

World Meteorological Organization

FIFTEENTH CONGRESS

GENEVA, 2007



Cg-XV/Rep. 3.5

Submitted by:

Secretary-General

Date:

5.II.2007

Original Language:

English

Agenda item:

3.5

HYDROLOGY AND WATER RESOURCES PROGRAMME (HWRP)

PROGRESS/ACTIVITY REPORT

SUMMARY

References:

1. Cg-XV/Doc. 3.5
2. *Abridged Final Report with Resolutions of the Fifty-sixth Session of the Executive Council (WMO-No. 977)*

CONTENT OF DOCUMENT:

Appendix:

- Progress/Activity Report

PROGRESS/ACTIVITY REPORT

Hydrology and Water Resources Programme

Activities of CHy

1. The adoption of weather, climate and water as the sub-title for WMO has placed significant responsibility on the Commission for Hydrology. To meet this challenge, additional efforts are required in order to focus activities on meeting the needs of the water communities within countries and provide them with hydrological solutions. Typically, the water sector within the various countries is organized under many different sectors and institutions, and it is important that the outputs of the HWRP address their differing concerns and provide them with relevant solutions. This places extra responsibilities on the Permanent Representatives to be able to get the support of a Hydrological Adviser who could coordinate with the various national entities engaged in the water sector. The products, outputs and publications of the Programme should reach all users of the hydrological services. CHy-XII had also looked into this issue and had recommended that Members review the membership of their country in CHy in line with this perspective.

2. CHy-XII, held in Geneva in November 2004, re-organized its structure by eliminating two sub-groups and establishing only the Advisory Working Group with nine members including the president and the vice-president. However, to encourage wider participation of experts, it established Open Panels of CHy Experts (OPACHEs) in the following five areas of activities: Basic Systems (Hydrometry and Hydraulics), Water Resources Assessment and Water Use, Hydrological Forecasting and Prediction, Disaster Mitigation – Floods and Droughts (hydrological aspects) and Analysis of Hydro-climatological data for variability and trends.

3. The president of CHy chairs the AWG, and represents the Commission directly or through selected representatives in various bodies within WMO and outside the Organization. The update of the *Guide to Hydrological Practices* is also under his responsibility. The vice-president of CHy assists the president of the Commission and is responsible for the coordination of regional activities and the review and update of INFOHYDRO.

4. Five members of the AWG have under their responsibility the activities of one of the areas with the support of the respective OPACHE. Of the two remaining members, one is responsible for activities associated with WHYCOS and international data access and exchange, while the other deals with capacity building and technology transfer including the coordination of the preparation of Technical Regulations.

5. As part of its activities, CHy undertook a review of the Data Rescue activities undertaken in Hydrology in the Member countries with a view to assess the gaps and needs to ensure that valuable hydrological data collected are not lost. Members have been requested to provide information on the status of data storage and archiving practices and needs.

6. During the last intersessional period, a significant effort was made to make CHy fully assume its role of leader of the HWRP, as mandated by 6LTP. As a consequence, the details of the activities of the Commission are reported under the programme headings.

Panel of Experts on Fresh Water

7. Congress, through its Resolution 18 (Cg-XIV), had requested Secretary-General to explore the possibility of setting up a Panel of Experts on Fresh Water in collaboration with the other UN organizations and international agencies working in water issues. Based on the report submitted by the Secretary-General, the existence of the UN-Water mechanism, the discouraging response of the other agencies and the limited resources available to the programme, EC-LVI saw

little merit in continuing with the proposal and as such the issue was not pursued further. It is therefore recommended that Resolution 18 (Cg-XIV) be discontinued.

Regional Activities

8. Regional Associations I, II, IV, V and VI have re-established their Working Groups on Hydrology, while at its session in September 2006, RA III established its Working Group on Hydrology and Water Resources. All Working Groups had met at least once during the intersessional period. The Working Groups had each recommended that meetings should be convened more than once during the intersessional period. The WGHs of RA I and RA III had met two times during the reporting period.

9. During the intersessional period most of the Regional Working Groups in Hydrology have decided to work towards concrete projects, instead of continuing to compile reports. However, due to reduced financial support these regional activities have not progressed well. CHy-XII expressed its concerns at the decline in support to the regional activities of the WGHs during the last intersessional period. During the intersessional period, the AWG has actively sought to align the activities of the Working Groups with those of the Commission with the aim to increase the support available for these activities.

Publications

10. CHy-XII, while discussing the publication of the sixth edition of the *Guide to Hydrological Practices*, had recommended that widest distribution and availability should be ensured, including by making it available on the Internet.

11. A number of publications were completed under the Programme. One Operational Hydrology Report: *Guidelines on the Role, Operation and Management of National Hydrological Services*, and one Technical Report on *Intercomparison of Forecast Models for Streamflow Routing in Large River*. Proceedings of the international workshop on "Management and Governance of Groundwater in Arid and Semi-arid Countries" was jointly published with IAEA. Five publications on Integrated Flood Management were published under the APFM (see paragraph 39 below) and widely distributed. These are also available on www.apfm.info. In addition information material on WHYCOS in the form of "WHYCOS Guidelines" for the development, management and governance of HYCOS projects; on water-related disasters, "Be informed and be prepared" on the occasion of World Water Day 2004; on IWRM and Floods "Making Integrated Management of Floods part of the Development Agenda" were also published.

Technical cooperation and VCP

12. A number of requests under VCP had been received for supporting NHSs. However, only two data rescue projects, in Egypt and Nigeria, could be supported through the VCP funds.

13. WMO, in response to a request from the Nigerian Ministry of Water Resources, is making an assessment of the NHS: the status of its hydrological network, database and services, including an assessment of the maintenance and calibration capacity for the hydrological measuring instruments in the country, to ensure quality assurance in hydrologic measurements. A national team of experts assisted by WMO prepared a detailed status report.

14. WMO assisted the Kenyan Ministry of Water and Irrigation in developing a Flood Management Strategy in the Lake Victoria basin as a pilot project under the WMO-GWP Associated Programme on Flood Management (APFM). The Flood Management Strategy prepared in collaboration with Kenyan experts and in consultation with various national stakeholders, Ministries, and Departments has been adopted by the Government to ensure

sustainability of development in the flood prone areas in the Lake Victoria Basin. WMO in collaboration with the World Bank (WB) and Japan International Cooperation Agency (JICA) is now assisting the Kenya Government to implement the recommendations and proposed activities envisaged within the Strategy.

15. WMO is implementing another pilot project under the APFM in Zambia, where a strategy for flood management in the Kafue Basin, a sub-basin of the inter-state River Zambezi, is being developed based on the Integrated Flood Management (IFM) approach. The strategy integrates land and water resources development in the river basin, with a view to maximize the efficient use of floodplains whilst minimizing loss of lives.

16. The Comisión Nacional de Agua (CONAGUA) of Mexico signed a new agreement with WMO in September 2005, under the framework of which it is now requesting the assistance of the Organization to implement a Project to strengthen IWRM in Mexico. This new project, called PREMIA, and financed entirely by Mexican fiscal funds, will implement recommendations of the previous, successful WMO-World Bank-CONAGUA project, PROMMA, which was concluded in 2005. Experts from CHy and staff of the HWRD have participated actively in the implementation of both these projects.

Basic Systems in Hydrology

Water Resources Assessment

17. WMO continued its efforts in promoting the use of the WMO/UNESCO Handbook on Water Resources Assessment - Review of National Capabilities. Apart from the English, French, Spanish and Russian versions, now available in the WMO Home Page, the handbook has also been translated into Chinese. To promote the use of the handbook, WMO has organized a series of regional workshops on the subject in all WMO's Regions. The last three workshops were organized in collaboration with AGRHYMET for French-speaking countries of west and central Africa in Niamey, Niger in November 2005 and with UNESCO for Spanish-speaking countries of RA IV in Bogotá, Colombia in February 2006 and for English-speaking countries of RA IV in 2007.

18. CHy had decided to prepare a user-friendly manual to provide information on techniques to undertake the actual assessment of water resources of a country, in terms of location, amount and variability. To decide the scope of the manual, WMO, in cooperation with UNESCO organized an expert meeting in Geneva, in September 2005. Experts are providing their contribution and the final version is expected to be published in 2008.

Quality Management Framework

19. Major activities in QMF as adopted by CHy are the update and revision of publications such as the *Technical Regulations* and the *Guide to Hydrological Practices*, complemented by the update and preparation of *Manuals on Stream Gauging, Flood Forecasting and Warning, Water Resources Assessment, Design Flood Estimation* and on *Low-flow Estimation and Prediction*.

20. The new edition of Volume III - Hydrology of the WMO's Technical Regulations incorporating all the changes that were approved by Congress and EC, was published in English in 2006.

21. The Commission established a Review Committee under the chairmanship of Prof. K. Hofius (Germany) and composed of experts from India, South Africa, Uganda, Canada and Venezuela to provide guidance to update the fifth edition of the *Guide to Hydrological Practices* 1994 (WMO-No. 168). The sixth edition would consist of two volumes (Volume 1: Hydrology- From Measurement to Hydrological Information; Volume 2: Management of Water Resources and the

Application of Hydrological Practices). Each chapter has been revised/updated by lead author/co-authors and peer reviewed under the overall guidance of the members of the Review Committee. The final draft is currently under editing process and it is expected that at the end of 2007 the new edition of the *Guide* will be published. As per the decision of CHy and Cg-XII the sixth edition of the *Guide* would be a living document and made available in electronic form on the Internet and on CD.

22. Recognizing the prevalent new technologies in stream gauging, the *Manual on Stream Gauging* (WMO-No. 519 - OHR 13), published in 1980, is being revised after more than 25 years. The draft of the revised version of the *Manual*, composed of two volumes, is presently under a peer review process.

23. The need to update the *Manual on Probable Maximum Precipitation* was recognized by CHy-XI. After the designated CHy expert prepared the first draft, a meeting of reviewers with the author was held in Burlington, Canada, in October 2004. Because of linguistic aspects it was decided to prepare a further version edited in English before sending it back to the reviewers in early 2006.

24. An expert of the relevant OPACHE has submitted a first draft of the *Manual on Low Flow Estimation and Prediction* in early 2007. The review process will follow.

25. The first meeting to develop the scope of a *Manual on Flood Forecasting and Warning* was held in January 2005. Some chapters have already been prepared. The progress on the preparation of the *Manual* is being closely watched. Similarly, due to some logistical problems, such as the resignation of the AWG member responsible for this activity, the preparation of the *Manual on Design Flow Estimation* has suffered some delay. The president of CHy and the Secretariat are currently taking the necessary measures to finalize this project in the scheduled time.

26. CHy-XII had identified an activity "to develop a proposal and implement a project to assess the performance of flow measurement instruments and techniques against WMO standards" in the theme area "Basic systems (hydrometry and hydraulics)". The proposal aims to address the absence of standards and guidance material for uncertainty analysis in relation to recent advances in flow measurement instruments and techniques such as acoustic Doppler current profilers (ADCPs), point acoustic velocity meters, surface-velocity radar, and large-scale particle image velocimetry (LSPIV). The proposal has been widely distributed and has received the support of several organizations, including the International Association of Hydraulic Engineering and Research (IAHR), the International Association of Hydrological Sciences (IAHS), the International Organization for Standardization (ISO), the Association of Hydro-Meteorological Equipment Industry (HMEI) and various NHSs.

27. Following up on the recommendation of CHy-XI, a revised format for INFOHYDRO based on meta database standards and internationally recommended structures was developed. CHy-XII, aware of the difficulties encountered in collecting and updating data in the framework of the previous release of INFOHYDRO, assigned the vice-president of CHy to further simplify the new version of INFOHYDRO with the assistance of the WMO Secretariat. The simplified version was put to trial in a few countries and was extremely satisfactory. The INFOHYDRO input form has now been sent to all NHSs for providing the information. The responses received are being used to continuously update the database that is now available on the WMO Website.

WHYCOS

28. As requested by Cg-XIV, a comprehensive report on "WHYCOS and the status of the HYCOS components" had been prepared and submitted to EC-LVII. Recognizing that the concept

of WHYCOS had considerably evolved over the years, CHy-XII recommended a greater focus on regional and national operational objectives in order to provide impetus for HYCOS project development, implementation and sustainability. The report, prepared in consultation with the WHYCOS International Advisory Group (WIAG) and with inputs from CHy, reviewed the approach to the concept, current status of implementation of the programme including the regional components: their success and pitfalls, the issues of data exchange and standardization, and their long-term sustainability. EC was satisfied with the progress of activities under the programme.

29. CHy-XII had also recommended preparing adequate information material to disseminate the evolving concept of WHYCOS to all its partners and stakeholders. As a consequence, guidelines on the development, implementation and governance of HYCOS components were prepared, published in English, French and Spanish and disseminated to various partners. A special web page for the WHYCOS www.whycos.org was developed and launched in January 2006.

30. Working together with the Niger Basin Authority, the Volta Basin Authority, the Mekong River Commission and SOPAC, financial resources for the implementation of five of the HYCOS components were secured. In RA I, SADC-HYCOS Phase II with financial support from EC and the Netherlands, Niger-HYCOS and Volta-HYCOS with financial support from the Government of France and the African Water Facility, are under implementation with a total participation of 24 countries. Mekong-HYCOS in RA II, with financial support from France, involves four countries. Pacific-HYCOS being implemented in partnership with SOPAC and with financial support from the EU will help build capacities in 14 island countries in the region.

31. As regards other HYCOS projects under advanced development, the status is as follows:

- A preparatory workshop for Carib-HYCOS (CIC) was jointly organized by the Research Institute for Development (IRD) of France and WMO and hosted by the authorities of Martinique (Regional Council) in Fort de France, Martinique in December 2004. Experts from countries discussed the draft project document and the proposed budget with potential donors. Thus far no definitive confirmation of funding has been received from donors;
- Within WMO efforts to get financial support for HYCOS projects, WMO circulated the second call from the EU-ACP Water Facility for submission of financial proposals for projects to all countries and regional institutions involved in potential HYCOS components in the Africa, Caribbean and Pacific (ACP) region, urging them to make use of the facility and apply for funding. The IGAD Secretariat with assistance from the WMO Secretariat applied for the funding for the IGAD-HYCOS. The project has passed the first evaluation and the full application form is currently under in-depth evaluation;
- The existing project proposal for Aral-HYCOS was revised in collaboration with the Executive Committee of the International Fund for the Aral Sea (EC IFAS) and the NMHSs of the Aral Sea basin states to take into account the implementation of related hydrological projects in the basin. The project document was endorsed by the five Aral Sea basin states in the regional consultation meeting held in Almaty, Kazakhstan, in December 2006;
- Based on three regional meetings organized jointly by the International Centre for Integrated Mountain Development (ICIMOD) and WMO, and funded by USAID/OFDA, the project document for HKH-HYCOS was endorsed by representatives of NMHSs and government officials of the six countries in Thimpu, Bhutan in May 2005. The feasibility of the regional flood information system in the HKH-region was successfully demonstrated in a pilot project during the flood season of 2005;

- The draft project proposal for ARCTIC-HYCOS has been developed in cooperation with the NHSs of the Russian Federation, Norway and Iceland and forms the core component of the Arctic Hydrological Cycle Monitoring, Modelling and Assessment Programme (ARCTIC-HYDRA) that is an approved project to be undertaken in the International Polar Year (IPY).
- 32. Other HYCOS components under development are Lake Chad-HYCOS, Senegal River-HYCOS and Congo-HYCOS, where certain financial partners have indicated their interest.
- 33. Technical and financial partners showed their keen interest in the new approach to the activities of WHYCOS as evident from their participation in the seventh meeting of the WIAG held in February 2006, which was preceded by a two days Technical Conference. Fifty experts, representing HYCOS projects, basin organizations, space agencies, universities and research institutes, development banks and other donors, attended the technical conference and the meeting.

Forecasting and Applications in Hydrology

Flood Forecasting Initiative

- 34. The principal objective of the Flood Forecasting Initiative has been to strengthen the cooperation between National Hydrological and Meteorological Services to deliver timely and more accurate products and services required in flood forecasting and warning.
- 35. A series of eight regional workshops were organized in Pretoria, Republic of South Africa (November 2003); Nairobi, Kenya (August 2004); Valencia, Spain (April 2004, for Ibero-American countries); Bangkok, Thailand (December 2005); Bratislava, Slovakia (December 2005); Niamey, Niger (April 2006); Zaragoza, Spain (September 2006, for Mediterranean countries) and altogether an approximately equal number of meteorologists and hydrologists from NMHSs of 86 countries participated in these regional workshops. The aim of the regional workshops was to discuss problems, identify major gaps that should be addressed and suggest solutions for issues related to strengthening flood forecasting capabilities at national and regional level. Outputs from the meetings have been the identification of opportunities and challenges in the development and use of forecasting tools available today; the use of meteorological and climatological forecasting methods including now-casting for flood forecasting; and the definition of an outreach. Another major and spontaneous output has been the establishment of the Ibero-American network for the monitoring and forecasting of hydrometeorological phenomena (PROHIMET), created on the initiative of some participants of the Valencia workshop, with core funding from CYTED (Ibero-American Programme of Science and Technology for Development). See Website at <http://hercules.cedex.es/hidraulica/PROHIMET/>
- 36. Realizing that in many parts of the world flash floods are a major cause for the loss of lives, a series of activities were conducted to address this issue as part of the Flood Forecasting Initiative. In particular, two regional workshops were co-sponsored by WMO and held in Tsukuba, Japan in February 2005 and in Lhasa, China in November 2005. An International Workshop on Flash Flood Forecasting was jointly organized by WMO and NOAA along with USAID and the Department of Environment of the Government of Canada in San José, Costa Rica in March 2006. More than 100 participants from 48 countries participated in the workshop.
- 37. These events provided a perfect input to the Synthesis Conference organized in November 2006 in Geneva to establish and agree on a strategy and action plan to improve national and regional capacities for flood forecasting. The “Strategy and Action Plan for the Enhancement of Cooperation between National Meteorological and Hydrological Services for

Improved Flood Forecasting” prepared by the Synthesis Conference, is included in the CD-ROM of background documents, and an Executive Summary is contained in the Annex to Appendix C (Res. 3.5/2 (Cg-XV)).

Integrated Flood Management

38. The Associated Programme on Flood Management (APFM) is a joint initiative of WMO and the Global Water Partnership, supported by the Governments of Japan and the Netherlands since 2001. Its main objective is to develop and promote the concept of Integrated Flood Management (IFM) as a development policy concept. The concept aims at maximizing the net benefits from flood plains while minimizing losses of life from flooding.

39. The concept has been formulated in the IFM Concept Paper and subsequently the publications of the ‘Flood Management Policy Series’. Apart from the IFM Concept Paper, the Flood Management Policy Series consists of four publications, dealing with the Environmental, Economic, Social as well as Legal and Institutional Aspects of IFM. The series constitute the conceptual framework of IFM and forms the basis for policy advice provided by APFM.

40. Regional pilot projects have been implemented to test and refine various aspects of the concept, and have included assistance to governments in formulating flood management strategies (Kenya and Zambia), in fostering the flood management capacity on the community level (South-Asia: Bangladesh, India and Nepal), in addressing the transboundary dimension of flood management (South America: Brazil and Uruguay) and in dealing with rapid onset floods in forecasting and warning for affected municipalities (Central and Eastern Europe: Poland, Romania and Slovakia).

41. The APFM has established a network of institutions involved in flood management and has pro-actively disseminated the concept of IFM to policy makers and flood managers through various workshops and specialized conferences.

42. The current phase of the APFM (2006-2010) moves from “Concept to Field Demonstration” through field demonstration projects and developing the necessary tools for implementation and providing adequate mechanisms for capacity building. Based on support from various specialized partners in APFM’s network of institutions, an IFM Help Desk function is planned. This would allow governmental and non-governmental institutions that want to implement IFM to approach the Help Desk for policy and strategic guidance, as well as for technical assistance in project formulation.

43. The International Flood Initiative (IFI) started to be developed as the Joint UNESCO/WMO Flood Initiative (JUWFI) in 2005. EC-LVII through its Resolution 5, had approved the participation of WMO in the International Flood Initiative to ensure that Members would be provided with added value in their efforts towards adoption of an integrated flood management approach. In its current organization, key participating organizations are UNESCO and WMO and it has further expanded to include the International Strategy for Disaster Reduction (ISDR), the United Nations University (UNU), IAHS, IAHR, the International Institute for Applied Systems Analysis (IIASA) and the Institute of Catastrophic Loss Reduction of Canada. The Secretariat of the Initiative is the International Centre for Water related Hazards (ICHARM), hosted by the Public Works Research Institute of Japan. The first meetings of the Advisory Committee and the Management Committee have been held in Geneva in January 2007.

Hydrology in the context of global environmental issues

44. In order to promote hydrological activities in the World Climate Programme and related conventions, WCP-Water continues to work in close collaboration with UNESCO, IAHS, IPCC and

the Cooperative Partnership on Climate and Water (CPCW). Under this framework an expert meeting on hydrological sensitivity to climate conditions was organized in December 2003 at Wallingford, United Kingdom. Three technical reports were published in 2004, addressing the detection of change in hydrological time series of maximum annual flow, trends in flood and low flow hydrological time series and the development of a data analysis system. In June 2005 the fourth meeting of the WCP-Water Steering Group was organised in Wallingford. In an effort to guide activities in trend analysis, Members have been requested to identify pristine river basins in the countries that could serve as reference basins to detect climate change signals in hydrological time series.

45. WMO organized an expert meeting under the banner of WCP-Water on “The needs of Water Managers for Climate Information in Water Resources Planning” in December 2006 in Geneva. The results of the expert meeting could form the basis for the integration of climate information in water resources planning and management, at the national level in collaboration with WMO’s Climate Prediction Centre, and the climate research community. The national demonstration projects, to be undertaken through extrabudgetary resources, would help water managers to adapt solutions that take due consideration of long-term potential climate change. WCP-Water places high importance in the enhanced cooperation with CCI.

46. The Global Terrestrial Network – Hydrology (GTN-H) supports a range of climate and water resource objectives identified by GCOS. Its areas of activity include the development of a meta-data base in close cooperation with activities undertaken in the context of the WMO Information System (WIS) and the establishment of a global hydrological monitoring network building on the subset of 380 key hydrological stations, “Global Terrestrial Network – Runoff” (GTN-R), to monitor continental freshwater fluxes to the World Oceans. Eighty-two Members have been requested to make available hydrological data from these stations in an institutionalized, timely fashion. The second session of the GTN-H panel was held in July 2005 in Koblenz, Germany.

47. In order to address the needs of observations related to water in the context of climate studies and to facilitate the use of observational data in water management, IGOS had accepted the objectives for IGWCO. The IGWCO theme has been developed with support from the HWRP and was approved as an IGOS theme in 2004. The organizational structure of IGWCO consists of a Science Advisory Group and Executive Committee. Since May 2005, WMO hosts the IGWCO Secretariat for the Executive Committee with shared secretarial responsibilities and support from [Japan Aerospace Exploration Agency \(JAXA\)](#). GTN-H forms a key programme in support of IGWCO and both contribute to support the Water Tasks of GEO.

48. The Global Runoff Data Centre operating under the auspices of WMO continues to be the world’s prime depository of global hydrological data and information. Members continue to send large amounts of hydrological time series to the Centre although there are also significant gaps in hydrological data from a number of regions. Recognizing the importance of groundwater as a resource, WMO and UNESCO have worked together to launch the IGRAC. The Centre is hosted by the Government of the Netherlands and operates since 2005 under the auspices of WMO.

Sustainable Development of Water Resources

49. CHy, based on their recommendation from EC-LVI, concentrate the activities of the HWRP on WMO’s core areas of competence i.e., water resources assessment and flood forecasting, and the experience of the last two financial periods had noted that every activity of the HWRP contributes to sustainable development. As such, it was difficult to identify any specific activity to undertake under this heading. It therefore had recommended to eliminate this sub-programme during the next financial period and redistribute its activities to other sub-programmes. Furthermore, the reduction of component sub-programmes of the HWRP had the added advantage of concentrating the scarce resources available.

50. In order to help improve groundwater management in arid and semi-arid countries, WMO in collaboration with the Ministry of Water Resources and Irrigation of Egypt organized an International Workshop on Groundwater Management in Arid and Semi Arid Countries in April 2005. UNESCO, UNEP, the International Atomic Energy Agency (IAEA) and the Islamic Development Bank also joined and supported the workshop. More than 70 experts, including 25 women, from 45 countries representing NHSs, academic institutions and the private sector, participated in the workshop. WMO, in collaboration with IAEA, published and distributed the proceedings of the workshop to participants and WMO experts.

51. In collaboration with the non-governmental organization FogQuest, efforts were made to increase the involvement of NMSs in the countries to harness the non-conventional source of freshwater in form of fog and dew. The fourth conference on Fog and Dew Collection being organized in June 2007 is being cosponsored to encourage attendance of participants from the NMSs.

52. Other activities contributing to sustainable development were undertaken under the other sub-programmes of HWRP, such as: the regional workshop on Water Affairs, the Global Course on IWRM, the training for local communities in IFM, the courses on IWRM and on the contribution to the achievement of the MDGs.

Capacity Building in Hydrology and Water Resources

53. After a lengthy and thorough review process, the "*Guidelines on the Role, Operation and Management of NHSs*" were published in 2006. This document, the main objective of which is to provide guidance to the senior managers of NHSs on the key issues that they might face as they, lead, manage and administer their Services, has been widely disseminated. The initial feedback received has been mainly a positive one, a fact that supports the recommendation of the CHy's AWG, which had suggested that the Guidelines should be translated in all official languages of the Organization.

54. The economic value of the hydrologic information and services provided by NHSs is not fully recognized by policy/decision makers, other stakeholders and the general public and therefore the adequate funding of NHS is not usually a national priority. This is reflected in inadequate budgetary allocations for the Hydrological Services, which has resulted in the systematic deterioration of the hydrological networks around the world, particularly in developing countries. To address this issue and to help managers of NHSs to effectively demonstrate to their governmental authorities and other stakeholders the benefits that can be gained through investment in improved hydrological services, Guidelines on the "Economic Valuation of National Hydrological Services" are being developed. It is planned to finalize the draft and publish the Guidelines in 2007.

55. CHy-XII had adopted a WMO Strategy on Education and Training in Hydrology and Water Resources, which had been approved by EC-LVII, with the objective of optimizing the available resources, by concentrating WMO's support in those areas identified by the "WMO hydrological community" as requiring priority attention.

56. In accordance with the Strategy, an identification of requirements had been initiated through the RA WGHs. Surveys on training needs had been carried out in 2005 (in RAs III, V and VI) and in 2006 in RA I and RA IV, while RA II will be covered during 2007. In response to the survey in RA III, a Workshop on Maintenance of Automatic Hydrometric Stations was organized in November 2005 in Santiago, Chile followed by two roving seminars on the topic in Colombia and Brazil in 2006. In RA V, based on a similar assessment of training needs, following an initiative of

the WGH a series of courses for Hydrographic Technicians was held with the support of New Zealand.

57. In December 2006 a Workshop on Water Affairs for South and Southeast Asia was held in Hanoi, Socialist Republic of Viet Nam. This activity, the first of a series of regional workshops, was aimed at personnel of NMHSs in mid-managerial positions, with the objective of putting their work into an international, socioeconomic and geopolitical context.

58. In the framework of WHYCOS, three workshops were organized for Niger-HYCOS in Niamey (the topics were Hydrometry and Topography, IWRM and Rating Curves), two for SADC-HYCOS in Cape Town and Pretoria, South Africa (Space Technology for WRA and Network Design), and one for Volta-HYCOS in Ouagadougou, Burkina Faso on Hydrometry and Topography. All these training events took place in 2006.

59. Training activities undertaken by APFM include the co-organization of the Global Course on IWRM, Neuchâtel, Switzerland, October 2004; the organization of a series of workshops on flood management strategy formulation for policy makers and stakeholders in the Lake Victoria Basin, Kenya in 2004, and in the Kafue Basin, Zambia in 2006; the training for local communities on their approach to flood management in flood affected areas of Bangladesh, India and Nepal, 2003-2005; the organization of workshops on IFM in the Quarai Basin, in Uruguay and Brazil, in December 2005; the organization of national and regional outreach workshops with governmental and non-governmental stakeholders for the community approach to flood management in Bangladesh, India and Nepal, 2005-2006; a workshop on the integration of flood warnings in areas prone to flash floods, in Poland, April 2006 and the provision of lectures on IFM during the JICA Training Courses on River and Dam Engineering, as well as on Flood Hazard Mapping, in Japan, in November 2006.

60. The regular training courses supported by the HWRP, on the other hand, have continued to be supported and during the last intersessional period two Latin-American courses (2003-2004 and 2006-2007) on Operational Hydrology were held under the distance learning modality in Caracas, Venezuela and the International Postgraduate Diploma Course in Applied Hydrology and Information Systems for Water Management, was held in Nairobi, Kenya, in 2004. The Secretariat is assisting the RMTTC Nairobi in redesigning this course to update its contents.

61. The training activities on hydrology and water resources, together with the decision of EC-LVIII to widen the scope of WMO Regional Training Centres to include other areas of interest of WMO, have sparked the interest of several institutions specialized in hydrology and water resources in cooperating more closely with the Organization.

62. An Expert Meeting on Computer Aided Distance Learning in Meteorology and Hydrology was held in Nanjing, China in September 2006. The meeting produced a series of innovative recommendations on which the Secretariat has already started acting. *[More information will be provided during Cg-XV.]*

HOMS

63. There are currently about 180 components in the HOMS Reference Manual (HRM). The online version of the HOMS Reference Manual has undergone a major revision, in particular by uploading the French, Spanish and Russian versions. It should be noted that the 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.

64. 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. It recommended a comprehensive updating campaign, which was initiated in early 2007. Once this process is completed, a circular letter to all Members 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.

65. In order to take an informed decision on the future of HOMS, the CHy AWG requested the implementation of a system to monitor the utilization of the online version of the HOMS Reference Manual. This was installed in October 2005. The results obtained to date, even though of preliminary nature, show a steady number of visitors to the HOMS Web site (approximately 300/month).

66. Three experts from Africa (Kenya, Ghana and Nigeria) attended a 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.

Water-related Issues

Cooperation with other UN agencies

67. WMO has continued supporting and participating in UN-Water meetings and activities during the last intersessional period by collaborating in the preparation of policy briefs, the establishment of its Website, organizing seminars and participating in various meetings and videoconferences. On behalf of UN-Water, activities under World Water Day 2004 with the theme "Water and Disasters" were coordinated by WMO jointly with ISDR. Another output of this collaboration, the World Water Development Report, was launched during the Fourth World Water Forum (WWF4). WMO collaborated in the preparation of three chapters together with UNESCO and ISDR.

68. WMO has continued its active participation in UN-Water/Africa, the regional body of UN-Water in the region. WMO organized the 3rd session of UN-Water/Africa in Addis Ababa, Ethiopia in March 2005 and is since then the chair of the group, therefore representing it in the AWF Governing Council (GC).

69. In response to the Cg-XIV request to the Secretary-General of maintaining WMO's support for the African Ministerial Council on Water (AMCOW) [see reference 1], WMO was very active in the organization of the Pan-African Implementation and Partnership Conference on Water, held in Addis Ababa, in December 2003, convened by AMCOW. WMO coordinated activities of the thematic session of "Managing Risks – Water and Climate", which was attended by thirty experts from the NMHSs of different African sub-regions. The Secretary-General addressed the session, and WMO's activities in the field of water and climate were displayed at the conference exhibition. In August 2005, the Chairman of the AMCOW Technical Committee was invited to a joint meeting with the sub-regional coordinators of the RA I - WGH to coordinate their respective activities. WMO also provided financial and technical support to several AMCOW meetings.

70. The AWF, conceived as a financial instrument to assist in meeting the targets and goals established by the African Water Vision for the water sector and the MDGs, provides investment support for water resources management and water service provisions in Africa. The African Ministers endorsed the proposal for the AWF, presented by the African Development Bank (ADB), during the AMCOW meeting in Addis Ababa in December 2003. The ADB hosts the AWF. The inaugural meeting of the African Water Facility was organized by ADB in Tunisia in June 2005.

WMO's membership in the AWF-GC has provided a good opportunity to WMO to assist the African Member states and River Basin Organizations in securing funds from the AWF to support their water activities.

71. The eighth and last session of the UNESCO/WMO Standing Committee on Terminology was held in Geneva in March 2007. The Standing Committee has finalized its work and prepared the final draft of the third edition of the UNESCO/WMO *International Glossary of Hydrology*, which is now being revised.

72. The joint activities with UNESCO are planned through the regular meetings of the UNESCO/WMO Liaison Committee. Its last meeting was held in Geneva in January 2007, which among others confirmed the work plan to finalize the third edition of the UNESCO/WMO *International Glossary of Hydrology*. Other joint activities with UNESCO such as IFI, IGRAC, Water Resources Assessment activities and World Water Development Report are reported under respective items.

Cooperation with other IGOs and NGOs

73. The WWF4 was held from 16 to 22 March 2006 in Mexico City, Mexico. The WMO delegation to the event was headed by the Secretary-General and included D/HWR, the president of CHy and other professional staff. WMO coordinated the preparation of the framework theme on Risk Management through a consultative process, including holding a virtual forum, and developed the Baseline and Thematic Documents. WMO convened three technical sessions on the Importance of Information for IWRM; Flash Floods; and Drought Management and co-convened two sessions on Integrated Flood Management and International Collaboration in Flood Management under the Risk Management theme. The Secretary-General addressed the plenary session on the Risk Management Day and on the Regional Day of Africa. WMO participated in the water exhibition. The booth was visited by Ministers, Head of Organizations and more than 3000 delegates of various nationalities. There was a high demand for WMO publications on climate change issues, disaster prevention, flood management and water resources.

74. Close collaborative activities are planned with the European Space Agency (ESA) in Volta and Niger-HYCOS through its TIGER initiative launched in 2002 during WSSD to overcome problems faced in the collection, analysis and dissemination of water related geo-information by exploiting Earth Observation technology. Realizing the complementary nature of the activities under the TIGER initiative and WHYCOS, WMO invited TIGER to the last WIAG meeting.

75. ICHARM, established at PWRI in Tsukuba, Japan under the auspices of UNESCO, serves as the secretariat of the IFI. WMO is closely collaborating with its activities through APFM and is also represented in its Board of Governors.

76. The International Commission on Irrigation and Drainage (ICID) is a non-governmental technical organization dealing with irrigation and flood management. As a representative of one of the major water consumers and in view of its interest in the application of climate information, close links are being maintained.

77. IAHS regularly participates in the activities of HWRP by attending the CHy and AWG meetings as an observer, while WMO regularly supports participation of hydrologists from LDCs in IAHS General Assembly.

78. WMO works closely with the Stockholm Water Institute and has participated in the Stockholm Water Week in 2004, where it organized a session on Coping with Climate Variability, Climate Change and Water-related Hazards, in 2005 when it convened a seminar on behalf of UN-Water, and in 2006.

79. Through its close collaboration with River Basin Authorities such as those for the Lake Chad and those for the Mekong, Niger, Volta, Senegal and Sava Rivers, the HWRP assists in the development of hydrologic networks and information systems. The Programme has also been involved in activities related to the Rhine, Zambezi, La Plata and Yellow River Commissions and Basin Authorities.
