Global Water Partnership

Global Water Partnership China
全球水伙伴（中国）

Final Workshop Report

Regional Workshop on South-South Cooperation in Flood Management

14-16 December 2015

Foshan, Guangdong, China

www.gwp.org

April 2016

Cover photo: © Angela Klauschen / GWP

This report was compiled by GWP Secretariat with the support of GWP China and all participants. We would like to thank all for their precious contribution.

Global Water Partnership (GWP)
Secretariat
PO Box 24177
104 51 Stockholm, Sweden
Visitor's address: Linnégatan 87
Phone: +46 8 1213 8600
Email: gwp@gwp.org
Websites: www.gwp.org
www.gwptoolbox.org
Facebook.com/globalwaterpartnership
Twitter: @GWPnews

Contents

Acronyms **3**

I. Overview – Executive Summary **7**

II. Proceedings of Plenary Discussions **8**

A. Opening speeches 8

B. Workshop objectives and keynote speeches 10

III. Thematic Sessions and Round-Tables **11**

A. Session 2 - Flood forecasting, monitoring, warning and responses 11

B. Session 3 - Flood management in urban settings 12

C. Session 4 - Community-based approaches to flood management 14

D. Session 5 - Flood management practices in a changing climate 16

IV. Technical Field Visit **18**

V. Internal Meeting **18**

A. Memorandum of Understanding (MoU) 18

B. Project Development 19

VI. Conclusions and Way Forward **21**

VIII. Annexes **22**

ANNEX I – BACKGROUND INFORMATION ON GWP'S WORK ON FLOODS *22*

ANNEX II – FINAL PROGRAMME *23*

ANNEX III – OVERVIEW OF ROUND-TABLE SESSIONS *26*

ANNEX IV – DRAFT MEMORANDUM OF UNDERSTANDING *28*

ANNEX V – MATRIX OF POTENTIAL PROJECTS *32*

ANNEX VI – LIST OF PARTICIPANTS *34*

ANNEX VII – PHOTOS *35*

Logos of Co-Conveners and Partners **39**

Acronyms

ADB	Asian Development Bank
APFM	Associated Programme on Flood Management
APWF	Asia-Pacific Water Forum
BSMEFFG	Black Sea and Middle East FFG
CARFFG	Central Asia Region FFG
CBS	WMO's Commission for Basic Systems
CBFEWS	Community Based Flood Early Warning Systems
CC	Climate Change
CDKN	Climate and Development Knowledge Network
CDR	Chinese Research Center on Flood and Drought Disaster Reduction
CHy	Commission for Hydrology
CWP	Country Water Partnership
DEM	Digital Elevation Model
DM	Disaster Management
DRR	Disaster Risk Reduction
EbA	Ecosystem-based Approach
FFF	Flash Flood Forecasting
FFG	Flash Flood Guidance
FFGS	Flash Flood Guidance System
FPP	Flood Preparedness Programmes
GCF	Global Climate Fund
GDP	Gross Domestic Product
GIS	Geographical Information System
GWPO	Global Water Partnership Organisation
GWP CACENA	Global Water Partnership Central Asia and Caucasus
GWP China	Global Water Partnership China
GWP SAS	Global Water Partnership South Asia
GWP SEA	Global Water Partnership Southeast Asia
HFC	Hydrological Forecast Center
HKH	Hindu Kush Himalaya
HRC	Hydrologic Research Center
IAHR	International Association for Hydro-Environment Engineering and Research
IDMP	Integrated Drought Management Programme
IMD	India Meteorological Department

INAWP	Indonesia Water Partnership
IWRM	Integrated Water Resources Management
JVS	Jalsrot Vikas Sanstha
MRCFFG	Mekong River Commission FFG
MoU	Memorandum of Understanding
MWR	Chinese Ministry of Water Resources
OFDA	Office of U.S. Foreign Disaster Assistance
P-GIS	Participatory GIS
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
RWP	Regional Water Partnership
SEAOFFG	South Eastern Asia Oceania FFG
SAsiaFFG	South Asia FFG
SDGs	Sustainable Development Goals
SIDS	Small Island Developing State
SNO	Senior Network Officer
SOP	Standard Operation Procedures
SIWW	Singapore International Water Week
TCS	Typhoon Committee Secretariat
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
USAID	United States Agency for International Development
WACDEP	Water, Climate and Development Programme
WACREP	Water and Climate Resilience Programme
WD	Western Disturbances
WMO	World Meteorological Organization
WWF China	World Wide for Nature China

I. Overview – Executive Summary

The **"Regional Workshop on South-South Cooperation in Flood Management"** was jointly organized by GWP China and GWPO from December 14th to 16th, 2015, at the Fontainebleau Hotel near Foshan in Guangdong, China.

Attended by **47 participants from eighteen countries**, the event was supported by the **Chinese Ministry of Water Resources (MWR), the Chinese Research Center on Flood and Drought Disaster Reduction (CDR), the International Association for Hydro-Environment Engineering and Research (IAHR)** and **WMO/GWP's Associated Programme on Flood Management (APFM).** There were representatives from all **four Regional Water Partnerships** (Central Asia and Caucasus, China, South Asia and Southeast Asia), the UNESCAP Typhoon Committee Secretariat, the Worldwide Fund for Nature China (WWF China), the Asia-Pacific Water Forum (APWF) and the Asian Development Bank.

This workshop was a follow up to a number of discussions between representatives of the **four Asian Regional Water Partnerships (RWPs) of Central Asia and Caucasus, China, South Asia and Southeast Asia** held since 2014 on how to work more closely together in areas of common interest to the region. One thematic area, which was clearly identified by all RWPs as adequate for initiating cooperation at that time had been the issue of floods. Hence, it was decided to go ahead with a workshop on this topic. More precisely, the aim was to promote the **exchange of experiences, knowledge sharing, capacity building, project development and other forms of cooperation** on the common issue of floods and ways to better manage them.

The **key topics selected** by the RWPs for the workshop were*:*

i) **flood forecasting, monitoring, warning and responses**;
ii) **flood management in urban settings**;
iii) **community-based approaches to flood management**; and
iv) **flood management practices in a changing climate**.

Country and regional representatives as well as invited international experts (WMO, ADB, APWF, UNESCAP Typhoon Committee, Sun Yat-sen University, etc.) presented **several case studies and interesting methodologies** on the above over the first two days, debating on them also during parallel round-tables (See the detailed reflection of the discussions as well as the full workshop programme in Annex 1 for further information).

On the afternoon of the second day, a **technical field trip was organized by GWP China** with the support of the Ministry of Water Resources and the Guangdong Provincial Water Resources Department. The participants visited the **Flood Control & Disaster Reduction Center of Foshan City** and one of the **sluices on the Pearl River**.

The workshop also represented a first step in establishing a **framework for cooperation between the RWPs** – in the form of a **Memorandum of Understanding (MoU)** – on further topics of shared interest (e.g. climate resilience, disaster risk reduction, Sustainable Development Goals, urban water management) for the years to come and for developing **a common work programme**. This discussion took place on the third day of the workshop with the attendance mainly of GWPO and RWP representatives.

II. Proceedings of Plenary Discussions

The Workshop was inaugurated on Monday, December 14th. The **Session 1 "Welcome and Introduction"** to the Workshop was chaired by **Mr. Zheng Rugang, Executive Secretary, GWP China.**

A. Opening speeches

The opening address was given by **Prof. Wang Hao, Acting Chair, GWP China,** who warmly welcomed all participants before giving an overview of issues related to water resources in China. According to Prof. Wang Hao, China is frequently challenged by floods and droughts due to the uneven distribution of rainfall between the South and the North of the country with average annual precipitation of over 2000 mm and only 400-600 mm respectively. Flood and drought disasters are a grave danger for China. Statistically speaking, one big flood occurs approximately every two years. The floods occur especially in the Eastern and Southern areas of China where there are over 50% of the population, 35% of the arable land and two thirds of the industrial and agricultural production value of the country. The nationwide losses resulting from floods are about 2% of the GDP. China has attached great importance to the prevention of flood and drought disasters and taken various engineering and non-engineering measures to tackle floods and droughts.

Prof. Wang Hao stressed that GWP China is willing to share its experiences with other countries and strengthen the exchanges and cooperation with the other Regional Water Partnerships (RWPs) in Asia in the areas of water resources management, training and capacity building.

His intervention was followed by a welcome speech by **Mr. Liu Zhiguang, Consul, Ministry of Water Resources**, who supported the organization of the workshop. After expressing his warm welcome on behalf of the Ministry of Water Resources (MWR), to all the participants to the Workshop, Mr. Liu Zhiguang explained that flood management has now become one of the big challenges for many countries in the world due to the climate change and the human activities, China being no exception. In recent years, the Chinese Government has attached great importance to the water resources and flood management. A number of measures have been taken, including the establishment of disaster risk prevention and reduction systems, flood risk management, sound management of excessive flood water, setting up of emergency management mechanisms, etc.

He indicated that China also attaches importance to the international exchanges and cooperation and that, in this context, MWR and GWP have a good cooperation relationship. Minister Chen Lei has met the GWP senior officials on many occasions and also attended important activities such as the High-level Roundtables in which he made keynote speeches that were organized by GWP China. He then acknowledged the good results and impact of GWP's different types of activities, promising that the MWR will continue to support GWP China in its endeavours.

Moreover, Mr. Liu mentioned the "One Belt and One Road" strategic programme proposed by President Xi Jinping in September 2013, which could be a vehicle for regional cooperation, the four Asian Regional Water Partnerships all being located in the targeted areas. According to him, this programme could represent a good opportunity for the cooperation between the four RWPs in coming years in such areas as water resources management, efficient irrigation, drinking water safety, waste water treatment in communities, desalination, etc. He finally wished that the four RWPs grasp all the opportunities to carry out the follow-up cooperation on flood management and other water-related issues.

Then **Mr. Rudolph Cleveringa, Executive Secretary, GWPO,** also welcomed participants on behalf of GWPO. His brief intervention focused on the following points: i) China's role as an emerging political and economic leader in the world, and in particular the Asia-Pacific region; ii) the importance of South-South cooperation on climate change in the context of COP21 and the Paris agenda, and China's pledge to invest in climate-adaptation and resilience-related projects, incl. technical assistance and capacity building, besides Global Climate Fund (GCF); iii) the need to ensure environmental sustainability of climate adaptation and resilience projects, incl. through an Ecosystem-based approach (EbA) to disaster risk reduction (DRR); iv) the challenge of addressing the strong *El Niño* phenomenon through urgent action in the Asia-Pacific region; v) the need to protect poorer communities/countries, incl. SIDS, against climate

change impact-induced losses and damages through pro-active risk management and viable climate insurance schemes, vi) positive aspects of floods, incl. groundwater and wetland replenishment, different types of flood-based farming systems.

Mr. Cleveringa ended his speech suggesting that workshop participants reflect on the following key questions: i) How binding and stringent will the COP21 agreement be in practice? ; ii) How will the private climate finance and the climate insurance sector further develop in Asia? ; iii) Is water sufficiently reflected in their values? If not, why are we missing on it?

Mr. Zhang Qingfeng, Director, Environment, Natural Resources & Agriculture Division, East Asia Regional Dept., ADB, also made a brief address presenting ADB's work on flood and disaster-reduction-related issues in China and other Asian countries. He referred to the key events in 2015 (COP 21 and related Paris Agreement as well as the adoption of the new SDGS) as being a "once-in-a-generation opportunity for global sustainable development". Noting that the "issues of climate change, water management, disaster resilience are well blended in the 2015 Sustainable Development Goals (SDGs), making it difficult to think of one without the other", he acknowledged the timeliness and relevance of GWP's workshop.

He then referred to the important flood risks in the Asia-Pacific region, and in particular to the recent flood events in Manila, Bangkok, and Beijing as examples of increased severity of flood disaster in the region. He stressed that "Asia has been the victim of the most destructive floods in recent history. Countless lives have been lost, the environment has been heavily damaged, and the fragile economies of developing countries in Asia have suffered considerable losses. Extreme rainfall events due to climate change and varieties of geophysical and socio-economic factors have made floods more frequent and destructive."

Moving to ADB's Vision on flood risk management, Mr. Zhang Qingfeng explained that the flood management paradigm has progressively evolved, from a reactive to a more proactive approach. He said "traditional approaches to flood management, namely "flood defense," or "flood control" now seem inadequate. Despite advancements in engineering and technology, flooding continues, if not increased in regularity and intensity. Today's floods are no longer caused by rainfall alone. Floods are the result of greater interaction between human society and the natural environment. Structural defense systems alone cannot address the emerging challenges, therefore non-structural solutions such as watershed management, sustainable farming, risk education, community preparedness and early warning should be the integral part of the flood management therefore integrated water resources management."

He added that "recently, more recognition has been given to the environmental and ecological approaches as an effective way of mitigating floods. Green cities development is concerned with how to design the whole city in a way that is more sustainable, efficient, adaptive, and resilient. Green cities development calls for holistic planning and management of water, flood, solid waste, storm water, and wastewater. If little consideration is given to the entire ecosystems, the impact can be devastating. 'Soft path' measures (such as land use changes, wetland storage and floodplain reconnection) and selective 'hard path' measures (such as bypass channels and controlled storage) both offer opportunities to simultaneously deliver effective and efficient flood risk reduction and promote ecosystem services, which have often been overlooked in the past."

He also said that ADB had already mainstreamed this new concept in its lending and non-lending operations and that payments for ecosystem services had been introduced to mitigate the impact of flood in a long run." Asian Water Development Outlook produced by ADB also suggested that there is a strong relationship between measures of national governance and water security. To enhance resilience to climate change, there is need to strengthen knowledge about its impacts on water resources, strengthen capacities to move into action with participatory and holistic approaches, and ensure investments focusing on 'no regret' options and options with co-benefits for mitigation and adaptation. To support this, in the run up to COP21, ADB's president announced that ADB will double its climate finance to $6 billion a year, or about 30% of its total operations by 2020. With this new commitment, about $2 billion will be used for climate change adaptation.

Mr. Zhang Qingfeng concluded thanking the organisers for inviting countries of the Asia-Pacific to participate in such a timely workshop, also stating that "ADB will be happy to participate, collaborate and organize similar events jointly with GWP and other partners in the region to exchange know-how, share the lessons and extend the collaboration to cope with challenges. The role of our knowledge partners in shaping our operations is also critical, therefore ADB will be working with partners like GWP in delivering the development goals in the region".

B. Workshop objectives and keynote speeches

Ms. Angela Klauschen, Senior Network Officer, GWPO, presented the **workshop's objectives and agenda.** This workshop was a follow up to a number of discussions between representatives of the four Asian Regional Water Partnerships (RWPs) of Central Asia and Caucasus, China, South Asia and Southeast Asia held since 2014 on how to work more closely together in areas of common interest to the region. One thematic area, which was clearly identified by all RWPs as adequate for initiating cooperation at that time had been the issue of floods. Hence, it was decided to go ahead with a workshop on this topic. More precisely, the aim of the workshop was to promote the exchange of experiences, knowledge sharing, capacity building, project development and other forms of cooperation on the common issue of floods and ways to better manage them.

Then she introduced the following **three key note speakers:**

- **Dr. Liu Zhiyu, Hydrological Forecast Center, MWR, China,** gave a key note presentation on the **"Evolution of operational flood forecasting and warning in support of flood management in China".** He explained that there is a very uneven distribution of precipitation in China, and that floods have been the most severe hazard for the country throughout history up to now. In general, three phases are identified in the evolution of flood control and management in China, namely from flood defense, flood diversion and storage, to harmonious coexistence between humans and water. As of 2014, the Hydrological Forecast Center (HFC) receives hydrological information from a total of over 90,000 hydrometric stations, among which there are over 3200 hydrological stations. There is a rainfall and typhoon monitoring system using satellite, radar, ground based systems, as well as rainfall forecasting and warning systems, and hydrological monitoring of rivers and reservoirs.

  There are still many challenges facing hydrological services in China, among others related to: i) operation of observation networks, ii) the need to improve the flood forecasting and early warning system, iii) service delivery, iv) capacity building, etc. It is anticipated that in future national hydrological services in China will advance in delivering high quality information, impact-based forecasts and multi-hazard, risk-based early warnings.

- **Mr. Ayhan Sayin, Scientific Officer, WMO/Associated Programme on Flood Management (APFM)** presented the **"Principles of Integrated Flood Management".**
  He presented the key features of WMO-GWP's Associated Programme on Flood Management (APFM) and the programme's main activities, which consist of: i) compilation of guidance materials and advisory tools; ii) field demonstration projects; iii) strategic advice on flood management through a HelpDesk (developing training and advocacy materials and capacity building); iv) building a network of institutions supporting a multi-disciplinary approach to flood management; v) contributing programme to the Global Framework for Climate Service.

  He also explained that APFM is based on a paradigm shift: i) from defensive to pro-active approaches; ii) from ad-hoc to Integrated Flood Management; iii) towards a culture of prevention by managing flood risk & living with floods; iv) balancing flood risk and achieving sustainable development needs; v) a change in decision making processes to include risk management approaches.

- **Ms. Li Suxiao, Senior Programme Officer, WWF Living Yangtze Programme, China,** gave a key note presentation on **"WWF's Strategic Approach to Modern Flood Risk Management".**

  Ms. Li Suxiao explained that the goal of WWF's strategic approach is: i) to influence the development of the national flood risk management policy, guidance and plans for the major river basins in China and many more smaller basins in the country, as well as ii) to promote internationally 'strategic and

integrated thinking' approaches, which are equally relevant for policy makers and flood risk managers in developing countries, emerging economies and OECD nations.

This strategic approach is based on a new philosophy with the following components: i) accept that absolute protection is not possible and plan for exceedance, ii) promote some flooding as desirable; iii) base decisions on an understanding of risk and uncertainty; iv) recognize that the future will be different from the past; v) do not rely on single measures, but implement a portfolio of responses; vi) utilize limited resources efficiently, and to fairly reduce risks; vii) be clear on responsibilities for governance and action; viii) communicate risks and uncertainty effectively and widely; ix) reflect the local context and integrate it with other planning processes.

III. Thematic Sessions and Round-Tables

The second part of the workshop, from 14th to 15th December, was divided in four thematic sessions on respectively: i) "Flood forecasting, monitoring, warning and responses", ii) "Flood management in urban settings", iii) "Community-based approaches to flood management"; and iv) "Flood management practices in a changing climate". Each session would start with a series of presentations followed by round-table discussions during "World Café"-type break-out brain-storming sessions.

A. Session 2 - Flood forecasting, monitoring, warning and responses

Plenary session:

During this thematic session, which was chaired by **Dr. Lam Dorji, incoming Chair GWP SAS**, the following presentations were made:

a. **Mr. Rabindra Osti, Water Resources Specialist, East Asia Regional Department, ADB,** gave a presentation on **"Flood Risk Management in Asia: From Knowledge to Action".** According to the Asian Water Development Outlook, 90% of the world's disasters are water-related and 90% of the global population affected by water-related disasters lives in Asia. Two-thirds of the natural disasters in the Asia-Pacific region are water-related and 80% of them are floods.

   Mr. Rabindra Osti presented ADB's approach, which has progressively evolved, from a reactive to a more proactive approach. Today's floods being the result of greater interaction between human society and the natural environment, there is a need to go beyond structural responses to address the emerging challenges and to resort also to non-structural solutions and 'soft path' measures as an integral part of the flood management therefore integrated water resources management.

   To enhance resilience to climate change, it is necessary to strengthen knowledge about its impacts on water resources, strengthen capacities to move into action with participatory and holistic approaches, and ensure investments focusing on 'no regret' options and ecosystem-based approaches to flood management, which have now been mainstreamed into ADB's lending and non-lending operations.

b. **Mr. Naseer Ahmad Gillani, Chief Water, Ministry of Planning, Development and Reform, Government of Pakistan,** presented the **"Inter-Regional Cooperation on Westerly Weather Systems Urban & Coastal Flooding".**
   Mr. Naseer Gillani explained that Western Disturbances (WD) in the region originate usually over the Mediterranean Sea as an extra-tropical frontal system, but its frontal properties are somewhat lost while moving towards Indo-Pakistan region. Even at the occlusion stage the WD phenomenon causes widespread heavy precipitation over North Pakistan and severe rains over lofty Hindu Kush Himalaya (HKH) region may be one facet of snow avalanches as well.

   An Early Warning system has hence been put into place to save lives from natural hazards, to reduce infrastructure damage and to reduce crop damage, through a classical or a computer based forecast system. The classical system includes surface weather charts, upper air charts; constant pressure charts; streamlined charts; prognostic charts, etc. He also said that cooperation between the countries was key to avert the worst situations.

c. **Mr. Watt Botkosal, Chairperson, Cambodia Water Partnership,** presented the **"Mekong regional flood management and national perspectives on transboundary flood management issues".**
Mr. Botkosal presented the lessons learnt from this case, which allowed to increase the capacity of national and provincial line relevant agencies', district and commune Disaster Management (DM) committees' staff and local communities on flood awareness and management. Regional and bilateral cooperation must be enhanced for better flood preparedness such as in implementing flood preparedness programmes (FPP), community early warning systems, flood damage and needs assessment, and flood emergency response contributing to the overall flood risk reduction initiative by the national governments. Transboundary flood issues were identified and it was agreed that they must be managed in a coordinated manner, promoting inter-governmental and inter-agency cooperation while being based on IWRM principles. Data and information on floods management and monitoring are required to be shared with sufficient technical capacity and hydromet systems operation in each country.

d. **Engr. Md. Waji Ullah Executive Director, CEGIS, Bangladesh,** gave a presentation on **"Community-based Flood Early Warning System, Information and Dissemination".**
He described flood management measures, including flood control embankments, dams and reservoirs, submersible embankments, dredging and excavation, regulators, flood wall, flood evacuation and shelter, as well as flood prediction and warning dissemination, using WATSURF.

WATSURF is a GIS-based flood prediction tool used to forecast water levels in flood plain and major rivers. In addition, a flood information system is using SMS format for dissemination and the process could be replicated in the whole basin.

Round-table discussions:

Then the participants split into **four separate round-tables/working groups** to discuss the topic in more details. The **key points from the round-tables** on the first theme, presented by Dr. Lam Dorji, were as follows:

- Flash floods are an extremely critical issue in Asia and damages caused by such events are very important, incl. frequent loss of lives. Therefore, Flash Flood Forecasting (FFF) was highlighted as a highly relevant topic to work on in the region.
- RWPs also acknowledged the amount of scientific knowledge and technical expertise available in the region that could be shared.
- One question that was raised was on how to harness these opportunities and to liaise better with donor institutions potentially interested.
- The importance of ecosystem services was also acknowledged as well as the need to prioritize them as a topic for cooperation between RWPs.

B. Session 3 - Flood management in urban settings

Plenary session:

The **second thematic session,** moderated by **Mr. Francois Brikke, SNO, GWPO,** was dedicated to floods in urban areas and included the following presentations:

a. **Dr. Mochammad Amron, Steering Committee, INAWP,** presented the **"National policy on flood management in Indonesia, with case study of Semarang City, Central Java".** His presentation discussed the structural and non-structural approaches to flood management, explaining the need for a comprehensive approach. He explained that while infrastructure could protect areas from flooding, it is not sustainable. To fight floods from upstream to downstream an integrated approach is necessary, with two dimensions, structural and non-structural. Structural measures include upstream reservoir development, rehabilitation of ponds and reforestation; downstream floodway development, river normalization, polder development, flood control infrastructure, coastal protection, land subsistence control. Non-structural measures include spatial and zoning control, community empowerment, early warning system, flood prone mapping, emergency response, housing plan, disaster management,

watershed management, flood hazard information system, public information and campaign, socialization and community negotiation.

b. **Prof. Cheng Xiaotao, Deputy Coordinator, GWP China, and Vice Chair, IAHR Flood Risk Management Committee**, presented **"Urban flood issues in China: challenges and coping strategies".**

Prof. Cheng explained that unprecedented urban expansion has taken place in China since 1998. With rapid urbanization, the development of urban flood control and drainage systems has become important for flood prevention in cities. The frequently occurring urban floods have raised strong concerns amongst the government and the communities. In April 2015, China's central authorities launched the innovative "Sponge cities" pilot programme to better address flood management in urban settings at national level.

This programme looks into: a) understanding better the rainwater system with effective control of peak runoff, runoff amount and pollution through the rain-water infiltration, storage and sewage purification, etc. ; b) improving the drainage system, by using the traditional drainage system， together with LID system to collect, transport and discharge rainwater; c) dealing with the storm water that exceeds the design standard of the drainage system through integrated use of natural water bodies, multi-functional storage pool, underground tunnel, etc.

c. **Mr. Irakli Megrelidze, Deputy Head of Hydromet. Department, National Environmental Agency,** presented an **"Assessment of the catastrophic events originated in the Vere River Basin, Georgia".**

As Mr. Megrelidze explained, on 13-14th June 2015, heavy rainfall (according to data from Tbilisi meteorological station, 49 mm precipitations were recorded within 3-4 hours) in the Vere River basin and its tributaries caused a sharp increase in the water level, and, as a result of landslide processes, large volumes of mudflow/debris flows were generated in the Tskneti-Akhaldaba section, leading to a major disaster. Houses, various infrastructure facilities, buildings located below the lowest mark of the River gorge, as well as the Tbilisi Zoo were significantly damaged and/or destroyed. According to the latest data, 20 people died and two people went missing.

As a result/lessons learnt, the following prevention measures were taken: i) installation of automatic rainfall measuring equipment and hydrological stations in the gorge; ii) flood modelling; iii) full provision of Vere gorge with early warning system; iv) construction of hydrotechnical installations; v) investigation and hazard assessment of the other river gorges around the Tbilisi.

d. **Eng. Badra Kamaladasa, Chair, Sri Lanka Water Partnership,** gave **"An overview of current flood management practices in Sri Lanka, covering river floods, dam induces floods and urban floods".**
Ms. Kamaladasa presented three different cases of flood management in Sri Lanka.

Firstly, she presented the case of Colombo City, which is vulnerable to river floods, local floods and coastal floods. Measures taken for flood mitigation included structural approaches (e.g. flood levees in lower reach, detention ponds, U/S reservoirs for hydro power generation, /flood detention, pumping local drainage to river, additional river outlet; as well as non-structural ones, incl. flood forecasting with transmission of data from river basin.

Then she presented the case of Batticalo City, capital of Eastern Province, where issues combined with Reservoir induced floods (coastal floods and local floods).

The third case was Anuradhapura, capital of NC Province, Heritage city, down-stream of three major reservoirs, where the key issues are reservoir floods and safety threats due to dam breach. The suggested responses for integrating flood risks & urban planning proposed were as follows: i) demarcation of flood risk zones; ii) definition of land-use for different risk zones; iii) Implementation of land-use regulations through restrictive regulation (e.g. prohibitions, penalties, resettlements) or economic incentives (e.g. preferential taxation for desired land-uses, extra taxation for undesired land-uses); iv) knowledge enhancement; v) community participation for development of flood mitigation plans; vi) awareness campaign focusing on Climate Change.

e. **Mr. Ayhan Sayin, Scientific Officer, WMO,** presented **"WMO's Global Flash Flood Guidance and Early Warning System".**

WMO's Flash Flood Guidance and Early Warning System has a global coverage and enhances early warning capabilities, currently covering fifty-two countries and more than two billion people around the world, saving lives and decreasing economic losses.

Mr. Sayin explained that in Asia, the following Flash Floods Management programmes are already operational: the Mekong River Commission FFG (MRCFFG), Cambodia (RC), Laos, Thailand, Vietnam and Myanmar; Black Sea and Middle East FFG (BSMEFFG), Armenia, Azerbaijan, Bulgaria, Georgia, Iraq, Jordan, Lebanon, Syria, Turkey (RC).

There are guidance projects in: South Asia FFG (SAsiaFFG) and some under implementation in Afghanistan, Bangladesh, Bhutan, Nepal, Pakistan, Sri Lanka and India; Central Asia Region FFG (CARFFG) (under implementation): Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan; in South Eastern Asia Oceania FFG (SAOFFG). There are also a number of programmes under consideration in Brunei, Indonesia, Malaysia, Papua New Guinea, Philippines, Singapore and Timor.

Round-table discussions:

From the **four separate round-tables/working groups, the key points from discussions** on this theme, presented by Francois Brikké, were as follows:

- At COP21, cities were recognized as major actors in CC mitigation, but not water and adaptation.
- An "Urban Water Hub" is about to be established with involvement of several organisations, incl. GWP.
- UN Habitat organises the "Habitat III" Summit in Ecuador in 2016, which could be a relevant forum to discuss urban flood management issues.
- WMO representative informed participants that his organisation has funds for demonstration projects on Flash Floods in urban areas in Asia, in particular SEA, SAS and Central Asia.
- ADB informed participants about their common principles and interest in site specific interventions (e.g. Urban Flood Management in Xinyu City, a new "green" city being planned)
- APWF/JWF: In preparation of the Asian-Pacific Water Summit in 2017, it was proposed to identify water issues and make water the highest priority.

C. Session 4 - Community-based approaches to flood management

Plenary session:

The **third thematic session,** moderated by **Ms. Priyanka Dissayanake,** Regional Coordinator, GWP SAS, was dedicated to community-based approaches and included the following presentations:

a. **Mr. Rozman Mohamad, Deputy Director, Flood Management Division, Depart. of Irrigation and Drainage, and Secretary, Malaysia Water Partnership,** presented **"The Malaysian 'Living with Floods' concept".**

The "Living with Floods" concept recognizes that it is not possible to completely eliminate floods in the context of climate change due to design limitations. However, floods' negative impacts can be reduced through an understanding of flood risks and by working towards modifying this risk-generation process in a holistic manner. This has been presented and accepted at the Malaysian National Water Resources Council in 2011.

The "Living with Floods" approach provides decision-makers with options to consider for flood risk reduction, complementary to existing structural and engineering measures. Losses resulting from floods can be avoided or dramatically diminished by taking action to reduce people's risk and vulnerability. Reliable and more advanced flood forecasting and warning systems are important.

b. **Dr. Man Purotaganon, Secretariat, Thai Water Partnership,** presented **"Capacity Building on Community-based Flood Management in Maesot Sub-watershed, Thailand".**
The project's key activities include: i) facilitating of networking among 20 communities; ii) capacity building of local stakeholders and strengthening capacity of local authorities in data and information collecting, analyzing those information, causes, impacts, and practical solutions for adaptations to flood risks management using Participatory GIS (P-GIS); iii) strengthening the capacity of local authorities to undertake participatory planning on flood risks management, and hazard mitigation in the risk and vulnerable areas; iv) facilitating the transposition/implementation of plans to actions, through the collaboration of government agencies, local communities and local authorities; v) sharing lessons learned and knowledge on community-based flood management among stakeholders in the project areas; vi) disseminating knowledge products from the project work to strengthen learning networks.

c. **Mr. Som Nath Poudel, Vice-Chair, Jalsrot Vikas Sanstha (JVS)/GWP Nepal,** gave a presentation on the **"Community approach to flood management in Nepal".**

Mr. Som Nath Poudel listed the key preparedness activities, including: i) getting community organized, ii) the creation of a Community Flood Management Committee, iii) information dissemination and training, iv) post flood management, e.g. making provision of emergency relief, provision of temporary refuge, v) making provision for flood fighting, vi) adjusting land use, vii) forecasting and warning, preparing an evacuation plan, viii) enduring communication link to the world.

He also explained that during flood responses the community has a vital role to play in monitoring, and implementing above mentioned activities, and that after the flood events the community should organize the rehabilitation and maintenance in 3 phases: 1) immediate rehabilitation; 2) intermediate rehabilitation; 3) rehabilitation when normal situation returns.

d. **Mr. P. Dorje Gyamba** gave an overview of the **"Cooperation of India's States along with Communities on Flood Management under the Indus Treaty with Pakistan".**
He explained that due to limited available lead time, especially in the upper reaches of the Indus basin rivers, rainfall forecast based modeling was necessary to increase lead time at least to up to 3 days. He also referred to inundation modeling for lower reaches of rivers having flat flood plains using available DEM (3 mha) and 2 D modeling tools. Then he said that inflow forecast for major reservoirs with a lead time of at least 7 days for flood as well as water management purposes using IMD weather products are required. Integration of Hydrological forecasting models with sea surge models for coastal areas for inundation forecasting during cyclone.

In terms of international cooperation, Mr. Dorje Gamba stressed the importance of exchange of flood data between upstream and downstream countries to help minimize loss of life and property, a crucial issue relevant to all countries in South Asia. He also concluded that saving human lives should be the foremost priority and that it be ensured through the implementation of permanent structural measurement, with potential involvement of/support from Asian RWPs.

e. **Dr. Liu Jinping, Hydrologist, UNESCAP/WMO, Typhoon Committee Secretariat (TCS),** presented the **Work of the Typhoon Committee on community-based flood forecasting and management.**

He first introduced the ESCAP/WMO Committee, a regional inter-government organization founded in 1968, affiliated to the UN Economic and Social Commission of Asia and the Pacific (UN ESCAP) and the World Meteorological Organization (WMO), with 14 countries collaborating. The Committee deals with typhoon-related flood disasters to assist its Members on the promotion of their capacity on community-based flood forecasting and management.

The Committee has developed Standard Operation Procedures (SOP) for Multi-Disaster Early Warning, with the following objectives: a) to provide, in a concise and convenient form, a list of major executive actions involved in respective hazard early warning systems; b) to ensure that all concerned Ministries, Departments and all other stakeholders are informed clearly about their respective roles and responsibilities; c) to ensure that a systematic early warning system is clearly outlined for all major

hazards and early warning system, SOPs are integrated into the overall disaster risk management system.

It has also developed a Community-based flood forecasting and flood hazard mapping to provide the knowledge of flood risks, when the evacuation would be needed and where evacuation could be safe. The Typhoon Committee moreover enhanced public awareness and public education to make the public have a better understanding of flood risk and to promote their self-rescue capability in better collaboration with flood control agencies.

Round-table discussions:

From the **four separate round-tables/working groups, the key points raised during the discussions** on this theme, presented by Priyanka Dissayanake, were as follows:

- Several RWPs, in particular GWP SEA and GWP SAS, are already working on Community-based approaches to flood management, with the front-runners being Malaysia, Thailand and Indonesia.
- GWP SAS and GWP SEA expressed strong interest in exchanging experiences on this.
- Since floods are not completely avoidable, it is important to adopt adaptive approaches and to "live with them". Communities have developed different ways to cope with such events, incl. adapted architecture, etc.
- There can be benefits from storm water management.
- It is of crucial importance to involve communities in flood management right from the beginning and to empower them through stakeholder involvement/public participation mechanisms.
- The Typhoon committee's manual could be useful for knowledge exchange.

D. Session 5 - Flood management practices in a changing climate

Plenary session:

The **last thematic session,** moderated by **Mr. Djoko Sasongko**, Regional Coordinator, GWP SEA, was dedicated to flood management and climate change, and included the following presentations:

a. **Ms. Yumiko Asayama, Manager, Japan Water Forum/Secretariat Asia-Pacific Water Forum (APWF),** gave a brief overview of the **"ADB-APWF-GWP Metaguidelines for Water and Climate Change"**, which promote the following five principles:
   i) usable knowledge by quantifying uncertainty, translating data into usable information and sharing data and information;
   ii) no-regret investments: by understanding short- to long-term risk under different climate change scenarios; coordinating approaches: and aiming for continuous improvement.
   iii) resilience: by adopting a participatory approach: building ownership and leadership and capacity development.
   iv) mitigation and adaptation: by implementing IWRM at basin scale, adopting a nexus approach, and minimizing the risk of duplication of efforts.
   v) financing: by identifying priority investments, creating climate readiness at national level and improving coherence on domestic climate funding for water.

b. **Dr. Lam Dorji, incoming Chair GWP South Asia,** presented the **"Approaches to Flood management in Bhutan".**
   He first exposed the country's challenges with regard to flood protection and management, including: i) rugged terrain and fragility; ii) dispersed low density population; iii) high cost of interventions – from terrain; iv) high per capita cost due to dispersed low population; iv) water resources, incl. high availability, but low accessibility; v) threats from climate change (e.g. increased intensity of rainfall and warmer temperature and glacial melt).

   Amongst the flood management initiatives undertaken in his country, Dr. Lam Dorji listed the following: i) artificial lowering of glacial lakes; ii) river training; iii) installation of an automated early warning system; iv) raising community awareness on risks and climate uncertainty; v) development/reliance

on model projections; vi) modeling future climate scenarios; vii) flood zonation; viii) improved hydromet data collection systems; ix) set up of regulatory mechanisms; x) restrictions to constructions in areas within 30 meters of river banks; xi) and the adoption of an integrated approach to flood management.

c. Mr. Hla Baw, GWP Southeast Asia, presented the **"Review of Design Flood for the Minmyin Dam in the Sagaing Region, Myanmar"**

In June, July and August 2015, Myanmar had bitter experiences with abnormal deviation in climate conditions, such as heavy rainfall and landslides in the Rakhine State. Most of the areas in this region were devastated, causing loss of lives and properties by means of severe floods. Also agriculture lands were silted and covered by sand. Some of the dams in the Magwe and Sagaing Regions experienced a significant amount of inflow due to the unexpected floods.

The lessons learned from this major disaster include the following observations and recommendations:

i) Most of the spillway and overflow structures at present were designed accordingly with the past data and conditions.

ii) To cope with the evident impacts of climate change, it is necessary to reconsider the previous design of spillways and retrofit/remodel these accordingly, with probable maximum flood (PMF) based on probable maximum precipitation (PMP), incl. auxiliary and emergency spillways;

iii) There is also a need to review the storage capacity of reservoirs and recalculate the operation of reservoirs;

iv) Reforestation and watershed management should be done properly;

v) Real time flood warning systems and sufficient observation stations should be installed within the catchment area of major reservoirs.

d. Dr. Xiaohong Chen and Dr. Xiaobin Qiu, Education Department of the Key Lab of Water Cycle and Water Security for South China, gave a presentation on **"Real time flood forecasting with Xin'anjiang Model in the Nan Basin, Thailand".**

The project's main achievements were: i) extracting basin information and developing a digital model of the Nan basin on the basis of DEM data; ii) use of the constant speed of water in grids and isochrones concept to replace the unit hydrograph of sub-basins; iii) analysis of the model parameter's sensitivity and uncertainty; iv) combined Arcgis Engine and C# development platform; v) development of a real-time forecasting system based on Xin'anjiang model for the Nan basin.

The key innovations of the project were: i) the use of the constant speed of water in grids and concept of isochrones instead of the unit hydrograph of sub-basins; ii) the analysis of the parameters uncertainty and uncertainty range of forecasting from the Xinanjiang Model; iii) integration with Arcgis Engine technology and C# development platform, iv) establishment of a real-time forecasting system based on Xin'anjiang model for the Nan basin.

The project revealed a number of shortcomings/inadequacies, such as: i) lack of knowledge in the effect of DEM resolution on the forecasting accuracy; ii) adoption of D8 method in recognizing flow direction, the result of which differs from natural conditions; iii) shortcomings in model structure.

e. A representative from GWP Southeast Asia presented on behalf of **Dr. Zaw Lwin Tun, Myanmar Water Partnership,** an **"Assessment of the Mone River Flood caused by the Cyclone Komen in 2015".**

There is strong evidence that the occurrence of floods is a rising trend in the Mone River not only due to dam construction, but mostly as a result of forest depletion, environmental deterioration and global climate change. While the water levels at the Mezali weir was lower in 2015 than during the big flood in 1948, the flood discharge is very high at Mone River. This flood discharge is reduced down at the downstream of Kyee On Kyee Wa Dam due to flood mitigation achieved by regulation of the dam. Floods will come with a great surprise or within a very short notice and destroy everything, in the absence of such a kind of dams on Mone River.

The lessons learnt from this case and recommendations for flood management in the Mone River are as follows: i) selection of a new design flood; ii) ensuring proper watershed management practice including forest conservation and reforestation procedures; iii) provision of auxiliary/additional spillways at appropriate locations for additional dam safety; iv) calculating back water curve at upstream of Kyee On Kyee Wa dam up to Setoketayar Town and development of protection embankments to prevent inundation; v) formulation/development of a proper rainfall-runoff model; vi) Installation of tele-metering stations both for auto-rain gauges and water level recorders to support the Early Warning System, and vi) collection of real time data should both at dam site and head office for immediate response.

Round-table discussions:

From the **four separate round-tables/working groups, the key points raised during the discussions** on this theme, presented by Djoko Sasongko, were as follows:

- There was agreement that GWP's work on the topic is key and relevant.
- ADB raised the issue of convincing national governments to commit additional funds on top of the USD 100 billion allocated through the Green Climate Fund.
- It was broadly agreed that GWP network should promote and make use of the APWF-ADB-GWP Metaguidelines on Water and Climate in their work.
- Another topic, which was mentioned as being of interest was the adaptation of infrastructure to climate change.

IV. Technical Field Visit

In the afternoon of the second day, a **technical field trip** was organized by GWP China with the support of the Ministry of Water Resources and the Guangdong Provincial Water Resources Department. The participants visited the **Flood Control & Disaster Reduction Center of Foshan City** and one of **sluices on the Pearl River**. At the Center, the **Foshan Water Resources Bureau** gave an introduction on **the flood control and disaster reduction mechanism** in the city and the history of the Center.

The Center, founded in 1983, has been responsible for the water related disasters control, ranging from floods and droughts to typhoons. Along with the Water Affairs Information and Geographic Information System (GIS) map, the Center has developed more than 10 application service systems **covering flood prevention engineering, underwater topography, water conservation projects, river-channel sections,** etc. Thus, the whole city is now supervised by **real-time video surveillance platform**. The visitors and Bureau staff spent half a day for interaction and discussion.

V. Internal Meeting

The last day of the workshop, **Wednesday, 16th December**, was dedicated to an internal meeting mainly attended by the representatives from the four Asian RWPs, the purpose of which was to discuss a **framework for cooperation (Memorandum of Understanding – MoU**) between the RWPs on further topics of shared interest, including climate resilience, disaster risk reduction, Sustainable Development Goals, urban water management for the years to come and to discuss **topics for potential projects to be jointly developed and submitted to interested donors.**

A. Memorandum of Understanding (MoU)

The first session of the internal meeting was dedicated to a **discussion on the initial draft of the MoU** developed by GWP SAS and GWP China in line with the previous MoU signed between two regions, which expired on 2012, was presented by Priyanka Dissanayake, Regional Coordinator, GWP SAS.

This new draft agreement was introduced to revive this collaboration and bring together the four Asian RWPs to collaborate more closely in in a manner similar to the Africa model of collaboration. Asian RWPs would hence be able to position/present themselves as "ONE ASIA" in all the international forums.

The discussion on the draft MoU was moderated by **Lal Induruwage, WACREP Programme Manager, GWP SAS**. There was a **very constructive debate** on:

i) why we need an MoU between these four regions,
ii) who should lead,
iii) where the much needed funds could come from and,
iv) what we can do together.

After constructive deliberations, all the participants were of the opinion that signing an MoU between four regions will bring positive results and therefore, it would be wise to go ahead with signing this MoU. It was emphasized that by positioning themselves as "One Asia", RWPs from the region could enhance their visibility vis-à-vis strategic and financial partners, notably with a view to access funds, such as the Green Climate Fund (GCF).

Further, participants were informed that there will be a small budget available for 2016 in the SNO/GWPO Budget for collaborative activity among these four regions and such activities will have to be identified and incorporated in the 3-year work plan of 2017-19. All the participants were agreeable to this suggestion. It was highlighted that the funds available from GWPO are seed funds and will need to be complemented by respective regional budgets, to allow for viable activities (e.g. meetings, workshops, etc.). RWPs will take the leading role in designing and implementing the MoU and related activities, while GWPO, via its relevant SNOs, will provide guidance, technical and financial support to the regions to that effect.

It was suggested that a road map be developed to take this task (collaboration) forward and **a focal point** was proposed by each region in this regard. Following names were proposed by the regions:

- GWP SAS Focal Point – Mr. Naser Ahmed Gillani
- GWP SEA Focal Point – Mr. Djoko Sasongko
- GWP China Focal Point – Mr. Rugang Zheng
- GWP CACENA Focal Point – Mr. Vadim Sokolov
- Inter-Regional Facilitator (IRF) – Mr. Lal Induruwage

The **following Road Map** was agreed upon by the participants:

- RWP focal points to finalize the draft MoU following all the regional protocol and forward it to the IRF to coordinate with two SNOs.
- RWP focal points to finalize the MoU and Regional Chairs to sign it by 15th March 2016.
- Each region to identify potential collaborative activities and share the thoughts with IRF by end February 2016.
- It was already decided to have an activity at the upcoming Singapore Water Week (SWW) in 2016 and have a workshop on "Urban Water Issues" (e.g. the "Sponge Cities" concept under the lead of GWP China and Bangladesh Water Partnership). GWP SEA colleagues have been requested to discuss this with Singapore counterparts and explore the possibility of having a side event at SWW.
- Further, Mr. Ayhan Sayin, WMO, suggested to incorporate as potential contents of speeding up GWP SEA Flash Flood Guidance System and catalyze the joint discussion of GWP SAS Flash Flood Guidance System initiative, which has been standing still due to ineffectiveness of the parties.

Finally, it was agreed that the minutes of the discussion and the draft MoU will be shared with the regions/participants to work on it. All the participants wish that this will be a fruitful collaboration and thanked SNO for the initiative.

B. Project Development

The session, which aimed at discussing the potential **areas of joint project development**, was introduced by an **overview of GWP's work** in the last couple of years as well as in the near future and **key global trends** important for GWP, by Angela Klauschen, GWPO SNO.

The topics briefly presented were:

- The Post-2015 Agenda and GWP's SDG-Water Preparedness Facility
- GWP-OECD Global Dialogue on Water Security and Sustainable Growth
- COP21 and the Paris Agreement, incl. climate resilience, disaster risk reduction and GWP's current related programmes (WACDEP, APFM and IDMP)

Then, Francois Brikke, GWPO SNO, presented a **selection of potential donors** that could be interested in funding such joint projects in Asia and beyond. These included: USAID/WMO, ADB, CDKN.

After this, Angela Klauschen, SNO, presented a **matrix of the round-table discussions' key outcomes and emerging themes on which RWPs could work jointly**. Based on this outcome matrix, she moderated a discussion to gather further input/ideas for project development.

The **three key topics** that were selected by RWPs present as most relevant for joint project development, were the following:

a. Designing water-and-climate-resilient cities

This idea is based on the Chinese *"Sponge Cities"* pilot model, which has been designed for and is currently implemented in several medium-size cities in China. The objective is to enhance the water absorption capacity of soils in heavily urbanized environments, where the ground is often sealed off and makes percolation of precipitation difficult, hence increasing flooding risks and impacts. There is an interest from several South-Asian and Southeast Asian countries – e.g. Bangladesh, Indonesia, Malaysia, Thailand – to learn from the Chinese experience and replicate this concept in their own cities. Moreover, some countries, e.g. Bangladesh, are currently developing similar projects, there is thus room for knowledge sharing with China.

This project would be led by GWP China as an effort to support neighbouring countries through South-South cooperation mechanisms as well as with reg. to mobilizing adequate funds from Chinese government authorities.

b. Flash Floods Forecasting and Early Warning Systems

A majority of the CWPs represented at the Regional Workshop identified flash floods as a key issue in Asia and expressed interest in cooperating on this topic in the near future, notably via knowledge exchanges and mutual capacity building efforts.

They also appeared very keen in supporting WMO in promoting/implementing its newly developed Flash Flood Guidance System (FFGS) throughout the countries of the region. WMO's Commission for Hydrology (CHy) jointly with the WMO Commission for Basic Systems (CBS) and in collaboration with the US National Weather Service, Hydrologic Research Center (HRC), and USAID/OFDA have developed the concept of the Flash Flood Guidance System (FFGS) with global coverage. The concept has been endorsed by the Fifteenth WMO Congress and is being implemented through a series of regional projects with funding from USAID.

c. Community-Based Approaches and Ecosystem-Based Approaches to Flood Management and Disaster Risk Reduction

GWP SEA and GWP SAS have experience in community-based approaches to flood management, and would like to enhance/replicate this further in the future. To that purpose, they have developed, or participated in the development of, related project proposals.

GWP SEA has already prepared a Concept Note on *Project Preparation for Community Based Flood Management in Southeast Asia,* and GWP SAS with a leading Indian environmental NGO have jointly submitted an Expression of Interest on *Community Based Flood Early Warning Systems (CBFEWS)* by APN.

There is also potential interest to further develop Ecosystem-based approaches to DRR and in particular flood management, notably in China and Sri Lanka, where the respective RWP/CWP has been involved in wetland restoration schemes. All participants agreed to further work in smaller groups to refine the concept notes and/or draft joint project proposals, as relevant, after consulting potential interested donors.

VI. Conclusions and Way Forward

Prof. Cheng Xiaotao, Deputy Coordinator, GWP China, chaired the **closing session of the workshop and share his conclusions** with the participants. He addressed **three main points** in his presentation:

1. *What are the common demands in flood management? (Challenges)*

In the context of global warming and especially on the way of rapid urbanization and industrialization in Asian countries, the common demand in the field of flood management is how to find a proper way to **rebuild a new balance between man and nature** and among regions step by step on the basis of **sharing both risks and benefits from flood events**.

2. *What should we do in the future? (Opportunities)*

In the field of flood management, GWP may try to do more in **communication and exchange of knowledge, information, experiences and lessons, technicians and experts**, that may increase understanding for each other, so that we can help governments and stakeholders to make good decisions/selections and may have more chance to get support from all aspects.

3. *How to do that? (Solutions)*

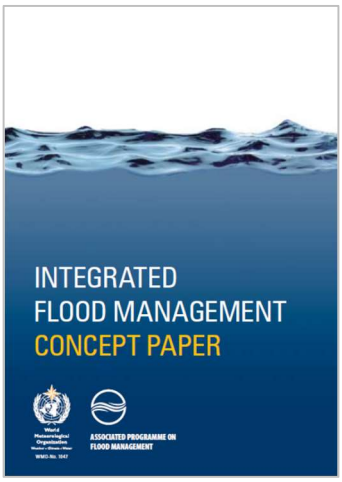
GWP should work to enhance **South-South cooperation in the field of flood management**, as well as IWRM. The ideas included in MOU for Cooperation between GWP SAS, GWP China, GWP SEA and GWP CACENA express the **regions' interest in cooperating based on win-win principles**, including through workshops, specific project implementation, mutual visits, public awareness raising and dissemination activities, and invite each other to participate in joint events and activities.

As for the way forward, participants agreed that the key next steps would be the following:

1. GWPO agreed to submit existing project concept notes with reg. to work on DRR, climate resilience, SDGs done by GWP in the region to ADB to explore joint areas of cooperation, by mid-January 2016.
2. With the support of the inter-regional facilitator and RWP focal points, the MoU between the four RWPs should be further discussed and finalized by end of February, 2016.
3. The signature of the MoU by the relevant Regional Chairs should take place soon after finalization and if possible in person, preferably by mid/end of March, 2016.
4. The next regional workshop on South-South cooperation should focus on the topic of urban-related water management (incl. water-sensitive cities) and will be hosted by GWP SEA in Singapore, in conjunction with Singapore Water Week, in July 2016.
5. The possibility to organise a side-event on water-sensitive cities during Singapore Water Week, under the lead of GWP China and Bangladesh Water Partnership, should be explored by GWP SEA with relevant Singapore counter-parts.
6. RWPs should assemble in relevant sub-groups to work on further development of joint projects, initially refining existing concept notes or other documents on the key topics selected: flash flood forecasting, water-sensitive cities and community-based approaches to flood management. Relevant ideas should be shared with the inter-regional facilitator by end of February, 2016.
7. WMO representative moreover invited RWPs to discuss involvement in WMO Flood Guidance System programme to help speeding up the up-take of this programme in Asia, in particular SEA and SAS.

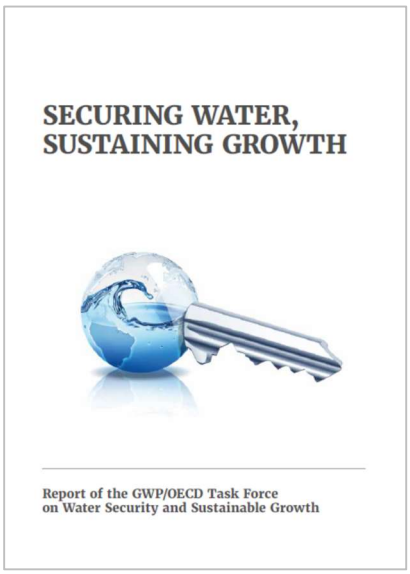
VII. Annexes

ANNEX I – BACKGROUND INFORMATION ON GWP'S WORK ON FLOODS

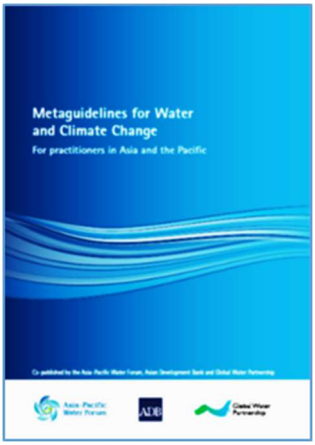


The joint **World Meteorological Organization's and GWP's Associated Programme on Flood Management (APFM)** has addressed with the help of over 20 partner organizations the various aspects of flood management for over 14 years, focusing on maximizing the net benefits from the use of floodplains and minimize the loss of lives – focusing on the implementation of the **Principles of Integrated Flood Management**.

A number of initiatives have been supported, including pilot projects in India, Nepal and Bangladesh; Thailand and Lao PDR; workshops supporting GWP Regional and Country Water Partnerships in Bangladesh and China as well as projects in Vietnam and Thailand. A series of projects on Community-based approaches to Flood Management, Integrated Coastal Flood Management and Transboundary Flood Management are technically supported by the APFM.



In 2015, **GWP and OECD jointly released the report "Securing Water, Sustaining Growth"**[1], which clearly showed to what extent floods represent an extremely, and increasingly, damaging type of water-related hazard. During 2011, floods in Thailand resulted in US$ 46 billion economic losses, and US$16 billion in insured losses. The authors' global risk analysis estimates an expected annual flood damage of US$ 120 billion per year from property damage alone. By the 2030s, in the absence of adaptation, coastal flood risk is projected to increase by a factor of four, while fluvial flood risk could more than double. The risk estimates are sensitive to assumed flood protection levels - thereby demonstrating how important flood protection measures are in reducing vulnerability to flood risk. Sea level rise, subsidence, population growth, and economic growth mean that flood risk in coastal cities and estuaries will, in future, become particularly concentrated in coastal Asia. The greatest flood risks to people (in terms of numbers of persons exposed to flood risk) are now, and will remain, overwhelmingly located in Asia.



Moreover, in 2012, the **Asia-Pacific Water Forum (APWF)** Steering Group released the ***Framework Document on Water and Climate Change Adaptation***, a publication aimed at leaders and policy-makers in Asia and the Pacific (APWF, 2012). This document identifies five key principles and corresponding actions focusing on what to do to address climate change impacts and why it should be done. **The 'Metaguidelines for Water and Climate Change' publication released in 2015** by **APWF** and the **Asian Development Bank (ADB) in collaboration with the Global Water Partnership (GWP),** builds on the framework document by providing examples of how the recommended actions have been and can be implemented, focusing on practical solutions illustrated through case studies from Asia and the Pacific.

[1] Source: Sadoff, C.W., Hall, J.W., Grey, D., Aerts, J.C.J.H., Ait-Kadi, M., Brown, C., Cox, A., Dadson, S., Garrick, D., Kelman, J., McCornick, P., Ringler, C., Rosegrant, M., Whittington, D. and Wiberg, D. (2015) Securing Water, Sustaining Growth: Report of the GWP/OECD Task Force on Water Security and Sustainable Growth, University of Oxford, UK, 180pp.

ANNEX II – FINAL PROGRAMME

Monday, 14th December

8.30 – Session 1: Welcome and Introduction – Chair: **Mr. Zheng Rugang**, Executive Secretary/Regional Coordinator, GWP China

- Welcome address – **Prof. Wang Hao**, Acting Chair, GWP China
- Welcome address – **Mr. Liu Zhiguang**, Consul, Dept. of International Cooperation, Science and Technology, Ministry of Water Resources
- Introductory speech – **Mr. Rudolph Cleveringa**, Acting Executive Secretary, GWPO
- Brief remarks – **Mr. Zhang Qingfeng,** Director, Environment, Natural Resources & Agriculture Division, East Asia Regional Dept., ADB
- Objectives of the workshop and agenda – **Ms. Angela Klauschen**, Senior Network Officer, GWPO
  - Key note speeches:
    - **Prof. Liu Zhiyu**, Vice-Chair, WMO - Hydrological Commission
    - **Mr. Ayhan Sayin**, Scientific Officer, WMO/Associated Programme for Flood Management (APFM)
    - **Ms. Li Suxiao,** Senior Programme Officer, WWF China
- Questions & Answers

10.30 – Group photo and Tea break

11.00 – Session 2: Flood forecasting, monitoring, warning and responses – Chair: **Dr. Lam Dorji**, Chair, GWP SAS

- Presentations by countries and experts:
  - "Flood Risk Management in Asia: From Knowledge to Action" – **Mr. Rabindra Osti**, Water Resources Specialist, East Asia Regional Department, ADB
  - "Flood Forecasting mechanisms in Pakistan"– **Mr. Naseer Ahmed Gillani**, Chair Pakistan Water Partnership
  - "Mekong regional flood management and national perspectives on transboundary flood management issues" – **Mr. Watt Botkosal**, Cambodia CWP, Steering Committee Member, GWP SEA, Cambodia CWP, Cambodia
  - "Flood Forecasting mechanisms in Bangladesh"– **Md. Waji Ullah**, Executive Director, Center for Environmental and Geographic Information Services, Bangladesh
- Round-table discussions
- Reporting back and Wrap Up

13.30 – Lunch break

14.30 – Session 3: Flood management in urban settings – Chair: **Mr. François Brikké**, GWPO

- Presentations by countries and experts
  - "National policy on flood management in Indonesia, with case study of Jakarta and Semarang cities" – **Dr. Mohammad Amron**, Steering Committee Member, GWP Southeast Asia
  - "Urban flood issues in China: challenges and coping strategies" – **Prof. Cheng Xiaotao**, Deputy Coordinator, GWP China; Chief Engineer, IWHR, China
  - "Assessment of the catastrophic events originated in the Vere River Basin" – **Mr. Irakli Megrelidze**, Dep. Head of Hydromet. Dept., National Environmental Agency, Georgia
  - "An overview of current flood management practices in Sri Lanka, covering river floods, dam induces floods & urban floods" – **Ms. Badra Kamaladasa**, Chair, Sri Lanka Water Partnership
  - "The Global Flash Flood Guidance System"– **Mr. Ayhan Sayin**, Climate and Water Dept., WMO

15.30 – Tea break

16.00 – Session 3: Flood management in urban settings (cont'd) – Chair: **Mr. François Brikké**, GWPO

- Round-table discussions
- Reporting back and Wrap Up

18:00 – Welcome Reception and Dinner hosted by GWP China

Tuesday, 15th December

9.00 – Session 4: Community-based approaches to flood management – Chair: **Ms. Priyanka Dissayanake**, GWP SAS

- Presentations by countries and experts
  - "The 'Living With Floods' concept" – **Mr. Rozman bin Mohamad**, Deputy Director, Flood Management Division, DID, Malaysia
  - "Strengthening community based flood risk mitigation management and adaptation" (Thailand) – **Dr. Man Purotaganon**, Steering Committee Member, GWP Southeast Asia
  - "Community approach to flood management in Nepal" – **Mr. Som Nath Poudel**, Vice Chair, JVS/GWP Nepal
  - "Cooperation of India States along with Communities for Flood Management under the Indus Treaty with Pakistan"– **Mr. Padma Dorje**, India
  - Presentation by the Typhoon Committee – **Mr. Liu Jinping**, Hydrologist, UNESCAP
- Round-table discussions
- Reporting back and Wrap Up

11.00 – Tea break

11.30 – Session 5: Flood management practices in a changing climate – Chair: **Mr. Djoko Sasongko**, GWP SEA (tbc)

- Presentations by countries and experts
  - "The Metaguidelines for Water and Climate Change" – **Ms. Yumiko Asayama**, Manager, Japan Water Forum/APWF
  - "Glacial Lake Outburst Floods in Bhutan", **Dr. Lam Dorji**, incoming Chair, GWP SAS
  - "Case study on review of design flood with respect to climate change at Minmyin dam in Sagaing Region in Myanmar" – **Mr. Hla Baw**, GWP SEA
  - "Real time flood forecasting with Xin'anjiang Model in the Nan Basin of Thailand"– **Mr. Chen Xiaohong**, Sun Yat-sen University, China
  - "Assessment on Flood Evaluation of Mone River due to Impact of Climate Change **"**– **Dr. Zaw Lwin Tun**, Myanmar Country Water Partnership (tbc)
- Round-table discussions
- Reporting back and Wrap Up

13.00 – Lunch break

14.00 – Field visit to Flood Management Project on the Pearl River

19.00 – Dinner at Fontainebleau Hotel

Wednesday, 16th December (internal meeting)

9.00 – Session 6: Developing a Memorandum of Understanding (MoU) and a framework for regional cooperation

During this session, the draft MoU on cooperation between the four RWPs in Asia will be presented and discussed in connection with a more extensive framework for cooperation among the RWPs in the coming years.

- Presentation of the draft MoU – Ms. Priyanka Dissayanake, GWP SAS
- Discussion on draft MoU and framework for cooperation – Moderator: Mr. Lal Induruwaghe, GWP SAS
- Wrap up – Prof. Cheng Xiaotao, GWP China

10.30 – Tea break

11.00 – Session 6: Recap of and reflection on the previous days' discussions

During this session, we will summarize and reflect on the key points discussed on Day 1 and 2, incl. challenges, opportunities and way forward on cooperation regarding flood management. This will be the basis for the subsequent session.

- Presentation of key points – Mr. François Brikké & Ms. Angela Klauschen, GWPO
- Comments from participants

11.30 – Session 8: Developing a joint regional project on flood management

During this session, a draft concept note for a joint regional project on floods management will be presented and discussed in connection with the discussions that preceded on Day 1 and 2. The key points addressed will be as follows: Key issues, opportunities, proposal content, funding sources, timeframe/milestones for project development.

- Presentation of draft concept note (matrix) – Ms. Angela Klauschen, GWPO
- Discussion on draft concept note – Moderator: Mr. François Brikké, GWPO

13.00 – Lunch break

14.00 – Session 8: Developing a joint regional project on flood management (cont'd)

- Discussion on draft concept note – Moderator: **Mr. Watt Botkosal**, GWP SEA
- Wrap up – **tbc**

15.00 – Wrap-Up/Conclusions of the workshop – **Prof. Cheng Xiaotao**, Deputy Coordinator, GWP China

16.00 – Closing – **Mr. Zheng Rugang**, Executive Secretary/Regional Coordinator, GWP China (tbc)

ANNEX III – OVERVIEW OF ROUND-TABLE SESSIONS

Session 2 - Flood forecasting, monitoring, warning and responses

Challenges	Opportunities	Collaboration
• Pressure from climate change and urbanization • No integrated flood management system in place • Lack of forecasting and early warning systems • Expensive forecasting and monitoring systems and questions about their sustainability • Difficulties in communicating with the communities • Need more communication between neighboring countries	• Willingness from countries to tackle early warning systems • Availability of expertise at regional level (WMO, ICIMOD, China, …) • Possibility of using the social network for communication and early warning system • Stakeholders involvement can strengthen monitoring • Ecosystem system services more and more recognized	• Enhance trans boundary collaboration and collaboration on information / experience sharing between countries • Foster more common projects on flood forecasting and early warning system • Three levels of collaboration: 1) between countries; 2) within the countries; 3) between countries and specialized agencies (ADB, WMO, …) • GWP good platform to liaise among agencies and governments

Session 3 - Flood management in urban settings

Challenges	Opportunities	Collaboration
• **Poor integration** of flooding issues in urban water management and planning • **Causes of flood problems**: population density, unplanned and scattered urban development, drainage system not updated not cleaned, no land for urban flood retention, poor absorption capacity of urban landscape, no rules for keeping wetland areas, solid waste a major issue, laws and regulations not adequate, occupation of land in dangerous areas • **Systems are becoming obsolete**: Cities becoming bigger and bigger, and dikes have been designed differently, water cannot drain out quickly, cities not planned according to a hydraulics, forecasting is short and expensive • **Social phenomena** difference between rich and poor areas	• **Combining flood management** with urban development and urban planning • **Better analysis** on what are the causes? Natural, social, technical, institutional, design of drainage life cycle and redesign… green and mart cities • **Live with floods**: storm water as a resource, seek for benefits, green infrastructure and design, rain water harvesting, learn from the “sponge city” concept, flood risk mapping • **Strengthen the knowledge** for different institutions to make integrated plans urban councils can monitor integrated development • Better communicate with the population as well as integrate them in planning and monitoring	• Peer to peer learning between cities • Learn more about outcomes from Paris Agreement and preparation of Habitat III • Can start in emerging cities with demonstration projects

Session 4 - Community-based approaches to flood management

Challenges	Opportunities	Collaboration
• **Awareness:** Need to make community aware on floods, right information concerning meteorology, emergency response, however not one solution fits all because of differences of context • **Engagement:** Community participation or just information? Cohesiveness of the city a challenge • **Communication**: Info published and in website but people do not look • People who live in flood areas do not have phones • **Working with communities:** Floods more in the hands of engineers, how to organize the communities with a clear mandate, Lack of funding from government • **Habitat**: Inadapted architecture • **Nature of floods:** Floods contain any things water, chemicals, debris	• **Key role for communities**: Community involvement needed because they are there, and engineers discussing with the communities to find solutions that are adapted, participatory approaches for the emergency and preparedness plan, communities has to come to the flood manager with their vision and knowledge, trust of local people, communities are open to accept technology • **Knowledge management:** Manuals developed by GWP Nepal, develop tools for predictability of the floods • **Living with floods:** Infrastructure rehabilitation and eco system approach and eco-friendly approach, Malaysia experience with water harvesting and drainage, storm water management can be a resource, collect flood water	• Good regional platform from typhoon committee • Share handbook from Nepal • Collaboration between South-South and North-South • Communities helping one another

Session 5 - Flood management practices in a changing climate

Challenges	Opportunities	Collaboration
• **Impact:** More extreme events and devastating flash floods, escalate impact and frequency of floods, great uncertainty about the future and what investments to choose, limitations to what humans can do • **Data shortage:** on glacier, sea rise monitoring, and assessment of Climate Change on typhoon, scientific data still not enough to determine impact, unpredictable data, uncertainty of data and models • **Regional differences:** Geography is diverse and impact differs from area to area (coast, mountain, plain, delta) and different from different areas	• **Capacity building;** need to know more about planning under uncertainty and climate change, info on scenarios, process data and then info sharing, good to mix local and scientific knowledge, new science WMO, ICIMOD and GWP but also need to work with academia, Research and academia improving technics to forecast • **Country adaptation program:** how to develop such programs, no regret investment, with costs implications, increase investments such as dams, but in balance with impact on environment, rehabilitate infrastructure and development of hydrologic thinking concerning CC, and emergency response • **Opportunities** from ADB, China and India to work on projects; Paris agreements provide a good framework; Working with Government NGOs private sectors ; Prepare projects with cost implications where the government is prepared to share the costs	• Circulate and integrate Paris agreement and meta-guidelines into country and regional planning • Need data sharing with other countries on climate change since it is a multi-country issue • ICIMOD and TYPHOON Commission are good and complementary platforms • Be innovative to get funds from donor agencies

ANNEX IV – DRAFT MEMORANDUM OF UNDERSTANDING

Memorandum of Understanding

Between

Global Water Partnership China

And

Global Water Partnership Southeast Asia

And

Global Water Partnership CACENA

And

Global Water Partnership South Asia

And

Global Water Partnership Secretariat,

For

Co-operation

May 2016

This Memorandum of Understanding (MoU) for co-operation between GWP's Regional Water Partnerships (hereinafter called Parties), signed on ___ (day of) _____ between GWP China having their office in Room 978, Building A, China Institute of Water Resources and Hydropower Research, No. 1 Yu-Yuan-Tan-Nan-Lu, Haidian District, Beijing, 100038, P R China, represented by the Chair of GWP China,

And

GWP SEA having their office in c/o Gedung Baru SDA 8th floor /808, Ministry of Public Works, Jl. Pattimura No.20. Kebayoran Lama, Jakarta-Indonesia, represented by the Regional Chair of GWP Southeast Asia,

And

GWP CACENA having their registered office in ICARDA-CAC (GWP CACENA/IWMI), Apt 123, Block 6, Osiyo str, Tashkent, 100000, Uzbekistan, represented by the Regional Chair of the Central Asia and Caucasus region (CACENA),

And

GWP SAS having their registered office at International Water Management Institute, 127, Sunil Mawatha, Pelawatte, Battaramulla, Sri Lanka, represented by the Regional Chair of GWP South Asia (SAS),

And

*Global Water Partnership Secretariat (hereinafter called "**Facilitating Party**"), having their registered office at PO Box 24177, 104 51 Stockholm, Sweden, represented by the Chair of the Secretariat,*

WHEREAS

a) Parties agree to cooperate as per the clauses of this MoU;

b) The facilitating party agrees to facilitate the cooperation specified in the clauses of this MoU;

c) In pursuance thereof, all Parties have agreed to enter into this Agreement;

NOW, THEREFORE, THE PARTIES HERETO HEREBY AGREE AS FOLLOWS:

1. GENERAL

1.1 Definitions and Interpretation

a. Definitions:

*i. "**Challenges**" means this Agreement, such as climate change related events, floods, droughts, rapid urbanization, food security and the implementation of the IWRM and the SDGs etc.;*

*ii. "**Co-operation**" means the mutual sharing and exchange of development solutions - knowledge, experiences and good practices, policies, technology and resources - between and among GWP SAS, GWP China, GWP SEA and GWP CACENA;*

*iii. "**GWP's towards 2020 Strategy**" means GWP Six-Year Strategy runs from 2014 through to the end of 2019. It will respond to emerging challenges and serve our Network by building on our strengths in sharing knowledge & experience, facilitating policy development process, building institutional capacity, working in partnership with key sectorial players, and promoting investments in institutions, information, and infrastructure. Three strategic goals of catalyzing change in policy and practice, sharing knowledge, and strengthening partnerships will focus our activities;*

*iv. "**Facilitating Party**" means the party who coordinate and facilitate implementation of this MoU from GWP Secretariat with the support of Regional Coordinators;*

*v. "**GWP SEA"** means Regional Secretariat representing 8 Country Water Partnership in Southeast Asia, namely Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Thailand and Vietnam. SEA also work with Partner organizations in Singapore.*

*vi. **GWP CACENA'** means Regional Secretariat representing two sub regions namely, the Southern Caucasus (Azerbaijan, Armenia and Georgia), and Central Asia (Kazakhstan, Kyrgyz Republic, Mongolia, Tajikistan, Turkmenistan and Uzbekistan) & Country Water Partnerships therein,*

*vii. **"GWP SAS"** means Regional Secretariat representing the Country Water Partnerships of Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka*

b. All terms and words not defined herein shall, unless the context otherwise requires, will have to be discussed and agreed upon by all Parties;

2.1. Commencement, amendments and termination of the agreement

2.1.1 Effectiveness of Memorandum of Understanding

*This MoU shall come into force and effect on the date, on which this MoU is signed by all the Parties (the "**Effective Date**").*

2.1.2 Amendments

The Memorandum of Understanding (MoU) for Cooperation may be amended at any time by mutual written consent of the four Parties. The four Parties will review the status of progress on the MOU during any inter-regional meetings.

2.1.3 Expiration of Agreement

This MoU will remain effective for five (5) years. If necessary, MoU will be prolonged by written agreement between all parties.

2. AGREEMENT

*2.1 Recognizing that the four Regional Water Partnerships (RWPs) in Asia, namely, GWP SAS, GWP China, GWP SEA and GWP CACENA (hereinafter referred to as "the four Parties") of the Global Water Partnership (GWP), have many common water issues and will face similar **challenges** in water resources management in the coming years, the four Parties have held discussions, with the*

support of the GWPO Secretariat during the Regional Workshop on Flood Management on December 14-16, 2015, in Guangdong, China, and expressed the willingness to promote cooperation amongst each other, based on win-win principles and with the aim to achieve mutual benefits.

2.2 *The cooperation between the four Parties aims at promoting the better implementation of the Integrated Water Resources Management (IWRM) principles, delivering the GWP's towards 2020 Strategy and contributing to the sustainable economic and social development of the countries in the four regions and achieving the Sustainable Development Goals (SDGs).*

2.3 *All Parties agree that the specific objectives of the cooperation are the exchange of knowledge and experiences between regions, the optimized use of resources and capacity in the development of joint programmes and projects the strengthening of GWP's Regional Asian position in international fora and events; and the improved overall coordination of activities among the four regions.*

2.4 *The four Parties will cooperate for more effective, consolidated contribution to regional processes and activities in synergy with regional organisations, such as the Asia-Pacific Water Forum (APWF), the Network of Asian River Basin Organisations (NARBO), the Asia Water Council (AWC), etc. This cooperation shall be enhanced through information and knowledge sharing, workshops, specific project development and implementation, mutual visits, public awareness raising and dissemination activities.*

The four Parties shall invite each other to participate in their respective events and activities and mutually support each other by liaising with regional organisations in a coordinated manner. All parties agree to organise a one GWP Asian regional event per year. Hosting of such events should preferably take place on the basis of regional rotation.

2.5 *The Regional Coordinators of the four RWPs (Parties) are the focal points for mutual communication and competent for identifying and coordinating the detailed cooperation programmes and activities.*

2.6 *The areas of cooperation between the four Parties include: implementation of IWRM, flood and resilience and Water-Energy-Food Nexus.*

2.7 *The parties will identify activities/corporate on cross-cutting themes under GWP 2020 Strategy: Gender and Youth.*

3. IMPLEMENTATION OF THE MoU

3.1 Fairness of the Implementation

The Parties recognize that it is impractical in this MoU to provide for every contingency, which may arise during the duration of the MoU, and the Parties hereby agree that it is their intention that this MoU shall operate fairly as between them, and without detriment to the interest of either of them, and that, if during the term of this MoU either Party believes that this MoU is operating unfairly, the Parties will use their best efforts to agree on such action as may be necessary to remove the cause or causes of such unfairness.

3.2 Funding of Activities

All Parties agreed to allocate some funds to implement the activities under this MoU for each of the next five years and relevant activities shall be included in the annual work plan of each Party, under the guidance of GWPO Senior Network Officers, who are representing these four GWP Regions.

***In WITNESS WHERE OF,** the Parties hereto have agreed to have this MoU endorsed by their respective duly authorized representatives of the day and the year signed by all the Parties.*

GWP China:
Name:
Designation: *Chair, GWP China*
Date:
For

_____
(GWP China)

GWP SEA:
Name:
Designation: *Chair, GWP Southeast Asia*
Date:
For

_____
(GWP SEA)

GWP CACENA:
Name:
Designation: *Chair, GWP Central Asia and Caucasus (CACENA)*
Date:
For

_____
(GWP CACENA)

GWP SAS:
Name:
Designation: *Chair, GWP South Asia*
Date:
For

_____
(GWP SAS)

GWPO Secretariat:
Name:
Designation: *Chair, GWPO*
Date:
For

_____
(GWPO Secretariat)

ANNEX V – MATRIX OF POTENTIAL PROJECTS *(WORKING DOCUMENT)*

A. Urban Flood Management

Scope	Topic	Activities	Allies	Sponsors
All RWPs (GWP China, Cambodia Dhaka, Putrajaya, Hebin, Jinan, Zhenjiang, Jiaxin, Xixie, Colombo, Pnomhpen..	**China 'Sponge cities':** - How to combine urban planning/management and disaster prevention in growing cities - Investing in combined grey and green infrastructure - **Water-sensitive urban design** (Australia) - Flood control and management - Flood management in Colombo City + Wetland conservation - **Dhaka Climate Smart City** > Lead: GWP China, Bangladesh, Malaysia, SLWP, CamWP...	- Support to policy reform/shaping, - Contribution to urban design and planning - Knowledge Exchange, Capacity Building - Replication, Innovative approaches ("Sponge Cities") - Peer-to-peer learning between cities, - Demo projects in emerging cities, - Workshops (local and international) - Exchanges between experts - Develop case studies/comparative studies from China and other countries - Sharing lessons learnt - Show case presentations in diff. Countries - Share experiences via Toolbox - Organise side-events at Singapore WWW and UN-Habitat III Conference	WMO/APFM, Chinese Government, Municipalities, Chin. Min of Construction, UN-Habitat, PUB... ICLEI, WWF... WB Mayors	USAid/WMO ADB, China SSCCCF, CDKN? AFD Private sector
PWP, BWP, Nepal (Kathmandu), Indonesia (Jakarta), Thailand (**Bangkok**), Lao PDR (Paksan)	**Urban flood management in slum areas**	- Bringing Donors - Multi-stakeholder forum - Information generation - Working with urban poor communities - Resettlement of poor urban communities - EW systems and reaction drills for poor communities	UN-Habitat, OIEau, ICLEI	ADB, BMZ, SDC, SECO, NL, DFID GCCAF...

B. Flash floods

Scope	Topic	Activities	Allies	Sponsors
All RWPs GWP Georgia, PWP, GWP Nepal, CamWP, BhWP Bangladesh	EW systems Emergency relief Forecasting FFs Snow-melt run off, Glacier melting/ outburst	- Facilitation of dialogue - **Influence/information of policy makers** - support platform, stakeholder involvement - Forecasting system in 9 river basins (Georgia) - Intl hydrological-meteor. experts for Hazard mapping - Replication of solutions - IPPCC Report No. 5 - Sharing best practices - TB cooperation on information sharing - Knowledge sharing between RWPs - Glacier monitoring - **Support to WMO GFFG (speed up process in SEA, kick-off programme in SAS)** - **Link up competent authorities on FF warning and reply** - Striking bal between FFs and water scarcity	WMO/GFF/APF, National governments, ICIMOD, ASEAN Humanitarian Assistance Unit (Jakarta)	USAid/WMO UNDP GCCAF, GCF...

C. *Community-based Approaches*

Geographic Scope	Topic	Activities	Allies	Sponsors
GWP SEA, GWP SAS, SLWP	**Community-based flood management**	- Best practice documentation - Regional KM Hub on CB Flood Management - Community participation in flood management (IFM concept) - Involvement of CWPs - Update of training guidelines - Study on economic gains of involving communities - Training of communities to monitor water levels (SLWP) + operating of gates in river mouth - Development of guidance to enhance community resilience towards floods ("Living with Floods" Concept)	APFM, Min Public Works, WMO, ASEAN, APWF, NARBO, CBRE, APAN	ADB Japan Fund for Poverty Reduction
	Community EW plans (India, Bangladesh, Nepal)	- Advocacy/public awarenes - Infrastructure support - CB of communities/SHs - Mitigation of floods at local level?	CWPs, National Disaster Management Agencis, SAARC Disaster Management Centre	

ANNEX VI – LIST OF PARTICIPANTS

Title	First Name	Last Name	Position	Organization
GWP CHINA REGION				
Mr	Hao	Wang	Acting Regional Chair	GWP China
Mr	Rugang	Zheng	Regional Coordinator	GWP China
Mr	Xiaotao	Cheng	Deputy Regional Coordinator	GWP China
Mr	Yunzhong	Jiang	Regional Water & Climate Resilience Programme Manager	GWP China
Ms	Juan	Wu	Regional Finance Officer	GWP China
Ms	Daidi	Zhang	Regional Administration Officer	GWP China
Ms	Yilin	Ma	Regional Communications Officer	GWP China
GWP ORGANISATION (GWPO)				
Mr	Rudolph Pabus	Cleveringa	Executive Secretary	GWPO
Ms	Angela	Klauschen	Senior Network Officer	GWPO
Mr	Francois	Brikke	Senior Network Officer	GWPO
GWP CENTRAL ASIA AND CAUCASUS REGION (CACENA)				
Mr	Irakli	Megrelidze	Deputy Head	Hydrometeorological Dept. National Environmental Agency, Georgia
GWP SOUTH ASIA REGION (SAS)				
Mr	Lam	Dorji	Regional Chair Designated	GWP South Asia
Ms	Priyanka	Dissanayake	Regional Coordinator	GWP South Asia
Mr	Lal	Induruwage	Regional Water & Climate Resilience Programme Manager	GWP South Asia
Mr	Som nath	Poudel	Vice President	Nepal Country Water Partnership/JVC
Mr	Naseer Ahmad	Gillani	Joint Secretary/Chief (Water/Environment) / Chair	Planning Commission, Government of Pakistan / Pakistan Water Partnership
Ms	Badra	Kamaladasa	Chair	Sri Lanka Water Partnership
Mr	Padma Dorje	Gyamba	Superintending Engineer	Ministry of Water Resources, India, River Development & Ganga Rejuvenation, Central Water Commission
Mr	Md Waji	Ullah	Executive Director	Center for Environmental and Geographic Information Services, Bangladesh
GWP SOUTH EAST ASIA REGION (SEA)				
Mr	Hla	Baw	Regional Chair	GWP South-East Asia
Mr	Botkosal	Watt	Regional Steering Committee Member	GWP South-East Asia
Mr	Mochammad	Amron	Regional Steering Committee Member	GWP South-East Asia
Mr	Man	Purotaganon	Regional Steering Committee Member	GWP South-East Asia
Mr	Djoko	Sasongko	Regional Programme Coordinator	GWP South-East Asia
Mr	Pahrian Ganawira	Siregar	Regional Water & Climate Resilience Programme Manager	GWP South-East Asia
Ms	Rini	Natalia	Regional Communications & Administration Officer	GWP South-East Asia
Mr	Rozman	Bin Mohamad	Deputy Director	Flood Management Division, Drainage and Irrigation Depart., Malaysia
INVITED EXPERTS				
Mr	Zhiguang	Liu	Consul	Dept of International Cooperation, Science & Technology, Ministry of Water Resources
Mr	Zhiyu	Liu	Director	Hydrological Information & Forecast Center, Ministry of Water Resources
Mr	Jinping	Liu	Hydrologist	UN ESCAP/WMO Typhoon Committee Secretariat (TCS)
Ms	Suxiao	Li	Senior Officer	Living Yangtze Programme, WWF China
Ms	Yumiko	Asayama	Manager	Asia-Pacific Water Forum, Japan
Mr	Ayhan	Sayin	Scientific Officer	Hydrological Forecasting and Water Resources Division, World Meteorological Organization
Mr	Qingfeng	Zhang	Director	Environment, Natural Resources, and Agriculture Division, East Asia Department, ADB
Mr	Rabindra	Osti	Water Resources Specialist	Environment, Natural Resources, and Agriculture Division, East Asia Department, ADB
Mr	Xiaohong	Chen	Professor	Sun Yat-sen University, Guangzhou, China
Dr.	Xiaobin	Qiu	Researcher	Education Department, Key Lab of Water Cycle and Water Security for South China

ANNEX VII – PHOTOS

Photo 1: Group photo, Opening Session, 14 December 2015

Photo 2: Break-out group, Round-table Sessions, 14 December 2015

Photo 3: Plenary discussion, Round-table Sessions, 14 December 2015

Photo 4: Technical Field Visit, Yilin Ma showing map of Pearl River basin, 15 December 2015

Photo 5: Visit to Flood Control & Disaster Reduction Center of Foshan City, 15 December 2015

Photo 6: Visit to Flood Control & Disaster Reduction Center of Foshan City, 15 December 2015

Photo 7: Field Visit, View of Pearl River basin, 15 December 2015

Photo 8: Visit of Guangzhou, Urban River Restoration project, 17 December 2015

The event was co-convened by:

Global Water Partnership China
全球水伙伴（中国）

Global Water Partnership

with the support of:

CDR

IAHR AIRH

ASSOCIATED PROGRAMME ON FLOOD MANAGEMENT

ESCAP/WMO Typhoon Committee

and the contribution of:

ADB

Asia-Pacific Water Forum

WMO

United Nations ESCAP

WWF

Global Water Partnership Central Asia and Caucasus

Global Water Partnership South Asia

Global Water Partnership Southeast Asia

www.gwp.org

The Global Water Partnership’s vision is for a water secure world. Our mission is to advance governance and management of water resources for sustainable and equitable development.