

World Meteorological Organization

XV-RA IV/Doc. 4.3

REGIONAL ASSOCIATION IV (NORTH
AMERICA, CENTRAL AMERICA AND
THE CARIBBEAN)

Submitted by: Secretary-General

Date: 10.II.2009

FIFTEENTH SESSION

Original Language: English

Nassau, Bahamas

Agenda Item: 4.3

24 April to 1 May 2009

Expected Result 3

ENHANCED CAPABILITIES OF MEMBERS TO PROVIDE BETTER HYDROLOGICAL FORECASTS AND ASSESSMENT

Strategic Thrust 1: Science and Technology Development and Implementation

SUMMARY

ISSUES TO BE DISCUSSED:

1. Issues related to Hydrology and Water Resources of interest for RA IV
2. Establishment of a Working Group on Hydrology and Water Resources and its Terms of Reference

ADDITIONAL FINANCIAL IMPLICATION:

None

DECISIONS/ACTIONS REQUIRED:

Approval of the draft text for inclusion in the report of XV-RA IV.

REFERENCES:

1. *Abridged Final Report with Resolutions of the Fifteenth World Meteorological Congress* (WMO-No. 1026)
2. *Abridged Final Report with Resolutions of the Thirteenth World Meteorological Congress* (WMO-No. 902)
3. Approved PINKS and Working Papers for CHy-XIII (November 2008)
4. *Abridged Final Report with Resolutions of the Fourteenth Session of RA IV (2005)* (WMO-No. 987)

CONTENT OF DOCUMENT:**Appendix for inclusion in the final report:**

Draft text for inclusion in the general summary of XV-RA IV

Appendix for information:

XV-RA IV/Rep. 4.3: Progress/Activity Report

DRAFT TEXT FOR INCLUSION IN THE GENERAL SUMMARY OF XV-RA IV

4.3 ENHANCED CAPABILITIES OF MEMBERS TO PROVIDE BETTER HYDROLOGICAL FORECASTS AND ASSESSMENTS (*agenda item 4.3*)

4.3.1 The Association noted that, in general, the needs of Members in the Region were adequately reflected in the activities of WMO in the Hydrology and Water Resources Programme given in the Strategic Plan as approved by Fifteenth Congress. It examined those topics in the Plan which required more emphasis and having considered those of higher interest to countries in Region IV, recommended to take them into account as appropriate in the future work of the Association's bodies in the field of on Hydrology and Water Resources.

4.3.2 The Association noted with appreciation the report of the chairperson of the Working Group on Hydrology (WGH), Mr C. Barrett (USA). It noted the progress made in carrying out activities of particular interest to Members by the coordinators who had been given specific assignments and were supported by other members of the WGH. In particular, it noted with interest that the WGH focused on these prioritized areas and that the results of the activities were reported by the chairman of the WGH. The following coordinators prepared activity reports on:

- (a) Hydrological Warning Systems - Mr Eduardo Planos (Cuba);
- (b) Integrated Water Resources Management - Mr Sadi Laporte (Costa Rica) and Ms Luz Graciela de Calzadilla (Panama);
- (c) Development of CARIB-HYCOS - Ms Ana Deisy Lopez (El Salvador) (On the continental component).

4.3.3 The Association was informed about the outcome of the thirteenth session of the Commission for Hydrology. It took note that the Commission had re-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 hydroclimatological data for variability and trends. The Association noted that one expert of the AWG leading activities associated with the WMO Quality Management Framework - Hydrology is from USA.

4.3.4 The Association noted with concern that very few delegations included experts in the field of water in the RA IV session. Therefore the Association stressed the important role that the Working Group on Hydrology played in the identification of regional needs in relation to the Hydrology and Water Resources Programme and that this should continue through the relevant body of the association.

4.3.5 The Association was pleased to learn that the Guidelines for the Education and Training of Personnel in Meteorology and Operational Hydrology, Volume II: Hydrology (WMO-No. 258) have been published in the five languages approved by Cg-XV and since November 2008 are available on the WMO Website.

World Meteorological Organization

XV-RA IV/Rep. 4.3

**REGIONAL ASSOCIATION IV (NORTH
AMERICA, CENTRAL AMERICA AND
THE CARIBBEAN)**

Submitted by: Secretary-General

Date: 10.II.2009

FIFTEENTH SESSION

Original Language: English

Nassau, Bahamas

Agenda Item: 4.3

24 April to 1 May 2009

Expected Result 3

ENHANCED CAPABILITIES OF MEMBERS TO PROVIDE BETTER HYDROLOGICAL FORECASTS AND ASSESSMENT

Strategic Thrust 1: Science and Technology Development and Implementation

PROGRESS/ACTIVITY REPORT

SUMMARY

Reference: XV-RA IV/Doc. 4.3

CONTENT OF DOCUMENT:

Appendices:

- A. Report on issues of interest for RA IV related to CHy-XIII
- B. Report of the chairman of the Working Group on Hydrology

REPORT ON ISSUES OF INTEREST FOR RA IV RELATED TO CHY-XIII

The thirteenth session of the Commission for Hydrology was held in Geneva from 4-12 November 2008. One hundred and seventeen delegates from 52 countries representing National Hydrological and Meteorological Services along with representatives of 14 International Organizations attended the session. The Commission for Hydrology unanimously re-elected Mr Bruce Stewart (Australia) president and Mr Julius Wellens-Mensah (Ghana) vice-president for the next intersessional period.

Adoption of Quality Management Framework for Hydrology

Collaboration with ISO

The Commission adopted the Quality Management Framework – Hydrology and expressed the desire that its members be periodically updated on the advances made in the relationship with the International Organization of Standardization (ISO) and the development of common standards. The Commission also urged its Members to become engaged with ISO national counterpart agencies for the development of standards of importance to NHSs.

Peer Review Process

With the adoption of a QMF-Hydrology, the publications brought out under the technical guidance of the Commission should undergo a comprehensive peer review before they were recommended for adoption as tools for the QMS. Therefore, the Commission adopted an updated peer review process for these publications.

Mandatory publications

The Commission deliberated on the issue of mandatory publications in light of the WMO QMF and considered it necessary to review this classification, which was made primarily on the basis of funding for the publication and made recommendations accordingly.

Assessment of the Performance of Flow Measurement Equipment

The Commission approved the work programme for the above-mentioned project. The project would encourage and solicit testing by contributing NHSs of the newer instrumentation and methodologies. Test results, including uncertainty analyses, would be disseminated on the project website and would be used to help develop WMO measurement standards for existing and newer technologies and methodologies.

Cooperation between CHy, CBS, CCI and CIMO to implement the WMO Flood Forecasting Initiative (FFI)

The Commission decided to supplement the Strategy and Action Plan on the FFI with a detailed activity plan and to explore the possibility of establishing an Inter-Commission Task Team comprising of representatives of CHy, CBS, CCI and CIMO for the implementation of the FFI.

The Commission also saw merit in closely collaborating with CAgM and CCI to work towards developing tools and best practices guidance for hydrological drought monitoring and prediction.

Assist setting up a HelpDesk for flood management

The Commission decided to assist setting up of a HelpDesk for Integrated Flood Management for the benefit of Members in the areas of flood management policy and strategy, and capacity building in support thereof.

Hydrological information in support of hydrology and climate research

The Commission decided that the Commission shall actively participate in the development of the WMO Initiative to encourage provision and dissemination of climate and hydrological information in support of hydrology and climate research, adaptation to climate change and climate variability and in providing feedback from the water community.

RAs incorporate point of view of WMO by community in development of Strategic Plan

The Commission recommended that views of the WMO hydrological community should be incorporated while developing Strategic Plans for RAs. It encouraged the WMO hydrological community to take every opportunity to provide prioritized proposals and suggestions to the formulation of the Strategic Plan for the period 2012-2015, for example through the deliberations of other WMO bodies such as Regional Working Groups on Hydrology and Water Resources and regional associations.

Progress on WHYCOS

The Commission expressed satisfaction with the significant advances made in the establishment of new and delivering of existing HYCOS projects in the various Regions and the impact on strengthening NHSs capacities. The Commission noted that the approach adopted, that is focusing not only on the strengthening of the networks but on the needs of the basin or the region, combined with the overall capacity development of NHSs, is proving beneficial.

The Commission urged Members to make special efforts to complete the information required in the INFOHYDRO, as only the comparison of a reasonably wide spectrum of responses covering NHSs from all WMO Regions.

Capacity building

The Commission revised the WMO Strategy on Education and Training in Hydrology and Water Resources, and decided that it should guide the activities of the Organization in education and training on hydrology and water resources for the period 2009-2012.

The Commission decides to ask the AWG to develop, by December 2009, a Course of Action, with timelines, for the proposed changes to HOMS.

The Commission requested the AWG to prepare a position paper on distance and blended learning techniques applied to Hydrology and Water Resources that would draw on the experience gained thus far in the HWRP to propose a future course of action in this area;

WIGOS Pilot project in Hydrology

The Commission considered the request of the EC Task Team on Integration of the WMO Observing Systems to undertake the pilot project on "Initiation of Global Network addressing a GCOS requirement". It decided to identify a package of approaches to address this requirement, and directed the AWG to develop components of such a package.

Advisory Working Group and OPACHES

The Commission re-established the existing OPACHES and urged Members to nominate additional experts to OPACHES and to facilitate the voluntary contribution of all members of the OPACHES to the activities of the Commission.

The Commission selected 9 Members to the AWG

Position	Name	Country
President	Mr Bruce Stewart	Australia
Vice-president	Mr Julius Wellens-Mensah	Ghana
Theme		
Water Resources Assessment	Ms Jeanne Balonishnikova	Russian Federation
Hydrological forecasting and prediction	Mr Zhiyu Liu	China
Hydrological forecasting and prediction	Mr Guido Van Langenhove	Namibia
Water, Climate and Risk Management	Ms Ann Calver	UK
Quality Management Framework	Mr Harry Lins	USA
Quality Management Framework	Ms Zsuzsanna Buzás	Hungary
WIGOS and WIS	Mr Antofnio Cardoso	Brazil

REPORT OF THE CHAIRMAN OF THE WORKING GROUP ON HYDROLOGY

The Report includes a review of activities carried out during the period 2005-2008 and a proposal for 2009-2013 and was prepared by the Chairman, Mr Curtis B. Barrett.

Review of activities 2005-08

This report contains information until 24 October 2008 (six months before the opening of the fourteenth session of Regional Association IV). Additional information may be provided orally during the session.

The ninth session of the Working Group for Hydrology was held in San Salvador, El Salvador, from 4 to 7 December 2006. In attendance were the most of the coordinators and co-coordinators of the five Sub-Working Groups. The working group determined priorities for the sub-groups activities for the rest of the regional intersessional period. Those priorities are: (1) Hydrologic Warning Systems (Dr Eduardo Planos Coordinator); (2) Training and Education (Mr Herbert Gonzalo Rivera Coordinator); (3) Integrated Water Resources Management (Mr Sadi Laporte and Ms. Luz Graciela Morales de Calzadilla, Co-coordinators) (Mr Portifiro Machado attended the session in representation of Mr Sadi Laporte); (4) Development of CARIB-HYCOS (Ing. Ana Deisy Lopez Ramos and Mr Bernard Thebe Co-coordinators) (Mr Erik Cadier attended the meeting in representation of Mr Bernard Thebe); and (5) Transboundary Water Resources Management, (Mr Pedro Tax and Ms Fanny Cardona Aguilar, Co-coordinators). These topics reflect the priorities of the WGH.

The Committee established work plans (included in the Report of the meeting-and available upon request) which listed terms of reference, activity description, expected outcome and milestone for accomplishments. All activities were planned to be accomplished by the end of 2008 (six months before XV RA-IV) given the next RA IV meeting would be in early 2009.

The WGH Chair provided the Advisory Working Group of CHy with priorities of RA IV for discussion at the AWG meeting held in March 2008 in Geneva. Although the Chair of RA IV WGH could not attend, we provided the AWG with the following Regional priorities: (1) Integration of Flash Flood warnings with Emergency Responders to produce Standard Operating Procedures; (2) Expansion of RA IV Early warning Flood Warning Systems; and (3) Training.

As of 24 October 2008 reports were received from the Integrated Water Resources Management Sub-Group from chairs Sadi Laporte and Graciela Calzadilla, an Update report from Ana Deisy Ramos on the CARIB HYCOS, and a report from the Hydrologic Warning Systems Group chaired by Dr Eduardo Planos. These reports are included with this summary (see Annexes 1 to 3 of this report). Two of the working groups are inactive. The Chair is working with the RA IV president and with the support of the Secretariat to replace two Coordinators.

In addition to WGH planned activities, there are additional planned activities in RA IV to strengthen warning system capabilities (subgroup 1).

The Central America Flash Flood Guidance (CAFFG) System has provided flash flood guidance for some of the countries during tropical storm rainfall events in 2007 and 2008. In fact this system is a tool for NHS forecasters to issue flash flood warnings. Currently personnel from each of 6 countries are being trained again on operating and maintaining the system. This system is a prototype Flash Flood tool (system) now being implemented in other regions of the world.

The meeting of the English-speaking countries of the Caribbean and Belize and Cuba took place in Havana, Cuba in 2007 for the discussion and analysis of the WMO/UNESCO Publication "Water resources assessment - Handbook for review of National Capabilities.

In 2006 a similar meeting took place in Bogota, Colombia, for Spanish-speaking countries of the Association.

The Carib-Hycos project for the region of the Caribbean is in the implementation stage. A work group integrated by the project Coordinator and two experts, Spanish- and English-speaking, visited the region of the Caribbean to evaluate the necessities of each country and carry out a survey of capacities. A regional meeting was held in Martinique, France, to establish the committee of coordination of this project.

The WMO Secretariat along with NOAA and the RA IV WGH is establishing a project to integrate flash flood warnings generated by NMHSs in Central America with Disaster Management agencies to assure response agencies use warnings to save lives. The goal is to use this project as a demonstration for other developing countries on how to establish an effective end-to-end warning system and Standard Operating Procedures for warnings to receive effective response.

Finally NOAA and WMO completed a training course on hydrologic analysis and forecasting held RA IV in Boulder, Colorado, United States of America, in June 2008. Twenty-eight hydrologists attended this course while over 100 people applied to attend.

Proposals for 2009-2013

In addition to the recommendation on the re-establishment of the working group, I strongly recommend that its session takes place at the beginning or at the end of the intersessional period. As the session of the Association may not be able to make a decision on this issue, I want to ask the delegations of RA IV Members to ask the next Congress to solve this important problem that is preventing the Group to apply all its potential.

I recommend that the RA IV Working Group for Hydrology (under the name of Working Group on Hydrology and Water Resources, which reflects better the present and proposed scope) should continue the next 4 years emphasizing: (1) implementation of Early Flood and Flash Flood Warning Systems; (2) linking Flash Flood and flood warning systems to disaster response planning and Disaster Risk Reduction; (3) continuing our Training and Education activities; and (4) continue Integrated Water Resources Management, including the transboundary management .

In the past 4 years the committee has made some gains in Early Warning Systems, promoting CARIB HYCOS and in establishing Integrated Water Resources Management activities. Gains were limited because of very limited participation by some Sub-Group coordinators. Results can be obtained if proactive, motivated Sub-Group coordinators can be selected.

1. **Establish Early Warning Systems-** Using the inventory of the past 4 years; plan a strategy to encourage countries to establish Flood and Flash Flood systems. For example, in this Region is the prototype (Central America) for the implementation of the Global Flash Flood Guidance System which is a Commission for Hydrology goal. The WGH can promote this in the Region and assist countries such as Mexico in continuing them. The WGH will support the CARIB-HYCOS linked with the implementation of warning systems.
2. **Flood warnings linked to Disaster response planning and Disaster Risk Reduction**

The Working Group on Hydrology is working with both the WMO Hydrology and Water Resources Programme and the Commission for Hydrology and the Disaster Risk Reduction

Committee & programme manager to establish an end-to-end warning system in 3 countries in Central America. The result of this 2-year project will be the establishment of Standard Operating Procedures that assure warnings generated by NMHSs result in evacuations and lives saved as well as damages properly managed,

3. Continuing RA IV Training and Education activities

This committee needs to determine RA IV training & education priorities and plan conferences, workshops & training sessions to fill the gap.

4. Integrated Water Resources Management

The WGH needs to plan an IWRM activity in the Region. IWRM supports the Millennium goals to provide availability & access of water to country populations. WGH will seek partners and a project to link meteorological and hydrological forecasts to water management sectors in countries to improve availability of water supply to the various social and economic sectors of the country. In this way, the WGH will promote the analysis of the transboundary management.

Accomplishing these priority goals means re-establishing the IWRM and training & education sub-groups, choosing not to continue the Transboundary sub-group because this goal will be included in the Integrated Water Resources Management and establishing a new warning and disaster response sub-group.

ANNEX 1

23rd of September 2008

Mr Curt Barrett
Chairman of the WMO's RA IV Working Group on Hydrology

Dear Mr Barrett,

In response to your request, please find attached the report of the Sub-Group on "Integrated Water Resources Management" coordinated by the Eng. Luz Graciela de Calzadilla and by myself.

Truly yours,

Lic. Sadí Laporte M.
Director
C.S.ESTUDIOS BASICOS DE INGENIERÍA
INSTITUTO COSTARRICENSE DE ELECTRICIDAD

cc:
C.S. Estudios Básicos de Ing.

Introduction

Within any programme related to the Assessment of Water Resources, is very important to define the quantity, quality, distribution in time and space, and use of the water resources at the appropriate level. Therefore, the knowledge of the capacity of the countries to carry out these programmes is a first and fundamental step.

In the year 1998, the World Meteorological Organization and UNESCO issued the Spanish version of the Publication "Water Resources Assessment- Handbook for Review of National Capabilities". In this publication a methodology on how to evaluate the Water Resources Assessment activities is presented. Following this methodology the countries are able to obtain results with a certain degree of uniformity, which facilitates comparisons.

From 14 to 18 February 2006, a workshop took place in Bogota, Colombia on the WMO/UNESCO publication. Participants from the following countries attended the workshop: Colombia, Costa Rica, El Salvador, Guatemala, Mexico, Nicaragua, Panama, Dominican Republic and Venezuela. In addition there were also representatives from the World Meteorological Organization and the UNESCO's International Hydrological Programme for Latin America and the Caribbean.

One of the conclusions of the workshop is the preparation of an Appendix to update the Handbook.

After the workshop, the ninth session of the RA IV Working Group on Hydrology, which took place in San Salvador, El Salvador from 4 to 7 de December 2006, included in its agenda as item 4.3 the theme of Integrated Water Resources Assessment, with its fundamental objective: the promotion of the application of the WMO/UNESCO publication related to the evaluation of Water Resources Assessment activities.

The Work Plan of the Sub-group on Integrated Water Resources Management included the search for funds to organize a workshop (in May 2007) to present the results of the application of the handbook in Colombia, Guatemala and El Salvador.

In many opportunities I have requested information to the above-mentioned countries on the progress on the agreement reached in the meeting in Bogota in 2006. No response was given to me. I consider that there are many doubts on how to fill in the tables included in the Handbook and therefore more workshops should be carried out to train more experts in the application of the Handbook. The search for funds should continue and if the funds are not obtained the practical application of the Handbook would be very low.

With respect to Colombia I have been informed by Mr Hebert Rivera that IDEAM has applied the methodology included in the Handbook for Review of National Capabilities and that the methodology was improved though the participation of consulting firms. I have no information on the application of the Handbook in Guatemala and El Salvador. It looks to me convenient to continue with this project during the next intersessional period in order to be informed on the Colombian experience.

ANNEX 2

REPORT OF THE COORDINATOR OF THE SUB-GROUP ON HYDROLOGICAL WARNING SYSTEMS

1. The information obtained in the survey carried out in 2004 was upgraded with the objective of knowing the state of the hydrological warning system and its sustainability. The number of countries that have implemented hydrological warning systems has not greatly varied. 82% of the Spanish-speaking countries have implemented these systems in basins of special importance and they are capable of operating them under a contingency of national emergency. (The next page includes the form used for obtaining the relevant information.)
2. According to the information given by the countries the number of basins that have implemented and have in operation hydrological warning systems it is low in comparison with the quantity of basins that exist in the Region.
3. The sustainability of the hydrological networks and of the National Hydrological Services is a fundamental aspect for the correct operation of the warning systems and, in this sense, the Working Group on Hydrology and the Members have been stressing the importance of strengthening these activities and also the enhancement of the cooperation between National Meteorological Services and National Hydrological Services in the field of hydrological warning (a table on this issue is included below).
4. The Sub-group on Hydrological Warning Systems doesn't have information on the implementation of these kind of systems in the Caribbean Anglophone countries.

WORLD METEOROLOGICAL ORGANIZATION
Weather, Climate and Water
Regional Association IV Working Group on Hydrology
Survey on Models

Person responding to the survey:																	
Position:																	
Institution:																	
Country:																	
Model	Author of the Model	Application environment			Use								Sustainable				
					Forecasting			E C	M A	C A	C P	Institution			yes	No	
		ASp	ASb	Int	C	M	L										

Instructions for filling the table:

1. Add as many rows as necessary
2. **Model:** Name of the most used modes in the country
3. **Author of the model:** Name of the Institution that has developed the model
4. **Application environment:** Indicate if the model is related to ASp (surface water); ASb (groundwater); Int (surface and groundwater)
5. **Use:** Indicate if the model is related to C (Short-term forecasting); M (medium-term forecasting); L (long-term forecasting); EC (discharges studies); MA (water management); CA (water quality); CP (control and protection)
6. **Institution:** Institution responsible for operating the hydrological model
7. **Sustainable:** Indicate when appropriate "Yes" (it is possible updating and maintaining the model); "No" (it is not possible updating and maintaining the model)

WORLD METEOROLOGICAL ORGANIZATION
Weather, Climate and Water
Regional Association IV Working Group on Hydrology
Sustainability of the Hydrological Warning Systems

Item	Maintenance			Renovation			Technologic improvement		Financial resources			National capability		
	<i>D</i>	<i>B</i>	<i>E</i>	<i>D</i>	<i>B</i>	<i>E</i>	<i>NP</i>	<i>P</i>	<i>N</i>	<i>R</i>	<i>I</i>	<i>D</i>	<i>B</i>	<i>E</i>
Conventional Hydrological Networks														
Automatic Hydrological Networks														
Communication systems via radio														
Communication systems via satellite														
Computers and accessories														
Hydrological model														
Training														

Instructions for filling the table:

- 1 Add as many rows as necessary.
- 2 **Maintenance:** Capacity of the responsible institution to maintain the elements of a hydrological warning system in operation satisfactorily (D: deficient; B: Good; E: Excellent)
- 3 **Renovation:** Capacity of the responsible institution to renovate the elements of a hydrological warning system if these elements need to be replaced (D: deficient; B: Good; E: Excellent)
- 4 **Technological improvement:** Capacity built to introduce technological improvements in the hydrological early warning systems when significant technological changes occur in some of the elements (NP: not foreseen in the design of the system; P: foreseen)
- 5 **Financial resources:** Availability of financial resources for maintaining the various elements of the hydrological warning systems (N: national; R: regional; I: international)
- 6 **National capability:** Capacity of the institutions to maintain the various elements of the hydrological warning systems. (D: deficient; B: good; E: excellent)
