

REGIONAL ASSOCIATION II (ASIA)

MEETING OF THE WORKING GROUP ON WMO INTEGRATED OBSERVING SYSTEM AND WMO INFORMATION SYSTEM (WG-IOS/WIS)

**Seoul, Republic of Korea
30 November - 7 December 2011**

FINAL REPORT



WORLD METEOROLOGICAL ORGANIZATION



GENERAL SUMMARY

1. ORGANIZATION OF THE MEETING

1.1 Opening of the meeting

1.1.1 At the kind invitation of the Government of Republic of Korea, the meeting of the Regional Association (RA) II Working Group on WMO Integrated Observing System and WMO Information System (WG-IOS/WIS) was held from 30 November to 7 December 2011 in Seoul, Republic of Korea. The list of participants is given in Annex I.

1.1.2 Dr Ha-Man Cho, Deputy Administrator of the Korea Meteorological Administration (KMA) welcomed all the participants to Seoul. He thanked the Working Group members for their invaluable efforts in taking leading role in developing plans of the WMO Integrated Global Observing System (WIGOS) and the WMO Information System (WIS) in RA II, which are foundations in the service delivery by National Meteorological and Hydrological Services (NMHSs) in the Region. Dr Cho recalled that KMA has been conducting the KMA WIGOS Demonstration Project, which aims at integrating and co-using meteorological observation data produced by diverse domestic agencies, by standardizing observational environment, controlling observational data quality, and co-using observational data. He hoped that this Demonstration Project plays as a showcase for RA II Members in their national WIGOS activities. Dr Cho introduced the successful launch of the Communication, Ocean and Meteorological Satellite (COMS) in 2009, which provides KMA with good opportunities to contribute to the enhancement of availabilities and use of satellite data in the Region, and the KMA's contribution to the RA II Pilot Project to Develop Support for NMHSs in Satellite Data, Products and Training in line with the activities for the WMO/Coordination Group for Meteorological Satellites (CGMS) Virtual Laboratory for Education and Training in Satellite Meteorology. Noting the KMA's plan to host the Global Information System Centre (GISC)-Seoul and three Data Collection or Production Centres (DCPCs), using the advanced information and communication technologies (ICTs) and in cooperation with the neighbouring countries and other WIS Centres, he invited kind cooperation and support from the Members in the Region and members of RA II Working Group on IOS/WIS. Dr Cho highlighted that the results of the meeting including drafts of Implementation Plans of WIGOS and WIS for RA II will be considered by the RA II Management Group in February/March 2012 and adopted by the fifteenth session of RA II in December 2012. He concluded his address wishing a successful meeting and an enjoyable stay in Seoul.

1.1.3 On behalf of the Secretary-General of WMO, Dr Wenjian Zhang, Director of the Observing and Information Systems Department, welcomed all the participants in the meeting and expressed his gratitude to the Government of Republic of Korea and the Korea Meteorological Administration for hosting the meeting and providing local arrangements. Dr Zhang recalled that this Working Group established at the previous session of RA II in Tashkent, Uzbekistan in 2008 is consisting of two Sub-Groups with several Theme Leaders with the mandate to contribute to the implementation and further development of observing and information systems in the Region. Noting that the Sixteenth World Meteorological Congress held in May/June 2011 approved the WMO priorities for the financial period, 2012-2016, i.e., WIGOS/WIS, Global Framework for Climate Services (GFCS), Capacity Building, Disaster Risk Reduction (DRR) and Aviation Meteorological Services, he stressed that WIS and WIGOS are the cornerstones to support all the other priorities. He pointed out that the meeting was to review what had been done and achieved by the Group and discuss how to finalize its work towards the next session of RA II, planned for December 2012 and to prepare a solid proposal for future activities for implementing WIS and WIGOS to be undertaken by the RA II Members during the coming four years. He highlighted the most important topics to be addressed at the meeting were (a) Review and consideration of the status of IOS and WIS in RA II; and (b) Development of corresponding Regional WIGOS and WIS implementation plans. Stressing the importance of the regional collaboration for success of the work, he quoted an old proverb: "*If you want to go fast, go alone, if you want to go far, go together*", and he invited to ensure the WIS/WIGOS development in RA II "*both go far and go fast*" with contribution, commitments, and collaborative sprints in the Region. He wished a constitutive and productive meeting and assured the support for the participants by the Secretariat staff with the local host.

1.1.4 Mr Arif Mahmood, Chairperson of the Working Group welcomed members of the Working Group, invited experts and the WMO staff to the meeting. The Chairperson emphasized the importance of the implementation of WIS and WIGOS in RA II. He noted that the improvement has been made in the Regional Basic Synoptic Network (RBSN) and the Regional Basic Climatological Network (RBCN) in RA II and stressed that these networks should be further enhanced through the implementation of RA II Regional WIGOS Implementation Plan. He also noted that the telecommunication networks have been improved in RA II but some countries were not connected to the Global Telecommunication System (GTS). Taking these into account, he requested participants to review the current status of observing systems and the telecommunication networks, to report their activities carried out so far, to decide the work plan towards the next session of RA II and to consider the future working mechanism related to WIGOS and WIS including the formulation of the RA II Regional WIGOS Implementation Plan.

1.2 Adoption of the agenda

1.2.1 The meeting adopted the agenda as given in Annex II.

1.3 Working arrangements

1.3.1 The meeting agreed on its working hours and other practical arrangements for the meeting. It also agreed that all documents submitted for the meeting and presentations delivered at the meeting be posted on the WMO website at <http://www.wmo.int/pages/prog/dra/rap/RAIIWG-IO-WISDocPlanWMO.php>. During the meeting, documents and presentations were shared by the participants using an FTP site established at the meeting venue.

1.3.2 The Sub-Group on IOS met from 30 November to 7 December and the Sub-Group on WIS met from 5 to 7 December 2011. A joint meeting of the two Sub-Groups was held on 5 December 2011.

2 CONSIDERATION OF THE DECISIONS OF THE FOURTEENTH SESSION OF RA II (XIV-RA II), THE CBS EXTRA-ORDINARY SESSION (2010), THE SIXTEENTH CONGRESS (Cg-XVI) AND THE SIXTY-THIRD SESSION OF EXECUTIVE COUNCIL (EC-LXIII)

2.1 The meeting noted the guidance and recommendations of the fourteenth session of RA II (XIV-RA II) (December 2008), the extraordinary session of the Commission for Basic Systems (CBS) in 2010 (CBS-Ext. (10)) (November 2010), the Sixteenth Congress (Cg-XVI) (May-June 2011) and the sixty-third session of the Executive Council (EC-LXIII) (June 2010) related to IOS and WIS implementation activities.

2.2 The specific attention was given to the outcomes from Cg-XVI and EC-LXIII, including observation related resolutions by Cg-XVI, specifically Resolution 3 (Cg-XVI), Resolution 7 (Cg-XVI) and Resolution 50 (Cg-XVI); and Resolution 4 (EC-LXIII).

2.3 The Secretariat briefed the Working Group on the recent Congress directions and decisions related to GTS, WIS and data management. Congress felt that the area of responsibility of each RA II GISC should be officially agreed upon at the next session of RA II, scheduled for 2012. However, to allow the Members of RA II to benefit from the new system before this, Congress encouraged RA II to initiate the coordination and consultations as a tentative solution so that each National Centre (NC) should be linked to a principal GISC and to a secondary GISC, taking into account the efficiency of options, the cost effectiveness for both NCs and GISCs, data distribution capacity of GISCs, and the current structure of GTS.

3 REPORT OF THE CHAIRPERSON OF THE WORKING GROUP

3.1 Dr A. Mahmood, Chairperson of the Working Group underlined the importance of WIGOS that would provide a framework and mechanism for enabling the integration and optimised evolution of the WMO global observing system and WMO contribution to co-sponsored systems. He noted that together with WMO Information System (WIS), this will allow continuous and reliable access to an expanded set of environmental data, products and associated metadata.

4 INTEGRATION OF WMO OBSERVING SYSTEMS

4.1 *Regional aspects of WMO IOS, including Reports by Coordinator and Theme Leaders*

4.1.1 Due to the absence of the Coordinator of the Sub-Group on IOS (SG-IOS) at the meeting, all the Theme Leaders in the specific areas attending the meeting presented their own reports as augmentation information. In addition, all participants (core members of the Working Group and the invited experts) presented their contributions. The summary of all these reports is as follows.

4.1.2 Regional Basic Synoptic and Climate Networks (RBSN/RBCN)

Mr Manish Ranalkar (India), Theme Leader in the Surface-based sub-system of the GOS reported the current status of the Regional Basic Synoptic Network (RBSN) and the Regional Basic Climate Network (RBCN) and made recommendations as follows:

a) RA II consists of 35 Members whose meteorological observing networks differ in density and quality with an increase in the availability of SYNOP, TEMP and CLIMAT reports. RBSN consists of 1366 surface stations (~ 31 % of global total of 4339), 274 radiosonde stations and 30 radiowind stations. The status of the RBSN operation can be considered as satisfactory. Since June 2010 there has been increase of 11 RBSN stations.

b) A significant increase of the networks of Automatic Weather Stations (AWSs) has been noticed in the Region, specifically thanks to India. By the end of 2011, India will have a network of 675 AWSs and additional 400 AWSs are planned to be installed during 2012-2017. Maldives also plans installing 20 AWSs by 2012. These networks might become the parts of RBSN/RBCN or at least they can be considered augmentation to the conventional RBSN and RBCN. Criteria for inclusion of AWSs should be developed by the relevant RA II working body and submitted to the next session of RA II for approval.¹⁾

c) RBCN comprises of 666 CLIMAT reporting stations, 263 GCOS Surface Network (GSN) stations, 32 GCOS Upper-Air Network (GUAN) stations, and two GCOS Reference Upper-Air Network (GRUAN) stations: Xilinhhot in China and Tateno in Japan.

d) Thanks to a modernization of surface and upper-air observational networks by some Members of the Region, improvement in the GOS observation can be expected in RA II.

e) Observational gaps can be summarized as follows:

- Seven (7) Members (Bahrain; Kyrgyzstan; Lao People's Democratic Republic; Macao, China; Nepal; Sri Lanka and Uzbekistan) have no radiosonde stations included in RBSN;
- Only 11 Members out of 35 contribute to GUAN;
- Based on monitoring of SYNOP reports at MTN centres, 48 RBSN stations were silent during the period July 2010 to April 2011;
- Based on monitoring of CLIMAT reports at MTN centres, 60 RBCN stations were silent during the period July 2010 to April 2011; 21 CLIMAT TEMP stations were silent during this period.

f) Recommendations on surface-based observations can be summarized as follows:

- As some inconsistencies were noticed at the meeting, specifically regarding silent stations, the meeting recommended that the updated and corrected list of silent stations should be submitted to the XV-RA II; the Theme Leader in Surface-based Observations should take the actions and provide the corrected list; in this regard, the meeting suggested that all Members should provide a complete list of their observing stations and systems for the benefit of the whole Region;
- Members should ensure that all planned RBSN/RBCN stations are implemented and operational; existing problems (silent stations) should be fully addressed;
- High priority should be given to standardized data management, including data quality control procedures, to ensure compatibility, documented data quality, availability of metadata; and

¹⁾ It should be covered by the Task/Project 4 as a subtask/subproject for the surface-based component.

integration of observational data and products inside the Region as well as with those produced by Members in other Regions; in this regard, relevant technical regular material and guideline are highly needed (*note: improvement should be achieved through the implementation of WIGOS in the Region*);

- Mechanisms and a specific plan for improving traceability of instruments used in the Region should be established and specified (*note: improvement should be achieved through the implementation of WIGOS in the Region*);
- Integration of other observing systems such as radar, ground-based lightning detection networks, etc. having wide spatial coverage is required; it will also bring benefits for Members (*note: improvement should be achieved through the implementation of WIGOS in the Region*);
- Specific attention should be given to the RBCN.

4.1.3 Marine Observations

Mr Yasushi Takatsuki (Japan), Theme Leader in Marine Observations reported the current status of marine observations and made recommendations as follows:

- a) As of the end of October 2011, RA II Members operate 529 out of a total of 3472 floats for subsurface temperature and salinity observations; mainly in the western North Pacific and Indian Oceans.
- b) The Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (RAMA), one of major observation platforms for the Indian Ocean Observing System, is being implemented in the Indian Ocean. As of November 2011, 30 mooring sites out of the 46 planned locations are functioning.
- c) The Regional Marine Instrument Centre (RMIC) for the Asia–Pacific Region has been established in Tianjin, China. In July 2011, the JCOMM Marine Instrumentation Workshop for the Region was organized by RMIC. Full implementation of RMIC functions is expected in the near future. It is very important to assure the quality of observation data.
- d) Gaps and recommendations:
 - In recent years, the number of ships participating in the Voluntary Observing Ship (VOS) scheme has been in decline, partly due to public concern about the safety of ships and their crews, partly due to increased difficulties in recruiting ships.
 - Vandalism on moored buoys is a serious problem with the highest damage and negative consequences, particularly in the Indian Ocean; it is the greatest source of the loss of equipment and data. Piracy is another negative factor affecting the area of marine meteorological observation in the Region.
 - In view of sustainability of observing systems, many in situ observing activities in the oceans continue to be carried out under research agency support and on research programme time limits. The long-term funding and improved international and national collaboration are needed for the sustained ocean observing systems (*note: improvement of collaboration should be achieved through the implementation of WIGOS in the Region*).

4.1.4 Aircraft Observations

Mr Manoj Kumar Bhatnagar (India), Theme Leader in Aircraft Observations reported the current status of aircraft observations and made recommendations as follows:

- a) AMDAR Programme is operated by four (4) Members: China; Hong Kong, China; Japan; and the Republic of Korea, with a significant progress specifically in the case of China.
- b) The India Meteorological Department (IMD) has been progressing well in the establishment of its own AMDAR Programme with receiving and processing system utilizing Indian national and private airlines using aircraft to ground communication system by 2013. The necessary funds for this development have been allocated. In addition, Islamic Republic of Iran, Oman, Russian Federation,

Saudi Arabia and United Arab Emirates have made their initial stages for establishing their AMDAR Programme.

c) Recommendations:

- Enhanced collaboration and coordination of Members operating AMDAR Programme are strongly encouraged (*note: improvement of collaboration/cooperation should be achieved through the implementation of WIGOS in the Region*);
- Members operating the AMDAR Programme should share their experiences, lessons learned, and assist other Members in developing and implementing AMDAR Programme (*note: improvement should be achieved through the implementation of WIGOS in the Region*).

4.1.5 Satellite Observations

Mr Ashok Kumar Sharma (India), Theme Leader in the Space-based sub-system of the GOS reported the current status of satellite observations and made recommendations as follows:

a) Members of RA II have made significant contributions to the space-based component of the GOS. Both geostationary satellites and Low-Earth Orbit Satellites provide essential operational continuity of satellite observations to the GOS. The current geostationary satellites, FY-2C, FY-2D and FY-2E (China); Kalpana -1 and INSAT-3A (India); MTSAT-1R and MTSAT-2 (Japan); COMS-1 (Republic of Korea); and Electro-N1(P) (Russian Federation) are the main contributors for space-based component of the GOS in RA II, together with the polar-orbiting satellites FY-1D, FY-3A and the new generation FY-3B (China), as well as METEOR-M-N1 (Russian Federation).

b) The current Research and Development (R&D) satellites such as GOSAT and TRMM (Japan); HJ-1A, HJ-1B, HY-1B and HY-2A (China); Oceansat-II, Resourcesat-1, Cartosat-1, Resourcesat-2 (India), Megha-tropiques (India and France), with the expectation that data from these R&D programmes would be available to WMO Members will further enhance the GOS in RA II. Oceansat-II products are already available at website www.nrsc.gov.in. Megha-tropiques products will also be available after validation at www.mosdac.gov.in.

c) The data and products from satellites of other countries, e.g., Meteosat-7/9 and Metop-A (EUMETSAT); GOES-11/13 and NOAA-18/19; DMSP satellites (USA) and R&D satellites of NASA, ESA and CNES are also important for RA II.

d) All main satellite operators have been planning extensive future programmes for the benefit of all Members of the Region.

e) Recommendations can be summarized as follows:

- The future priority tasks are (also incorporated in the Regional WIGOS Implementation Plan (see Item 4.5)):
 - Calibration/validation of satellite data and products;
 - Satellite data assimilation in NWP models;
 - Early warning and nowcasting for severe weather phenomena;
 - Utilization of satellite data for climate services and research;
- The websites with satellite products of all satellite operators should be interlinked to allow a quick access to the products of all satellites in the Region to fully exploit the available products.
- Since so many satellite products are being generated by the satellite data, the simplified and standardized structure of the websites will enable users easy orientation and quick access to products, particularly useful in case of severe weather. A uniform design of satellite websites describing products, their validation, utilization, etc. should be considered under the WIGOS Implementation Plan.
- Information about the products, their validation and calibration parameters of the payloads should be made available along with the products to inform users about the quality of data.

- Vertical profile of wind by satellite is a product in much demand by the forecasters; developing the payload for this parameter on satellites may be considered in cooperation with other regions.
- In case of any severe weather, Members operating satellites should ensure continuing to update information provided to the likely affected countries through Regional Specialized Meteorological Centres or using any other mechanism.
- A Pilot Project on "Capacity Building in Assimilation of Satellite Data and Products in Numerical Weather Prediction (NWP) Models" needs to be launched in RA II so that the satellite data are fully exploited in improving weather services.

4.1.6 Other surface-based observing platforms

a) The other observational platforms such as radars, ground-based lightning detection networks, ground-based GPS measurements for total water vapour and wind profilers have been set up (or are planned) by some Members of RA II.

b) Many NHMSs in the Region, including China; Hong Kong, China; India; Islamic Republic of Iran; Japan; Pakistan and Republic of Korea operate their radar networks including the Doppler weather radars. Number of weather radars and number of NHMSs operating weather radars in the Region are both increasing rapidly. Almost all NHMSs make weather radar products available on their websites.

c) Recommendation:

- Establishment of collaborative networks such as radars, lightning detection networks, etc. for the benefit of the individual Subregions and the whole Region (*note: This should be achieved through the implementation of WIGOS in the Region*).

4.1.7 Status of calibration and maintenance of instruments

Mr Akira Yamamoto (Japan), on behalf of Mr Takashi Kobuchi, Theme Leader in Instrument Development reported the current status of calibration and maintenance of instruments and made recommendations as follows:

a) In the Region, there are two RICs operated by China and Japan, two RRCs operated by India and Japan and one RMIC operated by China with required level of capabilities and performance. However, there is a specific demand for the travelling standards enabling field comparison and calibration due to lack of funds needed for instrument calibration carried out directly in RICs.

b) The meeting noted with appreciation that RIC Tsukuba updated its website (in English) (www.jma.go.jp/jma/jma-eng/jma-center/ric/RIC_HP.html) with technical guidance material available for Members. In this regard, all RICs/RRCs should follow this approach and make their website available in English with up-to-date information for WMO Members as a strong capacity building tool.

c) The meeting was pleased to note that the JMA/WMO Workshop on Quality Management in Surface, Climate and Upper-air Observations was held at the JMA headquarters in Tokyo, Japan in July 2010 with 22 participants from 20 NMHSs of RA II. The workshop identified a number of issues regarding the implementation and operation of surface, climate and upper-air observations and developed a set of recommendations. The final report is available on WMO website at <http://www.wmo.int/pages/prog/dra/rap/documents/JMA-WMO-OBS-Workshop-Final-Report.pdf>.

d) The meeting noted the information on the joint RA II RICs and RRCs survey on meteorological instruments, calibration, and training in the Region and recommended that results of the survey should be submitted to XV-RA II for consideration.

e) The meeting noted that many Members of the Region have problems in the following areas (*note: improvements should be achieved through the implementation of WIGOS in the Region*):

- Sustainability of an observing system;
- Regular maintenance and calibration of basic meteorological instruments (traceability of measurements to international standards);

- Availability of expertise as well as technical documentation and guidance material related to instruments, including their maintenance; need for capacity building (*note: WMO Technical Regulations are not well understood due to language problem*);
- Quality management processes, practices and procedures;
- Availability of observational metadata;
- Utilization of third-party data as traceability of measurements to international standards cannot be guaranteed.

4.2 RA II Pilot Projects (RA II Pilot Project to Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations; RA II Pilot Project to Develop Support for NMHSs in Satellite Data, Products and Training)

4.2.1 RA II Pilot Project to Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations

Background and Mission

4.2.1.1 The Working Group recalled that the Pilot Project to Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations was established at the fourteenth session of Regional Association II (Asia) in 2008, to provide technical support to NMHSs of developing countries or least developed countries to ensure that quality assured observational data from weather, climate and upper-air stations are made available for the WWW, and the WIGOS and other relevant WMO Programmes, including the provision of relevant tools on a centralized website to meet the stated purpose, and training activities. JMA was appointed as the Coordinator of the Coordinating Group of the Pilot Project at the session.

Progress up to September 2011

4.2.1.2 The Working Group noted the key accomplishments of the RA II Pilot Project up to September 2011 are summarized as follows:

- (1) The mailing list (qm-obs@ml.kishou.go.jp) for the Coordinating Group has been available since the end of May 2010. The Coordinating Group members are able to send messages to all members through the mailing list for discussion about the Pilot Project.
- (2) As one of the activities of the Pilot Project, the questionnaire to assess the current status of the implementation of relevant observations, their provision and their quality management in RA II was conducted. The interim result of the survey was briefly reported to the JMA/WMO Workshop on Quality Management in Surface, Climate and Upper-air Observations in RA II (Asia).
- (3) Within the project, the JMA/WMO Workshop on Quality Management in Surface, Climate and Upper-air Observations was held at the JMA Headquarters in Tokyo, Japan, from 27 July to 30 July 2010 (see paragraph 4.1.6 (c)).
- (4) The results of the questionnaire survey conducted in 2010 were thoroughly analyzed and would be reported in written form to share with the members of the Pilot Project for future reference. The draft document of the report has been prepared by the Coordinating Group members of the Pilot Project, and it is currently reviewed by the WMO Secretariat. The final document of the report would be considered to be published as one of the WMO IMOP/IOM Report.

Next-Phase Action Plan

4.2.1.3 The Group further noted the next phase action plan for the RA II Pilot Project up to the end of 2012, as summarized below:

- (1) The Pilot Project should aim to realize the set of recommendations developed by the JMA/WMO Workshop on Quality Management in Surface, Climate and Upper-air Observations.
- (2) Exchange practices of the observations and their quality management in different NMHSs would

be promoted through the vital information sharing of the Pilot Project Coordinating Group. Existing quality control/assurance procedures developed by Members would be collected by the Coordinator to be shared among Members.

(3) Questionnaire on meteorological instruments, calibration and training in RA II would be conducted to gather necessary information on capability of calibrations of the RA II Members as well as their needs of RIC's services including provision of training materials and training events to the Members. This survey would be implemented by the end of 2011 by the cooperation of RIC Tsukuba and RIC Beijing together with RRCs in RA II.

(4) Referring to the results of the above mentioned questionnaire, the Pilot Project would consider a plan aiming to hold a training workshop by the end of 2012. The workshop would be held for calibration and maintenance of the instruments, which are the most important factors affecting data quality in RA II recognized by the JMA/WMO Workshop on Quality Management held at the JMA headquarters in Tokyo, Japan in July 2010.

4.2.2 RA II Pilot Project to Develop Support for NMHSs in Satellite Data, Products and Training

Background and Mission

4.2.2.1 The Working Group also recalled that the fourteenth session of WMO Regional Association II (XIV-RA II) held in Tashkent, Uzbekistan, 5-11 December, 2008 adopted a resolution to establish a Pilot Project for the Development of Support for National Meteorological and Hydrological Services (NMHSs) in the areas of satellite data, products and training. After the session, the WMO Secretariat invited WMO Members to join the Pilot Project Coordinating Group, whose members were Japan (Co-Coordinator); Republic of Korea (Co-Coordinator); Bahrain; China; Hong Kong, China; India; Kyrgyzstan; Maldives; Oman; Pakistan; Russian Federation; Uzbekistan; Vietnam and, as an observer, EUMETSAT (as of 31 May, 2011).

4.2.2.2 The project was established as a kind of self-help effort for NMHSs in RA II to improve the flow of satellite-related information. The major focus of the initiative is to facilitate the timely provision of satellite-related information by satellite operators themselves to users, i.e., NMHSs in RA II, especially in developing countries including least developed countries (LDCs). As there are also other ongoing activities such as the Virtual Laboratory (VL), it is needed to create synergies and provide greater benefits avoiding duplication of efforts.

First and Second-Phase Accomplishment

4.2.2.3 The Working Group also noted that the accomplishments of the RA II Pilot Project's first phase (from September 2009 to August 2010) and second phase (from September 2010 to August 2011) are summarized as follows:

(1) The first meeting of the Coordinating Group of the RA II Pilot Project to Develop Support for NMHSs in Satellite Data, Products and Training, Tokyo, Japan, 21 – 23 February 2011.

The Meeting:

- agreed to clarify satellite users' needs and determine the status of utilization through the RA II Pilot Project questionnaire system;
- agreed to share information on access to satellite imagery, data, products and training information through the RA II Pilot Project portal site; and
- shared an understanding that cultivating human resources is essential in promoting the utilization of satellite products.

(2) Issuance of newsletters to RA II Members

The newsletter is aimed at sharing the latest satellite-related information in areas such as imagery, data, products and training. Five (5) newsletters have been issued in the first phase and four (4) in the second phase. Contents have included:

- Information on access to satellite imagery, data and products, including application products
- News on meteorological satellites
- News on new services

- Brief progress reports on the Pilot Project
- Introduction to the activities of other RAs and WMO VL activities

(3) RA II Pilot Project website

The RA II Pilot Project website hosted by WMO Space Programme (WMO SP) was set up in the first phase (http://www.wmo.int/pages/prog/sat/ra2pilotproject-intro_en.php), and the following contents have uploaded in the second phase:

- Report on the first meeting of the Coordinating Group of the RA II Pilot Project
- Information on access to satellite imagery, data and products, and training
- RA II Pilot Project questionnaire relating to the availability and use of satellite data and products

Third-Phase Action Plan

4.2.2.4 The Group further noted the planned action plan as follows:

(1) Ongoing issuance of quarterly newsletters to RA II Members

Contents will include:

- Access to satellite imagery, data and products, including application products
- Training activities currently available or expected to be available in the future
- News on current status and future meteorological satellites
- News on new services of satellite imagery, data and their format, products etc
- Research work on satellite imagery, products and their applications to various areas
- Brief progress reports on the Pilot Project
- Introduction to the activities of other RAs and WMO VL activities

(2) Enhancement of the Pilot Project web pages on the WMO Space Programme (WMOSP) website hosted by WMOSP

Web pages will include:

- Information on access to satellite imagery, data and products, and training
- Newsletter archives
- RA II Pilot Project questionnaires
- Meeting reports

(3) Enhancement of RA II Member and Coordinating Group Member mailing lists (by April 2012)

- More effective collection and sharing of opinions on newsletters, requirements, etc. from RA II Members

(4) Identification of RA II Member requirements (by April 2012)

- Implementation of an RA II Member survey through the web-based RA II Pilot Project questionnaire system on satellite data utilization
- Sharing of the survey results through the website
- Identification of RA II Member requirements through the questionnaire system

The web-based RA II Pilot Project questionnaire is now opened to RA II Members, and they are recommended to answer the questionnaire by the end of 2011.

(5) Alignment of Pilot Project activities and Virtual Laboratory activities to optimize assistance to NMHSs in RA II (by August 2012)

- Ongoing liaison with the WMO Secretariat and the VL Secretariat (EUMETSAT) in order to optimize assistance to NMHSs
- Sharing training materials to avoid duplication of effort and facilitating training activities

(6) Planning of the second meeting of the Coordinating Group of the RA II Pilot Project to be held in 2012

- KMA will host the second meeting of Coordinating Group of RA II Pilot Project in the fourth quarter of 2012
- RA II Pilot Project training workshop/users meeting as joint meeting

(7) Development of the Fourth Phase work plan (by August 2012).

4.3 WMO Integrated Global Observing System (WIGOS)

4.3.1 The meeting noted with appreciation a very comprehensive presentation on WIGOS delivered by the WMO Secretariat on the WIGOS Concept and its implementation as well as the relevant guidance and recommendations adopted by Cg-XVI, EC-LXIII, and ICG-WIGOS-1 to be followed by WMO constituent bodies for the planning and implementing WIGOS. The aim of such detailed presentation was to provide all relevant information needed for good level of understanding of WIGOS required for consideration of its implementation at regional and national levels.

4.3.2 As was shown by the follow-up discussion, for many participants it was the first occasion when the WIGOS concept was presented in such a comprehensive way. Therefore, concern was expressed in some aspects, like implementation of the siting classification of surface observing stations in practice and potential negative impacts on the services taking into account constantly changing environment, specifically in the urban areas. In this regard, the meeting recalled that Cg-XVI, in view of the costs that may be encountered by Members to implement new standards, recommended that a careful examination of the scientific grounds and cost benefit was needed before a standard is made mandatory for use.

4.3.3 On the other hand, majority of participants clearly understood the need for standardization, regular calibration of instrument, the implementation of a whole quality management system to assure, control and document quality of observation for users, as well as a role of metadata for users, etc.

4.3.4 In this regard, the issue specific to RA II was underlined from a perspective of space-based observation because of so many satellite operators and different products available. Coordination and collaboration between them are more than needed.

4.3.5 The Group clearly indicated a need for, and benefit of sharing observational data and products.

4.3.6 The Group agreed that more communications and outreach activities, such as seminars and workshops should be organized in the Region and its subregions to explain the WIGOS concept and its implementation.

4.4 KMA WIGOS Demonstration Project

4.4.1 The meeting noted with appreciation the presentation on the WIGOS Demonstration Project "Establishment of a Common Information Infrastructure for Meteorological Observation Data" that had been implemented by KMA since 2009. The goal of the KMA WIGOS Demonstration Project is "Integration and co-use of meteorological observation data produced by diverse domestic agencies" by implementing three tasks: 1) Standardization of observation environment; 2) Quality control of observation data; and 3) Co-use of observation data.

4.4.2 The meeting noted that 26 domestic agencies had participated in the Project at the request of KMA, and as part of the Project, a new web-based system called "Observation Standard Sharing (OSS)" would be established for the data collection and integrated quality control by sharing data among all the agencies. The Project is scheduled to be completed by the end of 2012 with the operation of OSS system, which was in the test mode in 2011.

4.4.3 The KMA WIGOS Demonstration Project also aims at establishing special observatories for testing, developing and standardizing meteorological instruments and systems capacity. Two observatories for testing conventional AWS observation were put into operation in 2009, and another site is under construction for an experimentation of the state-of-the-art remote sensing techniques.

4.4.4 The meeting noted with appreciation experiences and lessons learned that KMA could share with other Members of RA II through the WIGOS implementation.

4.5 **Regional WIGOS Implementation Plan**

4.5.1 The meeting noted the brief presentation by the Secretariat with background information and recommendations by ICG-WIGOS-1 on the development of the initial draft of the Regional WIGOS Implementation Plan (R-WIP) taking into account the guidance and recommendations by Cg-XVI, EC-LXIII presented under Item 4.3.

4.5.2 In the round table discussion organized after the introductory presentation, all participants expressed their views and opinions, what tasks should be incorporated in the WIGOS Implementation Plan developed for their Region and submitted to XV-RA II for approval. The recommendations from the discussion can be summarized as follows:

The implementation tasks should be related to:

- Improvement of observing capabilities, especially of LDCs, including relevant software to be shared with those Members who cannot afford its development;
- Collaboration between Members, establishing mechanisms for bilateral cooperation;
- Collaboration with RA V, especially for the south-eastern part of the Region in the area of multi-hazard early warning system (MHEWS), nowcasting, very short-range forecasting, DRR; however, this task should take into account all relevant Subregions of RA II;
- Better cooperation in the implementation of the AMDAR and Satellite Programmes;
- Improvement of traceability of the measurements, including development of travelling standards and relevant mechanisms;
- Quality assurance, quality control, quality and data management, including relevant technical documentation and guideline to be available for Members;
- Standardization and compliance with WMO regulations, needed for integration and better utilization of observation into NWP; the worst situation is related to new technology and observing techniques.

4.5.3 In this regard, the implementation of WIGOS in the RA II must address the high demand for the sustainable capacity building including human resources development; it must be reflected as an inherent part of all implementation tasks specified in R-WIP.

4.5.4 The meeting further agreed that:

- R-WIP should contain the following **key tasks**:
 - Examination of current observing practices used by Members of RA II (compliance, status of technical documentation needed);
 - GAP analysis of the Regional and Subregional observing networks (shortcomings, deficiencies);
 - Setting key priorities of RA II and Subregions for meeting user requirements;
 - Drafting proposals for implementation projects needed;
 - Drafting a design of the Regional and Subregional observing networks with a specific emphasis to the integration of the current observing networks/systems;
 - Drafting proposal for implementation and continuous update the Regional and Subregional observing networks.
- R-WIP must reflect regional and subregional requirements, needs and priorities. The Regional Strategic and Operating Plan of RA II (see Item 6.1) should be used for this purpose.
- However, the meeting agreed that an appropriate GAP analysis of the current situation, problems, needs and priorities should be done as a starting point for an identification of the key areas to be reflected in R-WIP;
- R-WIP should propose bilateral or multilateral subregional projects as well as inter-regional projects (specifically between RA II and RA V for the south-eastern part of the Region; and potentially

between RA II and RA I for the south-western/western part as well as RA II and RA VI for the western part the Region);

- R-WIP should contain projects for the assistance and support given by developed Members, such as China; Hong Kong, China; India; Japan and the Republic of Korea, to least developed countries (LDCs) of the Region;
- R-WIP should take into account and build on relevant on-going national/bilateral and subregional projects that should be incorporated as the R-WIP implementation projects, specifically:
 - “RA II Pilot Project to Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations”; and
 - “RA II Pilot Project for the development of support for National Meteorological and Hydrological Services (NMHSs) in the areas of satellite data, products and training”.

In addition, a DRR project “Strengthening Regional Cooperation for Development and Sustainability of Meteorological, Hydrological and Climate Services to support Disaster Risk Reduction and Adaptation in Southeast Asia” should be taken into account because of benefits it can bring to Members of this Subregion of RAIL.

4.5.5 The meeting briefly reviewed the template of the Regional WIGOS Implementation Plan (R-WIP) and made the following recommendations:

- R-WIP for RA II should be developed in a format consistent with R-WIP of the other RAs and aligned with the high-level WIGOS Implementation Plan (WIP);
- A template of R-WIP would be a helpful for this purpose;
- When the key tasks the meeting agreed on (see proposal in 4.5.6 below) are incorporated in the template of R-WIP, and the template is adjusted accordingly by the Secretariat based on contributions received from the Sub-Group on IOS by deadlines specified below, such a document could be considered as the first draft of R-WIP to be submitted to RA II MG session in February/March 2012.

4.5.6 The meeting considered the following proposals for tasks to be incorporated in the R-WIP, submitted by Dr Zhang, D/OBS:

RA-II WIGOS IP Tasks/Projects

Key services priorities in RA II that need improved observations are as follows:

- Disaster Risk Reduction supported by Nowcasting;
- Climate services (for GFCS);
- Aviation meteorology services.

The following four **Tasks** are suggested to enhance the key services listed above:

I. Task/Project: RA II WIGOS/WIS Observation and Information Portal

Task/Project Leader: LEE, PAN (Hong Kong, China)

This regional portal will be one of the components of WMO WIGOS/WIS portal; it includes the following subtasks:

Subtask I.1: Comprehensive review of all existing observing systems of all RA II Members, including national governance structure, i.e. all national organizations who own and operate meteorological observations and their data sharing practise with NMHSs, etc; national strategy and plans for future observing systems development;

Focal Point: CHEN (CMA)

Subtask I.2: Comprehensive data and products portal, including satellite products

Focal Point: SHARMA (IMD)

Subtask I.3: Standard and best practise portal, including technical documents with necessary details in English from all RA II Members;
Focal Point: WON (KMA)

II. Task/Project: Observing systems integration for supporting disaster risk reduction and aviation services

Task/Project Leader: WON (KMA)

Subtask II.1: RBSN/RBCN stations standardization: instruments and observing methods standards, metadata, data processing and data management; QMS (QC/QA), real-time distribution/exchange.

Focal Point: RANALKAR (IMD)

Subtask II.2: Improvement of weather radar products for severe weather monitoring: standardization of data processing procedures, quality control and calibration; radar products (rainfall, wind field products) inter-comparison/validation, real-time distribution/exchange.

Focal Point: KOIDE (JMA)

Subtask II.3: Integration of surface-based (in situ, surface-based remote sensing), and satellite observations for integrated products, specifically for a regional/subregional multi-hazard early warning system (MHEWS), nowcasting and very short-range forecasting, DRR and aviation services.

Focal Point: AGSORN (TMD)

III. Task/Project: Improving observations for climate services:

Task/Project Leader: GAVRILOV (Roshydromet)

Subtask III.1: Improving the quality of observations, including traceability of instruments (through calibration in laboratories or travelling standards)

Focal Point: KOIDE (JMA)

Subtask III.2: Improving observations for climate monitoring and services, including atmospheric composition, hydrological observation, GCW, etc. ;

Focal Point: GAVRILOV (Roshydromet)

IV. Task/Project: A new design of the Regional and Subregional observing networks with a specific emphasis to the integration of the current observing networks/systems;

Task/Project Leader: SHARMA (IMD)

Agreed milestones (to ensure inputs for the RA II MG session, 29 Feb – 1 March, 2012, Doha, Qatar) are as follows:

- **10 January 2012:** Inputs from the Focal Points to the Task Leaders;
- **20 January 2012:** Inputs from the Task Leaders to the WMO Secretariat/WIGOS Planning Office (WIGOS-PO) (Dr I. Zahumensky);
- **30 January 2012:** Draft R-WIP from WIGOS-PO to all Focal Points & Task Leaders;
- **6 February 2012:** Deadline for feedbacks to be sent to WIGOS-PO;
- **10 February 2012:** Updated draft R-WIP submitted to Chair;
- **10 March 2012:** Updated draft R-WIP (with feedback from RA II MG session) from WIGOS-PO to the Chair of WG, all Focal Points & Task Leaders.

Note: Milestones after 10 March 2012 be updated based on the recommendation by RA II MG session.

4.5.7 The meeting requested the Secretariat to provide a template and guidance by mid-December 2011 that are needed for a development of these Subtasks in the same design.

4.5.8 Based on the agreed components and tasks, the Task Team on R-WIP (TT/R-WIP) was established with the membership as follows:

- Chair of TT/R-WIP: A. Mahmood (Pakistan) (Chairperson of the Working Group);
- Members:
 - All Task Leaders;
 - All Focal Points.

4.5.9 The session agreed on the Terms of the Reference of TT/R-WIP for the development of R-WIP to be submitted to RA-II/MG session for consideration and recommendations on its finalization for XV-RA II session, tentatively planned for December 2012 that are as follows:

- a) To liaise with all the other TT/R-WIP Members, and especially with those responsible for the individual subtasks of the relevant task, to achieve synergy and coordination of them as appropriate;
- b) To communicate closely with the Chair of TT/R-WIP and seek for his advice;
- c) Focal Point: in close collaboration and cooperation with the relevant Task Leader, to develop a draft design for the Implementation Project under their responsibility to be incorporated into R-WIP based on the Project Template and guidance provided by the Secretariat;
- d) Task Leaders: to collaborate closely with, and provide advice to the Focal Points under their responsibility for drafting of the Implementation Projects design.
- e) Chair of TT/R-WIP: to coordinate the development of the Implementation Projects design and provide his advice to all TT/R-WIP Members, as needed and requested;
- f) Chair of TT/R-WIP: to submit and present the draft R-WIP to the RA II MG session in 2012.

4.6 ***Guidance for Members on WIGOS Implementation***

4.2.1 The Guidance for Members on the WIGOS Implementation developed by the Secretariat was presented to the meeting. As a part of this presentation, more detailed attention was paid to the GAP analysis that should be a starting point of the whole implementation process together with the implementation of the Rolling Review of Requirements (RRR).

4.2.2 With the aim to achieve better picture of the current problems and needs of the Members in the Region, the participants were requested to fill in the document "GAP Analysis" presented by the Secretariat. The first draft of this analysis should have reflected a situation in their own NMHSs from the perspective of their position in the Service and their terms of reference as a Member of the Sub-Group on IOS. During the meeting, the participants from China, India, Japan, Thailand, and Uzbekistan provided their initial GAP analysis, findings of which were used for a specification of the key tasks to be incorporated into R-WIP.

4.2.3 The Chair further requested all participants to provide the Secretariat with the final version of the GAP analysis by 20 December 2011; in this case, it should be further elaborated by the participants in collaboration with other colleagues of their Institutes whose positions are WIGOS related. Findings provided by Members will be analysed and incorporated accordingly into the draft R-WIP submitted to RA II MG session in February/March 2012.

4.2.4 The meeting agreed that such a Guideline is needed for a successful implementation of WIGOS at a national level.

5 **WIS, GTS and Data Management**

The SG-WIS session was chaired by its Coordinator, Mr Hiroyuki ICHIJO (Japan), and discussed issues on WIS, GTS and data management.

5.1 ***Regional aspects of WIS, including reports by Coordinator and Theme Leaders***

5.1.1 **Data Communication Techniques and Structure**

5.1.1.1 Mr Azmat Hayat Khan (Pakistan), Theme Leader in Data Communication Techniques and

Structure reported the current status of GTS, data communication techniques and structure as follows:

- a) Current status of GTS in RA II still remains at the 2010 level, with Afghanistan, Bhutan and Iraq to be connected. The situation demands DVB satellite connectivity on priority.
- b) Several Members have successfully utilized mobile telecommunication network services like SMS, GPRS for data gathering and visualization. Moreover Data Collection Platforms (DCPs) supported by satellite telecommunication provide solutions for observing systems in those areas not covered by conventional commercial telecommunication services. These communication techniques need to be recommended for data communication and data access procedures, enabling data to be exchanged more timely. The Sub-Group welcomed Pakistan and Republic of Korea to summarize their experience in using mobile telecommunication network services, including analysis of service cost, and share with other Members.
- c) A few WIS centres have been designated by the Congress, which are ready or in the process of getting ready for start of operation of WIS in January 2012. On the other hand, most of Members have just started their implementation. It is desirable that Members refer to the information on WMO webpage (<http://www.wmo.int/wis>), for technical regulatory documents, i.e., the Manual on WIS and the Guide on WIS, and the WIS Implementation Plan.
- d) The study of DCPCs & GISCs structures and technological profiles depicts that these centres have adopted robust communication technologies and also active enough to digest new tools and technologies. However most National Centres require more focus for progressive implementation of WIS to a wider scale.
- e) The use of Web techniques will encourage users to step into WIS implementation. For example, Open Geospatial Consortium (OGC) defines standards for the OpenGIS Web Map Service (WMS) and related interfaces. They provide a simple HTTP interface for requested geo-spatial images from distributed geospatial datasets.

5.1.2 Data Representation and Metadata

5.1.2.1 Ms Jitsuko HASEGAWA (Japan), Theme Leader in Data Representation and Metadata, reported the summary of a survey on migration status of RA II Members as of 1-15 October 2011. In this period, RTH Tokyo received at least one report of surface synoptic observation reports in BUFR format from 53 % of RBSN stations (TAC form from 94 %), and upper-air sounding reports in BUFR format from 39 % of RBSN stations (TAC form from 90 %). Four BUFR reports equivalent to PILOT were received by RTH Tokyo in the monitoring period in 2011, while TAC bulletins were received from 18 stations. In terms of the number of countries, seven Members (China; Hong Kong, China; India; Japan; Macao, China; Mongolia; Saudi Arabia) issue BUFR messages of both surface and upper-air reports and three Members (Bangladesh, Democratic People's Republic of Korea (DPRK) and Russian Federation) issue BUFR messages of surface report. Seven Members provide their SYNOP messages in BUFR format that are converted by another centre (Saudi Arabia creates BUFR reports for Kuwait, Bahrain, Qatar, UAE, Oman, Yemen and DPRK for Republic of Korea). CLIMAT reports in BUFR format are created by six Members (China; Hong Kong, China; India; Japan; Mongolia; Saudi Arabia).

5.1.2.2 Based on the report, the meeting noted main findings of the survey, including 1) the obstacle in migration to TDCF such as difficulty in incorporating conversion software into existing systems as well as telecommunication facilities to exchange binary files; 2) lack of attention to migration status of reports other than surface observation and upper-air sounding; 3) the necessity to enhance monitoring of migration status, with possible refinements of Special MTN Monitoring scope and practices in cooperation with the WWW monitoring centres; and 4) the expectation for further discussion over the real benefits of TDCF observation data to core users, such as numerical weather prediction and climate re-analysis.

5.1.2.3 In response to the request of the Theme Leader, eight (8) RA II Members kindly shared their status, plans and challenges on this matter. The inputs are summarized below:

- Hong Kong, China has already started the migration of SYNOP, TEMP, SHIP, PILOT, CLIMAT, AMDAR, RADOB and Wind profiler.

- Islamic Republic of Iran is planning to start disseminating BUFR reports in early December 2011.
- Macao, China has started parallel dissemination of TAC and BUFR for SYNOP and CLIMAT in November 2010, while decoding incoming BUFR reports into the operational database.
- Nepal is trying to solve issues in dealing with binary files through its TCP/IP connections in collaboration with nearby RTHs. It committed to the TDCF migration, including staff trainings and preparation for necessary software.
- Pakistan is finalizing development of software for coding BUFR messages of TEMP and PILOT.
- Russian Federation plans to start dissemination of BUFR reports:
 - surface synoptic observations from RTHs Novosibirsk and Khabarovsk in TM 307086 to report dangerous phenomena as well as those issued by Mongolia
 - upper-air soundings will be next year in TM 309052
- Thailand is checking its TAC-BUFR conversion software and the dissemination of BUFR format reports is planned to start in December 2011 together with reports issued by Cambodia.
- Uzbekistan is not producing and disseminating TDCF reports and does not have a nearest future plan to start and seeking the possibility of WMO's support in the framework of Voluntary Cooperation Programme.

5.1.2.4 The Sub-Group stressed the urgency of further standardization of data representation systems and metadata.

5.1.3 WIS-GTS Operations, including Early Warning

5.1.3.1 Mr Naresh Kumar Pangasa (India), Theme Leader in WIS/GTS operations, reported on WIS-GTS operations. The Sub-Group appreciated the efforts on updating status of RMTN in RA-II was conducted jointly by him and Mr Hiroyuki Ichijo, RAII Coordinator of SG-WIS of WG-IO/IOS/WIS. In the Region there is substantial improvement in upgrading of GTS links for using speeds more than 9600 bps for dedicated links. Total GTS links currently in RA II are 91 and out of which 80 are operational.

5.1.3.2 Data gap regions are Afghanistan, Bhutan and Iraq. RTH New Delhi is making all efforts to restore Afghanistan and Bhutan connectivity and efforts will also be made for Iraq. Bhutan connectivity is expected soon for placing Bhutan data on GTS.

5.1.3.3 Space-based broadcast Multipoint connectivity in RA II has also been updated. The Sub-Group noted with appreciation that IMD has successfully managed the migration of its data broadcasting system. Worldspace audio broadcast service from RTH New Delhi has been stopped. However IMD has started its digital broadcast called DMDD through INSAT satellite and service provided to all national users as well as to some neighbouring countries.

5.1.3.4 The Sub-Group urged that all Members update timely contact information in the list of focal points, as this will help the Theme Leaders and the Coordinator to collect relevant status information more promptly.

5.1.4 Climate Data Management/Data Rescue

5.1.4.1 Dr Vladislav Shaymardanov (Russian Federation), Theme Leader in Climate Data Management/Data Rescue, submitted a report describing the Roshydromet's Archive System as an example of the solution for climate data rescue and management. He believes Roshydromet's Archive System data recovery experience can be used by National Meteorological Services (NMSs), and the main conceptual solutions used for building Roshydromet's Archive System were used in technical upgrade projects in NMSs of Central Asian States.

5.1.5 IGDDS and related Satellite Programmes

5.1.5.1 Ms WANG Chunfang (China), Theme Leader in Integrated Global Data Dissemination Service (IGDDS), reported on IGDDS initiatives and status of relevant programmes in the Region.

5.1.5.2 CMA's integrated data broadcasting system (CMACast), based on DVB-2S technology and commercial telecommunication satellite service, started its trial operation in the middle of 2011. JMA upgraded the Internet dissemination system to secure a smooth transition to JMA's next generation satellite series. Republic of Korea launched its first meteorological satellite named Communication, Ocean and Meteorological Satellite (COMS) in June 2010. The RA II Pilot Project to develop support for NMHSs in satellite data, products and training was established. The Sub-Group noted that IMD's digital broadcast (DMDD) should be included in IGDDS. Through their participation in IGDDS, Members in RA II contribute to further integration of satellite data and data management practices, for the benefit of the user community and in accordance with the goals of WIGOS and WIS. Efforts should be continued to improve user awareness, and data access, and to provide more training to users.

5.1.6 Regional WIS Requirements

5.1.6.1 Ms LI Xiang (China), Theme Leader in Regional WIS Requirements, reported the results of a survey to collect regional WIS requirements. A survey questionnaire was sent to 34 Members in RA II to collect the regional WIS requirements for data exchange, management and access of WMO programmes and other relevant international programmes, and their impact on WIS implementation, services and plans. The feedbacks were received from 10 Members, namely, Bangladesh; China; Hong Kong, China; Japan; Lao DPR; Macao, China; Myanmar; Pakistan; Thailand and Vietnam.

5.1.6.2 Besides the globally exchanged data as defined in Volume C1 and the data covered by WWW, there are some more data requirements, including satellite data, NWP products, regional observations, RADAR data, etc, for the other Programmes (such as WCP, WWIS, THORPEX, GAW, etc), regional exchange and national use. Three (3) Members provided the details for the volume, format and timeliness of the required data. It shows the wider bandwidth requirements for both of GTS and Internet.

5.1.6.3 There are three (3) Members reported their implemented metadata services, and reported the metadata standard(s) applied in their system and the estimated volume for metadata. The other Members which have not started the implementation of WIS Part B or at the beginning stage, they require much more on technical supports on WIS implementation including communication links, networks, hardware and software, and trainings on implementing, running and using of WIS services.

5.1.6.4 Because 70% of the Members have not provided the feedbacks to the questionnaire, the existing survey is not enough to fully reflect the regional WIS requirements. It is necessary to continue to investigate and collect the WIS requirements from RA II Members. It is suggested to organize more trainings, including consulting visits of WIS experts, to help RAII Members understand WIS vision, project plan, and technical specifications, and benefit from the WIS implementation. The Sub-Group expressed its concern about the low rate of response to the survey, and suggested the Theme Leader to send a status report on the feedbacks to all Members, in order to get more inputs from them.

5.1.7 Analysis and proposals for WIS progress in RA II

5.1.7.1 Mr Hiroyuki Ichijo (Japan), Coordinator of the Sub-Group presented the results of analysis of the Regional progress in Regional Meteorological Telecommunication Network (RMTN) and the VPN Pilot Project in RAs II and V.

5.1.7.2 The Sub-Group agreed on the following proposals and recommendations from the Coordinator.

- (1) The necessary conditions for an RMTN circuit should be defined as:
 - (a) a sustainable operational circuit to exchange mainly WWW data on a real-time basis; and
 - (b) both end centres agree on registration as an RMTN circuit.
- (2) Regional requirement of minimum GTS bandwidth required as an RMTN circuit should be raised from 9600bps to 64kbps to meet the performance requirements of an "All Hazards Network" of 2 minutes end-to-end within WIS. Appropriate target GTS bandwidths should be defined at the next

step considering requirements on operational data exchange of NWP and satellite products.

- (3) The migration to TCP/IP should be removed from high-prioritized Regional strategies.
- (4) All RTHs should restudy feasibility of migration from costly leased circuits to cost-effective circuits by using cloud based services such as IP-VPN with MPLS before introducing a facile way of the Internet use. In case of use of the Internet for an RMTN circuit as the very end solution, VPN techniques such as IPsec should be implemented in the circuit.
- (5) Along with Regional WIS implementation, RMTN will evolve into Area Meteorological Data Communication Networks (AMDCNs). RA II Members should consider appropriate evolution processes and procedures keeping the following principles and technical requirements in mind.
 - (a) Principles
 - Individual improvement to resolve shortcomings in the current GTS must be continued by centers concerned in cooperation with responsible RTHs.
 - Critical operation continuity must be ensured when new techniques, procedures and equipments are introduced.
 - Each GISC must lead strategic evolution towards AMDCNs in cooperation with DCPCs and NCs in their responsible area.
 - Each NC or DCPC should have a permanent connection with a principal GISC and a connection mainly for backup with an associated GISC if possible.
 - (b) Technical requirements
 - Acceptable delay-time for urgent information should be clarified in order to arrange message routing and priority handling by Message Switching Systems at all GTS centers.
 - Appropriate target AMDCN bandwidths should be defined considering future-oriented data exchange of NWP, radar and satellite products and so on.
 - Cost-effective and secure network services should be principally used for AMDCN with supplementary use of the Internet VPN.
 - Future-oriented flexibility should be considered in evolutional implementation, e.g., migration from IPver4 to IPver6, and from uni-cast to multi-cast.
- (6) Considering necessity of further development and more expertise in WIS technologies in the Regions, the VPN Pilot Project in RAs II and V should be reformed focusing on WIS applications in a more straightforward manner. The Coordinator should facilitate development of the reforming plan in collaboration with the leading centres in RAs II and V.

5.2 Progress Reports by WIS centres

5.2.1 Representatives from GISC Beijing and GISC Tokyo briefed the Sub-Group on the status of their centres. The Sub-Group appreciated that the two centres came into operation after designation at the Sixteenth World Meteorological Congress. It noted that GISC Tokyo is experimenting on new technologies in conjunction with the discovery access and retrieval (DAR) part of WIS, to best exploit the characteristics of Internet to implement practical services. It expressed expectation that the new framework of WIS should strengthen the RA II Members' capability of data management.

5.2.2 The Sub-Group recognized the needs of some Members to enhance capability in metadata management and invited all WIS centres to consider sharing their expertise, and software tools for metadata editing with other Members harnessing the existing framework of the CBS Software Registry.

5.2.3 Mr Pangasa, RTH New Delhi, reported its implementation of modernization plan, under which following systems are installed to enhance GTS activities and forecasting services: a new RTH, Central Information and Processing System (CIPS), Public Weather System (PWS), Synergie (forecasting work stations) and climate system, and all are integrated to benefit users. He also reported that RTH New Delhi is making process in its WIS implementation plan and he felt optimistic about completing its implementation by the end of 2012. Major improvements include: 1) RMDCN link has been upgraded to 2 Mbps and 2) the National Knowledge Network has been implemented with 1 Gbps connectivity

data transfer in close user group as well as internet services. The National Knowledge Network has been introduced at RTH New Delhi providing 1 Gbps connectivity for close user group, internet and telepresence services offered through this service.

5.2.4 Dr Sunghoi Huh (Republic of Korea) presented the progress of GISC Seoul implementation and KMA's future plan for WIS. He mentioned that since KMA joined the OpenWIS Development Group in May 2010 along with Météo France (MF), UK Met Office (UKMO), and Bureau of Meteorology (BoM), Australia, it had been developing the harness system through an internal project, which will be inter-operable with OpenWIS for GISC Seoul. He also reported that UZHYDROMET (Republic of Uzbekistan) experts visited KMA in September 2011, and both sides had agreed to collaborate in implementing the WIS. With regard to GISC Seoul implementation, KMA has the following timeline: 1) Complete OpenWIS Project (by December 2011); 2) GISC Seoul Implementation & Verification (by February 2012); 3) On-site audit by CBS ET-GDDP (March - April 2012); and 4) Pre-operation of GISC Seoul and internal DCPC (from June 2012).

5.2.5 Mr Pan (Hong Kong, China) suggested that it would be beneficial to the users, in particular, WMO Members that GISCs could provide registered users with some kind of notification message about the availability of new products/services as well as the termination of existing products/services, i.e., similar to the existing practice of METNO messages. He also suggested that in the future, it is worth considering that NMHSs could upload their weather information directly to the responsible GISCs (rather than to GTS MSSs) at the aim to make their weather information available to users with minimal latency.

5.3 WIS support to the integration of WMO observing systems

5.3.1 The Secretariat introduced a background document on the WIS support to the integration of WMO observing systems. WIS will play an important role in the interoperable layer of WIGOS. Within the WIGOS framework, WIS provides data and metadata exchange and data Discovery, Access, and Retrieval (DAR) services as well as management of related metadata that is essential to meet the stringent traceability requirements of special users. The metadata that drives DAR also adds to the value and usability of data and products created by WMO contributors, through increased access and usage of information, as well as linking the information to background information that increases the usability, especially for critical work such as climate analyses and research. The implementation of WIS based on Service Oriented Architecture (SOA) has resulted in WIS interoperability being defined by 15 interfaces described in the Manual on WIS. These specifications ensure interoperability with various components of WIGOS, as well as with GEOSS, IODE Ocean Data Portal and many other external agencies.

5.3.2 The evolution of the GTS will enable more timely exchange of observation data. A major achievement in the evolution of the MTN into the WIS core network has been the merging of the two communication clouds into a network based on the RA VI Regional Meteorological Data Communication Network (RMDCN) and managed by ECMWF. CBS has also approved the concept of Area Meteorological Data Communication Networks (AMDCNs), each associated with a particular Global Information System Centre (GISC). Mobile telephone network services have been successfully used by some Members for data gathering.

5.3.3 The WMO profile of the ISO metadata data was endorsed by CBS-XIV and EC-LXI and is being used for the initial implementation of WIS. Guidance and documentation on the latest WMO profile are available at http://wis.wmo.int/2010/metadata/version_1-2. The further application of the ISO 19100 series of geographic information standards to the development of a WMO conceptual model of data representation was accepted by CBS-XIV as a fundamental element of a CBS policy on data representation systems. This work will benefit the goal of WIGOS to make data and observations from diverse observing systems as if they were integrated. The experiences gained during WIS implementation will also be helpful to the development of WIGOS metadata standards.

5.3.4 The new functionality of WIS, especially the data management and metadata components have been a significant element of most WIGOS pilot projects. In particular, GAW has demonstrated the principles of interoperability for discovery, access and retrieval by exposing ISO19115 compliant

metadata at each WDC. The Global Hydrological network is planning to use WIS to distribute products to users for flood forecasting guidance and warnings. In addition to the pilot project, CHy has made great progress on metadata and data representation using ISO19115 and related standards for sharing of water related data through initiatives such as WaterML2. AMDAR project has worked towards standardising BUFR tables for data as well as working on ISO19115 compliant metadata for aircraft and airport observations. JCOMM pilot project has forwarded the concept of an IODE Ocean Data Portal which builds on the interoperability principles of WIS and will interface all National Ocean Data Centres to WIS. JCOMM has also developed the Marine profile of ISO19115. The WMO Space Programme project for GSICS is also working towards a data management infrastructure and data management procedures (including formats conventions, etc) in accordance with WIS standards. The GRUAN pilot project has developed an implementation plan that takes into account the metadata and WIS compliance. WIS compliance is also a part of WIGOS demonstration projects, particularly Kenya, Morocco, Brazil and RA IV where the interoperability aspects of WIS are included as specific elements of the projects.

5.4 Regional WIS Implementation Plan including Revising Regional Aspect of the Manual on the GTS (Agenda item 5.4)

Revising Volume II (Regional Aspect) of the Manual on the GTS

5.2.1 Mr Kenji Tsunoda (Japan), Invited expert, presented key issues to revise the Volume II (Regional Aspects) of the Manual on the GTS with the background information that at its twelfth session of the CBS Management Group highlighted closer coordination with Regional Associations on regional GTS/WIS implementation and updating the regional aspects of the Manual on the GTS as a high priority action for the next financial period.

5.2.2 The following paragraphs summarize major outcomes of the discussions on the key issues to maintain the Volume II of the Manual on the GTS and harmonize with WIS implementation.

- (1) Updating items in the Volume II and necessity of continuous maintenance;
- (2) The need for issuing the Regional Aspects for implementation of WIS; and
- (3) Designating a specialized "Theme Leader in revising Volume II (Regional Aspect) of the Manual on the GTS".

5.2.3 The Sub-Group appreciated the analysis and the offer from Japan to continue this important effort, and believed that Mr Tsunoda is the most suitable expert for the Theme Leader.

Regional WIS Implementation Plan (R2-WIS-IP)

5.2.4 Mr Ichijo (Japan) presented consideration on the key issues towards development of the R2-WIS-IP. He stressed the objectives to develop the R2-WIS-IP as follows:

- (1) Harmonized and synchronous implementation by all RA II Members;
- (2) Guidelines to achievable implementation to seek maximum benefits and minimum overhead investment; and
- (3) Strategic approaches to effective and efficient capacity building.

5.2.5 The Sub-Group agreed that at least 4-6 man-months will be needed to development the first draft of such a plan, and special mechanism for human resource mobilization is needed, e.g., "local secondment" of experts by Members.

Recommendation to RA II Management Group

5.2.6 Noting the importance of early development of R2-WIS-IP and revision of the Volume II of the Manual, the meeting deeply considered necessary resources, timeline and roadmap, and concluded a forward-looking discussion with the Recommendation on resources and work plans to develop R2-WIS-IP and to revise the Volume II of the Manual on the GTS as given in Appendix I.

6 CROSS-CUTTING COMPONENTS

6.1 Strategic Planning (WMO Strategic Plan; and Development of the RA II Strategic Operating Plan 2012-2015, including regional needs and priorities) (Agenda item 6.1)

6.1.1 The meeting recalled that the Sixteenth World Meteorological Congress (Cg-XVI, Geneva, May/June 2011) approved the WMO Strategic Plan 2012-2015 ([WMO-No. 1069](#)) that reflects its decisions and directions that will guide decision-making by the Organization and its constituent bodies during the period 2012-2015 to ensure focused and coordinated approaches across the Organization.

6.1.2 The meeting recognized that the WMO-wide Operating Plan (2012-2015) will be composed of the following three parts: (Part 1) the Secretariat Operating Plan 2012-2015; (Part 2) the Operating Plans of eight Technical Commissions; and (Part 3) the Operating Plans of six Regional Associations.

6.1.3 The meeting recalled that the fourteenth session of RA II (Tashkent, December 2008) adopted [the RA II Strategic Plan \(2009-2011\)](#) and identified the highest priority areas for Region II, as follows: (a) further improvement of the GTS and implementation of WIS/WIGOS; (b) sustainable capacity building including human resources development; (c) better climate services through the enhancement and operation of the RA II RCC network; (d) establishment of a Region-wide multi-hazard early warning system; (e) upgrading of service delivery capability, in particular for aeronautical and marine meteorological services; and (f) implementation of WMO Flood Forecasting Initiative, water resources assessment and regional exchange of hydrological data and information. The session considered that “the further improvement of the GTS and implementation of WIS/WIGOS” is still the highest priority in the Region for 2012-2015.

6.1.4 The meeting was pleased to note the progress on the development of RA II Strategic Operating Plan (SOP) 2012-2015 by the Task Team composed of Mr X. Xu (China); Dr B.Y. Lee (Hong Kong, China); Mr L.S. Lee (Hong Kong, China); Ms M. Jabbari (Islamic Republic of Iran); Mr N. Hasegawa (Japan); Dr W.-T. Yun (Republic of Korea); and Ms M. Nazarova (Uzbekistan). The meeting further noted that the president of RA II requested the Management Group, Working Groups and the Task Team members as well as the Secretariat to further work on the formulation of Regional Key Outcomes (RKO) and finalize the RA II SOP 2012-2015 before the next Management Group session. It also noted that a preliminary draft RA II Operating Plan (WIGOS/WIS part – Expected Result 4) was proposed to the WG-IO/WIS by the Secretariat, with using a Template for Operating Plans of the Technical Commissions and Regional Associations.

6.1.5 The meeting was informed of the preliminary analysis of the results of the 2010-2011 survey on the basic capability of NMHSs in RA II, as given in [Appendix II](#), received from 29 out of 35 Members. The meeting expressed its satisfaction of the overall improvement of weather, climate and hydrological services by Members of RA II, including service delivery capability and close liaison with other sectors, infrastructure for observation, telecommunication and forecast products.

6.1.6 The Group expressed a serious concern that observational infrastructure of some Members in the Region, particularly for detecting detailed structure of severe weather phenomena, such as radar and lightning detection networks, are not sufficient to produce and provide reliable and timely forecast and warning services. It also noted that a considerable number of Members in the Region is not yet ready for WIS implementation. Taking due note of the survey results on the enhancement of NMHSs, the Group proposed the specific highest priority areas in the fields of WIGOS and WIS, as follows:

6.1.6.1 In the field of the WIGOS implementation, **key issues** should be as follows:

- (a) Ensuring sustainability and continues improvement of the Regional observing networks;
- (b) Ensuring the traceability of the instruments to recognized international standards;
- (c) Further enhancement of observing networks, specifically as specified in 6.1.3 (d) and 6.1.6 above;
- (d) Implementing quality management procedures;
- (e) Sustainable capacity building including human resources development (as specified in 6.1.3 (b)).

6.1.6.2 In the field of WIS implementation, **key issues** should be as follows:

- (a) continued consolidation of the GTS to the managed network (RMDCN) in collaboration with advanced centres;
- (b) further improvement of GTS;
- (c) implementation of data discovery, access and retrieval (DAR) services; and
- (d) migration to Table Driven Code Forms (TDCF).

6.1.7 The Group felt that some questions in the survey questionnaire were not correctly understood by responded Members so that there are some ambiguities in the interpretation of the results of the survey. Therefore, the Group suggested that RA II subsidiary bodies and relevant Technical Departments of the WMO Secretariat be involved in the formulation of the next survey questionnaire together with the Management Group.

6.2 WMO Quality Management Framework (QMF)

6.2.1 The meeting noted the presentation on WMO Quality Management Framework (QMF) and the Quality Management System as one of the key WIGOS implementation components.

6.2.2 The meeting agreed that QMS should specify all QA and QC standard and best practices, including those for performance monitoring, feedback and remedial measures for the whole end-to-end system (from observations to the service delivery) to be implemented by Members to ensure reliability, quality and timeliness of all observational data/products and services supported by corresponding documentation as required.

6.2.3 The meeting noted with appreciation the development of "Quality Management" as a new volume of the WMO Technical Regulations, Volume IV (WMO-No. 49) as well as a kind offer of BoM, Australia, to assist WMO Members towards implementation of QMS. In this regard, it was pleased to note the development of the website on QMF ([Quality Management Framework](#)).

6.3 Regional multi-hazard early warning system

6.3.1 This item was discussed together with item 7.2.

7 LINKAGES WITH OTHER PRIORITY AREAS

7.1 Global Framework for Climate Services (GFCS)

Background

7.1.1 In 2009, the Heads of States and Governments, Ministers and Heads of Delegation representing more than 150 countries, 34 United Nations Organizations and 36 Governmental and non-Governmental international organizations present at the third World Climate Conference (WCC-3) unanimously agreed to develop the Global Framework for Climate Services (GFCS) to strengthen the production, availability, delivery and application of science-based climate prediction and services. They requested that a taskforce of high-level independent advisors be appointed to prepare a report, including recommendations on the proposed elements of the Framework and the next steps for its implementation. The High-level Taskforce (HLT) submitted its report to the Sixteenth WMO Congress (Cg-XVI) (16 May-3 June 2011), which endorsed its broad thrust.

The Report of the High-level Taskforce (HLT)

7.1.2 The main findings of the High-level Taskforce report, including the vision of the GFCS, the recommendations of the HLT; Cg-XVI response to the HLT report and the process for its implementation; and relevant outcomes of the sixty-third session of the WMO Executive Council (EC-LXVIII) (6-8 June 2011) as they relate to the Global Framework for Climate Services are presented in Appendix II.

Progress regarding the Global Framework for Climate Services

7.1.3 Pursuant to relevant decisions of Cg-XVI and EC-LXIII, the meeting noted that:

- a) A GFCS Office has been established within the WMO Secretariat since July 2011. The GFCS Office is a working and transition mechanism, which will coordinate the activities of the WMO Secretariat and serve as the point of contact on GFCS matters with Members, the UN system and various stakeholders. It shall facilitate the range of activities to support the development of the GFCS draft implementation plan and to prepare the Extraordinary Session of World Meteorological Congress in 2012;
- b) Consultations were held on Climate Services Information System (Geneva, 5-7 April 2011); Observations and Monitoring (Geneva, 24 August 2011); Agriculture, Food Security and Water (Rome, 26-28 September 2011); Capacity Development (Geneva, 10-12 October 2011), Health and Disaster Risk Reduction (Geneva, 14-16 November 2011). Further consultations will be held on Observations and Monitoring; Capacity Development and Research in the months to come. These consultations are being conducted to facilitate discussions of key issues related to the production, availability delivery and application of climate services in the four priority areas (agriculture, water, health and disaster risk reduction) so that the Implementation Plan of the Framework is a true reflection of the aspirations of stakeholders (more information is available at: http://www.wmo.int/pages/gfcs/gfcs_en.html). In addition, GFCS is being featured through side events at major international events and conferences, to provide information on the benefits and the progress being made in the development of the implementation plan and governance mechanism for the GFCS;
- c) The first meeting of the Executive Council Task Team on GFCS was held from 13 to 14 October 2011 at the WMO Headquarters in Geneva. The meeting agreed on the process leading up to the Extraordinary Session of the WMO Congress in October 2012. Specifically, it agreed on:
 - The outline for the implementation plan;
 - The milestones and deliverables;
 - The need for early engagement of Members, partners and stakeholders through systematic consultations;
 - The size of the draft implementation plan, which should not be more than 100 pages. The governance document, which will be developed as a stand alone document as well as the annexes to the report are to be succinct, but were not limited in size;
 - The composition of the writers for the report: almost 100 experts from 36 countries nominated by governments, UN and international agencies and regional organizations, integrate the Team, which is drafting the implementation plan and governance of the GFCS. In the selection of experts, particular attention was given to geographical and gender balance;
 - The establishment of Sub-Group on GFCS governance chaired by Mr Abdalah Mokssit and integrating Dr Jack Hayes, Dr Joseph Mukabana, Dr Ajit Tyagi, Prof. Gerhard Adrian and Dr Sri Woro B. Harijono;
 - The mechanisms to involve Regional Associations, Technical Commissions, Executive Council bodies, partners and other relevant stakeholders in the development of the draft implementation plan of the GFCS.
- d) It is envisaged that a Zero Order draft of the draft Implementation Plan including the governance aspects will be available for review and comments by mid-February 2012 and a First Order Draft for submission to the sixty-fourth session of the WMO Executive Council by 13 April 2012. This draft will be open for further review from the end June to mid-July 2012. A final document will be produced by the end of August for the consideration of the Extraordinary Session of the WMO Congress in the last quarter of 2012.
- e) India had disbursed USD 125,000.00 to the GFCS Trust Fund. Switzerland was in the process of signing a contract with WMO for the transfer of CHF 500,000.00, while for Norway project proposals were being developed by the GFCS and the Resource Mobilization Office to access the pledges made at the Congress.

- f) Bangladesh; Republic of Korea; Hong Kong, China and Canada had indicated interest in contributing to the GFCS trust fund. In addition, Japan had indicated that some of its voluntary contributions could support GFCS activities.

7.2 Disaster Risk Reduction (DRR), including regional DRR projects

7.2.1 The Chief of Disaster Risk Reduction Programme of WMO briefed the Group on a project proposal under development for submission for funding, entitled, "Regional Cooperation Programme for Strengthening of Meteorological, Hydrological and Climate Services to support Disaster Risk Reduction and Adaptation in South East Asia".

7.2.2 With consideration for the recurrent hazards related to weather, water and climate in the region and increasing risks associated with extremes linked to climate variability and change, a comprehensive project is being designed to address the meteorological, hydrological and climate service needs of several sectors including disaster risk management, water resource management, agriculture and food security, energy, and finance and planning. The project involves 6 beneficiary countries, including Cambodia, Lao PDR, Thailand, Vietnam, Indonesia and Philippines. This is to support risk assessment, risk reduction through EWS and sectoral planning and risk transfer decision making across the sectors highlighted (Figure 1 in Appendix IV). It is in alignment and cooperation with ASEAN and also engaged cooperation and leveraging of activities with a number of national, regional and international partners such as:

- National: Ministries and agencies involved with hydro-met, DRM, and economic sectors, other EWS stakeholders
- Regional: WMO Regional Associations for Asia and the South-West Pacific, Mekong River Commission, Typhoon Committee and Panel on Tropical Cyclones, RSMC Tokyo - Typhoon Center, RSMC Tropical Cyclones - New Delhi, WMO Regional Climate Centers (Beijing, Tokyo), WMO Training Centres (Beijing, Nanjing, the Philippines), RIMES, ADPC, Asian Development Bank, etc.
- International: WMO, World Bank, UN-ISDR, UNDP (IFRC, OCHA and other agencies will be invited as relevant)
- Other countries to engage invite Hydro-met and bi-lateral donors: Australia, Canada, China, Finland, France, Hong Kong, Japan, Malaysia, New Zealand, Singapore, Republic of Korea, USA, etc.

7.2.3 The overall expected goals are:

- Increased coordination and cooperation at national and regional levels for provision of meteorological, hydrological, and climate information to the targeted socio-economic sectors.
- Increased utilization of meteorological, hydrological, and climate knowledge in the decision-making processes of governments and targeted socio-economic sectors.

7.2.4 This will be achieved through strengthened cooperation and capacity development as per the two schematics attached in Figures 2a and 2b in Appendix IV:

(1) Socio-economic stakeholder Needs and Requirements: Increased understanding of the needs and requirements of socio-economic target sectors for meteorological, hydrological and climate products and services.

(2) Technical and capacity development services:

- Hydrological services: Increased access to national and regional flood management information systems
- Climate services: Increased access to climate analysis tools, and climate forecast products and services
- Severe weather and marine services: Increased access to forecasting tools and severe weather (also including tropical cyclones and related storm surges) warning services
- Observing systems and data services: Increased regional dialogue and agreements for the exchange of meteorological, hydrological and climate data (space and terrestrial) and related

regional products and services

7.2.5 Currently, the proposal is being finalized for submission to the donors for funding consideration.

7.3 Capacity Building

Technical cooperation activities

7.3.1 The Group was pleased to note the technical cooperation activities carried out to support the WWW in Region II through VCP and Trust Fund projects. The Group noted that, during 2007-2011, 16 Members had received support for a total of 31 VCP projects: among them two projects were aimed at strengthening upper-air observing stations, seven at strengthening surface observing stations, eight at improving satellite receiving stations, and nine at enhancing the telecommunication facilities. However, as of 31 October 2011, five VCP project requests relating to the WWW submitted by four Members of RA II have not yet received support.

7.3.2 The meeting was informed that in 2011 China provided support for upgrading FengYunCast receiving systems to CMACast for 18 Members of RA II, together with new version of the Meteorological Information Comprehensive Analysis and Processing System (MICAPS).

7.3.3 The Group recalled that Cg-XVI (May/June 2011) decided that as in the fifteenth financial period, the fields of cooperation covered by the VCP during the sixteenth financial period shall include the implementation of the WWW with priority. The meeting encouraged donors in the Region to support the VCP requests for the implementation of the WWW in Region II in accordance with the priorities allocated by the CBS and given in the draft RA II Strategic Operating Plan for 2012-2015.

7.3.4 The meeting recognized that the WWW Implementation Support Revolving Fund of the VCP was retired since this mechanism had not been called upon by developing Members for many years. The remaining funds were transferred to the WMO Emergency Assistance Fund. In this connection and in view of the fact that the Emergency Assistance Fund scheme successfully supported the urgent requirements for restoration of basic WWW infrastructure affected by disasters in Bangladesh, Democratic People's Republic of Korea, Lao People's Democratic Republic, Myanmar, Pakistan and Yemen, the Group encouraged Members of RA II to make use of this technical cooperation mechanism to rehabilitate affected basic facilities of WWW and urged supporting Members in the Region to continue and enhance their contribution to the Emergency Assistant Fund.

7.3.5 The Group was informed of the progress of the Trust Fund project for Sri Lanka for the installation of an S-band Doppler radar system, including completion of access road, site preparation and commencement of foundation work at Gongala Peak site. Two factory training courses (September/October 2010), Factory Acceptance Tests (September/October 2010 and January 2011), a Coordination Meeting (October 2010) were conducted at the premises of the supplier of the radar. The installation of the radar and relevant training are scheduled for the first half of 2012.

Education and training activities

7.3.6 The Group was pleased to note that there were 38 training events held in RA II during 2008-2011, among these four events were related to the operation of satellite and weather radar and WIS implementation. The Group also noted that 11 Members of RA II received 65 fellowships from September 2007 and October 2011, including two fellowships related to the fields of WIGOS and WIS.

8 FUTURE WORKING STRUCTURE AND PROGRAMME

8.1 The Sub-Group on WIS discussed the issue of more active involvement of RA expert team members, theme leaders in regional IOS and WIS activities. Mr Ichijo showed some statistics on activeness of RA theme leaders vs. that of a typical CBS ET, which reveals that most RA theme leaders are remarkably less active than CBS ET experts. The Sub-Group also noted with concern that some members of the working group or theme leaders failed to attend the meeting due to national restrictions on travel abroad. The Sub-Group recommended to report these issues to the Management

Group of RA II, in order to address them systematically at RA level. The Sub-Group was briefed on the CBS nomination procedure for ET members, where PRs are reminded of their commitment on core member working days per year, which helped to raise the activeness of experts nominated. The Sub-Group recommended that RA II learn the experience of CBS in nomination procedure.

9 OTHER BUSINESS

9.1 No specific issue was raised under this item.

10 CLOSURE OF THE MEETING

10.1 The participants and the representative of WMO expressed their appreciation to the Government of Republic of Korea for the successful hosting of the meeting. They also expressed gratitude to the staff of the Korea Meteorological Administration for the warm hospitality and excellent arrangements made.

10.2 The meeting closed at 12:30 hours on 7 December 2011.

LIST OF PARTICIPANTS

Working Group on WMO Integrated Observing System and WMO Information System (WG-IOS/WIS)

Dr Arif MAHMOOD Chairperson	Pakistan Meteorological Department (Headquarters Office) Pakistan E-mail: dgpakmet@gmail.com / pakmet_islamabad@yahoo.com
Dr Sunghoi HUH Member	Korea Meteorological Administration (KMA), Republic of Korea E-mail: shhuh@kma.go.kr
Mr Alexander GAVRILOV Member	Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet), Russian Federation E-mail: gavrilov@dvugms.khv.ru
Mr CHEN Yongqing Member	China Meteorological Administration, China E-mail: chenyq@cma.gov.cn
Mr Chi-kin PAN (on behalf of L.S. Lee) Member	Hong Kong Observatory, Hong Kong, China E-mail: ckpan@hko.gov.hk

Sub-Group on Integrated Observing System (SG-IOS)

Mr Manish RANALKAR Theme Leader in the Surface-based sub-system of the GOS	India Meteorological Department, India E-mail: mrnanalkar@yahoo.com
Mr Yasushi TAKATSUKI Theme Leader in Marine Observations	Japan Meteorological Agency (JMA), Japan E-mail: y_takatsuki@met.kishou.go.jp
Mr Manoj Kumar BHATNAGAR Theme Leader in Aircraft Observations	India Meteorological Department, India E-mail: hatnagarmk1@gmail.com
Mr Akira YAMAMOTO (on behalf of Mr Takashi KOBUCHI) Theme Leader in Instrument Development	Japan Meteorological Agency (JMA), Japan E-mail: yamamoto_a@met.kishou.go.jp
Mr Ashok Kumar SHARMA Theme Leader in the Space-based sub-system of the GOS	India Meteorological Department, India E-mail: aksimd@gmail.com
Mr Dong Il LEE Theme Leader in the GEOSS	Korea Meteorological Administration (KMA), Republic of Korea E-mail: ldi@kma.go.kr
Dr Songkran AGSORN Invited expert	Thai Meteorological Department, Thailand E-mail: agsorn@hotmail.com
Mr Alexandr SOLOVEYCHNIK Invited expert	UZHYDROMET, Uzbekistan E-mail: uzhymet@meteo.uz / alex@meteo.uz
Dr Seong-Chan PARK Invited expert	Korea Meteorological Administration (KMA), Republic of Korea E-mail: scpark@korea.kr
Dr Do-Hyeong KIM Invited expert	Korea Meteorological Administration (KMA), Republic of Korea E-mail: dkim@kma.go.kr

Dr Jae-Gwang WON
Invited expert

Korea Meteorological Administration (KMA), Republic of Korea
E-mail: wonjg@kma.go.kr

Sub-Group on WMO Information System (SG-WIS)

Mr Hiroyuki ICHIJO
Coordinator

Japan Meteorological Agency (JMA), Japan
E-mail: hiroyuki.ichijo@oct.email.ne.jp / h_ichijo@met.kishou.go.jp

Mr Azmat Hayat KHAN
Theme Leader in Data Communication
Techniques and Structure

Pakistan Meteorological Department, Pakistan
E-mail: dirndmc@gmail.com / pakmet_islamabad@yahoo.com

Ms Jitsuko HASEGAWA
Theme Leader in Data Representation
and Metadata

Japan Meteorological Agency (JMA), Japan
E-mail: j-hasegawa@met.kishou.go.jp

Mr Naresh Kumar PANGASA
Theme Leader in WIS-GTS Operations,
including Early Warning

India Meteorological Department, India
E-mail: nk.pangasa@indl.gov.in / pangasank@hotmail.com

Ms WANG Chungfang (on behalf of
Mr RAN Maonong)
Theme Leader in IGDDS

China Meteorological Administration, China
E-mail: wangcf@cma.gov.cn

Ms LI Xiang
Theme Leader in Regional WIS
Requirements

China Meteorological Administration, China
E-mail: lixiang@cma.gov.cn

Mr Kenji TSUNODA
Invited expert

Japan Meteorological Agency (JMA), Japan
E-mail: tsunoda@met.kishou.go.jp

WMO Secretariat

Dr Wenjian ZHANG

Director, Observing and Information Systems (OBS) Department
E-mail: wzhang@wmo.int

Mr Peiliang SHI

Director, WMO Information System Branch/OBS Department
E-mail: pshi@wmo.int

Mr Kuniyuki SHIDA

Programme Manager, Regional Office for Asia and the South-
West Pacific (RAP)
Development and Regional Activities (DRA) Department
E-mail: kshida@wmo.int

Dr Igor ZAHUMENSKY

Programme Coordination Officer, WIGOS Planning Office/OBS
Department
E-mail: izahumensky@wmo.int

Dr Dong-Eon CHANG

Seconded Expert, RAP Office/DRA Department
E-mail: dchang@wmo.int

AGENDA

1. ORGANIZATION OF THE MEETING

- 1.1 Opening of the meeting
- 1.2 Adoption of the agenda
- 1.3 Working arrangements

2. CONSIDERATION OF THE DECISIONS OF THE FOURTEENTH SESSION OF RA II (XIV-RA II), THE CBS EXTRA-ORDINARY SESSION (2010), THE SIXTEENTH CONGRESS (Cg-XVI) AND THE SIXTY-THIRD SESSION OF EXECUTIVE COUNCIL (EC-LXIII)

3. REPORT OF THE CHAIRPERSON OF THE WORKING GROUP

4. INTEGRATION OF WMO OBSERVING SYSTEMS

- 4.1 Regional aspects of WMO IOS, including Reports by Coordinator and Theme Leaders
- 4.2 RA II Pilot Projects (RA II Pilot Project to Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations; RA II Pilot Project to Develop Support for NMHSs in Satellite Data, Products and Training)
- 4.3 WMO Integrated Global Observing System (WIGOS)
- 4.4 KMA WIGOS Demonstration Project
- 4.5 Regional WIGOS Implementation Plan
- 4.6 Guidance for Members on WIGOS Implementation

5. WIS, GTS AND DATA MANAGEMENT

- 5.1 Regional aspects of WIS, including reports by Coordinator and Theme Leaders
- 5.2 Progress reports by WIS Centers
- 5.3 WIS support to the integration of WMO observing systems
- 5.4 Regional WIS Implementation Plan

6. CROSS-CUTTING COMPONENTS

- 6.1 WMO Strategic Planning (WMO Strategic Plan; Strategic Plan for the Enhancement of NMHSs in RA II (Asia) (2009-2011); and RA II Strategic Operating Plan, including regional needs and priorities)
- 6.2 WMO Quality Management Framework (QMF)
- 6.3 Regional multi-hazard early warning system

7. LINKAGES WITH OTHER PRIORITY AREAS

- 7.1 Global Framework for Climate Services (GFCS)
- 7.2 Disaster Risk Reduction (DRR), including regional DRR projects
- 7.3 Capacity Building

8. FUTURE WORKING STRUCTURE AND PROGRAMME

9. OTHER BUSINESS

10. CLOSURE OF THE MEETING

Annex to paragraph 5.4.6

RECOMMENDATIONS TO THE RA II MANAGEMENT GROUP**Recommendation related to Revising Regional Aspect of the Manual on the GTS**

- (1) Designating a specialized Theme Leader in Regional WIS manual
RA-II Management Group is invited to consider designating a new “Theme Leader in Regional WIS manual” in the SG-WIS. The Theme Leader deals with make a draft of practical procedures, in particular updating DAR metadata catalogue. It’s expected to be a part of Manual on WIS after make arrangements with other Regions.
- (2) Draft an amendment
SG-WIS and the Theme Leader are invited to review the Volume II of Manual on the GTS (1991 edition) and make a draft amendment or new edition (if possible) with changes in paragraph 2 of this document 5.4(1). The draft amendment is submitted to the fifteenth session of RA II.

Recommendation related to Development of Regional WIS Implementation Plan in RA II

RA-II Management Group is invited to consider development of Regional WIS Implementation Plan in RA II (R2-WIS-IP) according to the timeline and working mechanism as follows:

- (1) Timeline towards XV-RA II
- (a) Finalizing a work plan to recommend to RA II MG : Dec 2011 - Jan 2012
 - SG-WIS contribution by e-mail discussion
 - (b) Approval of the work plan by RA II MG : End of Feb 2012
 - (c) Establishment of development mechanism : Mar 2012
 - Coordination of an ad-hoc team by volunteered resources
 - Arrangement of working tools
 - (d) Development of an initial draft of R2-WIS-IP : April – Sep 2012
 - Development work by correspondence
 - User review by diversity of levels from technical to administrative people
 - 2 day-meeting to finalize the initial draft
 - (e) Formulation to 1st version : End of Sep 2012
 - Formal documentation by Secretariat
 - Executive summary for XV-RA II
 - (f) Presentation of R2-WIS-IP (1st version) to XV-RA II : Nov/Dec 2012
- (2) Member initiative development
R2-WIS-IP will be developed on Member initiative basis with support by the Secretariat. For effective achievement along the timeline, it is recommended:
- (a) to establish a small group of experts who fully concentrate on the development work;
 - (b) to introduce a new concept of “Local Secondment” who works at his/her-own office but devotes his/her full working hours to a specific WMO task as voluntary contribution; and
 - (c) to mobilize one or two experts of “Local Secondment” for a few months to keep adequate resources for development of R2-WIS-IP.

Annex to paragraph 6.1.5

Preliminary Results of RA II Survey 2010-2011

1. Background

1.1 At its fourteenth session held in Tashkent, Uzbekistan, in December 2008, Regional Association (RA) II adopted the Strategic Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in RA II (Asia) (2009-2011), which was developed based on the survey results on the basic capabilities of NMHSs in RA II during 2005-2008 (the report is available at: <http://www.wmo.int/pages/prog/dra/documents/RAIISurveySummaryReport.pdf>.)

1.2 To facilitate the development of the Strategic Action Plan for 2012-2015, the Association carried out a revised survey on the basic capability of NMHSs in the Region in 2010-2011. The survey questionnaire consisted of 12 main topics including management, observing systems, telecommunications, forecasting system, natural disaster prevention and mitigation, climate services, Aeronautical meteorological services, hydrological services and partnership.

2. Overview of Results

2.1 As of 21 November 2011, 29 out of 35 Members responded to the survey (response rate: 29/35 = 83%). The analysis of the survey results is therefore still limited and preliminary. The following are key findings of the survey based on 29 Members' returns:

- (a) *Management* – Most Members have legal basis for the provision of meteorological services, but yet about 50 per cent of Members do not implement cost-recovery for the services. About 90 per cent of Members have a structured training plan for professional, technical and supporting staff. Close cooperation with academia, media and private sector is well maintained.
- (b) *Observing systems* – Operational observation networks were enhanced in most Members. More than 70 per cent of Members operate ground stations to receive high-resolution geostationary satellite images.
- (c) *Telecommunications* – Speeds of GTS for more than 80 per cent of Members are now category III (over 64 kbps) and about 60 per cent replied that they implement WMO Information System (WIS) and are benefited from WIS in terms of data exchange.
- (d) *Data-processing and forecasting system* – About 60 per cent of Members are operating NWP system and the overall capability of NWP in RA II was not much increased for the last 3 years. However almost all Members use and interpret NWP products. In the mean time, a nowcasting system for high impact weather warning has not yet been applied in many Members.
- (e) *Natural disaster prevention and mitigation* – Most Members have links with national disaster managers. Given that yet about 60 per cent of Members have a public education programme, more efforts have to be made for better communication with the public.
- (f) *Climate services* – All Members responded that they provide climatological information for the sustainable use in conservation of natural resources, but only about 60 per cent of Members explicitly provide monthly and/or seasonal climate predictions. For the survey period of 2010-2011 about 40 per cent of Members have increased the number of climatological stations and the number of climate variables measured and processed.

- (g) *Aeronautical meteorological services* – About 90 per cent of Members are designated as the meteorological authority for aviation services but quality management systems and cost-recovery of services are not yet implemented in many Members.
- (h) *Hydrological services* – Efforts for expanding the spatial and temporal coverage of hydrological observation networks have been made in many Members. More than 70 per cent of Members provide services on flood and flash flood warnings, but services on landslide and debris flow warnings are not provided in many Members. Improvements of adaptation capacity of water resources system in a changing climate are relatively less paid attention.
- (i) *Public weather services* – About 80 per cent of Members operate a Website for real-time weather forecasts and warnings. In the meantime 60 and 40 per cent of Members are operating automatic telephone answering system and TV weather forecast programme, respectively.
- (j) *Partnership* – Cooperation with other service providers in the provision of specific weather services or advice may need more enhancement. Less than 40 per cent of Members collect and distribute automated meteorological observations from aircraft. About 60 and 40 per cent of Members join RA II pilot projects on enhanced use of city-specific NWP products and on support of the Aeronautical Meteorology Programme, respectively.

3. WIGOS and WIS Related Issues

3.1 A total of 21 and 6 questions are related to observing and telecommunication systems, respectively and 11 of those are newly added questions to the survey 2010-2011.

3.2 Most Members carry out regular maintenance and calibration of observation instruments and also implement reliability measures on quality management routines and procedures of weather observations. Almost all Members deliver the measured observations at remote stations in real-time. About 90 per cent of Members work towards enhancement of temporal and spatial coverage of their weather measurements each year for the survey period. Compared to NMHSs efforts for the maintenance of observing systems, the rate of employing qualified maintenance technicians is limited.

Table 1. Percentage of Members answered 'yes' to the questions regarding maintenance of observation systems

Questions	2010 (%)	2011 (%)
II-1. Carries out regular maintenance and calibration	92	92
II-2. Implements reliability measures on quality management routines	88	88
II-3. Real-time delivery of observations	96	96
II-4. Enhancement of temporal and spatial coverage	92	88
II-5. Employ qualified maintenance technicians	81	85

3.3 In general, operational observation networks in the Region have been enhanced since 2008. For example, the number of operational surface stations of Regional Basic Synoptic Network (RBSN) was 1,801 in 2011 while it was 1,413 in 2008. The improvements were also made in the number of RBSN upper-air stations, AWSs, wind profilers, and so on. However, 8 out of 29 responded Members do not operate any weather radar, which is essential observational tool for detecting detailed structure of severe storms and therefore critical component of nowcasting system. More than 70 per cent of Members operate ground stations to receive high-resolution geostationary satellite images while relatively fewer Members (about 60 per cent) operate the polar-orbiting satellite receiving systems, yet these numbers are increased compared to the results of survey in 2008.

3.4 It was shown that about 30 per cent of Members are operating lightning detection networks. Considering that lightning is often related to severe storms and hence to possibility of disasters,

enhancement of the lightning detection network of the Members would be one of demanding issues. The percentage of using the service of Regional Instrument Centre (RIC) to ensure the accuracy of the instruments is relatively low (about 45 per cent), while that of using the service of national standard laboratory is about 70 per cent.

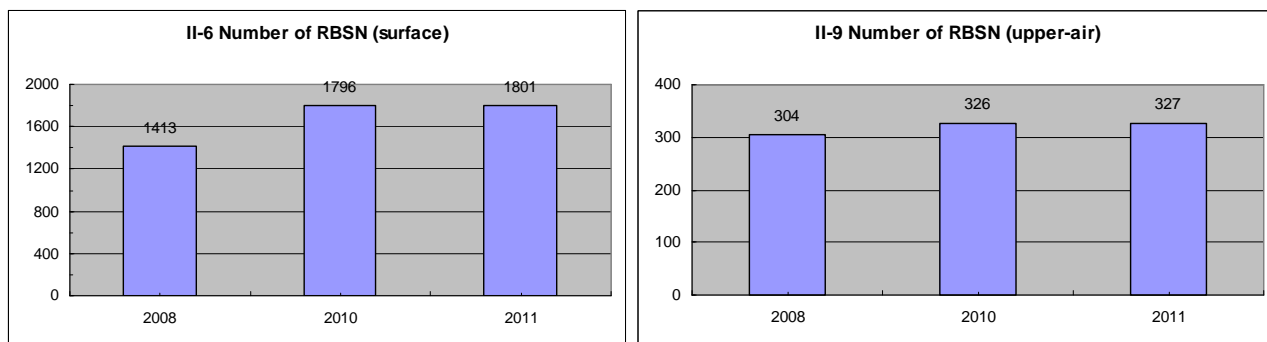


Figure 1. Total number of operational Regional Basic Synoptic Network (left) surface and (right) upper-air stations of the RA II members.

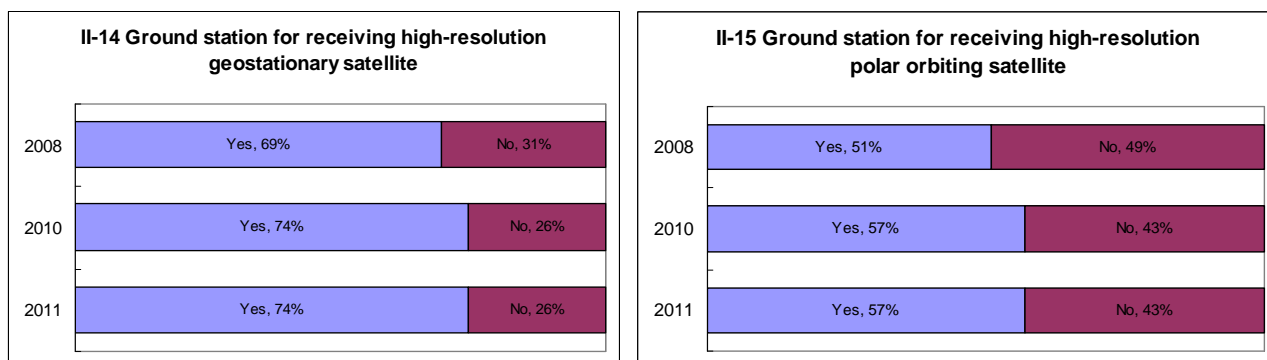


Figure 2. Percentage of operating ground stations to receive satellite images from geostationary and polar-orbiting satellites

3.5 The speed of GTS connection to the Regional Telecommunication Hub (RTH) was analysed with three categories: Category I with speed less than 9.6 kbps; Category II between 9.6 and 64 kbps; and Category III over 64 kbps. Eighty-two percent of Members now belong to Category III, including Members like Hong Kong, China; Kyrgyzstan; and Mongolia whose connection speeds were increased to this category in 2010.

3.6 Most of Members are connected to the Internet by broadband but two out of 29 responded Members indicated the Internet connected by telephone dial-up. Seven Members are still running radiofacsimile broadcast of meteorological and oceanographic information.

3.7 About 60 per cent of Members replied that they implement WMO Information System (WIS) and are benefited from WIS in terms of data exchange. In view the fact that WIS is one of WMO main priority areas, RA II needs further enhancement in the capability of WIS implementation.

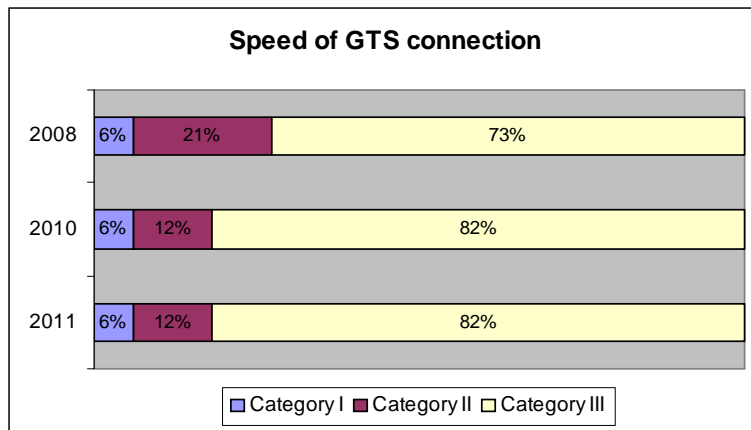


Figure 3. Distribution of the speed of GTS connections to RTHs in terms of Category I (below 9.6 kbps), Category II (9.6 to 64 kbps) and Category III (over 64 kbps).

4. Summary

4.1 The results of 2010-2011 survey indicate overall improvement of weather, climate and hydrological services by Members in RA II and also identify priorities for regional activities. Final analysis with inputs from more Members is expected to give further informative results to develop key issues in the Region.

Annex to paragraph 7.1

**A Summary of the Outcomes of the
Sixteenth World Meteorological Congress and the sixty-third session
of the Executive Council as they relate to the
Global Framework for Climate Services**

Relevant outcomes from the World Climate Conference-3

Congress noted that the overarching theme of the World Climate Conference-3 (WCC-3) (Geneva, Switzerland 31 August-4 September 2009) was; "Climate prediction and information for decision-making: focusing on scientific advances in seasonal to inter-annual time-scales, taking into account multi-decadal prediction" (http://www.wmo.int/wcc3/theme_en.php), and that it addressed issues relating to the application of climate prediction and information including assisting adaptation to climate variability and change in a wide variety of sectors including agriculture and food security, forestry, energy, water, health, urban and rural settlements, infrastructure, tourism, wildlife, trade and transport that contribute to sustainable socio-economic development.

The three-day technical component of WCC-3 was followed by a two-day high level segment attended by, *inter alia*, 13 Heads of State/Government, 57 Ministers (or equivalent) and 14 Heads of UN agencies or programmes which decided to establish a Global Framework for Climate Services to strengthen production, availability, delivery and application of science-based climate prediction and services and requested the Secretary-General of WMO to convene, within four months of the adoption of the Conference Declaration, an intergovernmental meeting of Member States of the WMO to approve the terms of reference and to endorse the composition of a task force of high-level, independent advisors to be appointed by the Secretary-General of WMO with due consideration to expertise, geographical and gender balance.

Relevant outcomes from the Intergovernmental Meeting

Congress recalled that the WMO convened the Intergovernmental Meeting for the High-level Taskforce on the Global Framework for Climate Services at the Geneva International Conference Centre (CICG) from 11 to 12 January 2010, under the chairpersonship of its President, Dr A.I. Bedritskiy. This Intergovernmental Meeting provided terms of reference which, *inter alia*, asked the High-level Taskforce to:

- (a) Develop the components of GFCS and define the roles, responsibilities, and capabilities of the elements within the GFCS and clearly illustrate how it will assist the integration of climate information and services into national planning, policy and programmes for, among others, water resource management and development, health and public safety, energy generation and distribution, agriculture and food security, land and forestry management, desertification, eco-system protection, sustainable development and poverty reduction, taking into account the special needs of Africa, Small Island Developing States (SIDS), Least Developed Countries (LDCs), and Land-Locked Developing Countries (LLDCs);
- (b) Develop options for governance of the GFCS, ensuring its intergovernmental nature, and provide a reasoning for the preferred option(s);
- (c) Outline a plan for the implementation of the GFCS, which includes:
 - (i) Ensuring a central role of national governments;
 - (ii) Proposing a range of options for immediate and longer-term actions to realize the GFCS;
 - (iii) Specifying measurable indicators, with timelines, for the actions necessary to implement the elements of the GFCS;
 - (iv) Estimates of costs of implementation of these options, with clear indications of the

- financial resources and enhanced technological capabilities required, and their likely sources, to ensure effective global implementation; and,
- (v) A strategy for capacity building in developing countries, particularly those of the African countries, Least Developed Countries (LDCs), Small Island Developing States (SIDS) and Land-Locked Developing Countries (LLDCs);
- (d) Make findings and propose next steps in relation to:
- (i) The role of the UN system and other relevant stakeholders, as well as the mechanisms for their contributions;
 - (ii) Approaches to global data policy (addressing data gaps, ownership, data protection, confidentiality, exchange, applications, and usage), that would lead to enhanced capability of the GFCS, taking into account Resolution 40 (Cg-XII) and Resolution 25 (Cg-XIII);
 - (iii) Improving systematic in-situ observations and monitoring of climate especially in data-sparse areas, in order to increase data availability, including for research and prediction;
 - (iv) Approaches for reviewing the implementation of the GFCS;
 - (v) Strategies for building capacity in developing countries in accordance with their needs and priorities, including their access to global and regional climate models output and the underlying technology embedded in the models, and their ability to independently develop/improve in-country climate services capacity; and,
 - (vi) A strategy for promoting a common global understanding of the GFCS and for coherent and coordinated messaging and information sharing.

The Intergovernmental Meeting also endorsed the following composition of the Taskforce:

1. Joaquim CHISSANO (Mozambique)
2. Jan EGELAND (Norway)
3. Angus FRIDAY (Grenada)
4. Eugenia KALNAY (Ms) (Argentina/USA)
5. Ricardo LAGOS (Chile)
6. Julia MARTON-LEFEVRE (Ms) (Hungary/France/USA)
7. Khotso MOKHELE (South Africa)
8. Chiaki MUKAI (Ms) (Japan)
9. Cristina NARBONA RUIZ (Ms) (Spain)
10. Rajendra Singh PARODA (India)
11. QIN Dahe (China)
12. Emil SALIM (Indonesia)
13. Mahmoud ABU-ZEID (Egypt)
14. High-level representative of indigenous peoples
15. High-level member from Pacific SIDS
16. High-level economist

Finally, the Intergovernmental Meeting charged the Secretary-General of WMO with the responsibility of recruiting the individuals to fill the last three positions (numbered 14, 15 and 16 in the previous paragraph). As a result, Ms Fiame Naomi Mata 'Afa from Samoa agreed to join the Taskforce, thus providing the competence called for by positions 14 and 15 while Dr Emil Salim from Indonesia supplied expertise in economics to the Taskforce, resulting in a Taskforce of 14 members.

The Report of the HLT

The co-chairs of the High-level Task Force on the Global Framework for Climate Services, Dr Jan Egeland/Dr Mahmoud Abu-Zeid briefed the Congress on the Taskforce's Report, noting that the findings of the Taskforce included:

- (a) Present capabilities to provide climate services fall short of meeting present and future needs and are not delivering their full and potential benefits. This is particularly the case in developing and least developed countries;
- (b) Existing climate services are not focused well enough on user needs and the level of interaction between providers and users of climate services is inadequate. Climate services often do not reach “the last mile”, to the people who need them most, particularly at the community level in developing and least developed countries;
- (c) To support climate services, high quality observations are required across the entire climate system and of relevant socio-economic variables and further commitment to sustaining high quality observations is inadequate and enhancements to existing networks are required, particularly in developing countries;
- (d) Effective climate services will depend on maximizing the potential of existing knowledge, new research developments and strong support from and strengthened collaboration between all relevant research communities;
- (e) Efforts to provide effective climate services globally will only be successful if capacity is systematically built to enable all countries to manage climate risk effectively. Current capacity building activities to support climate services need to be scaled up and better coordinated.

The vision of the GFCS developed by the HLT

The Taskforce proposes that the structure of the Framework be as proposed by the WCC-3, but with the addition of a capacity building component. The proposed components of the Framework are then as follows:

- (a) The User Interface Platform that will provide a means for users, user representatives, climate research and climate service providers to interact, thereby maximizing the usefulness of climate services and helping develop new and improved applications of climate information;
- (b) The Climate Services Information System to protect and distribute climate data and information according to the needs of users and according to the procedures agreed by governments and other data providers;
- (c) The Observations and Monitoring component that will ensure that the climate observations necessary to meet the needs of climate services are generated;
- (d) The Research, Modelling and Prediction component that will assess and promote the needs of climate services within research agendas;
- (e) The Capacity Building component that will support systematic development of the necessary institutions, infrastructure and human resources to provide effective climate services.

The Recommendations of the High-level Taskforce

The Taskforce had made five Recommendations:

Recommendation 1: We, the High-level Taskforce, unanimously recommend that the international community make the commitment to invest on the order of USD 75 M per year to put in place and sustain a Global Framework for Climate Services. This investment will build upon existing investments by governments in climate observation systems, research, and information management systems to return to the community benefits across all societal sectors but most importantly, and most immediately, in disaster risk reduction, improved water management, more productive and sustainable agriculture and better health outcomes in the most vulnerable communities in the developing world.

Recommendation 2: To ensure that the Global Framework for Climate Services provides the greatest benefit to those who need climate services the most, we recommend that the following eight principles be adhered to in its implementation:

- Principle 1:** All countries will benefit, but priority shall go to building the capacity of climate-vulnerable developing countries
- Principle 2:** The primary goal of the Framework will be to ensure greater availability of, access to, and use of climate services for all countries
- Principle 3:** Framework activities will address three geographic domains: global, regional and national
- Principle 4:** Operational climate services will be the core element of the Framework
- Principle 5:** Climate information is primarily an international public good provided by governments, which will have a central role in its management through the Framework
- Principle 6:** The Framework will promote the free and open exchange of climate-relevant observational data while respecting national and international data policies
- Principle 7:** The role of the Framework will be to facilitate and strengthen, not to duplicate
- Principle 8:** The Framework will be built through user – provider partnerships that include all stakeholders

Recommendation 3: We recommend that the UN-system establish, as a matter of urgency, an *ad-hoc* technical group to develop a detailed implementation plan for the Global Framework for Climate Services based upon the broad strategy outlined in this report, this plan to be endorsed by governments through an intergovernmental process prior to its implementation.

The detailed implementation plan should identify high priority projects to advance the Framework in areas where this would assist in reducing vulnerability to climate change and variability. In addition to the fast-track, capacity building projects, the implementation plan should describe a sustainable programme to underpin the coordination needed to maintain the operational capabilities of the Framework. The implementation plan should set targets to be achieved over the next ten years, further elaborate the roles and responsibilities of components of the Framework that contribute at the global, regional and national levels and of the secretariat that supports it, and include a risk assessment.

Recommendation 4: We strongly recommend that governments and development assistance agencies give high priority to supporting national capacity building that will allow developing countries to participate in the Framework. Further analysis of national needs is required, but in the meantime we recommend a number of fast track projects as outlined above. To ensure effective national access to global climate information by the largest number of countries, we recommend an initial strategy to strengthen rapidly or create the regional elements of the Framework. These regional elements should be led and hosted by countries of the region based upon regional agreements and should be tasked with supporting information flow and assisting national capacity building at national level.

Recommendation 5: The Taskforce is unanimous in recommending the following two options be considered for governance of the Framework:

Option A An Intergovernmental Board on Climate Services would be established to provide leadership and direction for the Framework. It would report to the World Meteorological Organization Congress. The Board would be open to membership of all countries and would meet in plenary session periodically, probably annually. It would develop formal mechanisms to engage the United

Nations and other stakeholders in its work. It would elect a chair and a small executive committee to conduct the affairs of the Board between sessions as well as designating a number of technical management committees to oversee and contribute to the Framework's implementation work. These management committees would work intergovernmentally and where possible would be based on relevant existing international committees.

Option B A Joint Board of relevant United Nations System entities (agencies, organizations, programmes, departments and independent funds) would be created to provide leadership and direction for the Framework. The United Nations System Joint Board would report regularly to the UN Chief Executives Board as well as to governments through the plenaries of the sponsoring UN agencies and programmes. The Joint Board would establish technical management committees to implement and manage the Framework, these management committees working intergovernmentally. Mechanisms to engage non-United Nations stakeholders in the work of the Board would be developed through both the User Interface Programme and, up to the level desired by governments, through participation in national delegations.

The Taskforce also recommended that Option A be adopted and that the Secretary-General of the World Meteorological Organization convene the first intergovernmental plenary meeting of the Global Framework for Climate Services by the end of 2011 and that the World Meteorological Organization should lead the process and put in place arrangements to ensure full participation of all interested UN agencies and programmes.

Response to the Taskforce's Report and the Process for its Implementation

The Congress:

- (1) Endorsed the broad thrust of the High-level Taskforce's Report;
- (2) Accepted the intent of Recommendation (1), with the understanding that the international community would make, consistent with its ability to do so, a significant investment in the implementation of the GFCS;
- (3) Noted with interest Recommendation (2), thereby encouraging the use of the eight Principles provided by the Taskforce as a guide for decision making in the implementation of the Framework;
- (4) In response to Recommendation 3 it:
 - (a) Entrusted the WMO Executive Council with the responsibility of developing proposals, with the involvement of relevant stakeholders including other UN bodies, for consideration by an Extraordinary Session of the World Meteorological Congress with the participation of all relevant stakeholders including other UN bodies. These proposals to address the:
 - (i) Development of the draft implementation plan for the GFCS;
 - (ii) Establishment of the draft Terms of Reference and Rules of Procedure for the Intergovernmental Board and its substructures based on the draft implementation plan;
 - (b) Requested the Secretary-General to:
 - (i) Support the work of the Executive Council as it develops the draft implementation plan which would include, *inter alia*, details of the on-going Secretariat support arrangements;
 - (ii) Organize an Extraordinary Session of the World Meteorological Congress in 2012 with participation of all relevant stakeholders including other UN bodies, to review and

adopt the draft implementation plan for the GFCS for subsequent consideration by the Intergovernmental Board, and to adopt the Terms of Reference and Rules of Procedure of the Intergovernmental Board;

- (5) Accepted Recommendation (4), particularly supporting the rapid implementation of projects at the national and regional level, possibly including, but not limited to the Report's "Fast Track projects", aimed at increasing the capacity of developing countries to provide climate services and ensuring such capacity developing projects proposed are of high priority and meet clearly identified requirements;
- (6) Proceeded with Option A of Recommendation (5) as contained in Chapter 10 of the Taskforce Report, to implement the GFCS, amended to reflect the agreement that the Intergovernmental Board of the Framework, will be accountable to the WMO Congress and that the management committee structures, that may be accountable to the Intergovernmental Board will be decided upon completion of the implementation plan.
- (7) Established the GFCS Secretariat within the WMO;

Congress also strongly urged Members to:

- (1) Continue to make their expertise available during the development and implementation of the GFCS;
- (2) Strengthen their own capacity to meet national climate services needs;
- (3) Make maximum use of national, regional and global capabilities to collect and exchange data and products, to generate climate information and to provide climate services;
- (4) Make voluntary contributions of the resources needed to continue the implementation of the GFCS;

Congress called on other United Nations System bodies, as well as all relevant regional and international organizations and entities, whether governmental or non-governmental, to give strong support to the implementation of the GFCS through participation in its working mechanisms and contribution of expertise and resources to its programmes, projects and activities;

Congress requested the Executive Council to:

- (1) Take necessary actions for the Global Framework for Climate Services to become an effective operational entity in 2012-2015 and beyond;
- (2) Give high priority to ensuring effective overall coordination of the Framework;
- (3) Review relevant resolutions and structures of the WMO with a view to ensuring effective implementation of the GFCS;

Congress requested the Secretary-General of the WMO to:

- (1) Convey the gratitude of Congress to the members of the High-level Taskforce for their outstanding work and for consulting broadly and producing a high quality and well balanced report in such a short time;
- (2) Continue to draw fully on the advice and assistance of climate experts and users of climate services in the further development of the Framework.

Relevant outcomes from the sixty-third session of WMO Executive Council

The Executive Council decided to establish an Executive Council Task Team on the Global Framework for Climate Services (GFCS (ECTT - GFCS) with the following Terms of Reference:

To support the Executive Council in implementing the decisions on GFCS taken by the sixteenth World Meteorological Congress (Cg-XVI), through development of following proposals for consideration by the Extraordinary Session of the World Meteorological Congress in 2012, for:

1. A detailed draft implementation plan for the Global Framework for Climate Services, based on the broad strategy outlined by the High-level Taskforce, duly incorporating:
 - i) Identification of high priority projects to advance the Framework,
 - ii) A sustainable programme to underpin the coordination needed to maintain operational capabilities of the Framework,
 - iii) Setting the targets to be achieved during the next ten years,
 - iv) Roles and responsibilities of components of the framework that contribute to the global, regional and national levels, including risk assessment.
2. The draft terms of reference and initial rules of procedure for the Intergovernmental Board and its substructures based on the implementation plan.

The Executive Council agreed on the following Membership for the ECTT – GFCS:

1. D. Grimes - Chair (Canada)
2. G. Adrian (Germany)
3. M. Arenda (Chile)
4. M.L. Bah (Guinea)
5. S.J. Cho (Republic of Korea)
6. C. De Simone (Italy)
7. R. Garcia Herrera (Spain)
8. M. Hatori (Japan)
9. J. Hayes (USA)
10. S.W. Harijono (Indonesia)
11. F. Jacq (France)
12. A. Mokssit (Morocco)
13. A. D. Moura (Brazil)
14. J.R. Mukabana (Kenya)
15. M. Ndiaye (Senegal)
16. A. Rolle (Bahamas)
17. A. Tyagi (India)
18. A. Waqaicelua (Fiji)

The Executive Council also decided that:

- The ECTT – GFCS should submit its draft report to the Council at its sixty-fourth session in 2012;
- The ECTT – GFCS should have broad consultations, at an early stage, with relevant EC bodies, particularly the ECWG-SOP and the ECWG-CWE, members, agencies within the UN System, international organizations, governmental organizations, non-governmental bodies, and other stakeholders, in its work.

Annex to paragraph 7.2

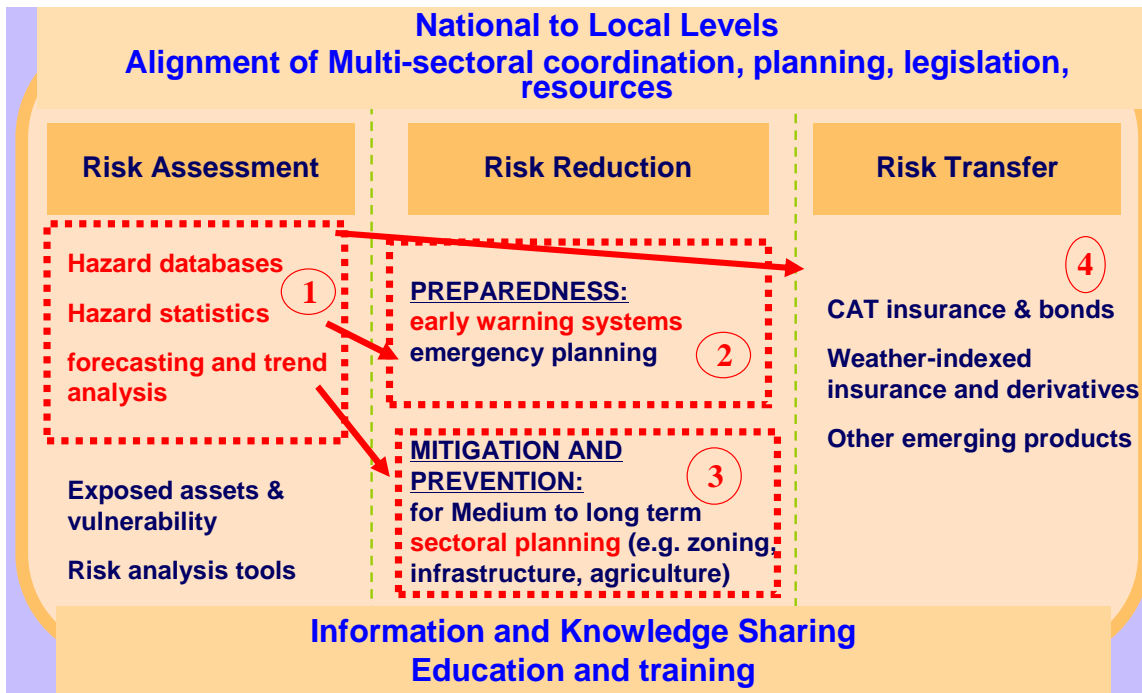


Figure 1: Development of meteorological, hydrological and climate services to support climate and disaster risk reduction

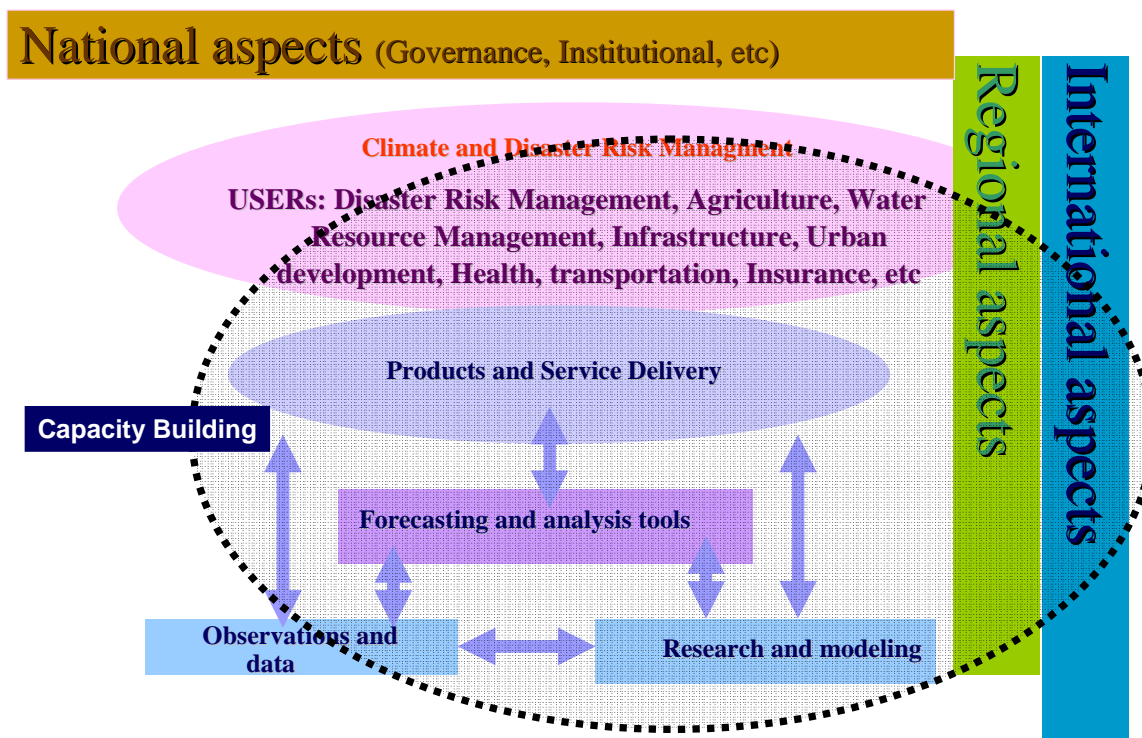


Figure 2a : National/regional/global Cooperation Framework for strengthening of Meteorological/hydrological and climate services

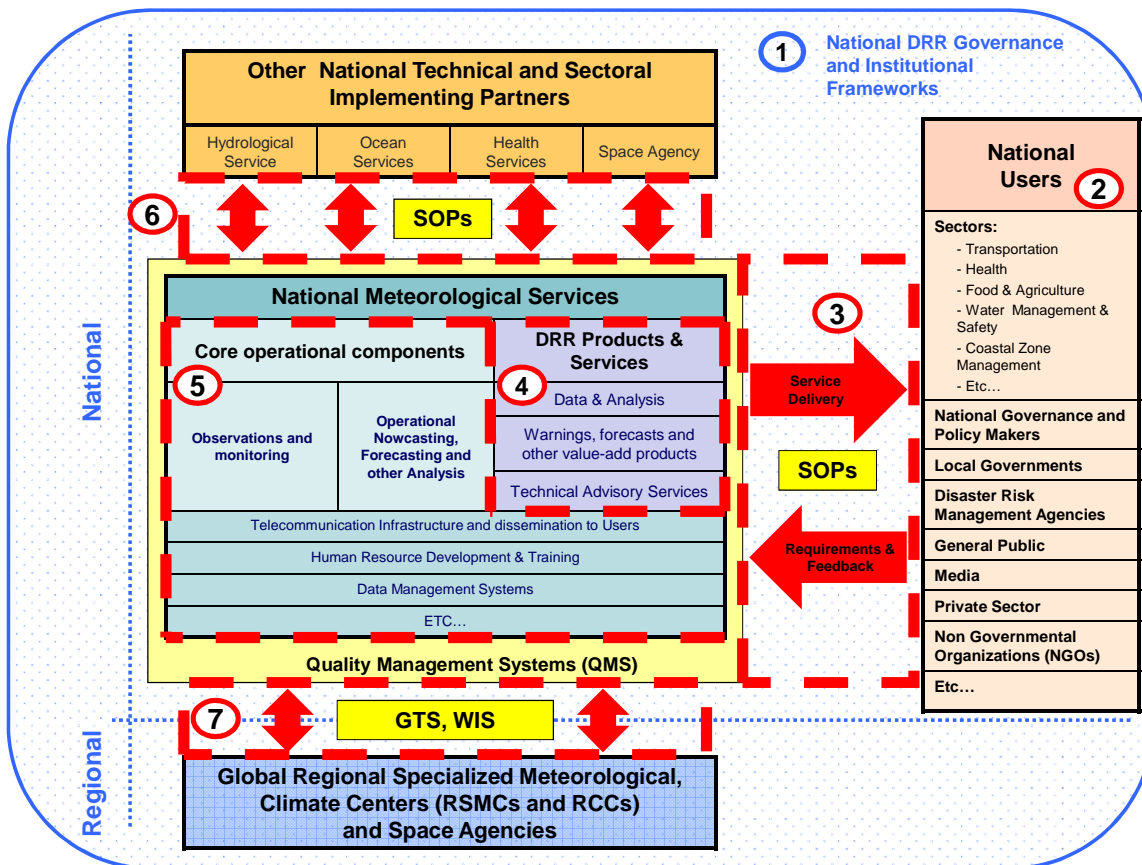


Figure 2b : National/regional/global Cooperation Framework for strengthening of Meteorological/hydrological and climate services