs: An Action Plan for Africa (Report and Implementation Strategy)</p> <p>GCOS Regional Action Plans for 10 developing regions (see web)</p>
Practices						
Technologies						

Scope of adaptation action <i>National level</i>						
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Approaches/strategies	Climate Applications and Services Partnership building, vulnerability assessment, capacity building in key socio-economic sectors including health, energy, tourism and urban design and management	Under implementation	National			
Practices	Climate Applications and Services Expert Teams on Climate and Health, Climate and Energy, Climate and Tourism, Urban and Building Climatology	Under implementation				
Technologies	Climate Applications and Services Facilitate the use of new Climate data management systems, improve performance in analysis, prediction and advising on implications of climate change.	Under implementation				

Scope of adaptation action <i>Local (community) level</i>						
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Approaches/strategies	Climate Applications and Services Partnership building, vulnerability assessment, capacity building in key socio-economic sectors including health, energy, tourism and urban design and management	Under implementation	Local			
Practices	Climate Applications and Services Show case studies in Shanghai	Under implementation				
Technologies	Climate Applications and Services Facilitate the use of new Climate data management systems, improve performance in analysis, prediction and advising on implications of climate change.					

Scope of adaptation action						
<i>Sectoral level</i>						
<i>Agriculture</i>						
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Approaches/Strategies	Agricultural Meteorology Programme (AgMP) 1) To review the strengths and weaknesses of existing national drought policies and recommend ways and means to establish and strengthen policy guidelines including future climate change scenarios 2) To promote and develop drought management strategies across WMO programmes	Under development	Regional and National			Drought Monitoring and Early Warning: Concepts, Progress and Future Challenges. 2006. WMO #1006.
Practices	Agricultural Meteorology Programme (AgMP) 1) The CAgM Expert Team on Drought and Extreme Temperatures will summarize the status of drought preparedness and drought coping strategies and prepare a report on these strategies. 2) A Cross-cutting Project on Drought Management in Southeastern Europe and Africa has been develop that will incorporate Data, Drought, and Risk assessment and Training and capacity building and Data and Information Delivery sections including Identification of response/mitigation measures and drought policy recommendations	Under development	Regional and National			

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Technologies	<p>Agricultural Meteorology Programme (AgMP) The CAgM Expert Team on Drought and Extreme Temperatures will assess the current status of monitoring and predicting droughts and develop standards for drought indices in different Regions. It will also recommend ways and means of improving drought monitoring and prediction.</p> <p>The World Agrometeorological Information Service (WAMIS) provides agrometeorological bulletins and tools and resources on a variety of issues including drought.</p>	Under development	Regional and National			WAMIS website: www.wamis.org

Water resources

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Approaches/Strategies	Hydrology and Water Resources Programme (HWR) Improving hydrological information systems through the World Hydrological Cycle Observation System (WHYCOS); Improving early warning & flood forecasting services; Strengthen capabilities of countries to assess their freshwater resources; Launching of an initiative to bring climate information to water managers		Under implementation	Regional and national		
Practices	Hydrology and Water Resources Programme (HWR) The strategies & approaches are put into practice through programmes & activities including WHYCOS, the WMO Flood forecasting Initiative, the Water Resources Assessment Programme & the World Climate Programme – Water (WCP-Water)					

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Technologies	Hydrology and Water Resources Programme (HWR) Means of implementation are the production of guidelines and manuals, facilitation of field projects both national and regional, the conduct of demonstration projects, building of communication platforms on national, regional and global levels, technology transfer through the HOMS Programme, Training workshops etc geared to build capacity that enables the development and implementation of adaptation measures built on sound information and high quality data products.					

<i>Health</i>						
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Approaches/Strategies	Climate Applications and Services Guidance on development of Early Warning Systems for heat waves and Health is in development through the CCI Expert Team on Climate and Health, in partnership with WHO. Most chapters are drafted, and the full document should be available for peer review later in 2007. A WHO/WMO infonote on Climate and Health will be developed in summer 2007.					
Practices	Climate Applications and Services Outlooks for Malaria outbreaks are being developed in Southern Africa and in the Greater Horn of Africa Region. The process is called MALOF, and these are held with both climate and health experts in conjunction with regular RCOFs. WMO co-sponsors WHO workshops at sub-regional levels (e.g. small Island states, mountain areas, semi-arid states, etc.) on health impacts of climate variability and change. These workshops are vital instruments in knowledge and capacity-building for both climate and health sectors in a region.					

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Technologies	Climate Applications and Services		<p>The spatial density and availability of climate data, and of health surveillance data Better observations in and modelling of urban environments for analysis of impacts of heatwaves.</p> <p>Greater effort in communication between the sectors is needed (conferences, workshops)</p> <p>Joint research into multidisciplinary models for disease outbreaks</p> <p>Intercomparisons of various Early Warning Systems for heat waves and health</p> <p>Climate-related health issues and knowledge needs to be addressed in government actions & policies for emergency response & in</p>			

			the mandates of NMHSs			
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Approaches/Strategies	World Climate Research Programme (WCRP) WCRP plans on holding subsequent Sea-level Rise workshops every two years especially for Least Developed Countries and Small Island Developing States.					
Practices	World Climate Research Programme (WCRP) Operation of Global Sea Level Observing System (GLOSS) Ocean modeling systems					
Technologies	World Climate Research Programme (WCRP) Early warning of changing risks and of specific ocean inundation, especially during intense storms, is vital for national infra-structure planning and adaptation strategies. Ocean modelling systems Study on changes in water storage on land, alterations in gravity and geometry of the ocean basin and coasts Global Sea Level Observing System (GLOSS) Update and integrate complementary geodetic capabilities (SLR, VLBI, DORIS, and GPS)—co-locating them where possible—into a reliable and consistent global geodetic ground and space network. • Install GPS positioning at all appropriate GLOSS tide gauge stations to determine changes in global					

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Technologies (continued)	<p>World Climate Research Programme (WCRP) Develop an integrated geodetic modeling capability that can be combined with those for the Earth sciences.</p> <ul style="list-style-type: none"> • Utilize observations of the time-invariant gravity field from the Gravity Field and Steady-State Ocean Circulate Explorer (GOCE), once launched, to determine the precise geoid, thereby enabling an estimation of the absolute ocean circulation for constraining climate models, as well as an improvement in understanding of geophysical processes related to sea level. 					

Energy

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Approaches/Strategies	Climate Applications and Services WMO's Commission for Climatology Expert Team on Climate and Energy is building partnership with UNEP and developing a new WMO Technical Note on 'Meteorological Aspects of Utilization of Renewable Energy Sources'. An info note on Climate and Energy is planned to be developed in summer 2007.		Improvement in the spatial density & availability of climate data for effective analysis of the role of climate in various segments of the energy industry. Better observations in & modelling of wind fields is for siting of wind farms. Greater effort in communication between the sectors is needed (conferences, workshops). Climate-related energy issues and knowledge needs to be addressed in government actions & policies for emergency response and in the mandates of NMHSs. Wider use of renewable energies as a key adaptation strategy			

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Practices	Climate Applications and Services Seasonal predictions from NMHSs and through Regional Climate Outlook Forums are an important source of advance information on upcoming climate patterns (e.g..					
Technologies	Climate Applications and Services Seasonal prediction models, precipitation totals that could affect the renewable energy industry, particularly hydropower generation					

Urban Sector

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Approaches/Strategies	Climate Applications and Services The Commission for Climatology Expert Team on Urban and Building Climatology is developing two new WMO Technical Notes on 'Building Climatology in a changing climate' and 'Urban Climatology and its relevance to urban design', to replace outdated versions of these documents, published as Technical Notes Numbers 149 and 150. This is a multi-year research effort. An info note on Urban and Building Climatology is planned to be developed in summer 2007.	Under implementation				
Practices	Climate Applications and Services Many NMHSs develop input to national building codes, based on sound climatological analyses of averages and extremes in wind, rain, temperature, runoff, snowloads, etc.	Under implementation	Improve the spatial density and availability of climate data in urban areas for effective analysis of the role of urban heat and cool islands, flash flooding, wind canyons, etc. Better modelling of the urban environment for improved urban design.			

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Practices (continued)	Climate Applications and Services		<p>Ensure all appropriate partnerships & effective commun. Mechanisms between relevant sectors (architecture, health, risk reduction & emergency services, planning, energy, transportation, etc.); Conferences, workshops with professionals & the public will help build resilient societies that can better adapt to a changing environment. Because of the anticipated growth of many urban centres and the proliferation of megacities, often in vulnerable areas such as flood plains and near coastlines, the importance of understanding the impacts of climate extremes in high-density areas is vital to development of risk</p>			

			reduction & adapt. strategies & policies.			
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Technologies	Climate Applications and Services					Technical Notes on Urban Climatology & its relevance to urban design (WMO/TN 149); Application of Building Climatology to the problems of housing and building for human settlements (WMO/TN 150), 1976. WMO/TN 665 on Guidance material on the calculation of climatic parameters used for building purposes, 1992 . A long-term bibliography on urban climatology exists and is kept up to date by the CCI Expert Team. WMO held a conf. on Tropical Urban Climates 28 March-2 April 1993 in Dakah, Bangladesh

Tourism

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Approaches/Strategies	<p>Climate Applications and Services The Commission for Climatology Expert Team on Climate and Tourism is building partnership with UNWTO and beginning joint studies on the impacts of climate variability and change on the tourism industry, particularly for the most vulnerable regions the sector (e.g. mountain and coastal areas). The ET may also begin looking into the impacts of tourism on the environment (stress on biodiversity, land use change, emissions from aviation, etc.) An info note on Climate and Tourism is planned to be developed in summer 2007.</p>	Under implementation	<p>Improve the spatial density and availability of climate data for effective analysis of the role of climate in various segments of the tourism industry Better observations in and modelling of mountain and coastal climates for siting of resorts for long term planning in a changing climate. Greater effort in communication between the sectors is needed (conferences, workshops)</p>			<p>A meeting of Experts on Climate, Tourism and Human Health, Topes de Collantes, Cuba, 22-29 January 1995 (WCASP 33; WMO/TD-No. 682, WMO, May 1995) WMO Bulletin: Tourism, Climate and Weather, P.</p>

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Approaches/ Strategies (continued)	Climate Applications and Services					Shackleford & L.E. Olsson, WMO Bulletin, Volume 44, No. 3, July 1995; & Climate Services for Tourism & Recreation, L. Lecha & P. Shackleford, WMO Bulletin, Volume 46 No. 1, January 1997. UNWTO & WMO jointly published the Handbook on Natural Disaster Reduction in Tourist Areas in 1998. UNWTO held an Internat. Conf. on Climate Change & Tourism, in Djerba, Tunisia (9-11 April 03)
Practices	Climate Applications and Services Seasonal predictions from NMHSs & through Regional Climate Outlook Forums are an important source of advance information on upcoming climate patterns (e.g. temperature & precipitation patterns) that could affect the tourism industry in the medium term.					
Technologies	Climate Applications and Services Seasonal prediction models, heatwaves & other extreme events, retreating glaciers, etc. that					

	could affect the tourism industry					
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