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Report on Activities of Working Group on Hydrology (WGH) of TC in 2014

(Item 4 of Tentative Program for TC 47th Session)

(Submitted by WGH)

ACTION REQUIRED:

This Committee is invited to:

a) Review the activities of TC WGH conducted in 2014
b) Approve the recommendations and AOPs of WGH for 2014 and beyond

APPENDIX: Report on activities of Working Group on Hydrology (WGH) of TC in2014

REPORT ON

ACTIVITIES OF WORKING GROUP ON HYDROLOGY (WGH)OF TC IN2014

In 2014, Working Group on Hydrology (WGH)of Typhoon Committee (TC) conducted a series of activities very positively referring tothe decision of 46th Session of the Committee which was held in Bangkok, Thailand, from 10 to 13 February 2014. This report was drafted mainly on the base of the outcomes of3rdWGH working meeting which was held in Seoul, Republic of Korea from 13 to 16 October 2014, and the discussion of the parallel session of TC 9th Integrated Workshop (IWS)which was held in ESCAP –UN Conference Center, Bangkok, Thailand from 20 to 24 October 2014.

The report highlighted the main progresses and achievements on hydrological component in Members in past year; briefly described the activities of WGH conducted in 2014, and summarized the status of implementation of WGH AOPs 2014. Based on the communication among Members and the discussion at TC 9th IWS, WGH proposed the implementation plan of AOPs for 2015 and beyond; and consequently requested the TCTF allocation for supporting WGH activities in 2015.

THE MAJOR PROGRESSES ON HYDROLOGICAL COMPONENT OF MEMBERS IN 2014

1) The Members of the Committee in 2014 conducted a series of activities on hydrological component and achieved remarkable progresses. The major progresses which may benefit other Members were briefly described as below.

2) The serous flood disaster events, including river flood, urban flood, flash flood and debris flow happened in some Members such as Laos, Japan, Malaysia, Philippines, Vietnam, etc. The hydrological departments in the Members provided valuable service of flood forecasting and warning to the decision-making departments of the Governments.

3) In China, Bureau of Hydrology (BOH) of the Ministry of Water Resources (MWR), based on 50km × 50 km grid numerical rainfall forecasting products from China Meteorological Administrative (CMA), has initiated the application of downscaling method on studying the coupling calculations between atmospheric numerical models and hydrological models, and the application of distributed hydrological models on simulating inflow processes of reservoirs and consequently calculating the amount of storm-water which reservoirs can afford while meeting the design water levels to optimize reservoir operation program for flood control and to analyze the anti-rainstorm capacity of small- and medium-sized reservoirs.

4) In Japan, the extremely heavy rainfall caused serious sediment disasters in a variety of locations to the north of Hiroshima City on 20 August 2014. The National Institute for Land and Infrastructure Management (NILIM) under the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) immediately dispatched sediment disaster experts and the Technical Emergency Control Force (TEC-FORCE) to the affected areas to provide technical assistance for the prevention of secondary accidents. TEC-FORCE also used its expertise to support other emergency efforts involving the placement of large sandbags and the installation of devices such as debris-flow sensors and monitoring cameras.

5) In Malaysia, through Department of Irrigation and Drainage (DID), 32 rainfall stations, 14 water level telemetry stations and 5 new siren stations were constructed in 2014. Also the Integrated Flood Forecasting and River Monitoring (IFFRM) for Sg. Kerianhas

been completed. Two flood hazard maps were prepared. A joint committee between various departments was formed to improve forecasting of extreme floods.

6) In Philippines, PAGASA made remarkable progresses on establishment of Flood Forecasting Warning System (FFWS) in Major River Basin; establishment of Community Based Early Warning system; and on Establishment of Urban Flood Inundation, hazard mapping and Risk Map.

7) In Republic of Korea, Han River Flood Control Office (HRFCO) of Ministry of Land, Infrastructure and Transport (MOLIT) assessed the flood forecasting systems in TC Members and confirmed the direction for the establishment of the extreme flood forecasting system. The Assessment System of Flood Control Measures (ASFCM) has already been established with the objectives of evaluating various socio-economic factors and estimating the damage cost caused by flood. Also, HRFCO developed the smartphone application for water front flood information provision and utilized the rain-radar system for increasing the accuracy of flood forecast.

8) In Thailand, in 2014 Royal Irrigation Department (RID) and the other agencies established collaboration on monitoring and analysis of flood situation to reduce the lost from Typhoon-related disasters; improved the telemetering system to the rural area which is the high risk area for flood warning and developed the communication system to disseminate flood information like on website or text messages. Also, RID has initiated the project on Urban Flood Forecasting and Inundation Mapping under WGH of TC in 2014.

9) USA in 2014 completed writing Hydrologic Services Manual, relating hydrologic products provided by NWS Guam along with hydrologic concerns and data for primary islands throughout Micronesia, Commonwealth of the Northern Mariana Islands and Guam. USA encouraged use of newly adopted Hydrologic Outlook statement to highlight potential heavy rainfall events and other flood products.

REVIEW OF THE THIRD WGH WORKING MEETING

10) The third WGH working meeting with the theme of "Extreme Flood and Structural Flood Control Measures in TC" was held in Seoul, Korea from 13 to 16 October 2014 at the kind invitation of the Ministry of Land, Infrastructure and Transport (MOLIT), Republic of Korea with generous offering of financial support.

11) The information of 3rd WGH working meeting was given a general briefing as below:

- The 3rd working meeting was attended by around 20 participants from 7 Members, including China, Lao PDR, Malaysia, Philippines, Republic of Korea, Thailand and Vietnam, and TCS. The meeting was chaired by hydrologist of TCS Mr. Jinping LIU on behalf of Chairperson of WGH.
- The working meeting reviewed and discussed mainly: (1) the progresses of WGH AOP2014 and implementation plan for 2015; (2) preparation of the 9th IWS and 47th annual session of the Committee; (3) 4th WGH working meeting in linkage with 7th World Water Forum (7WWF) to be held in Daegu, Korea in April, 2015;(4) usage of TCTF allocation for supporting WGH activities in 2014 and requirement for supporting WGH activities in 2015.
- Taking the opportunity, the participants of working meeting were invited to attend the 40th anniversary ceremony of HRFCO. On behalf of TC Secretariat and WGH, Mr. Jinping LIU was invited to deliver a congratulation speech, as one of three invited speakers.

— Taking the opportunity, the participants of working meeting were invited to visit the River Information Center of HRFCO and Radar Center of Korea Institute of Construction Technology (KICT). The president of KICT met the representatives of participants.

12) The WGH parallel session expressed its appreciation to the government of Republic of Korea, through HRFCO of MOLIT in cooperation with KICT and K-Water for hosting and organizing working meeting for WGH with funding support.

PROGRESSES OF WGH AOPS IN 2014 AND IMPLEMENTATION PLAN FOR 2015

13) Totally 8 AOPs related to WGH in 2014 were listed in table 1. The implementation status of WGH AOP2014 are shown in Annex 1 and the success indicators for WGH AOP2015 are shown in Annex 2.

Table 1 Summary of WGH AOPs in 2014

	Projects	**Driver**	**Duration**
AOP1	Assessment System of Flood Control Measures on Socio-economic Impacts	Korea	2008-2014
AOP2	Extreme flood forecasting system	Korea	2012~2016
AOP3	Estimation for Socio-economic Impact of Sediment-related Disaster	Japan	2013~2015
AOP4	Development and Application of Operational System for Urban Flood Forecasting and Inundation Mapping (OSUFFIM) for TC Members	China	2014~2017
AOP5	Extension of Xin'anjiang Model Application in Selected River Basins in TC Members	China	2013~2016
AOP6	Guidelines for extreme flood risk management in TC region	Korea	2013-2015
AOP7	Study on Prediction of Debris flow and Shallow landslide by the Satellite Rainfall Data	Japan	2013-2017
AOP8	Project of Synergized Standard Operating Procedures for Coastal Multi-hazard Early Warning System (SSOP)	TCS	2013-2014

AOP1: Assessment System of Flood Control Measures on Socio-economic Impacts

14) The project on Assessment System of Flood Control Measures on Socio-economic Impacts, led by Republic of Korea, was launched in 2008 and will be closed at TC 47th annual session (the 3rd Joint PTC/TC Session) to be held in UN Conference Center, in Bangkok, Thailand from 9 to 13 February 2015.

15) HRFCO of MOLIT, in cooperation with KICT, finalized the Technical Report of Structural Flood Control Measures for this project in 2014 which includes two parts:

— Part A: Guidelines for Structural Flood-control Measures Assessment with 4 chapters; and

— Part B: Manual for Assessment of Flood- control Measures (ASFCM) with 7 chapters.

16) The Technical Reportwas printed in the end of 2014 as one TC publicationand wasdistributed at 3rd Joint Session of PTC/TC (42ndSession of PTC and 47thSession of TC).

Also the publication will be distributed at 7 World Water Forum (7WWF) to be held in on 12-17 April 2015 in Daegu, Korea and other big events.

AOP2: Extreme Flood Forecasting System (EFFS)

17) The progresses of AOP2 in 2014 include:

a) investigation of the structural flood control measures with on-line, 2014 field survey and 3rd TC WGH Meeting

b) confirmed the establishment direction for the Extreme Flood Forecasting System

18) HRFCO of MOLIT of Korea, in cooperation with KICT and K-water, successfully conducted the third field survey from 13 to 20July 2014 with 8 participants from Korea, Laos, Thailand, and Philippines. The necessary data was collected from selected river basins including Chao Phraya River in Thailand, PamangaRiver in Philippine, and Nam Ngum River in Lao PDR. The survey reached the expected goals including:

— to gather additional data set for AOP2 and AOP6 to set an optimal direction for making the guidelines for flood risk management and establishing flood forecasting system in TC region;

— to understand unique environmental, social and economic characteristics of each member counties for appreciate flood forecasting system;

— to investigate and discuss the structural flood control measures in 3 countries; and

— to strengthen international cooperation to reduce flood damage by typhoon

— to update WGH webpage http://tcwgh.hrfco.go.kr

19) The WGH expressed its sincere appreciation to Korea Government through HRFCO& KICT for organizing this field survey with providing funding support, and also to Philippines, Thailand and Lao PDR for their close cooperation to this project.

20) The participants are encouraged to review WGH webpage and comment on improvement.

21) The WGH was informed that AOP2 will be extended one more year to 2017 and the implementation plan for AOP2 in 2015 and beyond, including:

— To initiate the computational design of the suitable extreme flood forecasting system with PC-version;

— To conduct the summary meeting of field survey to wrap-up the results of field survey and publish the report.

AOP3: Project on Estimation for Socio-economic impact of Sediment-related Disaster

22) The WGH was informed that the implementation plan of this project was postponed because of the personnel change in National Institute for Land and Infrastructure Management of Japan and there was one response only for the request of deciding the format and collecting the record.

23) The project will be extended one more year to 2016. The draft roadmap was discussed as:

— Furthermore, providing the draft format to collect the record of sediment-related disasters and deciding the format in 2015.

— Collecting the record of sediment-related disasters by the format from TC Members.

AOP4: Development Operational System for Urban Flood Forecasting and Inundation Mapping (OSUFFIM) for TC Members

24) The WGH noted that, a series of activities have been conducted since this project was proposed at 8th IWS which was held in Macao, China, 2014, including:

- The kick-off meeting for implementation of the OSUFFIM Project was held in Sun Yat-Sen University (SYSU), Guangzhou, China from 27 to 28 December 2013.
- The national working groups, project leaders and focal points at 3 countries have been set up and confirmed after the kick-off meeting.
- Field survey in Chiang Mai, the pilot city of Thailand, was conducted from February 5 to 9, 2014.
- Professor Yangbo Chen, the Chief Scientist of OSUFFIM visited the Department of Irrigation and Drainage (DID) of Malaysia On September 12, 2014 and had meeting with the OSUFFIM working group of Malaysia.
- The WGH was informed the field survey in Malaysia which was proposed as one of activities of OSUFFIM in 2014 will be postponed to 2015.
- The WGH was informed with appreciation that Prof. CHEN Yangbo, the chief scientist of OSUFFIM, is trying to apply the budget from the Government of Guangdong Province of China for supporting the project.
- The development of English version of operational system is on-going in SYSU.
- A joint training course for this project was held in SYSU, in conjunction with the training course of AOP5 (Xin'anjiang Model application) from 1 to 7 December of 2014 for selected TC Members, and SYSU providedthe logistics support for this training.The 10 participants from the Members of pilot cities including Malaysia, Thailand and Vietnam attended the training course. Total 8 experts and professors from BOH and SYSU took part in the course as lectures for OSUFFIM and Xinanjiang Model, respectively. Dr. LIU Zhiyu, Director of National Flood Forecasting Center of BOH, appeared the open ceremony. The participants were delivered the certificates signed by TC Secretary Mr. OlavoRqsquinho.At the joint training course, the implementation plan for 2015 was discussed and reached consensus:
    - China proposed Dongguan and Foshan; Thailand proposed Chiang Mai and Hat Yai; and Malaysia proposed Shah Alam as pilot cities.
    - Organizing the seminar on pilot study of Thailand in conjunction with 3rd TC/PTC Joint Session (TC47 and PTC42) to be held in ESCAP from 9-13 February 2014;
    - One-month attachment Training on data processing and model set up in middle March to April in SYSU, China. DID Malaysia and RID Thailand will nominate one candidate, respectively, to TCS and SYSU.
    - Participating in 4th WGH working meeting in April, 2015
    - OSUFFIM system installation in pilot cities in pilot cities of China, Malaysia and Thailand from May to August
    - Operational OSUFFIM system maintenance in pilot cities from September to December
    - Participating in 10th IWS of TC to be held in Kuala Lumpur, Malaysia in November/December, 2015

AOP5: Xin'anjiang Model Application in Selected River Basins in TC Members

25) The meeting noted that progresses achieved in 2014 for this project, including:

— An English version of flood forecasting system using Xin'anjiang model has been updated by BOH, China for this project;

— A joint training course for this project was held in SYSU, in conjunction with the training course of AOP4 (OSUFFIM) from 1 to 7 December of 2014 for selected TC Members, and SYSU provided the logistics support for this training.

26) The WGH also was informed the implementation plan for this project in 2015 will be focus on the application of National Flood Forecasting System (NFFS) of China in selected river basins in TC Members. China-side is willing to send experts to the Members for providing assistance to resolve the problems if needed.

AOP6: Guidelines for Extreme Flood Risk Management

27) The WGH noted the progresses of AOP6 in 2014 including:

— Confirmation of the guideline contents for extreme flood risk management is on-going;

— Organizing the 3rd TC WGH Meeting in Seoul, Korea

28) The implementation plan for AOP6 in 2015 includes:

— The draft guideline for extreme flood risk management will be accomplished and distributed to Members for Comments.

— 4th TC WGH Meeting will be held in connection with 7th World Water Forum which will be held in Daegu &Gyeongbuk,Republic of Korea in April 2015

AOP7: Study on Prediction of Debris flow and Shallow landslide by the Satellite Rainfall Data

29) The implementation plan of this project was postponed because of the personnel change in ICHARM, Japan.

30) The WGH was informed the project will be extended one more year to 2017. The draft roadmap was discussed as:

— Selecting pilot project areas among member countries from 2015.

— The study will conduct to identify dangerous areas on debris flow and shallow landslide in the selected pilot project areas.

— Also the study will conduct to propose near real time warning information by using the Critical Line Concept in the selected pilot project areas.

— Drafting manual for prediction on the disasters

AOP8: Project of Synergized Standard Operating Procedures for Coastal Multi-hazard Early Warning System (SSOP)

31) The WGH noted the remarkable achievements of this project in 2014, and agreed the proposal of extension of the project and consider to conduct phase II with the support from ESCAP and WMO.

32) The WGHexpressed its kind appreciation to ESCAP, Mr. Jim Weyman (Project Manager/Technical Advisor of SSOP), all authors and reviewers of SSOP Manual for their support, efforts and contribution. Also the appreciation was expressed to TCS for great efforts and contribution for coordinating activities for SSOP, particularly Mr. OlavoRasquinho, Secretary of TC, as one members of Steering committee of the project.

33) The WGH AOPs in 2015 and beyond were summarized in table 2.

Table 2 the summary of WGH AOPs in 2015 and beyond

	Projects	Driver	Duration
AOP1	Project of Synergized Standard Operating Procedures for Coastal Multi-hazard Early Warning System (SSOP)	TCS	2013-2015
AOP2	Extreme flood forecasting system	Korea	2012~2017
AOP3	Estimation for Socio-economic Impact of Sediment-related Disaster	Japan	2013~2016
AOP4	Development and Application of Operational System for Urban Flood Forecasting and Inundation Mapping (OSUFFIM) for TC Members	China	2014~2017
AOP5	Extension of Xin'anjiang Model Application in Selected River Basins in TC Members	China	2013~2016
AOP6	Guidelines for extreme flood risk management in TC region	Korea	2013-2016
AOP7	Study on Prediction of Debris flow and Shallow landslide by the Satellite Rainfall Data	Japan	2013-2017

PROPOSAL OF 4TH WGH WORKING MEETING WITH LINKAGE OF 7TH WWF

34) The WGH was informed that the 7th World Water Forum (WWF) will be held on 12-17 April 2015 and also noted that Korea-side is willing to integrate the 4th WGH working meeting of 2015 into 7th WWF.

35) The WGH noted that Korea has proposed a high level panel session on 'Leadership for National Water Management to Contribute to Economic Growth' as one of the thematic speciation session in the Thematic Process during the 7th WWF which will contribute sharing the best practices with stakeholders, especially developing countries.

36) The WGH was informed the information about the proposed session as below:

- The session will be organized by the Korea Institute of Civil Engineering and Building Technology (KICT) and sponsored by the Ministry of Land, Infrastructure and Transport (MOLIT), Republic of Korea. Also, it will be operated by cooperation among the Asian Development Bank (ADB), the World Bank, the Food and Agriculture Organization (FAO) and authorities from developing countries including the Philippines and Vietnam.
- The High Level Panel session consists of 6~7 presentations by panels regarding the effective linkage between water manage and economic development with best practices and recommendations and it takes approximately 120 min.
- The Session will have 7 partners including HRFCO, KICT, TCS, RID of Thailand, PAGASA of Philippines, DID of Malaysia and NHMD of Laos.

37) The WGH was informed Korea-side also proposed a side-event on 7th WWF with 120 minutes related WGH of the Committee. The participants will have more time to present the on-going projects of WGH on 7th WWF.

38) The WGH noted with appreciation that HRFCO in cooperation with KICT will organize 3-4 days working meeting for WGH linked with 7th WWF with funding support.

BUDGET PROPOSED FOR WGH ACTIVITIES IN 2015

39) WGH proposed $32,000USD TCTF totally to support WGH activities in 2015 including regular request shown in Table 3 and special request shown in table 4.

Table 3 The summary of request of TCTF for WGH activities in 2015

No.	Item	TCTF(USD)
1	Support to attend Integrated Workshop (IWS) and other activities	10,000
2	Support summary seminar related to field survey of Extreme Flood Forecasting System in selected countries	3,000
3	Support activities related to OSUFFIM	4,500
4	Support activities related to Xin'anjiang Model Application	3,000
5	Support 4th WGH working meeting linked with the Guidelines for extreme flood risk management in TC region	2,500
	Total	**23,000**

Table 4 The Special Request of TCTF for WGH Activities in 2015

No.	Item	TCTF(USD)
1	OSUFFIM attachment training for 2-3 persons from selected Members	4,500
2	Support hydrologists to participation of 7th WWF 2015 in Korea	4,500
	Total	**9,000**

RE-ESTABLISHMENT OF WORKING GROUP ON HYDROLOGY

40) The participants reviewed the Term of Reference (TOR) of WGH which was approved at TC 45thannual Session held in Hong Kong from 29 January to 1 February 2013.

41) The WGH noted that the current WGH Chairperson Mr. KamotoMinoro from ICHARM of Japan expressed he will retire from his position after TC 47th annual session. The participants of WGH accepted his nomination of his colleague Mr. Yoshio TOKUNAGA from ICHARM to be his successor to serve WGH as Chairperson. The participants expressed their highest gratitude to Mr. Kamoto Minoru for his valuable contribution to WGH during his term in past 4 years.

42) The WGH expressed its appreciation to Mr. LI Yan, from BOH of MWR, China for her remarkable contribution as Vice Chairperson of WGH in the past year and her commitment to serving for WGH as Vice Chairperson continually.

43) The WGH also noted the current Vice Chairperson Dr. LEE Sang-Heon from HRFCO of Korea has being not available since 2013. The participants of WGH agreed Koreato nominate Mr. Cho, HyoSeob, Assistant Director of River Information Center of HRFCO to serve WGH as Vice Chairperson at TC 47th annual session.

44) The reestablishment of WGH will be report to TC 47th annual session for approval.

CONCLUSIONS OF WGH

45) On the basis of the outcomes 3rd WGH working meeting and the discussion of the WGH Parallel Session of 9th IWS, the following conclusions were reached:

- The working meeting of WGH is very important to review hydrological activities and implementation status of WGH AOPs and to prepare IWS and annual session. The meeting should be continued.
- World Water Forum (WWF) is a significant event related water issues in the world every 3 years. It definitely could benefit the Committee on enhancing its visibility in the region and world to be involved in 7th WWF to be held in Daegu, Korea from 12 to 17 April 2015. WGH shall take this advantage of its annual working meeting to present its achievements on 7th WWF.
- The Project of Synergized Standard Operating Procedures for Coastal Multi-hazard Early Warning System (SSOP), under the ESCAP Trust Fund for Tsunami, Disaster and Climate Preparedness in Indian Ocean and Southeast Asian Countries, is a very successful example to closely link the two regional bodies together. The outcomes of this project, which could benefit TC and PTC regions as well as other regions, should be transferred into application in practice of disaster risk reduction for promoting the capacity building in Members. This kind of cooperation activities should be encouraged in future under umbrella of ESCAP
- How to promote the capacity of forecasting, early warning and risk management for urban flood is still a hot spot among TC Members, especially urban flood forecasting and inundation mapping. As the subsequent activity of TC Cross-cutting project of UFRM, development and application of operational system for urban flood forecasting and inundation mapping (OSUFFIM) could be a tangible measure on this aspect and it could play very meaningful and important role for TC Members to promote the capacity on the technique of urban flood forecasting and warning. Also, technical training courses on urban flood forecasting, inundation mapping and damage assessment should be considered as subsequent activities of project of UFRM in the Committee.
- WGH webpage which is focusing on the technical issues with the purposes could be a complementary to TC webpage and a good platform for Members to sharing information and enhancing technical exchange.
- Enhancement of the close collaboration with the AWG of WMO CHy, WMO RA II Working Group on Hydrological Forecasts and Assessments and RA V Working Group on Hydrological Services in several themes of common interest provides significant benefit to the Committee.

RECOMMENDATIONS OF WGH

46) On the basis of the outcomes 3rd WGH working meeting and the discussion of the Parallel Session, the participants concurred to make the following recommendations to the 3rd TC/PTC Joint Session (TC 47th Session) to be held in ESCAP UNCC, Bangkok, Thailand from 9-13 February 2015:

- To re-establish Working Group on Hydrology of the Committee and appoint Mr. Yoshio TOKUNAGA, ChiefResearcher of ICHARM of Japan as Chairperson; Ms. LI Yan, Deputy Division Director, Bureau of Hydrology (BOH) of China and Mr. Cho,

HyoSeob,Assistant Director of River Information Center of HRFCO of Korea as Vice Chairpersons of WGH for the period of two years to TC 49th annual session.

- To allocate US$32,000 from TCTF in total for supporting overall WGH activities for 2015 calendar year.
- To approve extending one more year for WGH AOP2 to 2017 and for AOP3 and AOP7 to 2016.
- To request HRFCO, MOLIT of Republic of Korea to host WGH fourth working meeting with funding support in linkage with 7th WWF to be held in Daegu, Korea from 12 to17 April 2015.
- To request HRFCO, MOLIT of Republic of Korea to perfect and maintain the WGH webpage and to set up the linkage with TC website in cooperation with TCS and Members.
- To request ESCAP and WMO to continue the support to implement further the on-going project of real-time Operational System for Urban Flood Forecasting and Inundation Mapping (OSUFFIM), which can be used in PTC and TC region.
- To request ESCAP to consider the possibility to support conducting SSOP phase II after the current SSOP project is closed and to encourage Members to contribute TC cross-cutting project of SSOP.
- To request WMO continue taking actions to facilitate involvement of WGH in the activities of WMO water and hydrology issues.
- To re-appoint the hydrologist of TCS and the focal point of WGH, Ms. Ji-Youn SUNG, Republic of Korea as the liaison to WMO RA II and RA V WGHs for the Committee.
- To request WGH continue taking the action on the closest linkages between the two working groups of WMO RAII and the Committee:
  - UFRM and flash flood/debris flow/landslide prediction/warning under the RA II theme of Disaster Mitigation – Implementation of the WMO Flood Forecasting Initiative including Flash Flood Forecasting Capabilities; and
  - Assessment of the variability of water resources in a changing climate under the RA II theme of Water Resources Assessment, Availability and Use (surface water and ground water).
- To request WGH continue focusing on improving the ability to forecast hydrological phenomena and provide measures for the effectiveness of the improvements.

Annex1. Implementation Status of WGH AOP 2014

Annex 2. Successor Indicators of WGH AOP 2015

Annex 1. Implementation Status- WGH AOP 2014

SP's KRA and SG	Objective Number	Objective	Action	Other WGs Involved	TCS Responsibility	Expected Quarter Completed	Other Organizations Involved	Success Indicators	Funding Required	Funding Sources	Completed YES/NO
KRA 1 SG 1 KRA 2 SG 2 KRA 4 SG 4a KRA 5 SG 6b KRA 6 SG 6b	1	Assessment System of Flood Control Measures on Socio-economic Impacts	Distribute the ASFCM Guideline to the TC members who want to apply the system and consult the ASFCM application in TC regions		coordination	(a) First (b) Second (c) Third (d) Fourth		(a,b) To collect of the TC member's comments of the ASFCM Guideline (c,d) Distribute the ASFCM Guideline and consult the effect of the ASFCM application in TC regions	TCTF $3,000 for application	MOLIT TCTF	(a,b) Yes (c,d) On-going
KRA1 KRA 4 SG 4a SG 4bKRA5 SG 5a KRA 6 SG 6b	2	Extreme flood forecasting system	To operate the TC homepage for WGH members and design the extreme flood forecasting system		See above	(a)First (b) Second (c)Third (d) Fourth	RID of Thailand, PAGASA of Philippines Laos	(a,b,c,d) To operate the TC WGH homepage and collect of the TCmember's comments of the homepage (d) To amend the TC WGH homepage (c,d) To design the extreme flood forecasting system	TCTF $3,000 for the investigation	MOLIT	(a,b,c,d) Yes (d) Yes (c,d) on-going

SP's KRA and SG	Objective Number	Objective	Action	Other WGs Involved	TCS Responsibility	Expected Quarter Completed	Other Organizations Involved	Success Indicators	Funding Required	Funding Sources	Completed YES/NO
KRA 1 SG 1 KRA 2 SG 2 KRA 4 SG 4a KRA 6 SG 6b	3	Project on estimation for socio-economic impact of sediment-related disaster	to improve former projects with establish common collecting format and methods of investigation for disasters to estimate estimation for socio-economic impact of sediment-related disaster and to share common technical background in TC members.	WGDRR	See above	(a)First (b)Second (c)Third (d)Fourth		(a) Providing a draft format to collect the record of sediment-related disaster (b) Deciding the format to collect the record of sediment-related disaster (d1) To make a "Sediment-related Disaster Record Database" to share the records in TC members (d2) To report and share the results of estimation of socio-economic impact		MLIT NILIM SABO TCTF	(a) YES (b) NO (d1) NO (d2) NO
KRA 1 SG 1 KRA 2 SG 2 KRA 4 SG 4a	4	Development of Operational System for Urban Flood Forecasting	To develop a prototype real time OSUFFIM for TC Members to promote		diver	(a)First (b)Second (c)Third (d)Fourth	Sun Yat-Sen University of China; RID of Thailand	(a1) set up of national working group (a2) Survey of Pilot City in Thailand and China	TCTF $4000 for supporting activities related to OSUFFIM development	SYS Univ. ; RID, Thailand; DID, Malaysia NHMS, Vietnam	(a1)YES (a2) YES (b1) Postponed

SP's KRA and SG	Objective Number	Objective	Action	Other WGs Involved	TCS Responsibility	Expected Quarter Completed	Other Organizations Involved	Success Indicators	Funding Required	Funding Sources	Completed YES/NO
KRA 6 SG 6b		and Inundation Mapping (OSUFFIM)	the capacity of early warning of urban flood and emergency response, particularly urban flood forecasting and inundation mapping.				DID, Malaysia NHMS, Vietnam	(b1) Survey of Pilot Cities in Malaysia (b-c1) Data collection in pilot cities (b-c2)Chinese version development (c-d1) implementation in China (c-d2)technical material preparing (d3) report the progress at IWS	TCTF $3500 for OSUFFIM training course	TCTF	(b-c1) On-going (b-c2) On-going (c-d1) On-going (c-d2) On-going (d3) On-going
KRA 1 SG 1 KRA 2 SG 2 KRA 4 SG 4a KRA 6 SG 6b	5	Extend application of Xin'anjiang Model in Selected River Basins in TC Members	To promote the Capacity of Flood Forecasting for TC Members; Use the Model in Pilot River basin in Malaysia in 2013		Coordination	(a)First (b)Second (c)Third (d)Fourth	BOH and Hohai University of China; DID of Malaysia	(a-b)Application of Xinanjiang model for Segamat River (a-b) Improve English version of Model. (b-c) On-Job-Training course (b-c) Application of model for another selected river (b-c) Report on trial in flood	$5500	TCTF BOH, China DID, Malaysia	(a-b) Postponed (a-b) On-going (b-c) Postponed to December (b-c) Not yet (b-c) Not yet

SP's KRA and SG	Objective Number	Objective	Action	Other WGs Involved	TCS Responsibility	Expected Quarter Completed	Other Organizations Involved	Success Indicators	Funding Required	Funding Sources	Completed YES/NO
								season (c-d) Test run with the help of experts for new river (d) Project report at IWS and Annual Session			(c-d) Not-yet (d) On-going
On-KRA 1 SG 1 KRA 2 SG 2 KRA 4 SG 4a KRA 6 SG 6b	6	Guidelines for extreme flood risk management in TC region	To develop the flood control measures for extreme flood and host a workshop to develop the consensus about the guideline among the members		See above	(a) First (b) Second (c) Third (d) Fourth		(a,b) Development of consensus about the contents in the guideline among the members (b,c) preparedness of WGH meeting(workshop) for TC members to discuss about TC AOP including extreme flood risk management (c)host WGH Working meeting (b,c,d) To develop the structural & non-structural flood control	TCTF $3,000 for hosting the WGH meeting(workshop)	MOLIT TCTF	(a,b) Yes (b,c) Yes (c) Yes (b,c,d) On-going

SP's KRA and SG	Objective Number	Objective	Action	Other WGs Involved	TCS Responsibility	Expected Quarter Completed	Other Organizations Involved	Success Indicators	Funding Required	Funding Sources	Completed YES/NO
								measures for extreme flood			
KRA 1 SG 1 KRA 2 SG 2 KRA 4 SG 4a KRA 5 SG 5a KRA 6 SG 6b	7	Study on Prediction of Debris flow and Shallow landslide by the Satellite Rainfall Data	To study on prediction of debris flow and shallow landslide by the satellite rainfall data	WGDRR	See above	(a)First (b)Second (c)Third (d)Fourth	accept application	(a-d) Developing Prototype system (ICHARM) (a-d) Correcting ground truth data on test fields (a-d) Analyzing on test fields (c-d) Workshop on test fields	N/A	PWRI/ICHARM	(a-d) Postponed (a-d) Postponed (a-d) Postponed (c-d) Postponed
KRA 1 SG 1 KRA 2 SG 2 KRA 4 SG 4a, SG 5a KRA 5 SG 5a SG 5b KRA 6 SG6b	8	Contribution to the development of SSOP Manual and SSOP Training	To review and comment on the SSOP Manual and related Documents To review and provide input into planned SSOP Training	WGH WGDRR TRCG	1st -4th	TCS, Members, ESCAP WMO PTC ADPC ABU	Seven beneficiary Members	NO	SSOP Budget	Project Manager, Steering Committee, and Task Team	On-going

Annex 2. Successor Indicators of WGH AOP 2015

SP's KRA and SG	Objective Number	Objective	Action	Other WGs Involved	TCS Responsibility	Expected Quarter Completed	Other Organizations Involved	Success Indicators	Funding Required	Funding Sources
KRA 1 SG 1 KRA 2 SG 2 KRA 4 SG 4a, SG 5a KRA 5 SG 5a SG 5b KRA 6 SG6b	1	Contribution to the development of SSOP Manual and SSOP Training	(a) To review and comment on the SSOP Manual and related Documents (b) To review and provide input into planned SSOP Training	WGH WGDRR TRCG	1st -4th	TCS, Members, ESCAP WMO PTC ADPC ABU	Seven beneficiary Members	NO	SSOP Budget	Project Manager, Steering Committee, and Task Team
KRA1 KRA 4 SG 4a SG 4bKRA5 SG 5a KRA 6 SG 6b	2	Extreme flood forecasting system	To design the computational draft of extreme flood forecasting system and publish the field survey report. To operate the TC homepage for WGH members		See above	(e)First (f) Second (g)Third (h) Fou rth	RID of Thailand, PAGASA of Philippines Laos	(a,b) To design the computational draft of extreme flood forecasting system (c,d) To collect the TC members comment about the system draft and develop the computational daft of system (b,c) To host the wrap-up meeting of the field survey and publish the field survey report (a,b,c,d) To operate the TC WGH	TCTF $3,000 for hosting the wrap-upmeeting of field survey and publishing the field survey report	MOLIT

SP's KRA and SG	Objective Number	Objective	Action	Other WGs Involved	TCS Responsibility	Expected Quarter Completed	Other Organizations Involved	Success Indicators	Funding Required	Funding Sources
								homepage		
KRA 1 SG 1 KRA 2 SG 2 KRA 4 SG 4a KRA 6 SG 6b	3	Project on estimation for socio-economic impact of sediment-related disaster	to improve former projects with establish common collecting format and methods of investigation for disasters to estimate estimation for socio-economic impact of sediment-related disaster and to share common technical background in TC members.	WGDRR	See above	(a)First (b)Second (c)Third (d)Fourth		(a) Finalize and distribute the data format to collect the record of sediment-related disaster from Members (b) To make a "Sediment-related Disaster Record Database" to share the records in TC Member. (c) To report and share the results of estimation of socio-economic impact	NO	MLIT NILIM SABO TCTF
KRA 1 SG 1	4	Development of	To perfect operational		diver	(a)First (b)Second	BOH, China;	(a1)Seminar on pilot study;	TCTF $4,500 for support	BOH, China;

SP's KRA and SG	Objective Number	Objective	Action	Other WGs Involved	TCS Responsibility	Expected Quarter Completed	Other Organizations Involved	Success Indicators	Funding Required	Funding Sources
KRA 2 SG 2 KRA 4 SG 4a KRA 6 SG 6b		Operational System for Urban Flood Forecasting and Inundation Mapping (OSUFFIM)	system, prepare data required and train for OSUFFIM establishment in selected TC Members			(c)Third (d)Fourth	Sun Yat-Sen University of China; RID of Thailand DID, Malaysia NHMS, Vietnam	(a-b))attachment Training Participating in 4th WGH working meeting in April, 2015 OSUFFIM system installation in pilot cities in pilot cities of China, Malaysia and Thailand from May to August Operational OSUFFIM system maintenance in pilot cities from September to December Participating in 10th IWS of TC to be held in Venue: Kuala Lumpur, Malaysia in November/December, 2015	the activities related to OSUUFIM; TCTF $4,500 for support one-month attachment training for 2-3 participants from selected Members	SYS Univ. ; RID, Thailand; DID, Malaysia NHMS, Vietnam TCTF

SP's KRA and SG	Objective Number	Objective	Action	Other WGs Involved	TCS Responsibility	Expected Quarter Completed	Other Organizations Involved	Success Indicators	Funding Required	Funding Sources
KRA 1 SG 1 KRA 2 SG 2 KRA 4 SG 4a KRA 6 SG 6b	5	Extend application of Xin'anjiang Model in Selected River Basins in TC Members	To set up real-time operational application of Xin'anjiang Model		Coordination	(a)First (b)Second (c)Third (d)Fourth	BOH and Hohai University of China; DID of Malaysia RID, Thailand NMHS, Vietnam	(a-c) to perfect English version of Model and document (b-d) establish the real-time operational application of model (d) report to IWS and Session	TCTF $3000 for support the activities related to Model application in selected Members	TCTF BOH, China DID, Malaysia RID, Thailand NMHS, Vietnam
KRA 1 SG 1 KRA 2 SG 2 KRA 4 SG 4a KRA 6 SG 6b	6	Guidelines for extreme flood risk management in TC region	To develop the guideline (draft) and host the WGH meeting link with 7WWF		See above	(a) First (b) Second (c) Third (d) Fourth		(a,b) prepare and host the WGH working meeting (b,c,d) To develop the guideline (draft) for extreme flood risk management in TC region	TCTF $2,500 for hosting the WGH meeting; TCTF $4,500 for support the linkage of WGH meeting and 7WWF 2015 in Daegu, Korea.	MOLIT
KRA 1 SG 1 KRA 2 SG 2 KRA 4 SG 4a KRA 5 SG 5a KRA 6	7	Study on Prediction of Debris flow and Shallow landslide by the Satellite Rainfall Data	To study on prediction of debris flow and shallow landslide by the satellite rainfall data	WGDRR	See above	(a)First (b)Second (c)Third (d)Fourth	accept application	(a-d) Developing Prototype system (ICHARM) (a-d) Correcting ground truth data on test fields (a-d) Analyzing on test fields (c-d) Workshop on	NO	PWRI/ICHARM

SP's KRA and SG	Objective Number	Objective	Action	Other WGs Involved	TCS Responsibility	Expected Quarter Completed	Other Organizations Involved	Success Indicators	Funding Required	Funding Sources
SG 6b								test fields		