

WORLD METEOROLOGICAL ORGANIZATION
WEATHER, CLIMATE AND WATER



**RA IV-CHY EXPERT MEETING ON WATER RESOURCES
ASSESSMENT**

(PANAMA CITY, PANAMA, 5 TO 7 MARCH 2013)

FINAL REPORT

OPENING SESSION

1. At the kind invitation of Empresa de Transmisión Eléctrica S.A. (ETESA), the RA IV-CHy Expert Meeting on Water Resources Assessment (WRA) was held in Panama City from 5 to 7 March 2012.

2. The meeting was opened by Mrs Karla Patricia García, Permanent Representative of Panama with WMO, who highlighted the importance of improving water resources assessment activities in the Region and in Panama in particular, making the present meeting a timely occasion to improve cooperation among RA IV NHSs in this field. Mr Claudio Caponi welcomed the participants on behalf of WMO's Secretary-General, Mr Michel Jarraud.

Objectives

3. The objectives of the Expert Meeting were to:
- Get regional advice on the contents of the Manual on WRA;
 - Promote a focused effort on WRA in the Region;
 - Explore interest in the development of a capacity building mechanism within the Region for assisting Members in their efforts to produce WRAs;
 - Explore interest in implementing a Demonstration Project to develop a regional support capability for conducting WRA;
 - Report its conclusions and recommendations to the forthcoming 16th session of RA IV to be held in April 2013 in Curacao.

Agenda

4. The Agenda of the meeting was adopted by the participants once it had been adjusted to reflect additional contributions offered by participants. A copy of the Agenda is included as Annex I.

Participants

5. Invited experts were drawn from those countries that had demonstrated in the past an interest in the field of water resources assessment. The meeting was co-chaired by Mr Eduardo Planos, Regional Hydrological Adviser of RA IV and Mr Harry Lins, President of the Commission of Hydrology, and was attended by 16 participants from 10 countries, the Regional Coordinator for Latin America and the Caribbean of IHP-UNESCO and three WMO Secretariat representatives. A list of participants is included as Annex II.

CHy ACTIVITIES IN WRA

6. Mr Lins provided an overview of the history of WRA in the work of the Commission for Hydrology (CHy), as well as a review of the specific outcomes of the 14th CHy session held in November 2012. CHy-14 noted the need to continue preparing guidance material that would help NHSs to enter a more modern era of water resources

assessment; one that is more dynamic in nature, reflects advances in real time monitoring and products derived there from, and incorporates the needs of the hydrological community and users of water information, particularly with respect to their regulatory and policy-oriented mission responsibilities, improving the generation of information needed for decision making processes. To this end, the Commission charged the Advisory Working Group to undertake the following five specific activities:

- a) finalize the WRA Manual (surface and groundwater) including assessment of water availability and use;
- b) compile and document guidance on optimization as applied to hydrological networks;
- c) develop approaches for continuous tracking of current water resources availability using appropriate information technology;
- d) review and provide advice on how the Commission can contribute to the topic of water sharing and allocation, including the advantages and disadvantages of approaches and in what conditions/environments they may be more widely useful; and
- e) undertake an investigation of modeling approaches to the characterization and prediction of water availability and use.

The Water Resources Assessment Manual should be more than a water balance assessment; comprehensive in scope, encompassing both water availability and use; dynamic in terms of being updateable at a variety of time and space scales; and built on the existing WRA Technical Report and available procedures and documentation.

7. Mr Caponi, after recalling what the respective roles of Regional Associations and Technical Commissions were in the framework of WMO's organizational structure, briefly reported on the conclusions and recommendations of the Workshop on Development of WRA Methodologies and establishment of an Information System for WRA in RA II, held in October 2012 in Seoul, Korea. This Workshop and the present Expert Meeting were considered by CHy as two important milestones in the determination of the way forward for implementing activities related to WRA in the period 2013-2016 and were considered by participants at the Expert meeting as an innovative and positive way to increase synergies and cooperation between Regional Associations and Technical Commissions.

8. The participants had been asked, prior to the meeting, to review the Technical Report "Technical Material for Water resources Assessment" (WMO N° 1095) as the basis for the preparation of the Manual on Water Resources Assessment, which CHy-14 had agreed to prepare during its next intersessional period (2013-2016).

9. In the ensuing discussion, participants generally welcomed the publication of the Technical Report, as they viewed it as containing much valuable information to assist NHSs in undertaking WRA. However, they agreed that additional work was needed to produce a Manual according to the requirements set by CHy for this category of publication under QMF-H. For instance, while the structure of the report was useful, and

Fig. 2.2 was seen as a useful schematic of the WRA development process, the relative weight given to the explanation of different parts of the process was inconsistent. It was noted that several important steps in the process were missing in the text, such as modeling. Also, too much text was dedicated to data collection, often going into details of procedures which are either familiar to many NHSs or are easily available in other publications, including by WMO. For example, proper references should be made to those publications when dealing with the operation and maintenance of hydrological data gathering equipment. It was also felt that it was going to be very difficult to find the right balance between being general enough to address the needs of an intended global audience, and treating the subject too superficially to make the Manual useless. Some suggested that CHy might consider an alternative approach of issuing several versions of the Manual, each dedicated to a different region, but in the end the view was that a single Manual was preferable, as is the case for every other subject treated by CHy Manuals. Several experts recommended that other organizations, both from within the UN System and from outside, including NGOs, should be involved in the preparation of the Manual.

10. Other more specific comments for the preparation of the Manual were:
 - a) recommendations made in workshops on the use of the UNESCO/WMO Handbook for Review of National Capabilities should be considered for inclusion;
 - b) a link to the decision-making process should be explicitly included;
 - c) water quality issues should be addressed in more depth, including the determination of indicators;
 - d) consideration of suspended sediment and its possible negative impact on the resource should be at least mentioned;
 - e) the section on climate change scenarios, if included, should deal with how to proceed to produce regional scenarios at different time scales and not summarize the background of global IPCC scenarios;
 - f) the use of models should be dealt with in more detail, including links to easily available models and other specific software and tools;
 - g) issues of scale and how to deal with them should be included;
 - h) consideration of the water-energy nexus and of water security should be included;
 - i) the sections on Net Available Resources, Exploitable Water and the chapter on Presentation of Results should be expanded and treated in more detail;
 - j) reference to Figure 9.1 should have some additional text to avoid misunderstanding of the arrows appearing therein;
 - k) additional emphasis should be put on the use of new technologies;
 - l) the role of extreme precipitation events and their possible effect on overestimation of water resources should be mentioned; and
 - m) use of examples to demonstrate practical usage of the formulas.

WRA IN RA IV: EXPERIENCES AND GAPS

WRA in USA (presented by Jared Bales)

11. Water availability is being assessed in the US using a combination of in-situ monitoring, remote sensing, surveys and modeling. In this context, availability means having the right amount of water, of the appropriate quality and at the correct time to

meet human and ecological needs. The goal is to provide a comprehensive view of water supply and water use in near real-time at a basin scale of about 100 km². Streamflow information at about 8,000 locations across the US is being supplemented by estimates of flow at ungauged sites. Ungauged flow estimates are being provided by a combination of statistical and physical models. New approaches are being developed to estimate evapotranspiration (ET). Thermal imagery from LANDSAT can be used to estimate ET at pixel sizes of about 30m, and ET can be estimated from a broad range of crop and vegetation types. MODIS thermal imagery provides daily to sub-daily ET at pixel sizes of 0.5-1.0 km. Combining spatially detailed bi-weekly ET from LANDSAT and daily ET from MODIS is providing new information on irrigation consumptive use. New algorithms also are being developed to better estimate consumptive use of water withdrawn for thermoelectric power plant cooling. All data and models from this effort are freely and readily available on the web. The USGS stands ready to partner with RA IV Members to enhance water resources assessments for the Region.

WRA in Canada (presented by Al Pietroniro)

12. The presentation on Water Resources Assessment in the Canadian context focused on a number of key elements. Governance of water management in Canada was described with the roles and responsibilities of the Meteorological Services and the Water Survey for Canada (WSC) in partnership with the provinces and territories highlighted. The Meteorological Service of Canada has three main functional areas of responsibility regarding water resources. As the main hydrological service provider in the federal government, WSC is responsible for monitoring and data provision for flow and water level information for all of Canada. This function is carried out in partnership with all the provinces and territories in Canada through a co-managed and cost-shared agreement. WSC is also responsible for operational hydrological and hydraulic model development in waters of federal interest. Lastly it was noted that WSC is responsible for managing or advising on water management on transboundary waters and international rivers (both inter-provincial and international) through established boards, acts and treaties. Given the size of the territory and the numbers of lakes and rivers in Canada (some estimates have it between 2.5 and 5 million) it was shown that a hybrid modelling/monitoring approach for water resources assessment is necessary. Example of coupled Numerical Weather and hydrological modelling systems operationalized for the Great-Lakes St. Lawrence region of Canada highlighted successful closure of the monthly water budget in that regions for a lake management study. It was proposed that this type of hybrid approach was necessary in the Canadian context given the sheer magnitude of the land-mass and hydrological features and the relatively small number of monitoring stations. It was argued that satellite-derived information, largely interpreted through land-data assimilations systems, would also provide important information in the Canadian context for water resources assessment. Clearly, some of the developments and tools developed in the Canadian context would likely be appropriate for other regions of the globe and could be made available. Finally, a discussion of tools and indicators developed in Canada for water resources assessment was made. These include the Green-Kenuetm, free-ware platform (developed by Canadian Hydraulics Centre in partnership with Environment Canada), which allows for the visualization of hydrological relevant information and development of important indicators. These indicators include flow and hydro-ecological indicators that are being developed for many hydrometric station locations in Canada.

Ecological Flows (presented by Federico Gomez)

13. The presentation on environmental flow, known in Costa Rica as compensation flow, reported on the effort that the Costa Rican Institute of Electricity has been doing to establish an objective methodology for determining a compensation flow regime that allows moderating the social and ecological effects caused by the development of new hydropower plants in the country. This methodology is based on a hydrological assessment, and demands intensive field work to determine preference-rules for the flow required for both socio-economic activities in the affected area, and life processes in the river and surrounding environment. The final result is a tool that allows proposing a compensation flow regime that ensures the subsistence of human activities and living organisms, that might be affected by a given water abstraction. With this conceptual basis, the methodology can be used to perform similar assessments for other types of disturbances to the natural hydrological regime at specific points or river sections.

WRA in the Caribbean (presented by David Farrell)

14 It was emphasized that a continuous assessment of water resources in the Caribbean was important due to the sensitivity of resources in the region to weather, climate change and climate variability. The presentation highlighted several events in recent years that had significant impacts on water resources at the regional, national and watershed levels. For example, the presentation noted that following Hurricane Tomas in 2010, the water resources of Saint Lucia suffered a significant impact due to partial siltation of the John Compton Reservoir caused by significant landslides along the hill sides surrounding the dam. It was further noted that the drought of 2009 and 2010 in the Caribbean had significant impacts on the water resources of most Caribbean Small Island Developing States (SIDS). The failure to provide formal early warning of the event and the lack of adequate policies and procedures for managing water resources under drought conditions further exacerbated the impacts of the drought.

15. The presentation noted ongoing efforts to improve real-time monitoring of water resources in the Caribbean to support a range of efforts. Included in among these projects was the Carib-HYCOS project. The presentation noted that, due to the proliferation of water resources-related projects in the region, and the lack of coordination between them, significant progress in the area of water resources management was being slowed. The presentation noted that the lack of adequate human and technical resources at the national level was another limiting factor. Finally, the presentation noted the efforts of an ongoing project (the Enhancing Resilience to Reduce Vulnerability project) managed by CIMH to support data fusion and integration to human resources provided an opportunity to identify gaps, enhance decision making in real-time and focus future projects.

Transboundary water resources (presented by Sadí Laporte)

16. An introduction was given to the importance of transboundary basins at the global level and for the countries of RA-IV, which presented the main features and water issues in the Colorado, Grande/Bravo, Usumacinta, Hondo, Lempa, San Juan, Sixaola, Orinoco and Amazon River basins, as well as the basins shared by Haiti and the Dominican Republic. In addition, a list of legal instruments and transboundary basins in Central America was presented.

17. The conclusion was made that the demand for fresh water in transboundary river basins in several Latin American countries approaches and exceeds the annual reserve and that an update of the WRA in those watersheds that require it was needed.

WRA in El Salvador (presented by Celina Mena)

18. During the last decade, El Salvador has made significant progress in assessing the quality and quantity of resources at baseline, with the aim of generating the basic information to guide land-use and risk management planning. To date, the estimation of water availability has been completed, as a key element for the national water balance, which is the basis for the environmental management of the resource. However, the sustainability of monitoring systems requires a high investment in logistical and human resources, which in turn require a high institutional investment.

19. With all the available information, the next step is to advance in the integration of databases to facilitate access to the information by the public, through easily interpretable applications.

WRA in Trinidad and Tobago (presented by Anthony Chadee)

20. The Water Resources Agency (WRA) is a division within the Water and Sewerage Authority (WASA) since 1976 and is accountable through the Chief Executive Officer (CEO) and a Board and then the line minister with responsibility of the Ministry of Environment and Water Resources.

21. The Role and responsibilities of WRA are as follows:

- a) manages all water resources using the Integrated Water Resource Management (IWRM) approach;
- b) water Resources Hydrological Planning, Monitoring and Assessment;
- c) river basin water quality monitoring and alert system (water quality monitoring system, real time);
- d) water resources education and conservation (adopt a river programme);
- e) design and publish National Water Resources Information System;
- f) develop and manage Artificial Recharge projects.

22. Trinidad and Tobago is divided into 14 hydrometric areas with a number of hydrological and water quality stations. The information obtained is used for the management of the country's impounded reservoirs especially during the dry season period (Jan-June) and flood forecasting during the rainy season (Jul-Dec). The Agency also produces an annual data report with a State of Water Resources report every 5 years.

23. Sources of water include:

Surface (rural intakes, springs and impoundment reservoirs): 60%

Groundwater (aquifers): 244 production wells and 241 observation wells: 28%

Desalinated water: 12%

24. Major sources of water include the Caroni River basin, Ortoire River and Hillsborough.

INNOVATIONS IN WRA AND RELATED INFORMATION SYSTEMS

25. Mr Lins made a brief presentation on WaterWatch, an example of a dynamic WRA tool developed by USGS in 1999, and available at <http://waterwatch.usgs.gov/>

26. He explained that this was a product to address the demand for information on the status of water resources in the USA on a real time basis, to complement the periodic WRA reports issued every 10 or 20 years. He added that the data presented in many of the WaterWatch products were provisional, as it typically takes 3 to 6 months to quality assure streamflow data, and that the website includes an appropriate disclaimer in this regard.

27. In the discussion, participants asked about the possibility of transferring the technology supporting WaterWatch and Mr Lins indicated that the USGS would be more than willing to cooperate in this respect. It was mentioned that the US and Canada are currently working on a joint WaterWatch Demonstration project. It was suggested that a regional workshop complemented by appropriate follow-up actions could be envisaged, with the clarification that each NHS could implement a WaterWatch according to its capabilities and available information. It was also mentioned that, as different countries have different policies on data dissemination to the public, initially the emphasis could be placed on national systems, with an incremental move to a regional system starting, for instance, with easily shared parameters, such as runoff ratio.

28. The discussion then moved to more general WRA subjects, such as the needs and requirements for WRA in the Region. In this regard, the issue of uncertain institutional responsibilities in some countries was raised. This problem was present even in the most advanced countries, especially when dealing with water use data, but the point was made that even if this constituted a challenge, it should not be an excuse for not trying to face such a challenge. In the case of the Caribbean, several Island States had undertaken some sort of WRA in the past, but usually these had not been comprehensive, dealing only with a component of the water balance. Some obvious advances in the promotion of regional cooperation have been achieved by projects such as Carib-HYCOS, however it should be mentioned that, in several cases, the technologies proposed by this kind of projects were not compatible, placing an additional burden on the recipient countries. It was suggested that this issue as well as the lack of sustainability of the HYCOS component projects be considered by WIAG at its next meeting. In addition, the fact that in the Caribbean it was usual to have several agencies collecting data, led to propose the need of establishing an inventory of such agencies followed by a data homogenization process. In the case of Cuba, although WRA had been undertaken twice in the past and regular update bulletin were being issued regularly, accessing new technology was a serious challenge. The disconnect between NMSs and NHSs was mentioned as an additional challenge for several countries. In El Salvador, the institutional situation was favorable, with the NMS and the NHS under the same Ministry (Environment) and a Water Law currently under discussion which would require a considerable amount of water resources information. However, the limited expertise in the use of GIS, the integration of databases and the improvement of the

technical staff to maintain automatic stations, were the main challenges. In Panama the prediction of seasonal flows and low flows needed to be improved and automatized, as well as the use of various models. Trinidad and Tobago faced problems with the integration of different brands of software and equipment needed for WRA. In addition the need of updating the “Envolvente Regional de Caudales Máximos” was mentioned. This is consistent with recommendations made at CHy-14.

PROPOSED FUTURE ACTIVITIES IN WRA IN RA IV AND COOPERATION WITH CHy

29. After an interesting and prolonged debate, participants agreed that future activities in WRA in the Region, to be undertaken when possible in cooperation with CHy, should be addressing the following issues:

- Evaluation of existing networks from the perspective of their adequacy for conducting WRAs;
- Increase in the availability of technical documents and training material;
- Guidance on how to strengthen the linkage between WRA and the decision-making process;
- Capacity Building in WRA, for example, implementation of a WaterWatch-type of system, update of the UNESCO/WMO Handbook, and the Distance Learning Course on Basic Hydrological Sciences in Spanish, currently under preparation by the RTC of Costa Rica on the basis of the WMO/COMET/NWS courses. The distance learning course was considered of fundamental importance for most countries in the region. CIMH was asked to make a similar effort to offer the English version of the course;
- Improvement in the capabilities to address properly water quality and sediment aspects of WRA; and
- Promotion of an improved integration and collaboration of NMS and NHS in countries of the Region.

THE SITUATION OF HYDROLOGY IN RA IV

30. Mr Planos presented a brief presentation highlighting several events in recent years that had significant impacts on water resources at the regional and national levels. The participants commented on the lessons learned regarding the approach taken by the Regional Association with respect to hydrological activities during its last intersessional period. While recognizing that the original purpose of improving the effectiveness of the traditional approach of creating a Working Group was a valid one, it was felt that the results had not been satisfactory and an alternative approach for the next four years was proposed, as described in Annex III.

COLLABORATION BETWEEN WMO AND IHP-UNESCO

31. IHP is developing its Seventh Phase through several programmes and working groups involving the LAC Member States, that will continue in its Eighth Phase starting in 2014 "Water security: responding to local, regional and global challenges". Several of these initiatives could be implemented at the regional level jointly with WMO strengthening existing cooperation, and benefiting from the available capacities in the Member States. Global initiatives such as FRIEND, the International Flood Initiative (IFI), Eco-hydrology (environmental flows), International Sediment Initiative (ISI), could benefit

at the regional level from the synergies between UNESCO and WMO. Other regional programmes could be also incorporated in this collaboration effort, such as the New Generation of Water Balances and the Urban Waters Management Programme. Moreover, capacity building activities in areas of common interest could be also promoted. It is expected that this collaboration will be further expanded at the global level.

ADOPTION OF THE REPORT

32. After discussing the English version of the report, projected on screen and reviewed paragraph by paragraph, the meeting adopted it unanimously, with the understanding that the Spanish version would be distributed as soon as it will be prepared by the Secretariat, and that it could be revised, should the participants consider that it does not represent a faithful translation of the agreed English version.

CLOSURE OF THE SESSION

33. The RA IV-CHy Expert Meeting on Water Resources Assessment (WRA) closed at 13H14 on 7 March 2013.



RA IV-CHY EXPERT MEETING ON WATER RESOURCES ASSESSMENT (PANAMA CITY, REPUBLIC OF PANAMA, 5 TO 7 MARCH 2013)

AGENDA

TUESDAY 5 MARCH (Chair: Eduardo Planos)

08:00 – 09:00 Registration of participants

Morning session

09:00 – 09:30 Opening session

- Opening ceremony
- Approval of the Agenda
- Organization of the Work

Introduction: General overview

09:30 Outcomes/results of CHy-14 regarding WRA (Harry Lins)

10:00 Coffee break

10:30 Review of the results of the RA-II workshop on WRA (Claudio Caponi)

11:00 Discussion of the WMO N° 1095 “Technical Material for Water Resources Assessment” (participants are requested to read it in advance)

12:30 – 02:00 Lunch

Afternoon session

Water Resources Assessment. RA IV Experiences and Gaps (countries presentations)
Proposed presentations and suggested presenters:

- 02:00 WRA in Central America (Celina Mena, El Salvador)
- 02:30 WRA in USA (TBD)

03:00 Coffee break

- 03:30 WRA in Canadá (Al Pietroniro)
- 04:00 WRA in the Caribbean Islands (CIMH)
- 04.30 Ecological Flows (Federico Gómez, Costa Rica).
- 05:00 Transboundary water resources, (Sadí Laporte, Costa Rica)

05:30 Announcements

07:00 Welcome Dinner

WEDNESDAY 6 MARCH

Morning session

08:30 Innovations in Water Resources Assessment and related Information System
(Chair: Harry Lins)

Short presentation by Harry Lins followed by group discussion. Suggested topics of discussion:

- Needs and Requirements for Water Resources Assessment
- Approaches and Methodologies for Dynamic Water Resources Assessment

10:00 Coffee break

10:30 Group discussion continues

- Current WRA practices and available guidance materials, including the CHy draft Manual on Water Resources Assessment
- Data and information requirements for Water Resources Assessment

12:30 – 02:00 pm Lunch

Afternoon session

02:00 Proposed future activities in WRA in RA IV (Chair: Eduardo Planos)

Group discussion. Suggested topics:

- Working toward a continuous monitoring activity and necessary data to produce water resources assessment at varying levels of sophistication
- Getting the most from the data we have. How to adapt WRA to the existing data

03:00 Coffee break

03:30 Group discussion continues

- Development of a capacity building mechanism within the Region for assisting members in their efforts to produce WRAs
- Proposal of a Demonstration Project to develop a regional support capability for conducting WRA.

04:30 Announcements

06:00 Bus available for dinner at Causeway Amador (for those who wish)

THURSDAY 7 MARCH

Morning session (Co-Chairs: Eduardo Planos and Harry Lins)

08:30 Areas of cooperation between a WGH-RAIV and CHy

10:00 Coffee break

Continues the morning session

10:30 Adoption of the meeting report and recommendations on WRA

12:30 – 02:00 pm Lunch

Afternoon session (Chair: Eduardo Planos)

02:00 RA IV Priorities in Hydrology

03:00 Gaps, obstacles and priorities. Hydrological Adviser's Report

04:00 Collaboration between WMO and IHP-UNESCO

04:30 Closing Session

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WMO RA-IV HYDROLOGY FORUM AND THE REGIONAL WORKING GROUP ON HYDROLOGY

At its sixteenth session in May 2011, the WMO Congress (Cg-XVI) emphasized the benefits to be derived from Regional Working Groups on Hydrology as they provide a platform for hydrologists within a Region to discuss matters of common concern. At its 64th Session in June 2012, the WMO Executive Council (EC-64) noted with satisfaction efforts made to solicit views from presidents of regional associations, presidents of other technical commissions and chairpersons of Regional Working Groups on Hydrology in developing the draft work plan of the Commission for Hydrology. The recognition by Congress and Executive Council of the importance of the Regional Working Groups (RWGs) on Hydrology reinforces the case consistently made by the Commission for Hydrology that the RWGs are a critical link in its ability to coordinate and integrate its activities with those of the Regional Associations.

Currently, RA IV is the only WMO Regional Association that does not have a Working Group on Hydrology or any other formal mechanism for facilitating interactions among the hydrological services and organizations. The lack of any such mechanism severely limits the ability of CHy to engage with the hydrological community within RA IV, as well as for the RA to influence the program of work and activities of CHy. Accordingly, at an RA IV-CHy Expert Meeting on Water Resources Assessment held in Panama City, Panama in March 2013, the assembled experts expressed their desire that a request be made at the Sixteenth Session of Regional Association IV (RA IV-16) in Curacao in April 2013 to re-establish the Regional Working Group on Hydrology, and to initiate a mechanism for the exchange of scientific and technical expertise, in support to the implementation of the WMO Hydrology and Water Resources Programme in the region.

Terms of Reference of the Regional Hydrology Forum

To provide a platform where all the issues and challenges related to the operation of hydrological networks and services can be discussed among interested professionals and other stakeholders, a proposal is made to establish a Regional Hydrology Forum, under the auspices of the RA-IV Working Group on Hydrology (WGH), and for members of WMO RA IV, with the following Terms of Reference:

1. To develop a common strategy within RA IV for the sustainability, design and harmonization of regional hydrological monitoring and data networks and other hydrological services;
2. To act as a platform for capacity building, exchanging good practices and technical solutions and promote approaches that will improve the cost-efficiency of hydrological services;
3. To strengthen networking among RA IV NHSs in the field of hydrology including through joint projects and activities;
4. To promote and facilitate the cross-border exchange of hydrological information and practices in the spirit of WMO Res. 25 (Cg-13);
5. To facilitate development of coordinated positions on improving hydrological services in support of social, economic and environmental needs, such as energy, security, health, water management and climate adaptation in consideration of relevant WMO programmes;

6. To provide advice to the Working Group on Hydrology in identifying possible contributions of RA IV NHSs to WMO programs, in particular the Hydrology and Water Resources Programme, including synergies with CHy activities;
7. To develop proposals on hydrological contributions to global, regional and national water and climate activities (WMO Integrated Global Observation System (WIGOS), WMO Information System (WIS), Global Framework for Climate Services (GFCS), Regional Climate Centres (RCCs), Regional Climate Outlook Forums (RCOFs), Climate Watches) and provide inputs in the development of the GFCS User Interface concept.

The RA IV Hydrology Forum is an informal entity, but will be strongly linked with the work of the RA IV WGH, as well as with broader issues in regional operational hydrology. The Hydrology Forum will operate through a series of virtual meetings or events, as well as through an e-forum and related consultation among the WMO Secretariat, CHy, RA IV WGH and NHSs.

The RA IV Hydrology Forum is targeted primarily at the NHSs of the region, with the aim of improving communication within the water and related sectors on national and regional scales. As necessary or appropriate, other experts and groups can be invited to participate.
