W O R L D M E T E O R O L O G I C A L O R G A N I Z A T I O N

WEATHER, CLIMATE AND WATER

COMMISSION FOR HYDROLOGY

SECOND SESSION OF THE ADVISORY WORKING GROUP

(Geneva, 8 to 12 October 2018)

FINAL REPORT

1. OPENING OF THE SESSION

1.1 The second session of the Commission for Hydrology (CHy) Advisory Working Group (AWG) was held at the WMO Headquarters in Geneva, Switzerland, from 8 to 12 October 2018. Participants included members of the AWG, Regional Hydrological Advisors (RHAs), the Chair of the Executive Council Task Force on Water, representatives from the International Association of Hydrological Sciences (IAHS) and the United Nations Educational, Scientific and Cultural Organization - International Hydrological Programme (UNESCO-IHP), as well as staff from the WMO Hydrology and Water Resources (HWR) Branch. The complete list of participants is included in Annex I.

1.2 Mr H. Lins, President of CHy, welcomed the participants and invited the WMO Deputy Secretary-General, Ms E. Manaenkova to make her opening remarks. Referring to CHy-Ext, Ms Manaenkova recalled that the goal of the session is to identify ways in which the hydrological community could better fit within WMO, beyond the ongoing Reform process. Ms Manaenkova also stressed the linkages between hydrology, meteorology and climatology in the context of climate change challenges, such as adaptation and disaster risks reduction. She also mentioned the just launched IPCC Special Report on Global warming of 1.5°C. Furthermore, she noted that the reform process offers a window of opportunities in terms of catalysing synergies and exploring trade-offs. The need to increase the prominence of water issues in WMO was recognized.

1.3 Mr Cullmann, Director of WMO's Climate and Water Department briefed participants on the main actors and bodies steering the WMO Reform (Executive Council Working Group on the Strategic and Operational Plan (EC WG-SOP), Executive Council Constituent Bodies Reform Task Force (EC CBR-TF), Executive Council Task Force on Water, their role and responsibilities and the timeline related to their respective workplans.

2. ADOPTION OF THE AGENDA AND ORGANIZATION OF WORK

The meeting agenda (Annex II) was adopted without amendment. It was noted however that agenda item 3.7 was to be moved right after item 3.1.

3. PREPARATIONS FOR THE EXTRAORDINARY SESSION OF CHY (CHY-EXT), GENEVA, FEBRUARY 2019

Presentation on the WMO Governance Reform

3.1 Mr Dimitar Ivanov, Executive Assistant to WMO Secretary-General on Public Private Partnerships (PPP) presented the WMO Constituent Bodies Reform (CBR), which covers three pillars: i) revision of the Executive Council, ii) revision of the Technical Commissions, and iii) revision of Congress General cycle. All the proposed reforms are reflected in the opening section of the Discussion Document for CHy-Ext discussed under agenda item 3.3 and are explained in detail on the Reform website https://public.wmo.int/en/governance-reform. Mr Ivanov recalled the recommendations and resolutions of EC-70 related to the Reform listed below:

- Resolution 18 (EC-70), Outcomes of the Special Dialogue on Water
- Resolution 35 (EC-70), WMO Executive Council structures
- Resolution 36 (EC-70), WMO Constituent Bodies Reform Transition Plan and Communication Strategy
- Recommendation 23 (EC-70), WMO Executive Council
- Recommendation 25 (EC-70), WMO technical commissions and other bodies

- Recommendation 26 (EC-70), Extraordinary session of the World Meteorological Congress in 2021

3.2 Mr Ivanov pointed out that while consideration is being given to change the Congress cycle to two years, no major changes concerning RAs are foreseen.

3.3 The reform proposal establishes two Technical Commissions: a Commission for Weather, Climate and Water Services and Applications (CSA) and a Commission for Observation, Infrastructure and Information System (COIIS), that will operate through Standing Committees and Study Groups. Additional bodies are envisaged: a Research Board, a Policy Advisory Committee, a Technical Coordination Committee and a Science Advisory Panel.

3.4 The CBR Task Force met in early September 2018 and developed a Transition Plan and a Communication and Outreach Plan. It is envisaged that the new TCs should kick off as soon as possible after being established, with their presidents and three vice-presidents exceptionally elected by Congress for the first period, after which the current TCs structure should be disbanded. The focus of TCs in the new structure would be normative, such as Technical Regulations development, and ensuring compliance. Engagement with private sector through Public Private Partnerships (PPP) should also be looked at.

3.5 Noting that EC-70 recognized the unique needs of hydrology in the Reform process, possible ways in which to elevate the status of hydrology within the WMO context were discussed. As Congress tends to be reluctant to amendments to the Convention, substitutive legal instruments were suggested, namely Protocols and/or a Declaration.

3.6 A Protocol has similar legal characteristics to a treaty/convention. Generally, a Protocol amends, supplements or clarifies a multilateral treaty. A Protocol may pertain to any topic relevant to the original treaty and is used either to further address something in the original or parent treaty, or to address a new concern. A Protocol is also used to add a procedure for the operation and enforcement of the treaty. A Protocol is 'optional' in the sense that it is not automatically binding on States that have already ratified the original treaty. In order to be binding, the States must independently ratify a Protocol.

3.7 Should additional steps be considered necessary to further elevate the status of hydrology in WMO, CHy-Ext could approve a draft Declaration and recommend it for approval to Cg-18. The Declaration could subsequently evolve into a Protocol, to be approved in one of the following Cg sessions (2021 or 2023), seeking Members' support.

3.8 It was also noted that, should NHSs not find an appropriate representation in the new structure, they might turn to other intergovernmental entities - that provide a higher recognition to hydrology - for their international activities. This would harm WMO's aspiration to increase its visibility in the water arena.

Session of Q&A on the WMO Reform

3.9 The CHy President opened the floor to AWG members for discussion through a question and answer session with Mr Ivanov. The questions and answers are attached as Annex III.

Follow-up on the HydroConference

3.10 WMO convened the HydroConference from 7 to 9 May 2018 in partnership with a wide range of international organizations. It was attended by 219 providers and users of

hydrological services from 85 countries and 34 organizations. The outcomes of the conference are synthetized in its final Statement, available at:

https://hydroconference.wmo.int/en/statement

In particular, the HydroConference resolved to form a partnership and develop a framework and guidance for reinforcing hydrological services based on user needs, and recommended that the WMO Commission for Hydrology takes a leading role in organizing the follow-up efforts to advance the complete hydrological value chain, in particular when it comes to operational hydrology. EC-70 endorsed the HydroConference Statement and requested CHy to take a leading role, in consultation with the Commission for Basic Systems (CBS) and the Commission for Atmospheric Sciences (CAS), in organizing the follow-up efforts, with a special focus on operational hydrology. It was noted that the new governance structure should ensure that the above recommendation and request are duly taken into account.

Discussion on the CHy-Ext document

3.11 The AWG debated the structure and content of the (temporarily called) Discussion Document for CHy-Ext in detail. The comments made during the discussion or provided separately by AWG members and RHAs were collected, and it was agreed that a first consolidated draft would be circulated to them before submitting it for internal approval and uploading it on the CHy-Ext mini-site by mid-December 2018.

3.12 It was decided to add a foreword that would explain the purpose and context of the document, while keeping in mind that many CHy-Ext participants may not be familiar with WMO procedures, activities and details of the CBR. The concern regarding the impact of the new two-Commission structure vis-à-vis the current seamless approach of CHy should be adequately described. This would entail explaining how the current CHy seamless approach - from data to services - would be disaggregated in the two new Commissions, their standing committees and study groups. The document shall propose ways to deliver the same seamless approach in the new framework, while taking advantage of the opportunities offered by the Reform.

3.13 AWG members decided that the document will present two structural options to CHy-Ext. The first option will attempt to map the current functions of CHy into the two commissions structure proposed by EC-70. The second proposes the addition of an Hydrological Assembly, which would ensure the integration of hydrology-related activities and coverage of themes currently carried out by CHy that would not fit in the mandate of neither COIIS nor CSA. In this option, an effort will be made to maximize the number of activities to be undertaken directly by the two Technical Commissions. The document should also leave the possibility to CHy-Ext participants to propose a new, different option, and explain why other options, such as retaining CHy as-is, or creating a virtual hydrological forum, were considered but discarded by AWG. The Group agreed that the objective of CHy-Ext shall be to finally **submit only one consensus option to Congress**.

3.14 The different proposals should provide sufficient details on the Terms of References (ToRs) of the new bodies proposed and their interactions with the ones foreseen in the EC proposal, in order to design a clear institutional framework. To this end, the AWG would need to closely liaise with CBR-TF in the next months.

3.15 It was noted that according to Regulation 182, CHy-Ext will address its recommendation(s) directly to Congress.

3.16 The various proposals should be developed having the following three goals in mind:

- To develop an effective platform that will support delivery of services and enhancement of capacities of the National Hydrological Services;
- To increase the visibility and involvement of the hydrological community in WMO activities and structures; and
- To elevate WMO recognition and relevance for its contribution to the global water agenda.

3.17 In addition to these three goals, the AWG agreed on a set of core principles against which to assess the various governance options presented in the document and their likelihood to contribute to the overall objective quoted above. The AWG discussed which general features should be considered as essential, and which elements are deemed as desirable for each option.

3.18 It was also agreed that a separate document on "grand challenges" should be prepared by the EC Task Force on Water with the support of the Secretariat. Consequently, two documents will be presented to CHy-Ext: one on "grand challenges" and one on structural options, each putting forward one Recommendation.

3.19 Finally, the Secretariat pointed out that the Cg-18 notification addressed to Foreign Affairs Ministries, mentioned the possibility of holding a side-event referred to as "a hydrological assembly". The AWG welcomed this idea, but recommended it not be named "hydrological assembly" in order to avoid confusion with the second option referred to in paragraph 3.13. As an Extraordinary Congress session will probably be approved by Cg-18 for 2021, with a likely focus on water issues, a process could be started at Cg-18, possibly through a Declaration, that may lead to the adoption of a Protocol on hydrology by Congress in 2021.

Organization of the pre-session online discussion

3.20 The pre-session discussion will be organized around three sets of questions on the following topics:

1. The "grand challenges" for hydrology i.e. enhancement of WMO critical contribution in the global water agenda (SDG, Sendai framework for DRR, Paris agreement, etc.);
2. WMO contribution to the broad hydrological community i.e. how can the WMO support National Hydrological Services and other partners to improve hydrologic observing systems and the delivery of products and information responding to the various societal needs; ways to enhance the essential role of hydrology in WMO and its further integration into the Earth system approach, and
3. Structure: identifying the strengths and weaknesses of the organization current working mechanisms for supporting the hydrological community, encouraging cooperation between the hydrological and meteorological operational communities.

3.21 The questions will be finalized by Secretariat on the basis of the proposals received and will be circulated among participants to this meeting by the end of October for review and possible comments. Questions shall be posted on the CHy website by 16 November 2018 and the wide hydrological community and key stakeholders of the water sectors be invited to provide inputs and comments. The debate on question set 1 may feed into the outcomes of the Executive Council Task Force on Water.

3.22 Social media shall be used to promote the debate and reach out to a wider audience.

4. PREPARATION FOR THE TECHNICAL CONFERENCE (TECO) ON FUTURE HYDROLOGICAL PRIORITIES AND ARRANGEMENTS, GENEVA, FEBRUARY 2019

4.1 A number of suggestions for the organization of the CHy-Ext and the TECO were aired by the participants. These suggestions will be taken into account in the development of the draft agendas of the two meetings that will be distributed among the AWG members by end of October 2018.

4.2 The main objective of the TECO will be to seek feedback from the hydrological community on its role and positioning within the new WMO structure. As such, resources made available for supporting a large number of participants to attend TECO should be prioritized to ensure participation of representatives of the National Hydrological Services and other water-related institutions.

4.3 Agendas for both TECO and CHy-Ext, the draft letters to Permanent Representatives requesting nominations will be circulated among participants to this meeting by the end of October for review and possible comments on a non-objection basis within 48 hours of receiving the documents.

5. REVIEW OF PROGRESS OF THE WORK PROGRAMME IN THE THREE CHY FOCUS AREAS AND DECISIONS ON ITS FUTURE IMPLEMENTATION

5.1 The CBR, whatever its outcome, shall not affect the timetable of the AWG activities that are due to be completed by December 2020 in line with the proposed implementation of reform.

5.2 The group noted that the visibility of CHy activities on WMO Websites (extranet and public) was rather fragmented and confusing. This, in turn, does not contribute to a clear communication of goals and achievements. Realizing that a total reorganization of the CHy web presence would not be realistic in the short timeframe, the AWG requested a simplification of the entry points and the discoverability of the most relevant topics before CHy-Ext, while planning a more in depth restructuring after the session.

5.3 The group then revised and updated the workplan of the three focus areas (Coordination and Implementation Support; Measurement, Monitoring and Infosystems; and Hydrological Applications, Products and Services), discussing its advances and the future steps, as presented in Annex IV.

6. SUPPORT TO AND INTERACTION WITH THE EC TASK FORCE ON WATER

Mr Arni Snorrason, Chairman of the EC Task Force on Water, highlighted the opportunity offered by the CBR to increase the representation of the hydrological community in WMO Constituent and Subsidiaries bodies. WMO brings a unique contribution to hydrological activities, but in light of the international challenges related to water reflected in the global agenda (Sustainable Development Goals - SDGs, Sendai Framework, Paris Agreement), WMO might play an additional major role in the formulation of policies relevant to water. To embrace this, WMO would need to develop a strategy for policy making, addressing the full hydrological value chain. In this context, Mr Snorrason reported on recent and planned events, such as the High Level Panel on Water, the International Decade for Action on Water and Sanitation, and the role that WMO and the United Nations Department of Economic and Social Affairs (UN DESA) will jointly play in coordinating a UN-Water Task Force to develop a mechanism for reviewing the implementation of SDG 6 and 11.5. Better communication of the achievements of water-

related activities should be sought, also within WMO. Mr Snorrason furthermore invited AWG members to consider ways in which to organize the contributions of the hydrological community to the planned Research Board.

7. COOPERATION WITH OTHER INTERNATIONAL ORGANIZATIONS

7.1 Mr C. Cudennec, Secretary General of IAHS, walked participants through the cooperation between IAHS and WMO in the area of hydrology and highlighted the main concrete outcomes. Building on the complementarity between the IAHS Monitoring and Observation for the XXI Century (MOXXI) initiative and the WMO HydroHub's Global Innovation Hub, a joint meeting on innovation in hydrometry was organized in Geneva in December 2017 in the WMO headquarters. A second workshop is envisaged in March 2019 in New York. IAHS, WMO and the International Association for Hydro-Environment Engineering and Research (IAHR) have developed syllabus and material for training courses on the WMO Manual on Stream Gauging. The fourth in the series was held in Lyon (France) in September 2018 and work is underway to organize the next event. IAHS is also collaborating with WMO, UNESCO and IAHR on the development of the Basic Instruction Package for hydrology (BIP-H), for which a draft shall be presented at the next WMO Congress in June 2019 and at the next IAHS General Assembly in July 2019 in Montreal. A special issue on "Hydrological Data: Opportunities and Barriers" of the Hydrological Sciences Journal is under preparation. The CHy President is a guest editor and a number of original contributions on WMO activities are expected.

7.2 Mr Cudennec recalled that IAHS also sits in the advisory body of APFM and the Innovation Committee of the WMO HydroHub. IAHS was also a partner of the organization of the HydroConference, during which the UNESCO-WMO-IAHS medals for hydrology were awarded. IAHS is also involved with WMO in several other initiatives, such as the Mountain Summit and the preparation of the freshwater component of the IPCC report. Finally, Mr Cudennec reminded AWG members that he sits as CHy representative in the EC Panel on Education and Training, for which he attended the 2018 meeting in Nairobi (Kenya).

7.3 Commenting on the WMO-IAHS partnership, he stressed that it is based on three pillars: spirit, agreements and individuals. While the spirit will not be affected by the Constituent Bodies Reform, he feared that the coherence of the partnership would be lost should WMO hydrological activities be split between the two proposed TCs. Conversely, some additional expertise of IAHS and sister associations, such as on the cryosphere, agro-hydro-meteorology or geodesy developed in the framework of IUGG could be of value to the WMO water agenda. A body such as the proposed Hydrological Assembly would provide a clearer and unique entry point for IAHS and other partners in the water sector, which in turn would facilitate individuals interactions.

7.4 UNESCO, through its International Hydrological Programme (IHP) and WMO through its Hydrology and Water Resources Programme have a long standing cooperation. In 2013, they signed a revision of the Working Agreement for a long-term cooperation in the field of freshwater, also foreseeing a regular liaison committee meeting (last meeting was held in March 2017 in Geneva). An overview of the current IHP phase 8 was provided with a focus on activities of relevance to CHy. UNESCO-IHP has been serving as member of the WMO HydroHub Advisory Council and has attended the Associated Programme on Flood Management (APFM) and the Integrated Drought Management Programme (IDMP) advisory committees meetings. Within the framework of their Joint UNESCO-WMO-UNU International Initiative on Flood (IFI), the two programmes in partnership with the International Centre for Water Hazard and Risk Management (ICHARM) have organized two side-events during the International Conference on Flood Management (ICFM) in September 2017 in Leeds and during the 23rd session of IHP Council in June 2018 in Paris. Also, the two programmes have co-organized the HydroConference in May 2018 in Geneva and a side-event on 'Education,

Capacity, Knowledge and Hydrological Services towards Sustainable and Resilient Societies'- held during the High-level Political Forum on Sustainable Development (HLPF) in July 2018.

7.5 The two programmes are co-responsible together with the United Nations Economic Commission for Europe (UNECE) of the UN-Water Task Force on Water and Climate and will co-lead various chapters of the World Water Development Report 2020 on water and climate change. UNESCO-IHP has been involved in other WMO programmes of relevance to CHy, including the Global Framework for Climate Services (GFCS) and WMO's Global Cryosphere Watch (GCW) on Cryosphere and Water Related issues.

7.6 The need to maintain and strengthen the close cooperation between the two programmes was stressed. It was agreed to organize a meeting of the WMO-UNESCO liaison committee before CHy-Ext to reach a common understanding of the ongoing Reform within WMO and the consequences on CHy and a new potential framework for the WMO hydrology programme, to reaffirm the willingness of the two programmes to continue working in synergy and complementary, and to identify concrete joint activities/projects/events. The need to better communicate the outcomes of this interagency cooperation to the management of both organization was also stressed.

8. OTHER BUSINESS

Jan Danhelka with the Secretariat will work on developing a proposal for recognition of long-term observing hydrological stations. This could be a topic for the hydrological side event to be held during Cg-18, with an expected decision from Cg-18 to endorse the concept of the Heritage Hydrological Stations (definitive name to be determined).

9. ADOPTION OF THE REPORT

The meeting adopted the draft report and asked the Secretariat to finalize it.

10. CLOSURE OF THE SESSION

The meeting was closed at 17:35 on Friday, 12 October 2018.

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ANNEX I

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ANNEX II

TENTATIVE WORK PLAN

TIME	AGENDA ITEM
Monday 8 October 9:00 – 12:00	**1. Opening of the session** **2. Adoption of the agenda and organization of work** **3. Preparations for the extraordinary session of CHy (CHy-Ext), Geneva, February 2019** **3.1** Presentation on the WMO Reform (D. Ivanov)
13:30 – 17:00	**3. Preparations for the extraordinary session of CHy (CHy-Ext), Geneva, February 2019 (Cont.)** **3.2** Follow-up to the HydroConference **3.3** Discussion on the CHy-Ext document **3.4** Hydrological community engagement questions
Tuesday 9 October 9:00 – 12:00	**4. Preparation for the Technical Conference on future hydrological priorities and arrangements, Geneva, February 2019** **4.1** Programme **4.2** Criteria for supporting participants **3. Preparations for the extraordinary session of CHy (CHy-Ext), Geneva, February 2019 (Cont.)** **3.5** Programme **3.6** Organization of the pre-session online discussion
13:30 – 17:30	**3. Preparations for the extraordinary session of CHy (CHy-Ext), Geneva, February 2019 (Cont.)** **3.6** Organization of the pre-session online discussion (cont.) **3.7** Session of Q&A on the WMO Reform (D. Ivanov) **7. Support to and interaction with the EC Task Force on Water**

19h30	Dinner at the Lacustre
Wednesday 10 October 9:00 – 12:00	**5. Review of activities since AWG-1** **6. Review of progress of the work programme in the three CHy focus areas and decisions on its future implementation** 6.1 Coordination and implementation support 6.2 Measurement, Monitoring and Infosystems
13:30 – 17:00	6.2 Measurement, Monitoring and Infosystems (cont.)
Thursday 11 October 9:00 – 12:00	6.3 Hydrological Applications, Products and Services
13:30 – 17:00	6.3 Hydrological Applications, Products and Services (cont.)
Friday 12 October 9:00 – 12:00	**8. Cooperation with other international organizations**
13:30 – 17:00	**9. Other business** **10. Adoption of the report** **11. Closure of the session**

ANNEX III

SESSION OF Q&A ON THE WMO REFORM

Q: Are detailed specifications for the Two Commissions approach available? That is, terms of reference, operational practices, integration/coordination guidance.

A: Draft ToR are available in Annex I to Recommendation 25 (EC-70) and will be finalized by March 2019 to be potentially adopted by Cg.

Q: Will the two Commissions meet every four years?

A: The proposal is to have the commission cycle aligned with the two year Congress cycle. Concern was expressed regarding the short timeframe allowed for activity progress.

Q: Commissions will elect a President and three Vice-Presidents, but is it stipulated that one of these will have to be an hydrologist?

A: The issue will be decided by Congress, however a strong recommendation for a rotating presidency allowing regularly an hydrologist to chair was expressed by the Group.

Q: What other management structures will be formed?

A: There are initial talks about having bodies in each Commission composed by Chairs of Standing Committees and Study Groups to monitor and steer the workplan of each Commission.

Q: Will there be a Hydrology specific working group in each Commission?

A: The TCs decide about their subsidiary bodies. For the first intersessional period it is proposed a "Hydrology Services" Standing Committee under CSA.

Q: Who forms Study Groups? The TCs or EC?

A: Technical Commissions decide on their working structure.

Q: To whom will the current work undertaken by CHy in the current intersessional period will be reported in 2019/2020?

A: work has to be seamless, and has to continue until the first joint TC meeting. It is not clear to which constituent body CHy will report to report for the current intersessional period. A technical subgroup could be formed to discuss this with Mr Adrian.

ANNEX IV

WORKPLAN: ***Focus Area: Coordination and Implementation Support (updates in red)***

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages	Status
RAs: ensure that the activities of regional associations, and, in particular, the Regional Association Working Groups on Hydrology (RA WGHs) are coordinated within overall Commission activities and that there is effective communication between the Commission and the RA WGHs;	• Establish direct communication with Chairs of RA WGsH; • Liaise with PRAs; • Transmit work plan of CHy, when finalized, to Chairs of RA WGsH, to consider when planning and implementing RA WGsH activities; • Obtain programme of activities/work plans and progress reports from Chairs of RA WGsH for feedback into CHy activities; • Participate in RA WGsH	• President • Vice-president	• Improved coordination and cooperation with the Regional Associations	• Resources are provided on a case to case basis.	• Involvement in meetings, workshops and conferences as determined in consultation with the Secretariat. • Report at AWG meetings • Report at EC Sessions • Report to CHy-16	• PRAs • RA HAs • RA Subsidiary bodies	• Participation to RA VI-17 session and hydrology work plan preparations, February 2018. • VP in RA III Plata meetings • RHAs attending HydroConference and AWG-2 • Active involvement in Special Dialogue at EC-70 • RA II – WG and DWAT workshop Nov 2018 – AWG participation • Regional hydrological considerations at CHy-Ext in the framework of WMO reform

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages	Status
	Meetings, where possible; • Report to each AWG Session on activities of RA WGsH; • Provide information on AWG decisions and recommenda -tions that relate to or impact on RA WGsH activities;						• Assess effectiveness of AWG liaisons with RAs • RA I session AWG representation ? Tom to be supported if he comes to CHy-EXT. Secretariat to attend as well. • RA I WGH meeting 5-7 Nov 2018 in Abuja. Secretariat to attend, seek Tom's involvement
Capacity Development: identify and lead actions with regard to the education and training requirements of Commission activities under the adopted Strategy on Education and Training for HWR and the QMF–	• Review of the WMO Strategy on Education and Training in HWR for the period of 2017-2020 • Implement identified actions based on review • Represent or nominate a	• Vice-president a)Z.Liu b)C.Cudennec	• Organized education and training activities	• CHy-AWG members • Consultants (subject to resources)	• Variable and as appropriate	• ETR; • IHP/HWRP Office in Germany • UNESCO, IHE, COMET program	• C. Cudennec participated in EC Panel on ETR in Kenya • Developed WHOS trainings for la Plata valid for all regions • 2 additional DL courses on

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages	Status
Hydrology. Consider developing open source and community of practice solutions to promote the transfer of technology and knowledge management;	representative in EC Panel on ETR						WHOS to be developed with COMET • Developed Field hydrology technicians DL courses for RA V and RA I
APFM and IDMP: represent CHy, in concert with the relevant AWG member for hydrological applications, products and services, on the Advisory and Management Committees of APFM; and represent CHy on the Advisory Committee of the IDMP, as per the operational guidelines of the two programmes;	• Provide advice to APFM and IDMP from a CHy perspective	• President	• The role of CHy in APFM and IDMP	• AWG Members responsible for Floods and Droughts Management • WMO Secretariat • OPACHE	• Involvement in meetings, workshops and conferences as determined in consultation with the Secretariat. • Report at AWG meetings • Report at EC Sessions • Report to CHy-16	• WMO Secretariat	• President CHy Chaired ACs and MCs of APFM and participated in those of IDMP in 2017 and 2018 • Reported at EC-69 • Explored working with GWP on WRM activities with their client community. Follow up required
WIS/WIGOS: represent CHy in ICG-WIGOS and coordinate the participation of	• Ensure timely and accurate CHy response to WIS/WIGOS	• Vice-president	• The role of hydrology in WIS\WIGOS	• AWG Members responsible for Data Management	• Involvement in meetings, workshops and conferences as determined in	• CBS • PRAs • RA Has	• Actively participated in: TT-EWIS, EB-WIGOS, TT on Emerging Data

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages	Status
relevant CHy experts in WIGOS and WIS expert teams;	requests;			• WMO Secretariat • OPACHE	consultation with the Secretariat. • Report at AWG meetings • Report at EC Sessions • Report to CHy-16 • Participated in 2017 and 2018 ICG-WIGOS meetings		Issues, TT on Data and partnerships, TT on OSCAR Surface, Workshop on Information Management (Oct 2017) • Submitted contributions on hydrological data to 2 EC-70 docs + the WHOS Architecture and Implementa-tion Plan • Need to integrate hydrologists with WHOS experience from the regions – consider formalization of the training programme
GFCS: liaise as necessary with the GFCS Secretariat (in cooperation with APFM/IDMP Technical Support	• Ensure timely and accurate CHy response to GFCS requests; • Represent	• J.Danhelka	• The role of hydrology in the GFCS	• AWG Members responsible for Applications • WMO Secretariat • OPACHE	• Involvement in meetings, workshops and conferences as determined in consultation	• PTC • IBCS • APFM, IDMP	• Attended one video-conference on TT on O&P • need to

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages	Status
Units) in matters relevant to hydrological contribution to/benefit from GFCS;	CHy in the Task Teams on Operational and Resource Plan and Monitoring & Evaluation • Contribute to the UIP				with the Secretariat • Report at AWG meetings • Report at EC Sessions • Report to CHy-16		reinforce the partnership with RCOF for hydrological outlook and other water information related needs • facilitate the flow of information and the uptake of outcomes with GFCS
• GDPFS: contribute to the development of WIPPS (aka GDPFS) reflecting the hydrological aspects and specifics and in particular the needs and concerns of NHSs in the development of the WIPPS	• interact with various global and regional forecasting initiatives making them aware of this ongoing process; • To develop a proposal of a comprehensive structure for hydrology within WIPPS; • To develop the procedures for the designation,	• J.Danhelka	• The role of hydrology in the evolution of WIPPS • Proposal for changes of the GDPFS Manual	• AWG Members for Applications • WMO Secretariat • OPACHE	• Involvement in meetings, workshops and conferences as determined in consultation with the Secretariat • • First draft of proposal – Dec 2017 • Report at AWG meetings • Report at EC Sessions • Report to CHy-16	WMO Secretariat	• Contribution to the preparation of the Scope Implementation Plan – approved by EC-70 • Finalized proposal for inclusion of Hydrological centres to the GDPFS Manual (including CHy forum discussion) – presented to CBS. Need to follow-up with them – to

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages	Status
	mandatory functions, and activities of new centers; oversee the process of designating global and regional hydrological centres (including negotiation and liaison with GloFAS/EFAS, UNESCO-IHP, GFP and others);						agree with CBS TT on whether and how to present it Cg-18
Data Centres: Establish a small task team to prepare a report with regard to the evolving role of GRDC, IGRAC and HYDROLARE, and liaise with the president of CCl with respect to the involvement of GPCC.	• Establish direct communication with Data Centres; • Review the evolving role of the Data Centres; • Implement identified actions based on review	• President • Vice-president	• Improved coordination and cooperation with the Data Centres	• AWG Members responsible for Data Management • WMO Secretariat	• Final Report to be presented at Cg-18 in 2019 • Involvement in meetings as determined in consultation with the Secretariat. • Report at AWG meetings • Report at EC Sessions • Report to CHy-16	• GRDC • IGRAC • HYDROLARE • GPCC • WMO Secretariat	• Completed preliminary documenta-tion (WHOS Plan and WIS 2.0 + info related to activities of each GDC) • Need to define the TT • Have a meeting January 2019 to complete report in time for Cg-18 –

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages	Status
							postponed to March 2019
GMAS EC-69 urged TCs to participate and contribute to the development of WMO GMAS, and requested EC WG/DRR to further advance the GMAS concept and the development of a strategy that emphasizes (among others) both the meteorological and hydrological aspects	• To represent the hydrological community to the of the Expert Group on GMAS (EG-GMAS) (subsidiary of the EC WG/DRR) • To report on progress to P-CHy and AWG	J. Danhelka	• Hydrological aspects recognition in GMAS vision and implementation plan	• AWG Members for Applications • WMO Secretariat		• WMO Secretariat, EC WG/DRR	• GMAS Concept proposal for EC-70 developed • EC requested to further work on the GMAS concept for Congress (meeting expected in Nov 2018)
CHy contribution to the High Mountains and Polar areas activities	• To represent the hydrological community in the preparation of the events	J. Danhelka, S. Pecora		• D. Berod, • P. Pilon		• IAHS • UNESCO-IHP	High Mountain Summit: Examples and success stories of transboundary networks to be presented on 25-27 February 2019 Geneva Ice and Snow Symposium in a changing world –

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages	Status
							August 2020 Reykjavík • International Year on Ice and Snow

WORKPLAN: ***Focus Area: Measurement, Monitoring and Infosystems*** ***(updates in red)***

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages	Status
WHOS: development and implementation of WHOS phase II, offering standardized web services, data hosting, archival, data rescue and dissemination, and relevant training, based upon data policies and adopted standards, and provide support to the HydroHub functions related to WHOS;	• Establish user requirement (data providers and data consumers), • Definition of WHOS architecture • Implementation Plan Development • Develop new Statement Of Guidance (SOG) and requirements ---------- TBD once plan approved: • Pilot • Training • Communication to Members	• S. Pecora • T. Kanyike	• WHOS Implementa-tion Plan • Technical documents • SOG and contribution to RRR	• WHOS focal points in each RWGH, NHSs • HydroHub (F. Teichert)	• User requirements defined – Sept 2017 • Definition of WHOS architecture – Dec 2017 • Draft Plan presented to EC-70 - June 2018 • SOG Q1 2018	• RAs, Global Centers, other observations and information systems, CBS,	• Implementa-tion plan approved by EC 70 June 2018 • Implementa-tion started • Silvano Pecora started a conversation with Google for possible use of their functiona-lities • Develop a task team (3-5 people) to support Silvano in the implementa-tion, particularly at the regional level
GHSF (newly called HydroHub, including WHYCOS): serve as a member of the GHSF advisory council; provide technical guidance on WHYCOS	• Populate and organize meetings the Advisory Council and the InnoC • Help implement the approved HydroHub structure and activities to ensure		• Fully operation HydroHub in 2018 • Sustainable operational & funding model established for HydroHubbeyon d 2018 • Continued	• Hydrohub (Sophia Sandström for preparing baseline docs and day to day activities, Igor for	• AC populated by June 2017; 1st AC meeting – before Sep 2017 • -WHYCOS draft strategy June 2017, final August 2017 • Milestones to be agreed by	• World Bank / GFDRR • UNESCO IHP (including HOPE Initiative) • RAs • CBS • WMO Secretariat	• AC established, 4 meetings done as of 5.10.18 (2 face-to-face), • New WHYCOS framework

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages	Status
activities to the HydroHub; support the hydrological services information platform and liaise with AWG members responsible for WHOS, Project X and Innovation and new data;	it is fully operational in 2018. • Serve as Chair and members of GHSF Advisory Council • Help develop the new WHYCOS strategy (including funding and communication), help existing and new HYCOS projects, including integrating them into HydroHub Review, revise and add information needed to transform INFOHYDRO into HISP • Recruit organisations to provide help via the Help Desk • Ensure adequate links with other CHy (and wider) activities as appropriate – including WHOS, Project X and Innovation • Ensure HydroHub links with RA priorities and RAWG Hydrology • Promote the	H.Lins and H.Dixon (both in the Advisory Council)	implementation of existing and new HYCOS projects (Senegal and IGAD transitional phase). • Conversion of INFOHYDRO into HISP • Active and fit-for-purpose Help Desk	HISP and HelpDesk/ CoP) • OPACHE AWG members • Regional HAs and relevant WGs	Advisory Council • Dec 2018: Fully operation HydroHub • June 2018: Sustainable operational & funding model established		drafted May 2018 • General and sectoral strategies drafted (e.g., funding, partnership, communica-tion).

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages	Status
	development and use of free and open source software for hydrology (such as MCH).						
Project X: Chair the Management Committee, finalize and test basic uncertainty analysis (UA) software, develop UA capacities for ADCP, including standardization of computation of discharge, discharge estimation via various techniques, and produce guidance documentation for calibration and performance testing, design of "regattas" for intercomparison of flow measurement instruments and techniques, ultimately supporting quantification of discharge	• Update Management group Membership • Conduct meetings with committee via phone/internet/face to face • Finalize the first module of UADAT • Comparison Test ADCP software • Compare point meter UA softwares • Support HydroHub goal of free and open software for hydrology UA methods. • Interface with HMEI and ISO to promote vendor and NHS adoption of best UA practices	• J.Fulford (Chair)	• Finalize contract with Qualisyst (support: Claudio) • work plan for next period • At least 6 per year (one face-to-face a year) • Hereafter: depending on workplan to be adopted Software distribution • Field Discharge Survey 2018 • Guidance conducting ADCP regattas for QA and recommendations	• WMO secretariat (Dom, Tommaso) • OPACHE members • ISO rep • HMEI rep • IAHS rep • IAHR rep • RAII WGHS • HydroHub 1 f2f meeting in 2017	• April 2017 • AWG Review, revise and adopt work plan for next period: July 2017 • Hereafter: depending on Work plan • Revise previous survey & conduct survey • Request updating of NHSs Q standards • Regatta guidance doc completed/finalized • ADCP dataset(s) to conduct software comparisons collected • Other meter discharge datasets to	• Innovation Hub • Manufacturers (HMEI) • Others as appropriate	• No major progress due to unavailability of key people • UADAT software tested in Summer 2018 • Revised workplan foreseen by the end of 2018

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages	Status
uncertainties (with error bands at stated confidence levels);			• Repository of Instrument test reports • Guidance for ADCP & point meter UA standards • Guidance for UA methods for discharge ratings • Technical report of developing rating curves with various field conditions • Free, Open and easy Software for developing index rating		conduct UA schemes/ software comparisons collected • Datasets collected & selected for comparison of rating UA schemes. • Conduct ADCP UA software tests w/datasets • Conduct other meter UA tests w/ datasets • Conduct comparison of rating UA schemes with datasets		
QMF-H: continue the development of relevant QMF-H guidance material, including training support material; deliver QMS training and guidance material to NHSs at all levels (measurements, monitoring, forecasting and	• Develop and implement QMS training strategy • Support to implementation of QMS possibly through the CoP?	J. Danhelka A member of the QMS WG N.Tuteja (forecasting)	• Training support materials • Application results of QMS in RAs	• OPACHE • C.Caponi • Secretariat support for publishing training materials including paper and online/video • QMS Working group	• Concept of the training strategy (AWG-2) • Training materials gradually developed	• NHSs • RAs	• Training strategy and material not started • Working group on regulatory material established, meeting End of October in Bratislava • 2 people agreed to review

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages	Status
related products) and promote adoption and appropriate implementation of QMS in NHSs;							document on uncertainty • Guidance on ecoflow: comments from reviewers received, case studies outside Italy missing. Material presented in Japan in August 2018 • Water Resources assessment: working group started duties in September 2018. • Manual on Stream Gauging: review (in cooperation with ISO) being completed – CHy review still needed (Secretariat to highlight the changes from previous

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages	Status
							version), and published as an update WMO document (as opposed to a joint WMO/ISO publication)
Networks: further develop guidance on hydrometric network optimization and prioritization of stations taking into account all users' needs, including the modelling community; update recommendation on station density; also consider the possibility of promoting the concept of hydrological "heritage" stations;	• Establish expert task team taking into account RAs experts to support the initiative; • Collect case studies of existing hydrological networks developments • Review of the existing WMO recommendation on station density, and network optimization principle • Propose new guidance material •	Y. Jianqing	• Task team established • Report on case study • outline of the guidance • The guidance.	• OPACHE • RAs WGH • Expert Task Team • WMO Secretariat (lead Igor)	• List of expert task team–June 2017 • Report on case study– September 2018 • outline of the guidance - September 2019 • the guidance – December 2020 • Review the first version of the guidance on hydrometry network optimization contributed by Korea before RA II WGH meeting	• UNESCO IHP • ISO-TC113, CEN • RAs • WMO Secretariat • Research institutes	• Working group established (might be completed with additional experts from Canada) • Draft review report available • Secretariat make sure similar initiatives are connected (e.g., CEN, Switzerland) • concept on heritage stations will be developed for consideration of Cg18
Innovation and new data: advise	• Serve as member of GHSF	• H.Dixon • J.Fulford	• Innovation Hub calls	• OPACHE • Regional	• Milestone to be agreed by	• World Bank / GFDRR	• Committee established

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages	Status
on calls for proposals and assess existing hardware and software issued by the Global Innovation Hub and other developers, with a view to their operational use in NHSs, including non-traditional data sources such as citizen observations, and remote sensing technologies including satellites. In this regard consider new developments and applications with respect to big data.	Innovation Hub Committee. • Help design and implement innovation calls. • Promote the update of Innovation Hub outputs within NMHSs. • Establish links with other similar initiatives outside of WMO • Develop links with the private sector regarding monitoring and data technologies	(both in the InnoC)	successfully designed and implemented. • Some of the outputs of the Innovation Hub applied within NMHSs.	HAs and relevant WGs (for input on priorities) • HydroHub (Florian)	Innovation Hub Committee. • Innovation workshop by Dec 2017 • Innovation call prepared by Dec 2017, depending on opportunities and funding	• UNESCO IHP • RAs • CBS, CIMO • WMO Secretariat • IAHS+IAHR • ISO • Private Sector • Others as appropriate	and several teleconferences done, 1st face-to-face 4-5 October 2018 • Innovation strategy ready for approval September 2018 • 1st Innovation workshop December 2017 • 1st Innovation call launched June 2018

WORKPLAN: Focus Area: Hydrological Applications, Products and Services (updates in red)

Activities	Actions	AWG Member	Outputs	Milestones	Status
A) APFM: **1) work with APFM on provision of guidance and training material on E2E EWSs for Flood Forecasting through the IFM HelpDesk, and other topics such as preparation of guidelines on how to formulate numerical weather prediction information for use in flood forecasting, consistent with the FFI-AG Work Plan of 2016-2019.** **2) Represent CHy on the APFM AC/MC meetings.**	A1 -provide reliable and easy access to E2E EWS for FF products (linked to E3 mentioned below); A2 - represent CHy AWG on the APFM AC/MC meetings (together with the President of CHy); A3 - implementation of new APFM strategy on project development;	A1 · H. Kim A2 · H. Lins · H. Kim A3 Link to E4	web portal (possibly using the IFM Helpdesk) for the CoP with easy access to available materials and technologies, and communication means with end users;	APFM AC/MC meeting (now SBP Forum) web portal;	1) There were two meetings of APFM (the last APFM AC/MC meeting, 4~5 Sept 2017, Geneva and the 1st SBP (Support Base Partners) Forum 2nd 24 Aug, 2018 Stockholm). The external core financial contributions came to an end in 2017, a new governance structure was proposed and adopted for the APFM. No more AC/MC but started SBP Forum and developed a new business model. APFM (partnership with GWP-West Africa and Volta Basin Authority) submitted the project proposal 'Integrating Flood and Drought Management and Early Warning for Climate Change Adaptation in the Volta Basin)' to the Adaptation Fund in Aug 2018. The decision on the submitted proposal is expected in Oct 2018. The APFM and IDMP are to integrate the HelpDesks and already jointly present in social medias such as Facebook and Twitter. Applying 3 pillars for APFM. 2) Hwirin attended on the APFM meetings with Harry Lins, Paul and Giacomo. 3) Web portal activity linked to E3 A joint Pres CHy/Chair UNESCO-IHP/GWP ExSec meeting might be held to further discuss synergies on this topic by the end of the current year.

Activities	Actions	AWG Member	Outputs	Milestones	Status
B) WMO Hydrological Status and Outlook (Including Sub-seasonal to Seasonal Hydrological Prediction): **1) Oversee the establishment and work of the expert Task Team coordinating the pilot phase of the initiative;** **2) Improve the utility of sub-seasonal to seasonal forecasts for hydrological and water resources management applications;**	B1 - Establish Expert Task Team (ToR and Membership). B2 - Establish the necessary links between this initiative and other related activities, including: a) WMO activities such as GFCS, WIGOS and GDPFS. b) external scientific initiatives and include outcomes from hydrological testbeds currently under development. B3 -Technical scoping of the initiative, including: a) Specifications of climate and hydrological data required for service development and delivery. b) Specification of the status, sub-seasonal and seasonal approaches to be used	B1 Task Team (Chair: A. Jenkins) overseen by AWG Members: N. Tuteja T. Kanyike H. Dixon B2 N. Tuteja and Task Team B3 Task Team monitored by N. Tuteja B4 Task Team monitored by N. Tuteja B5 Task Team monitored by N. Tuteja B6 Task Team monitored by T. Kanyike B7 Task Team monitored by Lead AWG	Technical specification reports assessing: a) Target users and their requirements. b) data specifications c) modelling approaches d) dissemination methods e) capacity development needs related to the project A WMO web portal for the system. Two demonstration pilot projects describing hydrologic status, sub-seasonal and seasonal prediction performance providing regular openly accessible assessment of regional hydrological status and (if possible) outlook via a central	Expert Task Team established – September 2017 Short progress reports every year Reports on system requirements – December 2018 Product delivery web portal – December 2018 Staged completion of Pilot Projects: a) Pilot Project established – December 2017 b) Pilot Project providing status assessments – June 2020 Seasonal Hydrologic Prediction Guidelines published (12 months) Hydrologic Community Requirements document for Seasonal to Sub-Seasonal predictions	B1: Task Team established following Initial Planning meeting in Entebbe, Uganda in September 2017. Task Team has held two face-to-face meetings - Entebbe, Sept 2017 and Wallingford, April 2018. B2: The Task Team met in April 2018 and invited Paul Davies (CBS) to define the links with other WMO activities. Some of the Work Packages include members that have worked with different external initiatives and will look into drawing their experiences and results into HydroSOS. B3-B5 This will be monitored throughout the development of activities of Work Packages. B6: Two basins were selected for this scoping phase of HydroSOS: South Asia and Lake Victoria Basin (LVB). The Secretariat is currently preparing ToRs for undertaking an assessment of national hydrometeorological capacities for water resources and an assessment of user needs. Regarding the GBM, Nepal, Bhutan and Bangladesh have provided focal points from their Services to liaise with Guna Paudyal (leader of Work Package

Activities	Actions	AWG Member	Outputs	Milestones	Status
	in the initiative based on the existing WMO material on SHP. B4 - Monitor and support the Expert Task Team's work establishing reliable and routine data streams for: a) Observation monitoring information b) Hindcast and forecast information B5 - Design and develop an operationally ready seamless water status and forecasting system. B6 - Development of at least two demonstration pilot projects in significant water supply regions around the world. B7 - Provide input to the Task Team's work developing an implementation plan for the System beyond 2020 and present to CHy-16	Members B8 a) CHy Review process and undertake necessary revisions b) Jan D. c) N. Tuteja	WMO website. - An implementation plan for submission to CHy-16 detailing the potential development into an operational system after 2020. - Related WMO Guidelines and other documents (outlined in Actions) published.		3a -for GBM-). The process of assessment of the existing modelling and data availability in those countries is being started. Regarding the establishment of the LVB, Tom: 1.1. Participated in planning meetings (Uganda & UK), 1.2. Provided updated workplan for Lake Victoria region to take HydroSOS forward. However implementation had stalled due to lack of resources- 1.3. Collected some information on existing models within the region through extended network in the region. B7: to be done further before the end of this phase of HydroSOS B8: The Guidelines on SHP have been reviewed and comments are to be shared with authors. The document on downscaling guidelines has been archived until further notice. Verification guidelines: Build upon work done in HydroSOS, HEPEX, Springer book chapter drafted by Narendra and work that will be done Second quarter 2019: next meeting of HydroSOS work packages

Activities	Actions	AWG Member	Outputs	Milestones	Status
	B8 - Complete related WMO Guidelines. including: a) Reviewing the Seasonal Hydrological Prediction Guidelines. b) Completing the Downscaling Guidelines. c) Developing sub-seasonal and seasonal hydrological verification guidelines to enhance end-user confidence (link with E5).				A tentative budget should be developed to quantify resources needed for the implementation of HydroSOS at the meeting Need for a bare bone map of current streamflow conditions based on data currently available online for pure demonstration purposes. Resource requirements will be discussed in the context of next meeting.
D) DRR: **1) contribute to the development of identifiers for cataloguing of hazardous events (promote hydrological perspective) and** **2) lead the finalization of the Manual on Flood Risk Mapping, including** **3) investigating the applicability of Common Alerting Protocols (CAP);**	ACTIVITY D1 - Contribute to DRR Programme including representing CHy on DRR FP RA-TC-TP and EAGs - Contribute to the catalogue ACTIVITY D2 - Finalize the manual - form a drafting team with new members (CHy-15 meeting volunteers M. Bussetini (Italy), Mexico – contact delegate for OPACHE member); ACTIVITY D3 - collect material on alerting protocols used in operational	D1 · Jan D. (lead) · Marcelo (assist) . Yuri (assist) D2 · Marcelo (lead) . Yuri (assist) · Tom D3 · Jan D. (lead)	D1 - Appropriate representation of hydrological aspects within DRR - Revised hydrological hazard definitions; D2 - Manual on FRM; D3 - material and recommended alerting protocol for operational hydrology;	D1 - Review of draft catalogue – J.Danhelka - proposed new hydrological hazard definitions to AWG (input to review of Technical Regulatory Materials); D2 - New Draft of Manual – AWG-2; - Finalized Flood Risk Mapping Manual – CHY-16; D3 - List of alerting protocols used – AWG-2;	D1: There was a meeting of the group on cataloguing that took place in Geneva in November 2017. WG agreed on the principles to use UUID (Universal Unique Identifier) that was later agreed by EC-70. J. Danhelka participated in the meeting and contributed to the document writing. Secondly RAVI decided to launch UUID prototype for RAVI – J. Danhelka represents hydrology there. D2: The writing of the Manual on Flood Risk Mapping is progressing steadily, with great contribution and involvement of the whole team, and a strong support of the Secretariat. An estimated 75/80% of the manual is already made. The remaining 20/25% is accounted for by: three chapters to be written (out of 13 + 2

Activities	Actions	AWG Member	Outputs	Milestones	Status
	hydrology including CAP - develop recommendations on use of alerting protocols in operational hydrology;			- Evaluation of protocols – AWG-2; - recommenda-tions for alerting protocol use in operational hydrology – Cg-18;	annexes), two and a half to be reviewed, and an overall review for consistency and language correction. D3: No commonly used alerting protocols except CAP has been found in the field of operational hydrology. Activity is closely connected with D1 and new GMAS, where CAP has been agreed as the only protocol to be used. In E1 and E2, definitions are being reworked on urban flooding and flash flood. Provide to D1 when the definitions will be available. Consider other AWG members for the peer-review process of D2. Or maybe not (potential conflict of interest). Anyway, consider peer-reviewers.
E) Implementation Strategy for the End-to-End Early Warning Systems (E2E EWS) for flood forecasting (using the Community of Practice approach): 1) develop assessment guidelines for NHSs to evaluate their E2E EWS for flood forecasting, furthering the earlier work on "Efficiency of flood forecasting services"	ACTIVITY E0 - Establish CoP approach for FF ACTIVITY E1 - develop generic and living list of requirements/best practices in E2E EWS for FF (based on existing materials); - prepare assessment guidelines making use of existing material including assessment	. ·Marcelo Uriburu – Activity Lead Contributors -Y. Simonov, H. Kim, T.Kanyike, N.Tuteja E0 Marcelo (lead), Tom (assist) E1 uri (lead)	ACTIVITY E1 - List of best practices (YS); - NHSs assessment guidelines (YS); E2 - Guidance material on platforms and models; - Guidance material (e.g. NWP formulation for FF);	Task team (TT) (work group) is formed to oversee development and implementing of the CoP approach in E2E EWS in FF; Meeting to develop CoP (ToR) approach 2017?; E1 teleconferences/ meeting to finalize NHSs assessment	E0 & E4 A meeting took place in Geneva (13-17 Nov 2017) on Establishing a Community of Practice on Flood Forecasting (CoP FF). It dealt not just with activity E0 but with activities E1 and E2 (reported separately), which explains the participation of the two Task Teams formed to carry out activities E1 and E2 (aka TT E1 and TT E2). The first part (2 days) was conducted using two parallel sessions, devoted (i) to the

Activities	Actions	AWG Member	Outputs	Milestones	Status
(including testing developed procedures) possibly through the establishment of a Task Team/Working Group, consistent with the FFI-AG Work Plan of 2016-2019, 2) develop access to the interoperable technologies including platforms and models for use in flood forecasting; 3) provide access to training and guidance material, in conjunction with item 1.4(g) below, on the aforementioned items; and 4) assist in the development of projects;	instructions E2 - inventory and assessment of capabilities of existing platforms and hydrological forecast models; - inventory of existing guidance material (what is available and what is missing), including river-ocean modelling and forecasting; - inventory of existing training material (what is available and what is missing) E3 - design (assemble content) web portal (using existing IFM Helpdesk capabilities) allowing access to technologies (e.g. models), guidance and training material; E4 - seek opportunities for implementing CoP approach using pilot projects based on countries' requests; E5 - Review guidelines for	E2 Hwirin Kim (lead) Y. Simonov (assist) E3 Hwirin Kim (lead) E4 E-team E5 N. Tuteja (lead)	- training material needed to support CoP; E3 - web portal of the CoP with easy access to available materials and technologies, and communication means with end users; E4 3 Members have progressed from assessment to filling identified gaps using CoP approach E5 Develop hydrological flood forecast verification guidelines for contribution to Hydrologic Forecast Verification Guidelines at multiple time scales.	guidelines in advance of FFI-AG3; E2 guidance and training material are available for CHy-16; E2 inventory and guidance material on interoperable platforms and models for CHy-16; E3 Launching of CoP and web portal HelpDesk in 2018; E4 3 pilot projects established CHy16; E5 Reviewed RA II document 2018	Assessment Guidelines for evaluating the NHSs capabilities in E2E Flood Forecasting (Activity E1), and (ii) to interoperable technologies to advance flood forecasting (Activity E2), and the second part (3 days) was conducted in a joint session, devoted firstly to discussing the results of each parallel session, and finally to the implementation of a Community of Practice for the End-to-End Early Warning Systems (E2E EWS) for flood forecasting (Activity E0). After very active discussions, several items (a dozen) have been agreed upon regarding the concepts and practices to be adopted in moving forward with the CoP FF. A list of Action Items arose from the meeting, and a Work Plan was agreed upon by the group. In the process of assessing the Flash Flood Guidance System with Global Coverage (GFFGS), the necessity of establishing a CoP for the GFFGS users (and other stakeholders) was expressed by various interviewees, with the expectation of improving the operations, the interpretation of products and their uncertainty. Provide to D1 when the definitions will be available coming out of terminology discussions in E1 and E2 E1

Activities	Actions	AWG Member	Outputs	Milestones	Status
	verification of hydrological forecasts (RA II) consistent with product requirements – coastal hydrologic services, very short range high temporal resolution hydrologic forecasts for flash flood guidance (link to B3 c).				Team of six members was formed (plus a few experts from E0, which expressed willingness to help and share their experience). Structure of the assessment guidelines was developed (10 sections covering the main pieces of the flood forecasting chain), covering all major flood types. Each section represents a table (or matrix) with relevant questions for each flood type and flood mechanism relevant for a country or basin. Four teleconferences were organized (as of 1.10.2018). Draft assessment guidelines are developed and being reviewed (first round of review). The assessment guidance material is being developed at the moment (first draft is ready). Harmonize this activity with HydroHub, especially for what concerns assessment of hydrometry networks. E2 & E3 Task Team on Interoperable Models and Platforms (TT E2) was formed with 5 experts. TT E2 developed definitions and criteria for Interoperable Technologies during Geneva meeting (Nov 2017). Hydrological Model template was determined and Hydraulic, Reservoir, Platform, terminology and definitions have been reviewed and revised through 7 teleconferences (Mar,

Activities	Actions	AWG Member	Outputs	Milestones	Status
					Apr, Jun, Jul, Aug, Sep 2018). A small group is working for the guidance material NWP formulation for FF. the draft table of contents will be finalized in October 2018. NHS will be contacted to collect information on operational models and platforms used at the national/local level for its consideration and potential inclusion in the inventory. Potentially avoid overcharging the HAs with requests for information, and try to aim at the heads of forecasting. Make use of the RAs WGH to identify who should be contacted. E4 E5 Narendra to provide short comments to the RA II WGH before the meeting. Narendra will consult with Yuri and Paul and Hwirin and Sung Kim before sending the final report to the President.
F) FFI: **ensure that all major projects under FFI (CIFDP, FFGS, SWFDP) include the requirements and reflect best practices for effective and sustainable flood forecasting, including**	ACTIVITY F Hold FFI-AG3 - Provide advice and guidance on implementation of the CIFDP and its subprojects according to the CIFDP-PSG work	F Y. Simonov (President Chairs FFI-AG) N. Tuteja to contribute to hydrological forecast	- CIFDP sub-projects implemented;- Independent assessment of CIFDP - guidance material on riverine-ocean modelling and	- CIFDP-C review of existing forecasting capabilities – July 2017; - CIFDP-B status review – November 2017; - proposal is developed and	FFI-AG3 was held (Dec, 2017), where WMO flood forecasting activities were shaped. FFGS review is being carried out – Y. Simonov is 1 of 3 independent reviewer. CIFDP initiatives are being conducted according to CIFDP Project Steering Group Workplan (subprojects implementation support,

Activities	Actions	AWG Member	Outputs	Milestones	Status
urban areas, consistent with the FFI-AG Work Plan of 2016-2019. **1) Co-chair the Project Steering Group (PSG) of CIFDP, participate in CIFDP sub-projects, coordinate closely with OPACHE member(s) participating in CIFDP and similarly contribute to the SWFDP and other projects/activities, ensuring improved flood forecasting early warning systems;**	plan; - develop hydrological aspects of new or existing CIFDP proposals - support the independent review/assessment of the CIFDP for the development of a sustainable coastal/riverine forecasting programme; - support FFGS implementation and training including mudflow/debris flow - preparation and provision of hydrological forecasting requirements on how to formulate numerical weather prediction information for use in flood forecasting to the SWFDP Steering Group; - provide advice and guidance to major projects (e.g., CREWS funded) on ensuring use of best practices for effective and sustainable flood forecasting;	requirements for NWP	forecasting;	seeking funding for the CIFDP-C riverine component – March 2018; - Shanghai proposal is received and reviewed – 2018; - CIFDP-C status review – April 2018; - CIFDP-F hydrological forecasting approach is assessed – June 2017; - new governance structure of CIFDP is proposed jointly with JCOMM MC;	participation in JCOMM management committee meeting). CIFDP (and FFGS) review expected towards end of October. These reviews will be followed by a second level review to assess the overall integration and sustainability of CIFDP, FFGS and SWFDP. Outcomes of the reviews will be presented to Congress 18 by Pres. CHy. Narendra has provided some work done on the use of NWP data for ensemble water forecasting for the short range, medium range and long range time scales. Some of these preliminary ideas have been shared with Hwirin, Yuri and Paul Pilon. These together with ideas from AWG colleagues will be used to develop specifications for NWP requirements, a task that we have committed to undertake. 10-15 pages document under preparation. 1 pager to be prepared for the SWFDP Steering Group.

Activities	Actions	AWG Member	Outputs	Milestones	Status
G) WRM and drought: develop and/or recommend tools for water resources assessment and planning to assist decision-making including under climatic variability and change, such as preparing guidelines for assessing hydrological drought severity and impacts for water resources management, possibly through the use of hydrological drought indicators. This could be achieved through the establishment of a Community of Practice on Droughts;	G1 Tools - Enhance Dynamic Water Resources Assessment Tool (DWAT): develop water resources assessment tool and manual; also apply the DWAT to various WMO member countries G2 Prepare guidance material for indicators - Broader in scope than drought (sector indicators dependent on water resources) G3 CoP Drought - Develop CoP Drought -Review of available documentation	G1 · H. Kim (DWAT) G2 · Tom · N. Tuteja G3	G1 DWAT Application and manual G2 Guidelines including methods for assessment of hydrological indictors for IWRM At least one demonstration case study	G1 - Draft manual of DWAT - September 2017 - DWAT workshop – October 2017 - Development of snowmelt function - September 2018 - DWAT webpage – by December 2019 G2 - Guidance material prepared – Draft by 2018; final document by AWG - 3 G3 -E0 completed and used as possible example - Possible G2-G3 meeting in 2018	G1 1) DWAT English manual and software tool are being reviewed by 3 CHy experts (Yuri, Marcelo, Tom). 2) 1st Global Workshop on DWAT will be held in 28-30 Nov 2018, Bhutan. An ongoing process of improvement will be initiated following this first workshop 3) Additional functionalities (modules) were developed including modeling of snow dynamic processes, and hydrological processes in paddy fields environment and inclusion of parameter optimization techniques. Once finalized, DWAT will be made available through the WMO website. G2 Tom was expected to support others on water resources management indicators, flood, etc upon request. He did not get any request. Clarify with Tom while at the DWAT workshop

WORKPLAN: ***Activities to be supported by the Secretariat, with support of experts from the OPACHE, without direct involvement of AWG members (updates in red)***

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages
APFM: implement activities identified as priority by the Advisory Committee/ Management Committee (AC/MC);	• Covered under WP 3					
IDMP: liaise with AgMP to ensure hydrological input to the Programme, assisting in the implementation of activities to bring them in line with APFM;	• Covered under WP 3					
Develop a statement on the definition of hydrological normals;	• Draft the statement	• President			• President confirms he will draft the statement	
Develop a manual on sediment transport measurements (suspended and bedload) and prepare related training material;	• Review existing material of WMO and other, and propose a way forward	• S. Pecora		• D. Berod • M. Busettini	• coordinate with UNESCO IHP and FICH (Santa Fe, Argentina) for a workshop on this topic • Narendra to provide contact details for sediment monitoring programme lead in Queensland State • Yang to provide contact details for sediment transport in Yellow river	

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages
Prepare guidance on conveying probabilistic forecasting to different users of the water community;	• Covered under HydroSOS	• N.Tuteja			• deliverable 5 working group 2c Aug 2020	
Review of CHy regulatory material hierarchy and style of documents, including reallocation of contents to different categories, in the context of WMO effort toward improved consistency and liaise with the AWG as required;	• Prepare one-page proposal for a way forward$ • Underway under Focus Area 2	• H.Dixon • J.Danhelka		• T.Abrate		
Public Private Partnership: Respond to request of Resolution 67 (Cg-17) and liaise with the AWG as required;	• Respond to Dimitar Ivanov request of collaboration					
Complete the guidelines on environmental flows: hydrological processes, management and ecological response.	• Already reported in Focus Area 2					

WORKPLAN: ***Activities to be implemented if one or more Members volunteer to lead their implementation (updates in red)***

Activities	Actions	AWG Member	Outputs	Resources	Milestones	Linkages
Operational guidelines that represent water availability and water supply reliability (including indicators);						
Evaluation of hydrological aspects of rainfall harvesting and potential products;	• Proposal for follow up received from Mr Anoop CHamakkala Kuriakose			• T.Kanyike • Nairobi UNESCO office has an ongoing activity on this – contacts through Amani		
Data rescue, including guidelines for filling in missing data;	• General guidance done in previous period • Review previous guidelines and original CHy request				• Concept note for a project in West Africa to be finalized for France by end of October 2018	
Evaluation of methods for design discharge estimation in consideration of climate variability and change;	• Review A. Cardoso's report	• T. Abrate and D. Sighomnou				
Organizing technical training and data exchange tools to support IWRM.	• Proposal once WHOS Phase II concept is prepared • Prepared training for La Plata – moved to Focus Area 1	• S.Pecora		H.Nacken		

ANNEX V

CHY REPRESENTATIVES

HWR Related Groups		**CHy Representative/s**
1	Management Committee - Assessment of the Performance of Flow Measurement Instruments and Techniques	Chair: J. Fulford Vice-chair: RA representative:
2	GHSF Advisory Council	Chair: President of CHy H.Dixon
3	GHSF InnoC	H. Dixon (Chair) J. Fulford
4	Flood Forecasting Initiative Advisory Group (FFIAG)	Chair: President of CHy Y. Simonov
5	Associated Programme on Flood Management (APFM) Management Advisory/Management Committee (now Support Base Partners Forum)	President of CHy CHy Representative: H. Kim
6	Integrated Drought Management Programme (IDMP) Advisory/Management Committee	President of CHy CHy Representative: H. Kim
7	International Flood Initiative (IFI) Advisory Committee	Secretariat
8	Global Runoff Data Center Steering Committee (GRDC)	AWG Member: S. Pecora
AWG liaisons with RA WGHs		
	RA I	T. Kanyike
	RA II	H. Kim (supported by J. Yang)
	RA III	M. Uriburu
	RA IV	H. Lins
	RA V	N. Tuteja
	RA VI	H. Dixon

Congress and Executive Council Groups		
1	Executive Council Task Team on WMO Policy for International Exchange of Climate Data and Products to Support the Implementation of the Global Framework for Climate Services	President of CHy
2	Executive Council Panel on Education and Training	Z. Liu/C. Cudennec
3	Presidents of Technical Commissions	President of CHy
4	EC WG-SOP	Representation of CHy has been discarded
5	EC Panel of Experts on Capacity Development	Secretariat attended the first (and only so far) meeting
6	CBS-Led Review on emerging data issues	S. Pecora
7	CBS-Led Review on data partnerships	S. Pecora
Joint Commission Working Groups		
1	Joint Expert Group on Climate, Food and Water	J. Danhelka, D. Jayasuriya (activities completed)
2	CIFDP Steering Group (PSG)	Y. Simonov (Co-chair) Member: G. Smart
WIS-WIGOS		
1	Inter-Commission Group on WIGOS (ICG WIGOS)	S. Pecora
2	Sub-group on Regulatory Material CBS Inter Programme Expert Team on WIGOS Framework Implementation Matters (IPET WIFI)	TBD
3	Sub-group on Metadata CBS Inter Programme Expert Team on WIGOS Framework Implementation Matters (IPET WIFI)	TBD
4	Sub-group on QM CBS Inter Programme Expert Team on WIGOS Framework Implementation Matters (IPET WIFI)	TBD
5	Sub-group on Information resource CBS Inter Programme Expert Team on WIGOS Framework Implementation Matters (IPET WIFI)	TBD
6	WIGOS Editorial Board (WEdB)	S. Pecora (need to forward email to Secretariat)
7	IPET-MDRD	S. Pecora
8	IPET-DRMM	Focal point: S. Pecora Day to day: Secretariat (T. Abrate)

9	IPET-OSDE	S. Pecora
10	IPET-SUP	M. Uriburu
Disaster Risk Reduction		
1	DRR CHy Focal Point	M.Uriburu (supported by J.Danhelka)
2	Expert Advisory Group on Hazard/Risk Analysis	J. Danhelka
3	EG-GMAS	J. Danhelka
Other		
1	GFCS TT ORP	J. Danhelka
2	SG SDPFS	J. Danhelka
3	OGC HDWG	T. Boston, S. Pecora
4	Joint Task team on BIP	Z. Liu, C. Pearson

NOTE: The latest updated version will be available online