

WMO RA II WGHS 2017-2020 (Status of 2018)

Sung Kim

Chairperson, WGHS RA II

Korea Institute of Civil Engineering and Building Technology



WMO OMM

World Meteorological Organization

Organisation météorologique mondiale

Expert Group on Measurements, Monitoring and Infosystems (EG-MMI)

| EG-MMI | Name | Member |
|--|--------------------------------|-------------------|
| Coordinator/Chairperson | Dr Sung Kim skim@kict.re.kr | Republic of Korea |
| Leader in hydrometric measurements | Dr Youngsin Roh | Republic of Korea |
| Leader in mass movements (sediment disasters and debris flows) | To Be Determined | TBD |
| Leader in provision of hydrological services | Mr Xin Zhao | China |



Chairperson and EG-MMI Coordinator (Sung Kim) (1)

| Deliverables | Activities | Outputs |
|---|--|---|
| 1. In his capacity as Hydrological Adviser, provision of assistance to the president of RA II in accordance with the duties stipulated in Regulation 168 (b) of the WMO General Regulations | <ul style="list-style-type: none"> (a) Represent WGHS as and when required, (eg at MG and EC) (b) Attend meetings of chairpersons of Working Groups (c) Other duties as required of chairpersons WGHS (see General Regulation 168 (b)) | <ul style="list-style-type: none"> · Hydrology and Water Resources issues remain a key aspect of the work of RAll · NMHSs are assisted in fulfilling their roles and responsibilities. · WGHS is adequately represented within the RAll environment. |
| 2. Preparation of a Working Group implementation plan in consultation with the president and the Management Group of the Association, with reference to the key performance indicators/targets and action plans under the respective expected results of the RA II Strategic Operating Plan, to undertake work on the various theme areas under the charge of the Working Group | <ul style="list-style-type: none"> (a) Chair theme leader meetings of the WGHS to develop implementation plan (b) Coordinate the activities of the Expert Group on MMI (b) Brief MG meeting on WGHS activities · Submit annual report to RA II president | <ul style="list-style-type: none"> · WGHS implementation plan · Work Plan for the EG on MMI · Annual progress report |
| 3. Participate in Executive Council sessions, when invited, representing the regional interests in relation to hydrology and water resources and to coordinate the WGHS activities with the Commission for Hydrology and other regional Working Groups on Hydrology | <ul style="list-style-type: none"> · Attend EC meeting if required · Develop WGHS work plan in consideration of CHy and other regional WGHS activities · Organize WGHS meetings | <ul style="list-style-type: none"> · Meeting reports · WGHS implementation plan |



Chairperson and EG-MMI Coordinator (Sung Kim) (2)

| Deliverables | Activities | Outputs |
|--|---|--|
| 4. Preparation and submitting to the president of the Association an annual report by 31 December every year and a final report in time for presentation to the sixteenth session of the Association, both copied to the WMO Secretariat | <ul style="list-style-type: none"> Develop WGHS activity report with input from Coordinator EG-HA and thematic leaders | <ul style="list-style-type: none"> WGHS activity reports |
| 5. Promote long-term operation of hydrological observation stations suitable for climate change and variability studies | <ul style="list-style-type: none"> Encourage Members to maintain stations having long hydrological records for climate studies. | <ul style="list-style-type: none"> Letter to National Hydrological Advisors Recommendations on improvements to the RA II Survey regarding NHSs including hydrological stations |
| 6. Improved knowledge of the status and structure of NHSs in RA II | <p>(a) Design and conduct survey by e-mail of NHS' activities and status</p> <ul style="list-style-type: none"> - hydrological observations - WRA and management activities - forecasting | <ul style="list-style-type: none"> Survey report for hydrological services in RA II |
| 7. Development and active use of an on-line RA II Virtual Hydrology Forum designed to facilitate broad engagement of experts throughout the Region in its activities and to help advance collaboration on its activities. | <p>(a) Design and development of RA II Virtual Hydrology Forum on the WMO Homepage</p> <p>(b) Invite PRs of Members that do not have designated NHAs to do so</p> <p>(c) invite the RA II WGHS members, RA II National Hydrological Advisors and hydrological experts in RA II to participate in the Forum</p> <p>(d) Facilitate the use of the RA II Virtual Hydrology Forum by e-mail</p> | <ul style="list-style-type: none"> Operation of RA II Virtual Hydrology Forum Increased number of Members having designated NHAs in RA II Increased capacity building on hydrological issues of importance to RA II Members |



Hydrometric Measurements (Youngsin ROH)

| Deliverables | Activity | Outputs |
|---|---|--|
| 1. Improvement in hydrometric measurements in both quality and accuracy | a) Providing guidelines for application of real-time measurement system and development of new measuring techniques <ul style="list-style-type: none"> · Providing guidelines for application of IVM and IRDIMS · Development of new measuring techniques to be applied to the IVM and IRDIMS | <ul style="list-style-type: none"> · Guidelines related to IRDIMS · Installation and operations · Maintenance · Development of index ratings · Technical report on new applications of IRDIMS · New application using surface velocimetry · Case studies using test bed |
| | b) Improvement of sediment measuring techniques <ul style="list-style-type: none"> · Development method to estimate suspended sediment using ADVN | <ul style="list-style-type: none"> · Technical report on estimation of suspended sediment using ADVN |
| | c) Improvement and development of systematic procedures for use of rating curve <ul style="list-style-type: none"> · Providing specific guidelines for development of rating curves (for all procedures) · Development of software tools to calculate discharge (including post processing and data QC) and develop rating curves | <ul style="list-style-type: none"> · Guidelines on development of rating curves (from field measurement to assessment of rating curves) · Software tools · Discharge calculation for all kinds of instruments · Development of rating curves |
| 2. Global application of software tools and methods for measuring discharge | (a) Assessment of applicability of software tools <ul style="list-style-type: none"> · Request CHy to review and test software tools · Request RA II members to test software tools and report to WGHS Chairperson · Improvement of software by considering results of the testing | Software tools and methods for measuring discharge including backwater and tidal influence |

Mass Movements (sediment disasters and debris flow) (TBD))

| Deliverables | Activities | Outputs |
|---|---|---|
| 1. Improvement in capacity to deal with water related disaster management (Hydrological Extremes) | <ul style="list-style-type: none">Attend seminars on sediment disasters in order to communicate and cooperate among member countries. | <ul style="list-style-type: none">Workshops on the provision of sharing knowledge for sediment disasters (e.g. attend workshop of TC DRR)ODA projects which transplant knowhow to developing countries |



Provision of Hydrological Services (Xin ZHAO)

| Deliverables | Activities | Outputs |
|--|--|---|
| 1. Development of national and regional capacity-building programmes and related training activities for hydrological services | <ul style="list-style-type: none">· Synthesize reports from individuals and participating countries in RA II on national and regional capacity development activities in hydrology· Make recommendations on their enhancement | <ul style="list-style-type: none">· Computer files and/or collected printouts from individuals and participating countries in RA II on national and regional capacity development activities in hydrology· Report showing synthesized results and recommendations on their enhancement |



Expert Group on Hydrological Applications (EG-HA)

| EG-HA | Name | Member |
|--|--|--------------------|
| Coordinator | Mr Muhammad Riaz riaz1962@hotmail.com | Pakistan |
| Leader in water resources assessment reflecting climate change and variability | Dr Hrwirin Kim | Republic of Korea |
| Leader in water-related disaster risk management | Dr Htay Htay Than | Myanmar |
| Leader in cryosphere modelling | Dr Sergei Borshch | Russian Federation |
| Leader in flood forecasting | Mr Sangay Tenzin | Bhutan |
| Leader in hydrological drought forecasting and prediction | Mr Pema Wangdi (Absent) | Bhutan |



Coordinator – EG on Hydrological Applications (Muhammad RIAZ)

| Deliverable | Activities | Output |
|--|---|--|
| 1. Assist the chair in accomplishing his tasks | (a) Tasks as assigned by the chair | Various tasks achieved |
| 2. Preparation of the annual report of EG-HA and submitting it to the chair | (b) Regularly contacting the theme leaders to assess progress in their assignments and activities (c) Ensuring that the thematic work plans as submitted by the EG-HA are well coordinated and aligned with overall RA II and CHy AWG (d) Preparing input to WGHS annual reports. | Input to the Annual Report |
| 3. Development of recs on the best use of hydrological forecasts to support flood management decision making | <ul style="list-style-type: none"> Review practices of water resource management agencies for averting losses from flooding and their use of flood forecasts Interview flood management practitioners and decision makers to ascertain needs for flood forecasts to gain insights on their best use Draft report on best practices making recs | Draft recommendations on the best use of hydrological forecasts to facilitate wise flood management practices |
| 4. Provision of assistance from the WGHS to RA II Pilot Project on Cryosphere | <ul style="list-style-type: none"> Contacting RA II Pilot Project lead through PR of Pakistan to offer assistance Developing separate Pilot Project work plan of the WGHS drawing on members of WGHS to advance project goals with Chair WGHS Coordinating and tracking of WGHS input to Pilot Project with Chair | <p>Work plan of the WGHS on Pilot Project to assist it in attaining its goals</p> <p>WGHS input to Pilot Project, based on work plan developed</p> |



Water Resource Assessment (Hwirin KIM)

| Deliverable | Activities | Outputs |
|--|---|---|
| 1. Improvement of water resources assessment techniques to assist decision making in water resources management | <ul style="list-style-type: none"> (a) Develop water resources assessment technique(DWAT, Dynamic Water resources Assessment Tool) (b) Provide guidance materials for DWAT(water resources assessment technique) | <ul style="list-style-type: none"> · DWAT 1.0 Software · User manual for DWAT 1.0 |
| 2. Globally implemented Dynamic Water Resources Assessment Tool (DWAT) to assist decision making in water resources management | <ul style="list-style-type: none"> (a) Request CHy to review and test DWAT (b) Implement DWAT in select RA II basins (c) Develop training material to allow broad implementation of DWAT (d) Organize and conduct one small global DWAT workshop for members of RA WGSH including CHy AWG | <ul style="list-style-type: none"> · Training Material for DWAT 1.0 · Report on case studies for DWAT 1.0 application |



Water-related Disaster Risk Management (Htay Htay THAN)

| Deliverable | Activities | Outputs |
|---|--|--|
| 1. Enhancement of use of national and regional hydrological forecasting for water-related disaster management (Hydrological extremes of floods) | <p>(a) Organize a workshop involving some South and Southeast Asian countries to inform national disaster agencies of forecast products and seek input on tailoring products and services to meet their needs</p> <p>(b) Prepare guidance material on critical needs of NDMA's for flood forecast products</p> | <ul style="list-style-type: none"> Documentation of needs and requirements of national disaster management agencies for hydrological forecast products and services |
| 2. Improvement of the availability of risk-based information upon which to base risk-based riverine flood forecasting and flood management activities | <p>(a) Training of hydrologists on flood risk mapping and risk-based flood forecasting techniques</p> <p>(b) Developing Concept Note on Pilot Project to implement Flood Risk Mapping and Impact-based Flood Forecasting on one targeted damage centre (community)</p> <p><u>Pilot Project</u></p> <p>(c) Developing the location-based flood disaster risk information requirements for one damage centre (community) of an RA II target community as a case study</p> <p>(d) Assessing the gaps, obstacles, challenges and requirements for flood disaster risk mapping of the targeted disaster centre (community)</p> <p>(e) Developing the functional requirements for impact-based forecasting & warning</p> <p>(f) Implementing impact-based flood forecasting for advancing Flood Risk-based Warning Services for the targeted damage centre (community)</p> | <ul style="list-style-type: none"> Trained hydrologists on flood risk mapping and risk based forecasting Concept Note for Pilot Project and bankable proposal Documentation on flood disaster risk information requirements Documentation on gaps, obstacles, challenges and requirements for flood disaster risks for the targeted disaster centre (community) Documentation on functional requirements for impact-based forecasting and warnings Documentation of pilot project on Impact based Forecast and Flood Risk-based Warning Services |



Cryosphere modelling (Sergeyi BORSHCH)

| Deliverable | Activities | Outputs |
|--|---|---|
| 1. Improvements to the mathematical representation of cryospheric processes in operational hydrological forecasting models (excluding GLOFs) | <ul style="list-style-type: none">(a) Reviewing suitability of and make recommendation on best practices for mathematical modelling of the cryosphere excluding GLOFS(b) Developing guidance material on (a) with an emphasis on their contributions to streamflow discharge and groundwater(c) Reviewing suitability of and make recommendation on best practices for mathematical modelling of the cryosphere with emphasis on glacier morphology | <ul style="list-style-type: none">• Technical report on review of the “experiences on modelling of snowpack and glacier component in operational hydrological modelling to produce streamflow discharge and ground water contributions”• Training Material on modelling of cryosphere components within hydrological modelling with an emphasis on their contributions to streamflow discharge and groundwater |



Flood Forecasting (Sangay TENZIN)

| Deliverables | Activity | Outputs |
|---|--|---|
| <p>1. Improvement in hydrological warnings capability through enhanced and effective cooperation with other NMHSs (2.1.1)</p> | <p>(a) Preparing recommendations on the use of numerical weather prediction outputs in flood forecasting</p> <p>(b) Documenting approaches to ascertain the deterministic error of each ensemble element of a NWP output, for example over the previous thirty day period, using this deterministic signal to provide a weighting on the confidence of the forecasted ensemble elements</p> <p>(c) Preparing training material on (b) for NWSs</p> | <p>(a) Guidance on the use of NWP outputs for use in flood forecasting systems</p> <p>(a) Technical report on the approaches to establishing the deterministic error in NWP outputs and how they should best be used in establishing hydrological forecasts with enhanced accuracy.</p> |
| <p>2. Issuance of flood, flash and urban warnings and constantly improving upon them (2.2.1)</p> | <p>(a) Documenting verification results for the SAsiaFFG System with some of the participating countries' experts and obtaining feedback on use of systems by forecasters</p> <p>(b) Develop the final version of guidelines for verification of hydrological forecasts with S Borshch (author).</p> | <p>(a.1) Report documenting verification results.</p> <p>(a.2) Report documenting experiences, including recommendations on approaching implementation of FFGS and its use.</p> <p>(b) Final version of guidelines for verification of hydrological forecasts.</p> |



Hydrological Aspects of Drought (Pema WANGDI-Absent)

| Deliverable | Activities | Outputs |
|---|---|--|
| <p>1.Improve National and Regional Drought Forecasting and Prediction capabilities for disaster risk management through enhanced and effective cooperation with other NMHSs</p> | <ul style="list-style-type: none"> (a) For the dry season, develop hydrological methodology: <ul style="list-style-type: none"> - Determine seasonal and 10-d moving P depths for the key basins using basin average P - Determine seasonal and 10-d moving runoff using the river flow data for the key basins - Develop P-R seasonal and 10-d relationships and assess uncertainty - Using the seasonal P forecast, calculate the R for key basins (a) For the dry season, investigate the applicability of a recession curve approach for forecasting discharges. (b) Investigate the use of various drought indices for dry season streamflow. (c) Provision of Seasonal Hydrological Outlooks to water managers <ul style="list-style-type: none"> - Provide runoff outlook report every 3 months using 10 day time steps for all the key basins in Bhutan. (a) Evaluate Hydrological Seasonal Outlooks <ul style="list-style-type: none"> - Analyze statistically the differences resulting from use of the outlooks versus no outlook scenarios through the workshop/meeting, comments, feedback for improvement | <ul style="list-style-type: none"> - Seasonal hydrological outlook report provided to major water users every 3 months based on <ul style="list-style-type: none"> - 10-day runoff forecasts for next 3 months period - assessment of water scarcity and deficits - Evaluation report of the efficacy of seasonal outlook |



Input to CHy-15 and 16th Session of RA II by WGHS

| Major Accomplishments | Session | Decision |
|---|------------|---|
| Dynamic Water Resources Assessment Tool (DWAT) | CHy, RA II | <p>CHy: urges CHy to assess the Tool testing its ability and to provide guidance on its further development for global utility</p> <p>RA II: requests RA II Members to assess the Tool, testing its ability and to provide guidance to the RA II WGHS Chairperson on its further development for the benefit of Members</p> |
| Guidelines for Verification of Hydrological Forecasts | CHy, RA II | <p>CHy: urges CHy to review and assess the global utility of the Guidelines as a potential contribution to the WMO Flood Forecasting Initiative</p> <p>RA II: requests RA II Members to review and apply the verification procedures, reporting their results and views on the procedures to the RA II WGHS Chairperson</p> |
| Software tool for index velocity method | CHy, RA II | <p>CHy: urges CHy to assess the utility and applicability of the software tool and methods therein for measuring discharge under backwater and tidal influence</p> <p>RA II: requests RA II Members to test the Software Tool, reporting their results and views on the procedures to the RA II WGHS Chairperson</p> |

Thank you for your attention!

