

WORLD METEOROLOGICAL ORGANIZATION

Weather, Climate and Water



**REGIONAL ASSOCIATION IV
(North America, Central America
and the Caribbean)**

**WORKING GROUP ON HYDROLOGY
REPORT OF THE NINTH SESSION**

**San Salvador, El Salvador
4 to 7 December 2006**

FINAL REPORT

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1. OPENING OF THE SESSION (Agenda item 1)

1.1 At the kind invitation of the Authorities of El Salvador, the ninth session of the Working Group on Hydrology (WGH) of the WMO Regional Association IV (North America, Central America and the Caribbean) was held in San Salvador, El Salvador, from 4 to 7 December 2006.

1.2 The meeting opened on 4 December 2006, in the meeting room of the Hotel Holiday INN in El Salvador.

1.3 Mr Curt Barrett, President of the Working Group on Hydrology (WGH) of the WMO Regional Association IV, welcomed the participants to the meeting and thanked the local organizers. He mentioned the activities he carried out in El Salvador after Hurricane Mitch in the field of Hydrological Forecasting. He stated that the time is short for discussing all that is needed but that he was confident with everybody's contributions the objective of the meeting would be met. In finalizing he expressed that there are two main topics that are embedded in the activities of the various sub-groups and these are "Integrated Water Resources Management" and "Disaster Mitigation and Prevention".

1.4 In the opening session, Mr Gabriel Arduino of the Water Resources Division of the Hydrology and Water Resources Department of the WMO Secretariat, on behalf of Mr Michel Jarraud, Secretary-General of the WMO, thanked the Government of El Salvador for arranging the meeting, for the excellent support and for the facilities made available to it. He informed the meeting that exactly 10 years ago the Commission of Hydrology met in Koblenz, Germany and proposed the new terms of reference expanding the field of activity of the Organization to the field of Hydrology and Water Resources.

1.5 Finally, Ms Elda de Godoy, Director General of SNET (Servicio Nacional de Estudios Territoriales) welcomed the participants and wished success in the discussions. She mentioned that the Salvadoran Government is allocating a high priority to hydrology and to the study of hydrological risks, including risk management. She informed the meeting that the Water Law is being developed by the Ministry of Environment and Natural Resources. She mentioned the Water Balance study and Water Quality study that were finalized in the country. She invited the participants to a technical visit to SNET and to enjoy the hospitality of the city of San Salvador.

2. ORGANIZATION OF THE WORK OF THE SESSION (Agenda item 2)

2.1 The session was attended by 11 participants from 9 RA IV countries. UNESCO was represented in the meeting. The list of participants is given in Annex 1 to this report. Mr C. Barrett chaired the session of the WGH. Mr G.Arduino acted as its Secretary assisted by Ms Y. Burnet.

2.2 The WGH reviewed and adopted its agenda, which forms the table of contents of this report. It also agreed on a timetable of work. The participants received a CD with information on CHy, the five topics addressed by the sub-groups together with information on WMO and the Hydrology and Water Resources Programme.

3. BRIEFING BY THE WMO REPRESENTATIVE (Agenda item 3)

3.1 Decisions of WMO bodies

3.1.1 The session was informed on the most important decisions made by the various WMO bodies since the last session of the Group in July 2003.

The Executive Council

Fifty-sixth Session

3.1.2 The fifty-sixth session of the Executive Council (Geneva, June 2004) made the following decisions with respect to the Hydrology and Water Resources Programme:

- It noted the efforts made towards enhancing the cooperation between CHy and the Regional Working Groups on Hydrology, as well as the continued collaboration with other technical commissions in areas such as the WIS, the Regional Climate Centres, Natural Disasters and the WMO Quality Management Framework; and
- After debating at length various alternatives for the way forward on the issue of the Panel of Experts on Fresh Water, the Council saw little merit in continuing with the proposal and recommended that this issue may not be pursued any further.

Fifty-seventh Session

3.1.3 The fifty-seventh session of the Executive Council (Geneva, June – July 2005) made the following decisions with respect to the Hydrology and Water Resources Programme:

- The Council noted with appreciation the “Comprehensive report on WHYCOS and the status of HYCOS projects under way” prepared by the Secretariat with the assistance of CHy. The Council recalled that this report had been requested by Cg-XIV, in order to assess the state of implementation and the sustainability of the various HYCOS components. It encouraged the Secretary-General to strengthen efforts towards the implementation of HYCOS projects.
- The Council examined the proposal on the “International Flood Initiative”, as developed by the Joint Task Team of experts representing the hydrological programmes of WMO, UNESCO, UNU and IAHS and approved the participation of WMO in the Initiative; and
- The Council, recognizing the importance of water issues, observed that more time should be assigned for discussing HWRP in WMO constituent bodies in the future.

Fifty-eighth Session

3.1.4 The fifty-eighth session of the Executive Council (Geneva, June 2006) made the following decisions with respect to the Hydrology and Water Resources Programme:

- While the Council endorsed the key role WMO is playing in hydrology and water resources, setting standards and linking meteorology and hydrology, it urged the Programme to continue to work through strategic partnerships with other water-related UN and regional agencies, in particular with the UNESCO-IHP, so as to develop initiatives that could leverage the resources available from within the WMO.
- The Council was pleased to note the continuing progress in the development and implementation of WHYCOS. The Council learned with satisfaction about securing funds from donors and starting the implementation of Niger-HYCOS, Volta-HYCOS, SADC-HYCOS Phase II, Mekong-HYCOS and Pacific-HYCOS, and noted with appreciation the support provided by the Governments of France, The Netherlands and the European Commission (EC) to the HYCOS projects. It was informed that the African Water Facility (AWF) had expressed interest to co-sponsor Niger, Lake Chad, IGAD and Congo HYCOS projects. The Council requested the Secretary-General to continue providing support to WHYCOS to ensure continued donors interest in implementing its components.

- The Council appreciated the support provided by the Government of Japan and the Government of The Netherlands for the implementation of the first phase of APFM (2001-2006). It noted with appreciation the support promised by the Government of Japan to the second phase of APFM (2006-2009). It appealed to other Member countries to contribute to the APFM fund for supporting implementation of sustainable and integrated flood management policies.
- The Council noted the progress that had been achieved with respect to the compilation of a range of guides, guidelines and manuals that constitute a framework of quality management for the provision of hydrological services. This includes the imminent publication of the report on Management, Role and Operation of Hydrological Services, the availability of final drafts of the 6th edition of the Guide to Hydrological Practices, the Manual on Estimation of Probable Maximum Precipitation and the first volume of the Manual on Stream Gauging for peer review and the various stages of development of the Manual on Water Resources Assessment, Manual on Flood Forecasting, Manual on Design Flood Estimation, Manual on Low Flow Estimation and Prediction and Guidelines on Valuation of Hydrological services. The Council was informed that for the preparation of the manuals, synergies have been established with ongoing programmes of other organizations.
- The Council noted that in many instances the support being provided by the Open Panels of CHy Experts (OPACHes) was significant, however, in some other areas has not been encouraging up to date. The Council urged Members to support the work of the Commission through involvement in, and providing support to, the OPACHes. The Council asked the Commission to find ways to recognize the contribution of OPACHE members for their voluntary work and requested the president of CHy to evaluate through the AWG the effectiveness of the working methods adopted by CHy-XII and to report to CHy-XIII.
- The Council supported the proposal that the future work programme of the Commission should focus on the application of the manuals and guidance and thus address issues of training and capacity building in the areas of basic systems (hydrology) and hydrological applications within a framework of quality management. The Council urged the president of CHy to bring forward a brief document outlining the strategic orientation of the Programme taking into account all available resources and opportunities, including the cooperation with the UNESCO's International Hydrological Programme (IHP). The Council requested that this strategic paper be presented to EC-LX. The paper should include an assessment of the existing and possible future coordination mechanisms with other UN and non-UN organizations, in particular UN-Water and the UNESCO/WMO Liaison Committee, in line with paragraph 10.1.4 of the Abridged Final Report of CHy-XII.
- The Council agreed that the recommendation of the CHy AWG that the electronic version of the Guide should be made available on the Internet and via a CD-ROM had merit and should be discussed further under the relevant EC-LVIII agenda item.
- The Council supported the proposal to invite the chairpersons of Working Groups on Hydrology from all the Regions to the AWG meeting just before the CHy session. It noted that this initiative would enable increased regional input to the work programme of CHy and thus better serve the WMO Member countries. The Council recognized the need to support the activities of the WGHs that are aimed at developing and implementing projects.

Twelfth Session of the Commission for Hydrology (CHy - XII)

3.1.5 The twelfth session of the Commission for Hydrology was held in Geneva, Switzerland from 20 to 29 October 2004. The session was attended by 161 participants, representing 55 members of WMO and 10 international organizations. Mr B. Stewart (Australia) and Mr J. Wellens-Mensah (Ghana) were elected respectively President and Vice-President of the Commission.

3.1.6 The Commission established an Advisory Working Group (AWG) composed of nine members, and five Open Panels of CHy Experts (OPACHE) on five thematic areas: basic systems (hydrometry and hydraulics), water resources assessment and water use, hydrological forecasting and prediction, disaster mitigation – flood and droughts (hydrological aspects) and analysis of hydrometeorological data for variability and trends. The Commission also included in its future plan of work activities associated with WHYCOS, international data access and exchange, capacity building and technology transfer, and the development of the sixth edition of the Guide to Hydrological Practices. The Commission identified a set of activities and outputs for each member of the AWG.

3.1.7 The Commission expressed its concern with regard to the decline of the financial support provided to the organization of the sessions of Regional WGH, and requested the AWG to prepare a proposal to the Secretary-General on how to address the issue. It also expressed concern at the low visibility of the WGHs' activities in the annual reports of the presidents of regional associations to the Executive Council and appealed to RHAs to adopt a proactive approach and provide inputs to the presidents of RAs in their annual report.

3.1.8 The Commission reviewed the statement on the scientific basis for and limitations of hydrological modelling prepared by the AWG along a similar statement on the scientific basis for and limitations of weather and climate forecasting. It requested NHSs to provide their views on the statement in view of its possible adoption by AWG.

3.1.9 The Commission also adopted a WMO Strategy on Education and Training in Hydrology and Water Resources. The strategy aims at assisting Members in assessing their education and training needs so that NHSs can effectively contribute to integrated water resources management in their countries. The primary target group of the strategy is represented by the technical staff of the NHSs at all professional levels, followed by academic and other government agencies involved in hydrology and water resources activities. Education and training supported by WMO should be, in principle, demand driven and therefore RA WGHs are requested to provide inputs for identifying the priority areas for action.

3.1.10 The Commission recognizing the increasing requirement for education and capacity building to support sustainable development and the need for improved interdisciplinary approach, adopted a recommendation inviting the Executive Council to widen the scope of the WMO Regional Meteorological Training Centres (RMTCs) in order to accommodate the other scientific and technical disciplines under WMO activities, e.g. by modifying the title to WMO Regional Training Centres (RTCs) and by modifying the criteria for their recognition.

3.1.11 In response to a request of the Congress to keep under review the implementation of Resolution 25 (Cg-XIII) a questionnaire on the exchange of hydrological data and products was circulated to all Members. From the results of the questionnaire it appears that there is a widespread need for international data exchange and that the majority of the respondent countries are satisfied with the present level of exchange, although at the same time almost all of them place restrictions of some sort on it. Resolution 25 (Cg-XIII) was reasonably widely known, and most of the countries recognized that it has or potentially could have in future a positive impact on the exchange of data and products. The type of data most commonly exchanged are water levels and discharge, while the strongest needs expressed are for more timely forecasts and information on water quality, including warnings on accidental pollution of water bodies.

3.1.12 The Commission reaffirmed that the exchange of hydrological data and products is a vital requirement to maximize successful management of rivers and support hydrological studies. It also requested the Member countries to implement Resolution 25 (Cg-XIII) in dealing with data exchange activities with other countries, the research community and international data centres. The Commission also noted that many NHSs were facing problems in developing standards for hydrological data and information exchange and invited the Secretariat to develop further efforts in that direction, in cooperation with NHSs.

3.1.13 Cg-XIV, acting upon a proposal to launch an intergovernmental review and action mechanism on water prepared by CHy and WMO Secretariat, had requested the Secretary General to develop a proposal for the establishment of a Panel of Experts on Fresh Water. This proposal, providing for a panel embracing all water related issues and serving as a science advisory panel for the inter agency World Water Assessment Programme, was subsequently submitted to UN Water. UN Water recognized that this proposal presented several important concepts but it was afraid that its establishment might have led to unnecessary duplications. Therefore both EC-LVI and CHy saw little merit in continuing the proposal and recommended not to pursue it any further. CHy however noted that the original proposal for an intergovernmental mechanism was possibly ahead of its time and might be put aside until international conditions become more supportive of its acceptance.

3.1.14 Noting that the role and function of NHSs varies from country to country, the CHy requested the AWG to compile a discussion paper on the advantages and disadvantages of changing the name of the Commission for Hydrology to the "Commission for Hydrology and Water Resources", in line with the programme and department names and the inclusion of the term "water" in the Organization's subtitle.

3.2 Other developments

3.2.1 In addition, the Group was informed on other issues of its interest.

HOMS

3.2.2 There are currently about 180 components in the HOMS Reference Manual (HRM), all revised and updated after 2001. Unfortunately the replenishment of the HRM with new components is advancing rather slowly, as only very few have been submitted by the National HOMS Reference Centres in the recent years.

3.2.3 At its first meeting in March 2005, the CHy AWG stressed that the HOMS concept was still a fundamental pillar of the capacity building activities of the HWRP but noted the slow rate of incorporation of new components in HOMS and the limited success of past efforts of the Secretariat to attract the submission of new components in selected areas.

3.2.4 Since the first meeting of CHy AWG, an effort has been made to update the online version of the HOMS Reference Manual, in particular by uploading the French, Spanish and Russian versions. This task was completed and the English, French, Spanish and Russian versions are available in the web page. It should be noted that HOMS web pages are the first set of WMO web pages that are so thoroughly translated to four languages. The incorporation of other WMO languages has led to the revision of the overall structure of the web pages.

3.2.5 At the request of CHy AWG, a system to monitor the utilization of the online version of the HOMS Reference Manual was installed in October 2005. The results obtained to date, even though of preliminary nature, show a steady number of visitors its HOMS website (approximately 300/month).

3.2.6 It is planned to hold a comprehensive updating campaign in early 2007 by requesting, in a proactive manner, new contributions to the HRM. This will be done by contacting previous providers and potential new providers of HOMS components, either by e-mail, by phone, or by personal contact. Then, in March 2007, a circular letter to all Members (PRs and HAs) will announce the updated and refilled HRM online and will encourage a greater use of this facility. The effects of these different measures will be monitored.

3.2.7 Three experts from Africa (Kenya, Ghana and Nigeria) attended short training course, in Canada, on Canadian HOMS components. The course was conducted as training of trainers in order to conduct similar courses at national level. Five National training workshops were supported by WMO and organized by the trainers in Kenya, Ghana and Nigeria.

Guide to Hydrological Practices, Technical Regulation and INFOHYDRO

3.2.8 The CHy-X and CHy-XI recognized the need to up date the Guide to Hydrological Practices. In the past intersessional period, the AWG decided to give priority to this activity. A Review Committee had been established under the chairmanship of Prof. K. Hofius (AWG member responsible for CHy input to internal WMO activities) and composed of experts from India, South Africa, Uganda, Canada and Venezuela for the preparation of the sixth edition of the Guide.

3.2.9 The Commission also decided to assign responsibility to the AWG to make recommendations for amendment to the Technical Regulations (WMO Pub. No.49) if AWG considers that they are of an urgent nature. The 2006 Edition of the Pub. 49 was printed in English and is going to be printed soon in the other five languages.

3.2.10 Following up on the recommendation of CHy-XI, the AWG prepared a proposal for revised INFOHYDRO, based on metadatabase standards and recommended structures. CHy-XII, aware of the difficulties encountered in collecting and updating data in the framework of the previous release of INFOHYDRO, recommended that the new version of INFOHYDRO be further significantly simplified and tasked the AWG to look into this matter. CHy-XII suggested that, once the revised version of INFOHYDRO is ready, the RA WGHs would coordinate the completion of the revised INFOHYDRO in each region and the vice-president with the assistance of the WMO Secretariat would compile a global version.

Water Resources Assessment Activities

3.2.11 WMO continue its efforts on promoting the use of the WMO/UNESCO Handbook on Water Resources Assessment - Review of National Capabilities. The English, French, Spanish and Russian versions are now available in the WMO Home Page on the Internet while China translated the Handbook into Chinese for use by Chinese speaking countries.

3.2.12 To promote the use of the Handbook, WMO has organized a series of regional workshops on the subject. The last workshop was organized in collaboration with UNESCO for Spanish speaking countries of RA IV in Bogotá, Colombia, in February 2006.

3.2.13 The CHy AWG noted WMO's efforts to promote the use of the Handbook by organizing a series of training workshops on its application in the various regions. It also noted the request of several member countries for assistance in organizing similar workshops at the national level. In this regard, it had been recommended that a CD containing an electronic version of the Handbook, workshop materials, and an electronic/interactive set of the tables for undertaking the assessment of capability be developed for use in both applying the manual and holding workshops. The CD was prepared by WMO Secretariat with technical support from CHy and it was distributed to all Members (PRs & HAs) and participants of the workshops.

3.2.14 The first meeting of the CHy AWG noted that the WMO/UNESCO Publication "Water Resources Assessment – Handbook for Review of National Capabilities" was valuable in assisting Members to assess their national capabilities for water resources assessment. However, there was need for a user-friendly manual to provide information on techniques to undertake the actual assessment of the water resources of a country, in terms of location, amount and variability. As much technical material in this field already existed, AWG members recommended that the WMO Secretariat should investigate the availability of such material and consider what would be involved in the preparation of such a manual.

3.2.15 WMO published the Manual on Stream Gauging (WMO n°519 - OHR 13) in the 80s. The Manual was developed to give guidance to countries on the procedure for stream gauging. It proved to be a useful tool to the National Hydrological Services in implementing their field activities. After more than 25 years of experience in using the Manual, it was realized that there is a need to review and update the first version and to produce a revised edition considering the new available technologies in the field.

3.2.16 WMO recruited a consultant to revise the current version of the Manual and include all the new technologies introduced and used in the field. Recently WMO received the first draft of the Manual composed of two volumes, each volume containing different chapters. The draft was circulated to a team of well-known experts for peer review.

WMO Flood Forecasting Initiative

3.2.17 WMO launched in 2003 a Flood Forecasting Initiative with the principal objective of strengthening the cooperation between National Hydrological and Meteorological Services to deliver timely and more accurate products and services required in flood forecasting and warning. The initiative has been implemented through the organization of a number of regional workshops, attended by experts directly involved in the preparation of forecasts, and was concluded by a Synthesis Conference on WMO Flood Initiative held in Geneva in November 2006. The results of the conference will serve as inputs in the review of cooperation mechanisms between NMHSs, and in the promotion of the application of NWP products for flood forecasting. In the preparation for the Synthesis Conference, Seven Regional Workshops were organized in WMO's Regions.

Associate Programme on Flood Management

3.2.18 The Associate Programme on Flood Management (APFM), a joint initiative of the World Meteorological Organization (WMO) and the Global Water Partnership (GWP), was established in order to promote the concept of Integrated Flood Management (IFM) and to show the practical steps for putting IFM concept into practices.

3.2.19 APFM was launched in August 2001 with funding from the Governments of Japan and of the Netherlands. In the framework of the programme's activities nineteen case studies on the existing flood management policies have been completed (three of them in Europe: Italy, Turkey and United Kingdom) and five pilot projects have been implemented (South East Asia, Kenya, Zambia, South America and Central and Eastern Europe). A concept paper on IFM has also been prepared, as well as four documents on legal, ecological, economical and social aspects of IFM.

3.3 COOPERATION WITH OTHER WMO BODIES AND INTERNATIONAL ORGANIZATIONS

3.3.1 The meeting was briefed on the above-mentioned subject.

ISDR

3.3.2 WMO, jointly with ISDR, took the lead in planning the celebrations for World Water Day 2004 on the theme "water and disasters". The emphasis in the awareness campaign was 'be informed and be prepared'. WMO prepared an Information kit and established a website (www.waterday2004.com).

3.3.3 The United Nations General Assembly has proclaimed the period from 2005 to 2015 as the International Decade for Action "Water for Life", starting on World Water Day, 22 March 2005. WMO jointly with ISDR will contribute on the theme of disaster risk reduction.

UNESCO

3.3.4 CHy-XII, in agreement with UNESCO IHP, agreed that in place of the planned sixth UNESCO/WMO International Conference a joint meeting of CHy AWG and IHP Bureau should be held, with a view to contributing to better planning of joint initiatives. It also requested the AWG to investigate the viability of other cooperation mechanisms, such as a joint commission similar to the Joint WMO/IOC Technical Commission on Oceanography and Marine Meteorology (JCOMM).

3.3.5 The "Joint UNESCO/WMO Flood Initiative (JUWFI)" subsequently extended to other UN agencies and renamed "International Flood Initiative" (IFI) was launched during the World Conference on Disaster Reduction in January 2005 by Mr K. Matura, Director General of UNESCO and Mr Michel Jarraud, Secretary General of WMO. The initiative will promote an integrated approach to flood management to maximize the long-term benefits of floods and to minimize the loss of life that result from floods. It will focus on research, training, information networking, promoting good governance and providing technical assistance. CHy-XII suggested that a similar cooperative approach should be adopted for collaboration between the two organizations in the field of water resources assessment.

UN-Water

3.3.6 Following the reorganization of the UN Secretariat the previous ACC Subcommittee on Water Resources has been re-established as UN-Water. UN Water is to act as the coordination mechanism between various United Nations agencies involved in issues related to water and at the same time represent the voice of the United Nations on all water-related issues. WMO strong support and efforts were instrumental in the establishment of UN Water.

WMO Natural Disaster Prevention and Mitigation Programme

3.3.7 WMO has established through Resolution 29 (Cg-XIV) a Natural Disaster Prevention and Mitigation (DPM) Programme to develop an organization-wide coordinating framework to enhance further WMO's contributions to the natural disaster risk reduction activities at the international, regional and national levels. To this end, DPM will work to implement the following goals:

- Promote greater emphasis on proactive strategies for prevention and preparedness
- Ensure that WMO core technical and scientific capabilities, particularly for risk assessment and early warning systems, are integrated optimally in all relevant phases of disaster risk management at the international, regional and national levels
- Promote and enhance the role of National Meteorological and Hydrological Services as a critical component of the national risk reduction platforms, particularly within developing countries

- Raise awareness on the magnitude of cost-benefits from investments in natural disaster prevention, particularly in early warning systems
- Work together with international, regional and national partners and the private sector to build A Safer World.

3.3.8 The Executive Council at its fifty-sixth session also established an Advisory Working Group, chaired by Mr I. Obrusnik (Czech Republic) with the mandate to overview the activities of the Programme.

3.3.9 In the framework of this programme a session on “Integrated flood risk management through appropriate knowledge sharing and capacity building systems” was organized by the Government of Japan, the World Meteorological Organization and the Australian Bureau of Meteorology during the World Conference on Disasters Reduction (Japan, January 2005).

3.3.10 WMO was asked to assist in the conceptual preparation of the Fourth World Water Forum (Mexico, March 2006), particularly in the development of the Thematic Area on Risk Management, a clear recognition of the leading role the Organization is seen as having in this field. A Baseline Document on the subject was prepared and assistance was provided in the organization of thematic sessions both of the virtual forum and of the WWF4 itself.

WMO Information System

3.3.11 WMO has started discussions and consultations among Members in view of the development of the WMO Information System (WIS). The WIS is designed to cover the data needs of all WMO programmes. To govern the process of development of WIS an Inter-Commission Team on WIS has been established; Mr P. Givone has been designated by the president of the Commission for Hydrology to represent CHy in this team. The first meeting was held in January 2005 in Geneva and the second in October 2005 in Boulder, Colorado, USA.

Fourth World Water Forum (4th WWF)

3.3.12 The World Water Forum is an initiative of the World Water Council that has the aim of raising the awareness on water issues all over the world. As the main international event on water, it seeks to enable multi-stakeholder participation and dialogue to influence water policy making at a global level, thus assuring better living standards for people all over the world and a more responsible social behaviour towards water issues in-line with the pursuit of sustainable development.

3.3.13 The 4th World Water Forum was held from 16 to 22 March 2006 in Mexico City, Mexico with the theme ” Local Actions for Global Challenges”. WMO participated actively in the event with high level delegation headed by the Secretary General. WMO provided financial support to thirty participants to attend the forum.

3.3.14 WMO prepared, through an ample consultative process, including holding a virtual forum, the Baseline and Thematic Documents on Risk Management, and convened three sessions on the Importance of Information for IWRM, Flash Floods (both these sessions were chaired by the president of CHy), and Drought Management and co-convened two sessions on Integrated Flood Management and International Collaboration in Flood Management (including IFI). WMO rented a booth for promoting WMO and APFM activities at the water exhibition. The booth was visited by Ministers, Head of Organizations and more than 3000 participants.

4. CONSIDERATION OF ACTIVITIES OF THE SUBGROUPS (Agenda Item 4)

4.1 The Regional Association IV during its session in San José, Costa Rica, in May 2005, established the following Subgroups:

- Subgroup on Training and continuing education:
- Subgroup on Hydrological warning systems:
- Subgroup on Integrated water resources management
- Subgroup on Development of CARIB-HYCOS:
- Subgroup on Transboundary water resources management

4.2 The topics of the subgroups were addressed in separate meetings in San Salvador and their coordinators prepared the work plans (including the procedure for reporting advances) which are attached as appendixes 1 to 5 to this document. The Subgroups are open to all members of the Group.

5. COOPERATION WITH THE HURRICANE COMMITTEE (Agenda item 5)

5.1 The Chairman and the Vice-chairman of the WGH informed the group on their participation in the yearly meetings of the Hurricane Committee. It was suggested that the working group collect Hydrological information on Hurricane and tropical events for the 2006 season and present the information to the Hurricane Committee. The WGH will recommend to the Committee that starting in 2007, NMC's request input from NHS's concerning hydrological events and include them in their reports for the next season.

6. COOPERATION WITH THE COMMISSION FOR HYDROLOGY (Agenda item 6)

6.1 The WMO Secretariat presented information on the CHy work and explained the mechanism for becoming a member of the Open Panels of CHy Experts (OPACHE). The group was informed that its Chairman would be invited to the last session of the Advisory Group that would be held most probably in March 2008.

7. OTHER MATTERS (Agenda item 7)

7.1 The UNESCO representative thanked for the invitation to participate in the meeting of WGH and explained that in the IHP work programme exists a set of topics that have a common aspects with the activities of the WGH. In these topics the possibility of strengthening the working relations should be considered. In relation to this he gave the example of the agreement on the organization of the workshops on the UNESCO/WMO Manual on Water Resources Assessment – Review of National Capabilities and reminded the meeting that the workshop, to be financed by WMO, in the Caribbean region is pending. The representative agreed in transmitting the wishes of the group that the workshop takes place.

8. ADOPTION OF THE REPORT AND CLOSURE OF THE SESSION (Agenda item 8)

8.1 The WGH adopted the report of the session and requested the WMO Secretariat to make any editorial changes deemed necessary. The Group recommended that, after approval by the president of RA IV, the report should be circulated to the members of the WGH and to all Members of RA IV.

8.2 At the closing session, the chairperson, Mr C. Barrett, thanked the participants for their valuable contributions during the session, the WMO Secretariat, and the local organizers for their contribution. The representative of the Secretariat added his own words of thanks to the participants and local organizers for their support during the meeting.

8.3 On behalf of the Government of El Salvador, Eng. D. Lopez expressed its satisfaction with the results of the meeting and wished all the participants a safe return home.

8.4 The meeting was closed on 7 December 2006 at 5 pm.

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RA IV WORKING GROUP ON HYDROLOGY

SUBGROUP ON TRAINING AND CONTINUING EDUCATION

Coordinator: Hebert Rivera (Colombia)

Terms of reference	Proposed activity	Expected outcome	Deadline	Present status
Define and meet regional requirements for training and continuing education	Collate requirements forms from all Spanish-speaking countries and obtain information from the other regions	National requirements identified	March 2007	Forms in Spanish are ready to be sent out
	Collate requirements forms from all English-speaking countries; (Set up a teleconference to decide how to deal with topic)	National requirements identified	May 2007	Forms in English are ready to be sent out
	Process information from questionnaires and prioritize main topics and planification of a workshop (Set up a teleconference to decide how to deal with topic)	Regional requirements prioritized	July 2007	
	Meet regional training needs;	Course or workshop	December 2007 – June 2008	
Help develop distance learning courses and Internet use for training in hydrology and water resources at various levels (hydrologists and hydrological technicians)	Send to the Caribbean and Central American countries the list of websites that provide courses	Circulate list of sites with available courses	March 2007	List of websites with available courses is ready
	Update the list of courses at other regional and university centres; Send out joint mailing	Supplement list	June 2007	

RA IV WORKING GROUP ON HYDROLOGY
Subgroup on Hydrological Warning Systems

Coordinator: Eduardo Planos (Cuba)

Terms of reference	Proposed activity	Expected outcome	Deadline	Present status
Organize hydrological forecasting activities in cooperation with CHy; prepare a report and a workshop on flash flood prediction systems based on global data	Inventory all such initiatives in the region (NOAA-PROHIMET-IRD-Others)	Evaluation report on activities carried out	June 2008	
	Update report on flash flood forecasting systems in use in the region	Detailed country reports	June 2008	
	Hold a capacity-building workshop on hydrological forecasting for countries with systems installed, subject to the availability of funding	Proposal for the updating of systems and facilities	Sept. 2008	
	Disseminate best practices in the region and set up a warning system in Colombia, subject to the availability of funding	Technical report	Nov. 2008	
	Update reports on the use of mathematical hydrological forecasting models in the region	Detailed country reports	June 2008	
Encourage standardization of hydrological forms, in particular the preparation of a report on the various forms in use in the region	Inventory hydrological data formats and protocols used for flash flood forecasting in the region	Detailed country inventories	Dec. 2008	

WORKING GROUP ON HYDROLOGY RA IV
Subgroup on Integrated Water Resources Management

Coordinators: Sadi Laporte (Costa Rica) and Luz Graciela de Calzadilla (Panama)

Terms of reference	Proposed activity	Expected outcome	Deadline	Present status
Promote the practical application of the <i>Manual on Water Resources Assessment</i> in the region's Spanish-speaking countries via four pilot projects (Colombia, Guatemala, El Salvador and Costa Rica* to take part)	Propose a workshop requesting funding from UNESCO-WMO	Funds obtained	March 2007	
	Prepare workshop	Workshop held	April 2007	
	Hold workshop	Training for pilot projects	May 2007	
	Prepare draft reports for each participating country	Information available to assess national water resources	October 2007	
	Prepare final reports for each country	Country reports assessing national water resources	December 2007	
	Compile the final report	Final version on application of the Manual in the four participating countries	March 2008	
	Share experiences with the other countries, with a view to encouraging them to apply the Manual	Assistance to the other Spanish-speaking countries in the region for application of the Manual	April-July 2008	
	Submission of final reports from the other participating countries	Assessment of national water resources in the region's Spanish-speaking countries	December 2008	

Envisage a similar procedure for the English-speaking countries	Apply the Manuel in English speaking countries if there are funds available, with the possibility of having a workshop in 2007	Assessment of national water resources in the English-speaking region	After December 2008	
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- * Further to the workshop to discuss the Manual which took place in Bogotá in February 2006, five countries (Guatemala, El Salvador, Colombia, Venezuela and Dominican Republic) offered to conduct pilot applications. Colombia has started to compile information to fill in the boxes; however, as this is a multidisciplinary undertaking, it has not progressed very far. Guatemala, which has had some experience in applying the previous version of the Manual, must update and validate existing information. None of the other countries in the region has made much progress in applying the Manual.

RA IV WORKING GROUP ON HYDROLOGY
Subgroup on Development of CARIB-HYCOS

Coordinators: Bernard Th  b   (France) and Deisy L  pez (El Salvador)

Terms of reference	Proposed activity	Expected outcome	Deadline	Present status
Update project document.	<ul style="list-style-type: none"> • Request the new project document from the officers in charge of CARIB HYCOS CIC (Haiti, Dominican Republic, Barbados, Trinidad and Tobago, Cuba, Jamaica, Guadeloupe and Martinique) 	Project document updated for CIC	Feb. 2007	
Contribute to CARIB-HYCOS. Follow up recommendations prepared at previous WGH meeting on CARIB-HYCOS development, in particular with regard to input from the various partners appointed at the previous meeting	<ul style="list-style-type: none"> • Send project document to the Caribbean countries to ascertain whether they are interested in joining CARIB HYCOS CIC (RA IV island component), in coordination with the officers in charge of implementing CARIB HYCOS CIC • Study the possibility of implementing a similar project in the COC (RA IV continental component), by sending the present document to countries to ascertain their interest, in coordination with the officers in charge of CARIB HYCOS CIC • The interested countries adapt the project document to Central America, especially Tables 1 and 2, and review activities already included in other projects under way in the region, such as BCIE-Guatemala and PREVDA, with a view to their merger 	<p>List of other Caribbean countries with the possible inclusion of other countries in the first stage of the project</p> <p>List of interested COC participants</p> <p>Project document updated for COC</p> <p>Funding available</p>	<p>March 2007</p> <p>March 2007</p> <p>Sept. 2007</p>	

	<ul style="list-style-type: none"> • Help with identifying donors (COC-CIC) 			
Establish links with other RA IV hydrological activities	<ul style="list-style-type: none"> • Relations with hydrological warning systems • Integrated water resources management • Hurricane Committee • Training and continuing education • Transboundary water resources management 	Establishment of inter-changeable HYCOS functions and future modifications		
Help execute this HYCOS component, bearing in mind the WHYCOS Guidelines for development, implementation and governance	<ul style="list-style-type: none"> • Support the first project phase with the countries mentioned in the note¹, given that funding has become available for some Caribbean countries as a result of efforts by WMO and other bodies • Ensure that a WGH RA IV component is represented at the September CARIB-HYCOS CIC workshop 	Better CARIB-HYCOS integration with other regional initiatives	Sept. 2007	
Prepare a report on the sustainability of the CARIB-HYCOS observation systems	<p>Check with CARIB-HYCOS CIC officers to ascertain whether a similar study was conducted for the island component</p> <p>If this is not the case, check with ECLA regarding the offer made at the Santo Domingo meeting to see if it is still interested in conducting this study for both the CIC and the COC.</p>	<p>Reply from CARIB-HYCOS CIC</p> <p>Reply from ECLA</p>	Feb. 2007	

¹ The first stage, which has already been prepared, will start with the participation of the following countries: Haiti, Dominican Republic, Barbados, Trinidad and Tobago, Cuba, Jamaica and France, with a pledge from Martinique (France). WMO and IRD (France) have signed a draft Agreement.

**RA IV WORKING GROUP ON HYDROLOGY
Subgroup on Transboundary Water Resources Management**

Coordinators: Fanny Cardona (Honduras), Pedro Tax (Guatemala)

Terms of reference	Proposed activity	Expected outcome	Deadline	Present status
<p>Have all countries in the region pool their experience in implementing bilateral and multilateral water resources management projects</p>	<ol style="list-style-type: none"> 1. Obtain information on projects, including regional experiments such as the Lempa River projects 2. Prepare a report describing a transboundary hydrological forecasting system for community protection and water resources management 3. Distribute the report and envisage holding a workshop to disseminate the report 	<p>Information available</p> <p>Report</p> <p>Information disseminated</p>	<p>July 2007</p> <p>December 2007</p> <p>December 2008</p>	
<p>Help disseminate the concept of integrated flood management</p> <p>Show how flood management best practices boost sustainable development in the countries</p>	<p>Have WMO and WGH jointly circulate the questionnaire on flood management</p> <p>Analyse projects in transboundary basins that could be implemented within the framework of the Associate Programme on Flood Management (APFM)</p>	<p>Replies to questionnaire</p> <p>Report on project outcomes and suitability for replication in other basins</p>	<p>June 2007</p> <p>November 2007</p>	