**WORKPLAN: Focus Area: *Hydrological Applications, Products and Services***

| **Activities** | **Actions** | **AWG/OPACHE Member** | **Outputs** | **Resources** | **Milestones** | **Linkages** |
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| **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  H.Lins  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; | * Secretariat support in web-portal development; | * APFM AC/MC meeting; 4-8 September * web portal; | * GWP * FFI-AG; * CHy AWG President; * Secretariat |
| **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:   1. WMO activities such as GFCS, WIGOS and GDPFS.   2. external scientific initiatives and include outcomes from hydrological testbeds currently under development.   B3   * Technical scoping of the initiative, including:  1. Specifications of climate and hydrological data required for service development and delivery. 2. Specification of the status, sub-seasonal and seasonal approaches to be used 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:  1. Observation monitoring information 2. 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   B8   * Complete related WMO Guidelines. including:  1. Reviewing the Seasonal Hydrological Prediction Guidelines. 2. Completing the Downscaling Guidelines. 3. Developing sub-seasonal and seasonal hydrological verification guidelines to enhance end-user confidence (link with E5). | 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 Members  B8  a) CHy Review process and undertake necessary revisions  b) Jan D.  c) N.Tuteja | * Technical specification reports assessing:  1. Target users and their requirements. 2. data specifications 3. modelling approaches 4. dissemination methods 5. 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 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. | * Lead AWG Members and Expert Task Team (Chair: A. Jenkins) * Secretariat support for organising the Task Team's work and meetings * Secretariat support for establishing a WMO website and publication material for the initiative. * Side events at external conferences * Resourcing for demonstration projects | * Expert Task Team established – September 2017   .Meeting in Uganda; 25-29 Sep   * Short progress reports every year * Conference May 2018 * Reports on system requirements – December 2018 * Product delivery web portal – December 2018 * Staged completion of Pilot Projects:  1. Pilot Project established –December 2017 2. Pilot Project providing status assessments – June 2020  * Seasonal Hydrologic Prediction Guidelines published (12 months) * Hydrologic Community Requirements document for Seasonal to Sub-Seasonal predictions   a) Review process started June 2017 | * GDPFS * WIGOS / WHOS * GFCS * Related external scientific initiatives * IAHS |
| **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),– contact delegate for OPACHE member);   ACTIVITY D3   * collect material on alerting protocols used in operational hydrology including CAP * develop recommendations on use of alerting protocols in operational hydrology; | D1   * Marcelo (lead) * Yuri (assist)   D2   * Marcelo (lead) * 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; | * AWG members * OPACHE * APFM | D1   * Review of draft catalogue - TBD * proposed new hydrological hazard definitions to AWG (input to review of Technical Regulatory Materials);   D2  Drafting team formed May 2017   * New Draft of Manual – AWG-2; * Finalized Flood Risk Mapping Manual – CHY-16;   D3   * List of alerting protocols used – AWG-2; * Evaluation of protocols – AWG-2; * recommendations for alerting protocol use in operational hydrology – Cg-18; | * OPACHE; * DRR programme; * PWS * Members * International Basin Authorities * RAs |
| **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” (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; | 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 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 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 B8 c). | * Marcelo Uriburu – Activity Lead * Contributors -Y.Simonov, H.Kim, T.Kanyike, N.Tuteja   E0  Marcelo (lead), Tom (assist)  E1  Yuri (lead)  E2  Hwirin Kim (lead)  Y. Simonov  (assist)  E3  Hwirin Kim  (lead)  E4  E-team  E5  N.Tuteja (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); * 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. | * OPACHE; * TT * Secretariat to develop web portal HelpDesk; * Financial budget (place holder) * One joint face-to-face meeting of key contributors (within 9 months from now) | * 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 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   Review process of S. Borsch’s report started in July 2017 | * OPACHE; * FFI-AG; * CHY-AWG; * CREWS; * IFI; * Members; |
| **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 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; | ACTIVITY F  Hold FFI-AG3   * Provide advice and guidance on implementation of the CIFDP and its subprojects according to the CIFDP-PSG work 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; | * F   Y. Simonov  (President Chairs FFI-AG)  N.Tuteja to contribute to hydrological forecast requirements for NWP | * CIFDP sub-projects implemented; * Independent assessment of CIFDP * guidance material on riverine-ocean modelling and forecasting; | * G.Smart | * CIFDP-C review of existing forecasting capabilities – July 2017; * CIFDP-B status review – November 2017; * proposal is developed and 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; | * OPACHE * JCOMM * CBS * WDS * GDPFS * GFCS |
| **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 * Prepare brief report on available assessment tools (inventory) for national/basin scale application   G2 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) * N.Tuteja to provide OPACHE member to undertake assessment report   G2   * Tom * N. Tuteja   G3 | G1  DWAT Application and manual  Brief report of assessment tools  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 - December 2018 * Brief report on available assessment tools – AWG-2   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 | G2   * GWP * IDMP |