

**FOURTH TECHNICAL CONFERENCE ON MANAGEMENT OF  
METEOROLOGICAL AND HYDROLOGICAL SERVICES IN ASIA**

***WEATHER, CLIMATE AND WATER SERVICES FOR SECURE AND  
SUSTAINABLE LIVING***

**(ISLAMABAD, PAKISTAN, 5-9 FEBRUARY 2007)**

**Final Report**



**WORLD METEOROLOGICAL ORGANIZATION**

## **1. OPENING OF THE CONFERENCE**

1.1 At the kind invitation of the Government of the Islamic Republic of Pakistan, the Fourth Technical Conference on Management of Meteorological and Hydrological Services in Regional Association II (Asia) was held in Islamabad, Pakistan, from 5 to 9 February 2007, with the theme of "Weather, Climate and Water Services for Secure and Sustainable Living".

1.2 The Conference was attended by 37 Directors or senior officials of National Meteorological and Hydrological Services (NMHSs) of 17 Members in Region II, one representative from a regional organization, and two invited lecturers. The list of participants is given in Annex I.

1.3 Dr Qamar-uz-Zaman Chaudhry, Director-General of the Pakistan Meteorological Department and Permanent Representative of Pakistan with WMO, welcomed the participants and extended the warmest greetings and welcome of the Government of Pakistan. Dr Chaudhry stressed the importance of this Conference as a forum to exchange views and share experiences among representatives of NMHSs of RA II, in light of the growing demand of societies within the context of achieving sustainable development. He stressed the need to explore climate as a major natural resource. He expressed deep appreciation and delight for the presence of Mr Michel Jarraud, Secretary-General of the World Meteorological Organization (WMO) at this Conference.

1.4 Mr A. Majeed Isa, President of Regional Association II (Asia) expressed his sincere gratitude to the Government of Pakistan for extending this invitation to the Members in Asia and thanked the Pakistan Meteorological Department for efforts to organize the Conference. He pointed out that the management of NMHSs is facing growing challenges because of government and public demand for delivering accurate and timely warnings and weather forecasts while financial resources available for services are very limited. Mr Isa encouraged NMHSs in RA II to continue the process of increasing efficiency and improving ability to meet these challenges.

1.5 Mr Michel Jarraud, Secretary-General of the World Meteorological Organization (WMO), expressed his deep appreciation, and that of WMO, to the Government of Pakistan for hosting this Conference in the historic city of Islamabad. He emphasized that strengthening the capacities of NMHSs to contribute effectively to sustainable development entails the improvement of existing weather-, climate- and water-related monitoring services and applications, and the development of newer ones. This is being accomplished by supporting the national efforts aimed at modernizing the NMHSs, strengthening their human resources development plans and developing appropriate products, as well as by encouraging new partnerships and strategic alliances among the NMHSs and between the NMHSs and other partners at all levels. In addition, Members are also being supported in their efforts to develop innovative ways of mobilizing resources – financial, human and material among others. In referring to a number of measures taken in the WMO Secretariat to increase efficiency, in particular the creation of the Development Cooperation and Regional Activities Department and the opening of the WMO Office for West Asia in Bahrain, the Secretary-General assured that WMO will continue to support NMHSs to promote the social and economic benefits of weather, climate and water services in Asia. He wished the Conference every success.

1.6 H.E. Senator Anisa Zeb Tahirkheli, Minister of State for Education, Government of Pakistan, expressed her pleasure to meet the delegates in this Conference. On behalf of the Government of Pakistan, she welcomed all participants and wished them a successful Conference and a joyful stay in Pakistan. Ms Tahirkheli emphasized the vulnerability of some countries in Asia to weather-related disasters because of the lack of the required resources for putting in place adequate infrastructure. She emphasized the importance of enhancing early warning capacity of NMHSs to prevent and mitigate adverse effects of natural disasters. She expressed her deep appreciation to the efforts of WMO in capacity building of NMHSs in RA II.

## **2. SUMMARY OF DISCUSSIONS**

2.1 Following a general introduction of the organization of the Conference by Dr T. Toya, Regional Director for Asia and the South-West Pacific, WMO, Mr M. Jarraud, Secretary-General of WMO delivered a keynote lecture entitled "Weather, water, climate and sustainable development: The role of WMO". The Secretary-General highlighted major issues facing the NMHSs; key social and economic drivers for the NMHSs; and possible WMO contributions to the Millennium Development Goals, as well as the recent WMO activities in various fields. He introduced upcoming WMO events including the International Conference on Social and Economic Benefits of NMHSs (Madrid, 19-22 March 2007) and the Fifteenth WMO Congress and the fifty-ninth session of the Executive Council (Geneva, 7-25 and 28-30 May 2007, respectively) with reference to the WMO Strategic Plan and WMO Secretariat Operating Plan (2008-2011). Mr Jarraud emphasized the need for further cooperation at national, regional and international levels; within multiple domains; and across disciplines; thus the need for a stronger WMO. He shared with the Conference his view that the Permanent Representative of a Member with WMO could play an active role in representing WMO in the country, in addition to the role of representing the country in WMO.

2.2 The lectures and case studies were presented by Directors or senior officials of NMHSs, representatives of international/regional organizations, invited lecturers, and staff of the WMO Secretariat. The presentations covered the following topics of the Conference:

- Topic I: Social and economic benefits of weather, climate and water services;
- Topic II: New initiatives for observations: WMO Integrated Observing System (IOS) and the Global Earth Observing System of Systems (GEOSS);
- Topic III: WMO Information System (WIS) and use of information and communication technology;
- Topic IV: Strengthening of NMHSs to provide accurate and timely information to end-users;
- Topic V: Role of NMHSs in disaster risk reduction;
- Topic VI: Strategy for sustainable development of NMHSs.

The programme of the Conference is given in Annex II.

2.3 Following extensive discussions on the various presentations, the Conference came to the conclusions and recommendations as given below.

## **3. SOCIAL AND ECONOMIC BENEFITS OF WEATHER, CLIMATE AND WATER SERVICES (Topic I)**

3.1 Dr D. Gunasekera (Australia) pointed out that the potential socio-economic value of meteorological services is substantial but the realization of this potential is not automatic. It requires developing lasting relationships between the meteorological service providers and the users. It is encouraging to observe the gradually increasing number of studies focusing on the economic value of meteorological services. There is a continuing need for NMHSs to play a leading role in facilitating such studies in collaboration with the user community.

3.2 Dr Q. Chaudhry (Pakistan) presented some examples concerning the role of Pakistan Meteorological Department (PMD) in saving lives and reducing economic losses by issuing timely and accurate forecasts of severe weather conditions. He underlined the importance of meeting the specific needs of users by issuing forecasts tailored to their requirements. The fast response and preparedness of PMD and the specific needs during the earthquake of October 2005 has contributed to a large extent in enabling WMO to provide necessary assistance in support of PMD efforts to deliver tailored services.

3.3 Mr K. Shuaibi (Kuwait) underscored the importance of building trust with various users in improving visibility of NMHSs and expanding their role and involvement in national disaster prevention policies. He stressed the importance of investing in using state-of-the-art technology to improve the infrastructure of NMHSs.

3.4 Mr L. Song (China) introduced the Social and Economic Benefits of Meteorological Services in China. He explained that China is frequently hit by various disasters related to extreme weather and climatic events. The annual economic losses reach 186 billion RMB representing 2.8% of China's gross domestic product. Each year the meteorological disasters affect about 400 million people, kill more than 4,000 people and destroy almost 50 million hectare of cropland. He stated that the meteorological service cost-benefit ratio of the China Meteorological Administration (CMA) is 1:35 to 1:40.

3.5 Dr Azaya D. (Mongolia) highlighted the importance of weather services for agriculture and life stalk industry in Mongolia. She pointed out the needs of Mongolia for capacity building and improved regional cooperation in various fields such as data exchange and data quality control.

3.6 The Conference made conclusions and recommendations as follows:

- (i) Studies of economic benefits of meteorological information are a crucial input into cost-benefit assessment of meteorological services. The availability of such studies is very limited, particularly for developing countries. Such studies need a multidisciplinary approach involving users, NMHSs, economists and statisticians;
- (ii) There is a greater need for NMHSs to take a leading role in facilitating and undertaking such studies in collaboration with the user community;
- (iii) With regard to the 2007 Madrid Conference, NMHSs and users should make efforts to attend the Conference and Permanent Representatives should consider how to actively encourage users from their respective countries to take part in the Conference;
- (iv) To ensure continuous and productive dialogue between producers and users of meteorological and hydrological products, NMHSs and WMO should consider organization of events at national and regional levels on socio-economic benefits;
- (v) Noting that there is growing recognition among the meteorological community of the importance of assessing the costs and benefits of weather-, climate- and water-related information, WMO needs to coordinate activities and assist Members in this direction.

3.7 In view of the above, the Conference agreed on the need for NMHSs to facilitate:

- (i) Maintenance of essential infrastructure;
- (ii) Investing in new technologies;
- (iii) Delivering factual information based on sound science in promoting the services and improving visibility of NMHSs;
- (iv) Continuous review of staff capability and their method of operation in tandem with new and emerging challenges;
- (v) Building institutional partnerships with end-users with clear understanding of user's requirements and continuous and productive dialogue between providers and users of meteorological and hydrological information and products;
- (vi) Capacity building to ensure desirable competencies, especially in the area of accurate weather forecast and overall delivery of quality products;
- (vii) Implementation of medium- and long-term training programmes.

#### **4. NEW INITIATIVES FOR OBSERVATIONS: WMO INTEGRATED OBSERVING SYSTEM (IOS) AND THE GLOBAL EARTH OBSERVING SYSTEM OF SYSTEMS (GEOSS) (Topic II)**

4.1 Mr A. Majeed Isa (President of RA II) stressed the importance of GEOSS in providing societal services in various sectors including meteorology. He urged all Members to participate in the GEOSS and encouraged NMHSs to get involved in the activities of this free of charge and beneficial system.

4.2 Dr J.C. Nam on behalf of Mr S.K. Chung (Republic of Korea) introduced the Integrated Observation Network of the Korea Meteorological Administration (KMA). He mentioned that the Integrated Observation Network could be used for early detecting and continuous monitoring of severe weather events; improvement of accuracy of NWP model by using initial data through data assimilation; long-term extraction of climate variation information; and GEOSS, THORPEX, GPM, CEOP (Coordinated Enhanced Observing Period), etc. He further mentioned that KMA would continue to expand observation systems for better meteorological services and would also be willing to share the experiences and technologies with Members in the Region.

4.3 The Conference recommended the following:

- (i) All Members in RA II are urged to participate in GEOSS and NMHSs become fully involved in its implementation process;
- (ii) NMHSs should strengthen their observing networks;
- (iii) WMO should address the need for capacity building for LDCs and small NMHSs in satellite-based technology;
- (iv) WMO Members should have full access to all data generated by GEOSS.

#### **5. WMO INFORMATION SYSTEM (WIS) AND USE OF INFORMATION AND COMMUNICATION TECHNOLOGY (Topic III)**

5.1 Mr H. Ichijo (Japan) described the WMO Information System (WIS) and related use of information and communication technology. He stressed that the WMO Information System (WIS) concept was mainly developed by CBS and approved by the Fourteenth Congress in 2003 as an important component of the WMO basic infrastructure, and now it is heading for the implementation phase. He described the status and plans of the WIS from a comprehensive view. He stressed that WIS will be a common information infrastructure beneficial to every NMHS. He provided information on strategies and steps leading to WIS early implementation.

5.2 Mr P. Shi (China) briefed the Conference on the latest implementation status of the GTS and impact of the recent earthquake south of Taiwan on the operation of GTS and the Internet. He introduced the concept of WIS; its background; structure; major technical challenges; implementation progress and timetable; the services and potential users of WIS; and its benefit to NMHSs.

5.3 Mr S.A. Yahyai (Oman) presented the Portable Station Value Verification Package for Regional High Resolution Models "ORMVERIF". The Oman Meteorological Department has implemented a portable verification package to be used to evaluate the NWP models. He stated that Oman is willing to provide Members with a copy of the package free of charge if requested.

5.4 The Conference noted the development of the WIS and agreed with the view of CBS that:

- (i) The WIS will be a single coordinated infrastructure based on information exchange requirements to support all WMO and related international programmes;
- (ii) The WIS will enhance NMHS capabilities in its service, cost-effectiveness and national role;

- (iii) The WIS is heading for the implementation phase. Pilot projects and prototypes are the driving force behind early implementation;
- (iv) Regional contributions are expected through participation in pilot projects, preparation for semi-operation and studies on policy issues and technical aspects;
- (v) More assistance is needed for WIS capacity building of developing countries, especially involvement of their experts in technical development of WIS;
- (vi) The success of WIS depends upon volunteering Members actively supporting and contributing to projects that have the potential to facilitate the implementation of WIS;

5.5 In view of the above, the Conference recommended the following:

- (i) The Permanent Representatives should pay more attention to this key project of WMO, and promote WIS at high-level meetings such as the upcoming WMO Congress;
- (ii) For the purpose of responding to requests of users, NMHSs in RA II have to further advance the domestic meteorological services in close cooperation with each other;
- (iii) NMHSs in RA II should participate in the VPN pilot project for RAs II and V and WMO should provide assistance for their participation.

## **6. STRENGTHENING OF NMHSs TO PROVIDE ACCURATE AND TIMELY INFORMATION TO END-USERS (Topic IV)**

6.1 Mr C.Y. Lam (Hong Kong, China) emphasized in his presentation that delivering accurate and timely services amounts to making the services relevant to users. It depends fundamentally on the adaptation of a requirement-driven model of operation. To tackle most common information needs, the setting up of an AWS network is a practical and cost-effective foundation. International cooperation, especially the availability of NWP-generated city-specific forecast time series over the Internet, will enable all meteorological services to match public expectations in the "several days" time scale. He also advocated that meteorological services should diversify their services to make themselves relevant to strengthen their position.

6.2 Mr K. Sakurai (Japan) presented the recent progress in providing accurate, timely and user-oriented meteorological information. He stated that while the NMHSs worldwide have been striving for ever better quality of the forecast services, natural disasters such as heavy rains, floods and droughts leave a mark on the people. He emphasized that although there is no question as to the importance of NMHSs' efforts to fulfill the above-mentioned mission, it is beneficial for NMHSs to optimize the use of:

- 1) existing technical resources, such as on-going RA II projects and operational observational/forecast products of Regional Specialized Centres and some of the NMHSs; and
- 2) emerging projects or activities (to be) available in the Region such as WIS-related projects,

for the purpose of promptly meeting the earnest social needs of Member countries. He gave examples of assistance to be provided in the Region by the Japan Meteorological Agency (JMA).

6.3 Dr J.C. Nam (Republic of Korea) introduced the Digital Forecast System of the Korea Meteorological Administration (KMA). The KMA Digital Forecast System produces a detailed and quantitative forecast, and is based on the Internet. It is applicable for mitigation of disasters, energy managements, agriculture and fisheries, water resources management, market management and transportation.

6.4 Mr S.A. Awan (Pakistan) listed the tasks carried out by PMD in forecasting river floods in Pakistan. Challenges faced by PMD include obtaining data on cross boundary rivers, forecasting rainfall amount and forecasting air temperature which can be crucial for ice melting and eventually can lead to flooding.

6.5 Mr N.H. Rajbhandari (Nepal) described the engagement of the Department of Hydrology and Meteorology in various activities such as meteorology, hydrology, glacier monitoring, etc. He described the weakness of the Department and the needs for strengthening the capacity in collecting data and carrying out weather observations.

6.6 To strengthen NMHSs to provide accurate and timely information to end-users, the Conference recommended that NMHSs should:

- (i) take into account relevance, accuracy and usefulness when preparing and issuing hydrometeorological products and warnings;
- (ii) enhance their system of dissemination of information;
- (iii) build close coordination with disaster management authorities in their respective countries;
- (iv) make use of available facilities in the area of training, NWP, etc., such as those in JMA and KMA;
- (v) In order for NMHSs to further utilize new and existing resources/services (on the Internet) such as NWP output for weekly/seasonal/typhoon forecasts for public weather services or disaster prevention and mitigation, it is worth making an environment which will enable NMHSs to share up-to-date information on available resources/services.

## **7. ROLE OF NMHSs IN DISASTER RISK REDUCTION (Topic V)**

7.1 On behalf of Dr A.M. Noorian, Dr J.B. Jamali (Islamic Republic of Iran) stressed that hazards are part of the environment which cannot be stopped but can be prevented from becoming disasters. He listed the disaster risk management strategies which include: governance, risk identification, knowledge management, reduction of risk factors and preparedness. The challenges to risk management activities include political recognition, institutional capabilities and availability of data. He demonstrated that shortcomings of risk need emergency response, seasonal warnings need preparedness and long-term warnings (climate) need prevention as action of response to such warnings.

7.2 Mr Md. A. Hussain (Bangladesh) introduced the role of the Bangladesh Meteorological Department (BMD) in disaster risk reduction. Recalling the 1876 cyclone which hit Bangladesh claiming more than 200,000 lives, and 300,000 in 1970, Mr Hussain described the functions and activities of BMD providing various weather and seismological products and warnings. He concluded that the number of casualties in his country dropped by 11 times as a result of accurate and timely warning.

7.3 Mr A.M. Ramiz (Maldives) presented disaster risk reduction through people centered multi-hazard early warning system in the context of Maldives. He summarized types of disasters affecting Maldives and described the activities carried out by the National Meteorological Centre to respond to these hazards. Since more than 80% of the area of the country lies less than 1m above mean-sea-level, erosion and sea-level rise are among the two major hazards posing a threat to Maldives. He added that due to economic losses caused by the 2004 Tsunami, the country had not been able to graduate from LDC status.

7.4 Mr G. Samarasinghe (Sri Lanka) described the role of the Department of Meteorology in Sri Lanka in the disaster risk reduction. He detailed the various types of hazards affecting Sri Lanka and described the functions and activities carried out by the Department of Meteorology. Floods and landslides are the major hazards facing Sri Lanka and droughts are

becoming increasingly significant. He stressed that recognition of NMHSs as major component of the national infrastructure in disaster management is very important to promote NMHSs and also simultaneously motivating them to improve their performance.

7.5 Ms M. Brikshavana (Thailand) described the current and future projects in Thailand for telemetric flood forecasting and early warning. Expanding radar network, replacing voluntary rainfall stations and installing state-of-the-art measurement tools were important elements in disaster risk prevention in Thailand.

7.6 Ms D.L. Chau (Viet Nam) described the role of NMHS of Viet Nam. She listed the activities carried out by the National Centre for Hydro-Meteorological Forecasting (NCHMF) in tracking typhoons and issuing warnings and forecasts. She stressed that many lives were saved through the issuance of accurate and timely warnings for the 2006 typhoon Xangsane. She iterated that without the cooperation and prompt action in evacuating citizens from areas along the expected path of the typhoon, lives would have never been saved.

7.7 The Conference agreed on the need to:

- (i) continue to increase awareness to the people on a regular basis;
- (ii) urge JCOMM to play a more active role on tsunami issue;
- (iii) demonstrate the decrease of economic losses due to the contribution of meteorological services.

7.8 The Conference recommended the following:

- (i) NMHSs should more clearly define their role in disaster risk reduction by identifying the specific products and services being provided to manage the risks associated with specific natural disasters in their respective countries;
- (ii) Given that disaster risk reduction is the responsibility of a wide range of national agencies, NMHSs should more clearly define their particular role and responsibilities within national frameworks so that duplication of function and effort can be avoided. This approach would provide an environment where NMHSs' products and services in disaster risk reduction are more efficiently and effectively provided and utilized.

## **8. STRATEGY FOR SUSTAINABLE DEVELOPMENT OF NMHSS (Topic VI)**

8.1 Mr K. Konaré (WMO) identified the difficulty of mainstreaming NMHSs activities into sustainable development process in developing countries. He pointed out the relationships between NMHSs activities and sustainable development issues and targets as internationally agreed, and recognized that NMHSs contribution to sustainable development of the respective countries is not yet visible in most developing countries. He stressed that NMHSs need to know more about the relevant national development strategies and need to cooperate closely with those responsible for strategies in their countries.

8.2 Mr J. Yu (China) presented the enhancement ability of NMHSs through Operational and Technical System Reform in the China Meteorological Administration (CMA). The purpose of the reform is to enhance the ability of the meteorological service to meet the increased meteorological service requirements of social economic development in China. The goal of the reform is to setup a "Multiple-field, highly intensified, research-oriented and open" meteorological operational system. In the coming years, the highest priority will be given to the development of the following eight operational subsystems: weather, climate, climate change, ecological and agricultural meteorology, atmospheric compositions, weather modification, space weather, and lightning. He then provided some information on GEO activities in China such as setting up a National Committee of GEO, creating a National High-Tech R&D Programme - Earth Observation formed, and publishing GEOSS Ten-Year Implementation Plan in Chinese language.



8.3 Dr T. Hashida (Japan) outlined the international cooperation strategy of the Government of Japan for supporting sustainable development of NMHSs, including its basic strategy and gave several examples which covers projects implemented directly by the Japan Meteorological Agency (JMA), as well as those supported by the Official Development Assistance (ODA) in the form of Technical Cooperation, Grant Aids and ODA Loans. He added that in order to further mobilize resources for the sustainable development of NMHSs, it is indispensable, in planning and implementing cooperative projects, to strengthen partnership/collaboration with other governmental authorities, to effectively appeal socio-economic benefits in the fields of, among others, disaster prevention/mitigation and protection of the environment, to develop a sustainable operation plan, taking into consideration (a) necessary operational costs, (b) capacity building by incorporating expert trainings, and (c) upgrade of operational systems, and to exchange informal and frank views with PRs or advisors to PR as well as the WMO Secretariat at every occasion, in preparing, planning and implementing cooperative projects.

8.4 Dr S. Karmakar (SMRC) introduced the objectives, structure and activities of the SAARC Meteorological Research Centre (SMRC). He further described future plans of the SMRC.

8.5 Mr S. Jaaffar (Bahrain) presented the role of the Bahrain Meteorological Service (BMS) and described the structure for the future. He described the strengths, weaknesses, opportunities and threats of BMS. The BMS maintains the provision of timely and accurate weather forecast and operates with highly skilled dedicated staff members.

8.6 The Conference recommended the following:

- (i) NMHSs should keep abreast of the development and implementation of national sustainable development strategies, policies and plans in Member countries so as to influence policy formulation and the planning process and to benefit from related opportunities that would lead to increase the image, visibility and funding of NMHSs;
- (ii) NMHSs should develop and review regularly their development strategies through survey involving relevant government departments, private sector and other stakeholders;
- (iii) RA II Members should support regional cooperation initiatives such as the SAARC Meteorological Research Centre (SMRC);
- (iv) When preparing technical cooperation projects, the development priorities of the country should be taken into consideration, in particular disaster risk reduction, environmental protection, climate change, health, national land/infrastructure development, and project proposals should include relevant operational cost, capacity building including expert training and upgrading of operational systems;
- (v) Members should further develop leadership in the respective NMHSs.

## **9. CLOSURE OF THE CONFERENCE**

9.1 The Conference reviewed and adopted the Report.

9.2 The participants, the president of Regional Association II and the representative of WMO expressed their thanks and appreciation to the Government of Pakistan and Dr Qamar-uz-Zaman Chaudhry and his staff for the warm hospitality and excellent arrangements made.

9.3 The Conference closed at 11:46 hours on 9 February 2007.

**Fourth Technical Conference on Management of  
Meteorological and Hydrological Services in Asia**

***Weather, Climate and Water Services for Secure and Sustainable Living  
(Islamabad, Pakistan, 5 to 9 February 2007)***

**LIST OF PARTICIPANTS**

<b><u>I Members</u></b>	<b><u>Participants</u></b>	<b><u>E-mail address</u></b>
<b>Bahrain</b>	Mr A. Majeed H. ISA Mr. Shukri HASIM	amhisa@caa.gov.bh shukri.jaffar@gmail.com
<b>Bangladesh</b>	Mr Md. Amirul HUSSAIN	directorbmd2005@yahoo.com
<b>Bhutan</b>	Mr Jamyang PHUNTSHOK	J_phuntshok@moa.gov bt jamyn_lo@danknet.bt
<b>China</b>	Dr QIN Dahe Mr Zehn Zelin Mr SONG Lianchun Mr SHI Peiliang Mr YU Jixin Mr XU Xianghua	qdh@cma.gov.cn cdccc@cma.gov.cn songlc@cmagov.cn shipl@cma.gov.cn yujx@cma.gov.cn xianghua@cma.gov.cn
<b>Hong Kong, China</b>	Mr Chiu-ying LAM	chiuylam@hko.gov.hk
<b>Iran, Islamic Republic of</b>	Dr Javad BODAGH JAMALI	intl-affairs@irimet.net
<b>Japan</b>	Mr Kunio SAKURAI Dr Toshihiko HASHIDA	inad-jma@hq.kishou.go.jp inad-jma@hq.kishou.go.jp
<b>Kuwait</b>	Mr Khaled SHUAIBI Mr Essa RAMADAN Mr Husain AL-SARAF	knmc@kuwait-airport.com.kw
<b>Maldives</b>	Mr Abdul Muhusin RAMIZ	abdul_muhusin@meteorology.gov.mv
<b>Mongolia</b>	Dr Azzaya DOLGORSUREN	azzaya23@yahoo.com meteoins@magicnet.mn
<b>Nepal</b>	Mr Nirmal Hari RAJBHANDARI	nirmal@dhm.gov.np nirmalhr@hotmail.com
<b>Oman</b>	Mr Sultan AL YAHYAI	s.alyahyai@met.gov.om s.alyahyai@gmail.com
<b>Pakistan</b>	Dr Qamar-uz-Zaman CHAUDHRY  Eng. Dr Ib Shaikh Mr Shaukat Ali AWAN Mr Arif MAHMOOD Mr Naeem SHAH Mr Miuhammad RAFIQ Mr Hazrat MIR Mr Miuhammad RIAZ Mr Zia-ud-Din KHAN Mr Ghulam RASUL Mr Azmat Hayat KHAN Mr Ata HUSSAIN Ms Asma YOUNAS	qamarc@hotmail.com dgpmd@hotmail.com pakfloodcommission@hotmail.com saliawan2002@yahoo.com arifmahmood1954@hotmail.com naeemshah1956@yahoo.com rafiq_quetta@yahoo.com hazratmir2007@yahoo.com riaz1962@hotmail.com zia52pk@yahoo.com grmet@yahoo.com pmd@pakmet.com.pk atahussaingill@yahoo.com tsupmd@yahoo.com

<b>Republic of Korea</b>	Mr Soon-Kab CHUNG Dr Jae-Cheol NAM	skchung@kma.go.kr jcnam@kma.go.kr
<b>Sri Lanka</b>	Mr Gunavi SAMARASINGHE	sbaladev_24@yahoo.com
<b>Thailand</b>	Ms Muntana BRIKSHAVANA	tmd-inter@tmd.go.th
<b>Viet Nam</b>	Ms Chau Lien DUONG	dlchau@nchmf.gov.vn dlchau@yahoo.com

## **II. Invited Lecturers**

Australia	Dr Don GUNASEKERA	don.gunasekera@abare.gov.au
Japan	Mr Hiroyuki ICHIJO	h_ichijo@naps.kishou.go.jp

## **III. Regional Organization**

<b>SAARC Meteorological Research Center</b>	Dr Samarendra KARMAKAR	smrc@citech.net
---	------------------------	-----------------

## **IV. WMO Secretariat**

Dr Tokiyoshi TOYA	ttoya@wmo.int
Mr Kaliba KONARÉ	kkonare@wmo.int
Mr Kunyuki SHIDA	kshida@wmo.int
Dr Jaser K. RABADI	jkrabadi@yahoo.com
Mr Jeong-Gyoo PARK	Jpark@wmo.int

## **V. Local Organizing Committee**

Mr Azmat Hayat KHAN	pmd@pakmet.com.pk
Mr Ata HUSSAIN	tsupmd@yahoo.com
Mr Saadat Zia KHAN	pmd@pakmet.com.pk

---

**Fourth Technical Conference on Management of  
Meteorological and Hydrological Services in Asia**

***Weather, Climate and Water Services for Secure and Sustainable Living***

**Islamabad, Pakistan, 5-9 February 2007**

**Programme**

**1. Monday, 5 February 2007**

**Morning**

08:30 - 09:15 Registration

09:15 - 11:00 Opening ceremony

11:00 - 11:30 Coffee break

**Chair: Dr Qamar-uz-Zaman Chaudhry (Pakistan)**

11:30 - 11:45 General introduction

**Dr Tokiyoshi Toya (WMO)**

11:45 - 12:15 Keynote lecture

Weather, water, climate and sustainable development: The role of  
WMO

**Mr Michel Jarraud, Secretary-General of WMO**

12:15 - 12:30 Discussion

12:30 - 14:00 Lunch break

**Afternoon**

**TOPIC I - SOCIAL AND ECONOMIC BENEFITS OF WEATHER, CLIMATE AND  
WATER SERVICES**

**Chair: Mr Abdul Majeed H. Isa (Bahrain)**

**Rapporteur: Ms Muntana Brikshavana (Thailand)**

14:00 - 14:30 Meteorological services - how to maximize the benefits to the  
community

**Dr Don Gunasekera (Australia)**

14:30 - 15:00 Economic benefits of hydrological and meteorological Services -  
Pakistan Case

**Dr Qamar-uz-Zaman Chaudhry (Pakistan)**

15:00 - 15:30 The Development of NMHSs

**Mr Khaled Shuaibi (Kuwait)**

15:30 - 15:45 *Coffee break*

15:45 - 16:05 The Socio-economic benefits of meteorological services in China

**Mr Song Lianchun (China)**

16:05 - 16:25 Social and economic benefits of weather, climate and water services

**Dr Azzaya Dolgorsuren (Mongolia)**

16:25 - 17:30 Discussions and recommendations on Topic I

## 2. Tuesday, 6 February 2007

### Morning

#### TOPIC II - NEW INITIATIVES FOR OBSERVATIONS: WMO INTEGRATED OBSERVING SYSTEM (IOS) AND THE GLOBAL EARTH OBSERVING SYSTEM OF SYSTEMS (GEOSS)

**Chair: Mr Chiu-ying Lam (Hong Kong, China)**

**Rapporteur: Mr Hussain Al Sarraf (Kuwait)**

- 09:00 - 09:30 GEOSS and the capacity building of NMHSs in RA II  
**Mr Abdul Majeed H. Isa (Bahrain)**
- 09:30 - 10:00 KMA Integrated Observation System (IOS) for better meteorological services  
**Mr Soon-Kab Chung (Republic of Korea)**
- 10:00 - 10:30 Discussions and *recommendations* on Topic II
- 10:30 - 10:45 *Coffee break*

#### TOPIC III - WMO INFORMATION SYSTEM (WIS) AND USE OF INFORMATION AND COMMUNICATION TECHNOLOGY

**Chair: Mr Chiu-ying Lam (Hong Kong, China)**

**Rapporteur: Ms Azzaya Dolgorsuren (Mongolia)**

- 10:45 - 11:15 WMO Information System (WIS) as a single coordinated global infrastructure  
**Mr Hiroyuki Ichijo (Japan)**
- 11:15 - 11:45 WMO Information System: Opportunities and challenges for NMHSs  
**Mr Shi Peiliang (China)**
- 11:45 - 12:05 Portable Station Value Verification Package for Regional High Resolution Models "ORMVERIF"  
**Mr Sultan Al Yahyai (Oman)**
- 12:05 - 12:30 Discussions and *recommendations* on Topic III
- 12:30 - 14:00 *Lunch break*

**Afternoon****TOPIC IV - STRENGTHENING NMHSS TO PROVIDE ACCURATE AND TIMELY INFORMATION TO END-USERS****Chair: Mr Khaled Shuaibi (Kuwait)****Rapporteur: Ms Duong Lien Chau (Viet Nam)**

- 14:00 - 14:30 Be relevant and effective - thinking beyond accuracy and timeliness  
**Mr Chiu-ying Lam (Hong Kong, China)**
- 14:30 - 15:00 Recent progress in providing accurate, timely and user-oriented meteorological information  
**Mr Kunio Sakurai (Japan)**
- 15:00 - 15:30 The Challenges to develop a new paradigm for forecasting services - Digital Forecast System  
**Dr Jae-Cheol Nam (Republic of Korea)**
- 15:30 - 15:45 *Coffee break*
- 15:45 - 16:05 Flood forecasting system in Pakistan  
**Mr Shaukat Ali Awan (Pakistan)**
- 16:05 - 16:25 Strengthening of Weather Forecasting Division to provide accurate forecast and early warning  
**Mr Nirmal Hari Rajbhandari (Nepal)**
- 16:25 - 17:30 Discussions and recommendations on Topic IV

**3. Wednesday, 7 February 2007****Morning****TOPIC V - ROLE OF NMHSS IN DISASTER RISK REDUCTION****Chair: Dr Samarendra Karmakar (SMRC)****Rapporteur: Ms Asma Younas (Pakistan)**

- 09:00 - 09:30 Risk assessment and management for natural disaster and mitigation  
**Dr Javad Bodagh Jamali (Islamic Republic of Iran)**
- 09:30 - 09:50 Role of Bangladesh Meteorological Department in disaster risk reduction in Bangladesh  
**Mr Md. Amirul Hussain (Bangladesh)**
- 09:50 - 10:10 Disaster risk reduction through people centered national multi-hazard early warning system in the context of Maldives  
**Mr Abdul Muhusin Ramiz (Maldives)**
- 10:10 - 10:30 Role of Sri Lanka Meteorological Service in disaster risk reduction  
**Mr Gunavi Samarasinghe (Sri Lanka)**
- 10:30 - 10:45 *Coffee break*
- 10:45 - 11:05 Integrated Telemetering System for disaster risk reduction over Thailand  
**Ms Muntana Brikshavana (Thailand)**
- 11:05 - 11:25 Role of National Hydrometeorological Service of Viet Nam in disaster risk reduction  
**Ms Duong Lien Chau (Viet Nam)**
- 11:25 - 12:30 Discussions and recommendations on Topic V
- 12:30 - 14:00 *Lunch break*

**Afternoon****TOPIC VI - STRATEGY FOR SUSTAINABLE DEVELOPMENT OF NMHSs****Chair: Mr Javad Bodagh Jamali (Islamic Republic of Iran)****Rapporteur: Mr Abdul Muhusin Ramiz (Maldives)**

- 14:00 - 14:30 Mainstreaming NMHSs activities into sustainable development processes in developing countries  
**Mr Kaliba Konaré (WMO)**
- 14:30 - 14:50 Enhancement ability of meteorological services through operation and technical system reform in CMA  
**Mr Yu Jixin (China)**
- 14:50 - 15:10 Strategy for supporting sustainable development of NMHSs by Japan  
**Dr Toshihiko Hashida (Japan)**
- 15:10 - 15:30 SAARC Meteorological Research Center (SMRC) and its future plans  
**Dr Samarendra Karmakar (SMRC)**
- 15:30 - 15:50 Bahrain Meteorological Service (BMS) – structure for the future  
**Mr Shukry Jaffar (Bahrain)**
- 15:50 - 16:15 Discussions and recommendations on Topic VI

**4. Thursday, 8 February 2007****Morning**Technical visit to the Pakistan *Meteorological* Department**Afternoon**

Field Trip

**5. Friday, 9 February 2007****Morning****Chair: Mr Abdul Majeed H. Isa (Bahrain)**

- 10:30 - 12:30 Adoption of the Report and Closing Ceremony
-