

Summary Report on analysis of AOP Implementation Questionnaire

(Item 11 of Tentative Program for TC 56th Session)

Submitted by TCS

ACTION REQUIRED:

This Committee is invited to:

- a) To take note of the analysis of AOP Implementation Questionnaire
- b) To approve the recommendations for WG AOPs' implementation
- c) To advise the improvement of the WG AOPs' implementation in the future

APPENDIXES:

- I. DRAFT TEXT FOR INCLUSION AT SESSION REPORT
- II. SUMMARY REPORT ON THE ANALYSIS OF AOP IMPLEMENTATION QUESTIONNAIRE

APPENDIX A

DRAFT TEXT FOR INCLUSION AT SESSION REPORT

11. ANALYSIS OF AOP IMPLEMENTATION QUESTIONNAIRE

1. The Committee reviewed the summary report on AOP implementation questionnaire submitted by TCS. Details can be found in the Appendix ??.
2. The Committee was informed with appreciation the great efforts on analyzing the AOP implementation questionnaire by TCS and WGs under the advice of AWG.
3. The Committee recognized the importance of aligning the TC efforts of the Typhoon Committee (TC) through WG's AOP implementation with UN's Early Warnings for All (EW4All) initiative, which aims to strengthen early warning systems globally.
4. The Committee also was noted the purpose of AOP implementation questionnaire in to encourage AOP leading Members to enhance and contribute more to AOP's outcomes and achievements with the key objectives of WG's AOP implementation questionnaire as: (1) to improve the effectiveness and productiveness of TC AOPs' implementation; (2) to increase the involvement and participation of TC Members; (3) to enhance the alignment with the four important pillars of the EW4All initiative; and (4) to standardize the mechanism for the proposal of new AOP in future.
5. The Committee was informed that the analyses of AOP implementation questionnaire has been fulfilled fruitfully as the scheduled work plan and roadmap under the supervise of AWG, and the close cooperation among TCS experts, AOP leaders, WG's chairpersons and Member's focal points.
6. The Session took note the fruitful findings of the analyses of AOP implementation questionnaire, as described in Appendix XXX
7. The Committee also highlighted the need for enhancements in the implementation strategy and activities of certain AOPs within WGs. These improvements should focus on aspects such as member participation, the execution of activities, communication with TCS and WGs' Chairpersons, as well as the engagement of members in WGs' working meetings and IWS.

CONCLUSIONS

8. The close cooperation of and in-kind contribution including funding, manpower and expertise from AOP participating Members, particularly the AOP leading Members are very important to conduct the AOPs' successful and fruitful implementation activities, and should be encouraged continually.
9. The clarification of the potential areas to be enhanced for the AOPs to be linked to the pillar(s) EW4All, and the identification on how to enhance the alignment to contribute to the pillars of EW4All in future will greatly benefit WGs to improve its strategy and cooperation on the aspects

of AOP proposal, Members' participation, implementation planning, budget estimation, and result review, etc.

10. The annual funding provided by the TCTF to support the implementation of WGs AOP activities has played a crucial role in initiating and encouraging TC Members especially leading AOP Members, to contribute in-kind resources. To further motivate Members to increase their contributions (funding, manpower, and expertise) to the scheduled annual activities, ensuring the achievement of approved success indicators from the TC Annual Session, the importance of TCTF's annual allocation for WGs' AOP implementation should be strengthened. It not only serves as initial funding but also reflects the Committee's supportive position in approving the AOPs.
11. As the executive body of the Committee, TCS should play its duty and function on coordinating the scheduled annual AOP implementation activities, and tracking and checking up the implementation status and progresses targeting the AOP success indicators which are approved at annual session. TCS experts should join in the implementation of WGs' AOP activities. It's recommended to conduct the approved AOP activities during the TC Annual Session within the Committee's platform, ensuring notification and close collaboration with TCS.

RECOMMENDATION

12. To request the new proposed AOP(s) to closely aligned with the KRAs of TC Strategic Plan and the pillars of UN EW4All initiative.
13. To request AOP leaders to involve 2 or more Members (including leading Member) in the AOP implementation plans/activities and the leading Member to conduct the implementation plan/activities based on the planning schedules and targeting the success indicators approved at TC Annual Session with the close cooperation with participating Members and TCS.
14. To request AOP leaders to update their action plans with new tasks and goals annually, and request for resources if necessary.
15. To request AOP leading Member to conduct the implementation plan/activities on the platform of the Committee as far as possible, and keep TCS informed so that TCS may provide better and stronger secretariat support on coordination to AOP implementation activities and checking up the implementation status and progresses effectively.
16. To encourage the AOP leading Member to support the AOP leaders and/or their representatives taking part in the WGs annual working meeting and/or TC IWS so as to guarantee that the AOP implementation plan can be implemented smoothly.
17. To encourage AOP leaders to continue sharing the information, achievements and outcomes with TC Members through various channels (e.g. publication, newsletter, emails, TC website, Official Facebook Page, etc.), including submitting articles to relevant journals such as TCRR.
18. To request WGs to review and analyze the AOP implementation status in an alignment with the updating of the Strategic Plan of the Committee.
19. To request WGs, in collaboration with TCS, to enhance the effectiveness and efficiency of their activities by monitoring and evaluating their initiatives, including Annual Operating Plans (AOPs), aligning with the stated mission in the Strategic Plans 2022-2026 and UN Early Warning for All initiative.

APPENDIX B

Summary Report on the Analysis of AOP Implementation Questionnaire

BACKGROUND

1. During its second meeting on June 14, 2023, in Ulsan, Republic of Korea, the AWG resolved to initiate monitoring of ongoing or past efforts by TC Members in contributing to the four key pillars of the EW4all initiative. This initiative aims to evaluate the Committee's contributions to EW4All, identifying opportunities for enhancing performance through Member Reports and the Working Group's (WG) Annual Operating Plan (AOP) specification.
2. During the AWG meeting on November 26, 2023, there was a recommendation to use a term other than "Evaluation" in order to enhance Members' understanding and interpretation of the questionnaire.

ACTIONS TOOK BY WORKING GROUPS AND TCS

1. Following the advice and guidance of AWG, the TCS completed the Proposal of Work Plan for Typhoon Committee AOP Evaluation (as attached in Annex 1) and the AOP Evaluation Questionnaire (as attached in Annex 2).
2. Following the arrangement of the Work-plan, TCS experts distributed the Questionnaire to all AOP leaders of WGM, WGH, WGD RR and TRCG by the end of August 2023;
3. WGH and WGM discussed the status and progresses on collecting the information and the comments of their AOP questionnaires from AOP leaders, Focal Points and Chairpersons at their annual working meeting in September and October, respectively.
4. The initial progresses and information of AOP implementation questionnaire were reviewed and discussed at WGs' parallel sessions and briefed at plenary session of 18th IWS which was held on 28 November - 01 December 2023 in Bangkok, Thailand.
5. TCS experts in cooperation with WGs' Chairpersons reviewed and analyzed the AOP implementation questionnaire for WGM, WGH, WGD RR and TRCG, receptively. The summary reports were attached as Annex 3, Annex 4, Annex 5, and Annex 6, respectively.

FINDINGS

6. Most AOP leaders of 3 WGs have demonstrated a satisfactory performance on responding to AOP questionnaires.

7. Most AOP leading Members of 3 WGs made great efforts on AOP implementation and conducted a series of positive and practical activities in the past 5 years, to fulfill their annual success indicators which were approved at TC Annual Session.
8. The topics of all AOPs closely aligns with the one or more KRA(s) of Typhoon Committee Strategic Plan. The implementation and achievements of most AOPs have played very important roles on realizing the Mission and Goal of the Committee.
9. The topics of all AOPs of WGs closely aligns with one or more pillar(s) of UN EW4All initiative. The implementation and achievements of all AOPs contributed remarkably to the four important pillars of the EW4all initiative in one or more Members.
10. The majority of AOPs completed the planned tasks and met the proposed success indicators, reaching the intended goals and producing positive outcomes. These successes have enhanced the capacity building of Typhoon Committee (TC) Members in the area of typhoon-related disaster risk reduction.
11. The execution of the majority has significantly benefited TC Members across various aspects, notably strengthening cooperation in technical exchange, personnel training, and knowledge sharing in meteorological, hydrological and DRR components among TC Members.
12. The implementation of all AOPs maximized the utilization of the TCTF annual allocation as initial funding. AOP participating Members, particularly the AOP leading Members contributed huge in-kind contribution including funding, personnel and expertise.
13. The AOP implementation questionnaires clarified the potential areas to be enhanced for the AOPs to be linked to the pillar(s) EW4All, and identified how to enhance the alignment to contribute to the pillars of EW4All in future, mainly focusing on the following aspects:
 - Meteorological component: (a) to enhance preparedness for typhoon risk by improving the accuracy of prediction models; (b) to develop new, enhance and evaluate existing techniques in typhoon monitoring and prediction; and (c) to facilitate and encourage information sharing and communication between TC Members for typhoon monitoring and prediction.
 - Hydrological component: (a) to enhance the real-time operational platform construction for Members so as to improve the water-related disasters forecasting and early warning; and (b) to improve the capacity of advanced technology application for Members in hydrological monitoring, data processing, and forecasting and early warning.
 - Disaster Risk and Reduction Component (a) to invest in capacity building initiatives to enhance the skills and knowledge of personnel involved in implementing the AOP. (b) to encourage and provide platforms for data and experience exchange and sharing in risk knowledge which will help to integrate into effective early warning systems
14. Some AOPs of WGs need to be improved on their implementation strategic and activities in following aspects mainly:
 - the Member's participation. A small number of AOPs do not involve any other Members in the AOP activity.

- the implementation of activities. Some individual AOPs conducted very few activities throughout the entire implementation period and did not meet the specified annual success indicators.
- The communication with the TCS and WGs Chairpersons. Some AOPs experienced a lack of communication with TCS and WGs' Chairpersons regarding the implementation activities. Consequently, the implementation status and progress of those AOPs could not be effectively tracked and verified.
- the attendance of WGs' working meeting and IWS. Certain AOP leaders or their representatives were unable to participate in the WGs' annual working meetings and TC IWS. Consequently, the execution of scheduled implementation plans might have been adversely affected in some instances.

CONCLUSIONS

15. The close cooperation of and in-kind contribution including funding, manpower and expertise from AOP participating Members, particularly the AOP leading Members are very important to conduct the AOPs' successful and fruitful implementation activities, and should be encouraged continually.
16. The clarification of the potential areas to be enhanced for the AOPs to be linked to the pillar(s) EW4All, and the identification on how to enhance the alignment to contribute to the pillars of EW4All in future will greatly benefit WGs to improve its strategy and cooperation on the aspects of AOP proposal, Members' participation, implementation planning, budget estimation, and result review, etc.
17. The annual funding provided by the TCTF to support the implementation of WGs AOP activities has played a crucial role in initiating and encouraging TC Members especially leading AOP Members, to contribute in-kind resources. To further motivate Members to increase their contributions (funding, manpower, and expertise) to the scheduled annual activities, ensuring the achievement of approved success indicators from the TC Annual Session, the importance of TCTF's annual allocation for WGs' AOP implementation should be strengthened. It not only serves as initial funding but also reflects the Committee's supportive position in approving the AOPs.
18. As the executive body of the Committee, TCS should play its duty and function on coordinating the scheduled annual AOP implementation activities, and tracking and checking up the implementation status and progresses targeting the AOP success indicators which are approved at annual session. TCS experts should join in the implementation of WGs' AOP activities. It's recommended to conduct the approved AOP activities during the TC Annual Session within the Committee's platform, ensuring notification and close collaboration with TCS.

RECOMMENDATION

19. To request the new proposed AOP(s) to closely aligned with the KRAs of TC Strategic Plan and the pillars of UN EW4All initiative.
20. To request AOP leaders to involve 2 or more Members (including leading Member) in the AOP implementation plans/activities and the leading Member to conduct the implementation

plan/activities based on the planning schedules and targeting the success indicators approved at TC Annual Session with the close cooperation with participating Members and TCS.

21. To request AOP leaders to update their action plans with new tasks and goals annually, and request for resources if necessary.
22. To encourage AOP leading Member to conduct the implementation plan/activities on the platform of the Committee as far as possible, and keep TCS informed so that TCS may provide better and stronger secretariat support on coordination to AOP implementation activities and checking up the implementation status and progresses effectively.
23. To encourage the AOP leading Member to support the AOP leaders and/or their representatives taking part in the WGs annual working meeting and/or TC IWS so as to guarantee that the AOP implementation plan can be implemented smoothly.
24. To encourage AOP leaders to continue sharing the information, achievements and outcomes with TC Members through various channels (e.g. publication, newsletter, emails, TC website, Official Facebook Page, etc.), including submitting articles to relevant journals such as TCRR.
25. To request WGs to review and analyze the AOP implementation status in an alignment with the updating of the Strategic Plan of the Committee.
26. To request WGs, in collaboration with TCS, to enhance the effectiveness and efficiency of their activities by monitoring and evaluating their initiatives, including Annual Operating Plans (AOPs), aligning with the stated mission in the Strategic Plans 2022-2026 and UN Early Warning for All initiative.

Annex 1: The Proposal of Work Plan for Typhoon Committee AOP Progress Review

Annex 2: AOP Implementation Review Questionnaire

Annex 3: Draft Summary of WGM AOP Implementation Progress Questionnaire Review

Annex 4: Draft Summary of WGH AOP Implementation Progress Questionnaire Review

Annex 5: Draft Summary of WGDRR AOP Implementation Progress Questionnaire Review

Annex 6: Draft Summary of TRCG AOP Implementation Progress Questionnaire Review

Annex 1:

The Proposal of Work Plan for Typhoon Committee AOP Progress Review

Typhoon Committee Secretariat (TCS)
18 August 2023

1. The Advisory Working Group (AWG) members recognized the importance of aligning the TC efforts of the Typhoon Committee (TC) with UN's Early Warnings for All (EW4All) initiative, which aims to strengthen early warning systems globally.
2. AWG decided at its second meeting held on 14 June 2023 in Ulsan, Republic of Korea to initiate a monitoring on the ongoing or previous efforts of TC Members in contributing to the four important pillars of the EW4all initiative, including (a) disaster risk knowledge and management; (b) detection, observation, monitoring, analysis, and forecasting; (c) warning dissemination and communication; and (d) preparedness and response capabilities.
3. The proposed monitoring and reporting approach will enable an evaluation of the Committee's contributions to EW4All and identify opportunities for further enhancing its performance.
4. To facilitate this, AWG advised that the Members' Report, which already includes activities related to priority areas in TC Strategic Plan, will now also indicate to which pillar(s) of the EW4All they relate. Additionally, AWG suggested that each Working Group's (WG's) report should specify which Annual Operating Plan (AOP) is linked to the pillar(s) of the EW4All initiative.
5. Since the Targets and Key Result Areas (KRAs) serve as the foundation of the TC Strategic Plan, the assessment will primarily revolve around evaluating the implementation of the WGs' AOPs. The key objectives of this assessment are as follows:
 - to improve the effectiveness and productiveness of TC AOPs' implementation;
 - to increase the involvement and participation of TC Members;
 - to enhance the alignment with the four important pillars of the EW4All initiative; and
 - to standardize the mechanism for the proposal of new AOP in future.
6. Taking into account the suggestions and advice received, the TC Secretariat (TCS) has formulated recommendations for gathering information to assess the WGs' AOPs. Moreover, a brief summary will be offered to determine which pillar requires further improvement or enhancement in AOPs.
7. The evaluation should be mainly focused on following 6 dimensions:
 - 1) the alignment of AOP with KRAs of TC Strategic Plan;
 - 2) the alignment of AOP with four pillars of the EW4all initiative;
 - 3) the participation of Members to AOP's activities;
 - 4) benefits to Members from AOP implementation;
 - 5) AOP's output and achievement; and
 - 6) the potential AOP areas related to the pillars of EW4All could be enhanced in the future.
8. The preliminary road-map and work-flow for AOP evaluation are proposed as below:

Step1: to distribute the work-plan and questionnaire to AOP Leaders, focal points of WGs in

Members and WG Chairpersons within 20 August 2023 by TCS.

Step2: to complete the survey of AOP status via questionnaire (as attached) by 18th IWS/ 4th TRCG Forum by AOP leaders, focal points of WGs in Members, and WGs' Chairpersons.

Step3: to report the preliminary summary of survey at WGs' parallel sessions of 18th IWS for discussion by TCS experts and WG's Chairpersons.

Step4: to finalize the summary of survey and draft the information document with conclusions and suggestions for TC 56th Annual Session to be held in early 2024 by TCS experts and WGs' Chairpersons.

Step5: to report to the TC 56th Annual Session by TC Secretary.

Annex 2:

ESCAP/WMO TC AOP Implementation Review questionnaire

| PART I: to be completed by TCS | | | | | | |
|--|--|---------------|--|--|--|--|
| 1. Title of <input type="checkbox"/> AOP/ <input type="checkbox"/> PP/ <input type="checkbox"/> POP | | | | | | |
| 2. WG the AOP belongs to | <input type="checkbox"/> WGM <input type="checkbox"/> WGH <input type="checkbox"/> WGD RR <input type="checkbox"/> TRCG | Cross-cutting | <input type="checkbox"/> Yes <input type="checkbox"/> No | | | |
| 3. Leading Member(s) | | | | | | |
| PART II: to be completed by AOP leaders | | | | | | |
| 4. Participating Members | | | | | | |
| 5. Proposed Execution Period | | | | | | |
| 6. Objective | | | | | | |
| 7. Actions | | | | | | |
| 8. Alignment with KRAs | <input type="checkbox"/> KRA1 <input type="checkbox"/> KRA2 <input type="checkbox"/> KRA3 <input type="checkbox"/> KRA4 <input type="checkbox"/> KRA5 <input type="checkbox"/> KRA6 <input type="checkbox"/> KRA7 | | | | | |
| 9. Alignment with 4 pillars of the EW4all initiative | <input type="checkbox"/> disaster risk knowledge and management <input type="checkbox"/> detection, observation, monitoring, analysis, and forecasting <input type="checkbox"/> warning dissemination and communication <input type="checkbox"/> preparedness and response capabilities | | | | | |
| 10. Activities conducted in past 5 years: | | | | | | |
| 11. Beneficiary Members: | | | | | | |
| 12. Benefits to Members: | | | | | | |
| 13. Estimated in-kind contribution in total (in US dollar): | | | | | | |
| 14. Outcomes/achievement thus far: | | | | | | |

| | |
|--|--|
| 15. The potential areas to be enhanced for the AOP to be linked to the pillar(s) EW4All and how in future: | |
| <input type="checkbox"/> disaster risk knowledge and management: | |
| <input type="checkbox"/> detection, observation, monitoring, analysis, and forecasting: | |
| <input type="checkbox"/> warning dissemination and communication: | |
| <input type="checkbox"/> preparedness and response capabilities: | |
| 16. Implementation plan in future: | |
| PART III: to be completed by Focal Point of WGs in Members: <u>FP's name of Member</u> | |
| 17. Benefits from AOP implementation: | |
| 18. Suggestion/comments to AOP: | |
| 19. The potential AOP areas related to EW4All to be enhanced and how in future: | |
| <input type="checkbox"/> disaster risk knowledge and management: | |
| <input type="checkbox"/> detection, observation, monitoring, analysis, and forecasting: | |
| <input type="checkbox"/> warning dissemination and communication: | |
| <input type="checkbox"/> preparedness and response capabilities: | |
| PART IV: to be completed by WGs' Chairperson: <u>Chair's name</u> | |
| WG Chairperson's Comments: | |

Annex 3:

Draft Summary of WGM AOP Implementation Progress Questionnaire Review

WGM Chairperson: Dr. Tang Jie
TCS Meteorologist: Mr. Clarence Fong

January 9, 2024

I. Background

1. During the AWG meeting on 14 June 2023 in Ulsan, Republic of Korea, AWG made the decision to initiate a monitoring process to assess the ongoing or previous efforts of TC Members in contributing to the four important pillars of the EW4all initiative, and to identify opportunities for further enhancing its performance. This evaluation will be facilitated through the submission of Member's Reports and the utilization of WG's AOP specifications.
2. Under the advice and guidance of the AWG, TCS worked on the development of a comprehensive work-plan for the AOP evaluation. In addition, a questionnaire was created to gather relevant information.
3. During the AWG meeting on 26 November 2023, AWG advised TCS to use an alternative term instead of "Evaluation" to ensure that TC Members have a clear and comprehensive understanding of the questionnaire's purpose and facilitate meaningful participation.

II. Actions took by WGM for AOP Implementation Review

- TCS distributed the questionnaires to all WGM POP, AOP and PP leaders by the end of August 2023, and received most of the questionnaires by mid-November 2023.
- WGM Chairperson reviewed and commented on the completed questionnaires, and a discussion was held at the WGM parallel meeting at the 18th IWS which was held from 28th November to 1st December 2023 in UNCC, ESCAP, Bangkok, Thailand.

III. Synthesizing the Information from AOP Questionnaires

Currently, WGM has 4 POPs, 10 AOPs and 2 PPs (not to be reviewed). The basic information of the POPs and AOPs including the alignment with the pillars of EW4All and KRA is listed in [Table 1](#), while the potential areas to be enhanced for the plans to align with the pillars of EW4All with implementation plan in future is listed in [Table 2](#).

IV. Findings from WGM AOP Implementation Review

- (a) WGM POP/AOP leading Members have demonstrated significant dedication and effort in implementing the POP/AOP over the past years with focus on achieving the success indicators that were updated and approved during the TC Session annually.
- (b) The topics of the POPs/AOPs closely align with the one or more KRA(s) of Typhoon Committee Strategic Plan. The implementation and achievements of POPs/AOPs have played very important roles on realizing the Mission and Goal of the Committee.
- (c) The topics of the POPs/AOPs closely aligns with one or more pillar(s) of UN EW4All initiative. The implementation and achievements of all WGM POPs/AOPs contributed remarkably to the four important pillars of the EW4all initiative.

- (d) The POPs/AOPs fulfilled the scheduled tasks, achieved the expected goals and results in the period of implementation. The POPs/AOPs can enhance capacity building and technology sharing, and build partnership and strengthen international cooperation between Members.

V. Recommendation

- (a) To encourage POP/AOP leaders to continue sharing their forecasts, results, and information with TC Members through various channels (e.g. emails, website, etc.).
- (b) To encourage POP/AOP leaders to invite more TC Members to join or participate in their action plans for capacity building, technology transfer, and other forms of collaborations.
- (c) To encourage POP/AOP leaders to update their action plans with new tasks and goals annually, and request for resources if necessary.
- (d) To encourage POP/AOP leaders to share their achievements and increase their visibility by submitting articles to relevant journals such as TCRR.

Table 1 Basic information of WGM Annual Operating Plans

| Item | Title | Organizer | Start Date | Alignment with KRA | Alignment with EW4ALL | Participating Members | Beneficiary |
|-------|--|------------------------|------------|--------------------|-----------------------|---|--------------------------------|
| POP1 | Improving the Algorithm of Typhoon Summer Prediction | KMA | 2015 | KRA1,2 | EW4 | | All TC Members |
| POP2 | Collaborative Discussion (CoDi) Forum on TC Analysis and Forecast | CMA, HKO | 2018 | KRA1,5,7 | EW2,3 | China; Hong Kong, China | 4 TC Members |
| POP3 | Tropical Cyclone Research and Review | CMA | 2013 | KRA1-7 | EW1-4 | All TC Members | All TC Members |
| POP4 | Verification of Tropical Cyclone Operational Forecast | CMA, HKO | 2015 | KRA1,5,6 | EW2 | All TC Members | All TC Members |
| AOP1 | Enhanced Use of Ensemble Forecast | JMA | 2011 | KRA2 | EW2 | | All TC Members |
| AOP2 | Improve the Performances and Impacts of South China Sea Typhoon Model | CMA | 2012 | KRA1,2,6 | EW2 | Hong Kong, China; Macao, China | All TC Members |
| AOP3 | Development of Regional Radar Network | TMD, JMA, Met Malaysia | 2011 | KRA2,5 | EW2 | Lao PDR, Viet Nam, Philippines | 6 TC Members and 5 PTC Members |
| AOP4 | Radar Nowcasting based on RaINS/SWIRL | Met Malaysia, HKO | 2019 | KRA1,2,3,4,5,6,7 | EW2 | | All TC Members |
| AOP5 | Storm Surge Watch Scheme | JMA | 2012 | KRA1,2,3,4,5,7 | EW2 | All TC Members | All TC Members |
| AOP6 | Contribution for the Experiment on Typhoon Intensity Change in Coastal Area (EXOTICCA-II) | CMA, HKO | 2014 | KRA1,2,6 | EW2 | China; Hong Kong, China | All TC Members |
| AOP7 | Enhancing Utilization of Himawari 8/9 Products | JMA | 2018 | KRA2,5 | EW2 | Malaysia, Singapore, Thailand, Viet Nam | 4 TC Members |
| AOP8 | Parallel Analysis of Satellite Data in Operational Tropical Cyclone Monitoring | CMA | 2018 | KRA1,5,6 | EW2 | China | All TC Members |
| AOP9 | Enhancement of Disaster Risk Reduction against Heavy Rain in Collaboration of a new AOP of WGH | JMA | 2020 | KRA1,2,3,4,5 | EW1,2,3,4 | Philippines | |
| AOP10 | GK2A Utilization for Tropical Cyclone | KMA | 2021 | KRA2 | EW2 | Republic of Korea | All TC Members and PTC Members |

Table 2 Potential areas to be enhanced for WGM Annual Operating Plans to align with the pillars of EW4All with implementation plan in future

| Item | Potential Areas to be enhanced to align with the Pillars of EW4All | | | | Implementation Plan in Future |
|------|--|--|--|--|--|
| | Pillar 1 | Pillar 2 | Pillar 3 | Pillar 4 | |
| POP1 | | | | To enhance preparedness for typhoon risk and improve prediction accuracy, it is important to utilize advanced seasonal prediction results. | To enhance the accuracy of the Summer prediction algorithm, improvements will be made to the Hybrid-based seasonal prediction models. In late May 2024, the results of the summer (June to August) Outlook will be shared with members via email. Development of probability-based technology for seasonal typhoon prediction. |
| POP2 | | CoDi helps members share their local observations, monitoring and forecasting analysis. | CoDi has the potential to facilitate the communication for warning system. | | Open registration for international trainees at the international training course on tropical cyclone . |
| POP3 | Build TCRR into a comprehensive multidisciplinary journal focus on tropical cyclone and raise public awareness on disaster prevention and risk | Improve the quality and visibility of publications and make TCRR into a first-class academic journal with a high impact factor | | | 1) Enhance the role of the Editorial Board for better understanding of cutting-edge issues; 2) Compile article collections and start new columns to increase international influence; 3) Empower the editorial staff and improve quality and efficiency through collaboration; |

| Item | Potential Areas to be enhanced to align with the Pillars of EW4All | | | | Implementation Plan in Future |
|------|--|--|---|---|--|
| | Pillar 1 | Pillar 2 | Pillar 3 | Pillar 4 | |
| | management | | | | 4) Align research and publication with the development of the Asia-Pacific Typhoon Collaborative Research Center. |
| POP4 | | Acquire tropical cyclone forecast verification requirements from the related members. | | | To carry out post-season verification and reliability analyses on the operational forecast of tropical cyclones. To provide the real time verification information on track and intensity forecast. Continue to strengthen international cooperation and promote the exchange of TC forecast data and verification techniques. |
| AOP1 | | Improving prediction accuracy | | Improving storm weather prediction accuracy will support response efforts | Provide the current operational TC genesis guidance products using ensemble forecast. Seek further approaches to increase the benefit of ensemble forecast utilization, including improvement of the current operational products. |
| AOP2 | | Improving prediction accuracy | | | To improve the performance and impacts of TRAMS including the dynamical core, physical processes and model products |
| AOP3 | | To develop the weather radar observation and regional weather radar network | | | The development of a regional weather radar network will contribute to improving the region's disaster risk reduction in the region. Continue the development of radar data exchange and radar networks and improve the quality of radar observations in the region. |
| AOP4 | | Updating the training modules based on the new methods/ technologies of Nowcasting from the WMO Guideline. | | | The next attachment training on RaINS is proposed to be held in August 2024. |
| AOP5 | | To improve accuracy of the SSWS model. | | | Major upgrades of the model and products (such as introducing ensemble prediction, increasing grid resolution and so on) had been completed by 2022. The system will be kept to minor changes (e.g. improvement of typhoon bogusing) in the immediate future. |
| AOP6 | | Typhoon experiment scheme based on Satellite-Aircraft-Ocean-Land . | | | |
| AOP7 | | To develop and enhance RDCA detection in the region | | | Feedback from participating countries on the development of RDCA algorithms in their countries will lead to improvements in the domain-extended RDCA products provided by the JMA. Supporting the development of the RDCA in each country, and by expanding the number of countries participating in this AOP, the development and improvement of RDCA algorithms not only in the participating countries but also in regional RDCA algorithms in the future to improve national and regional RDCA detection. RSMC Tokyo for Nowcasting also collaborates to widely utilize RDCA products in regions covered by Himawari 8/9 satellites. |
| AOP8 | | Quantitative evaluation of the application of different satellite data to tropical cyclone monitoring. | | | Application evaluation of active wind radar and passive microwave wind products from Fengyun-3 satellites (FY-3D/E/3G/3F) in tropical cyclone wind field monitoring and warning. Application evaluation of precipitation measurement radar and microwave observation from Fengyun-3 satellites in tropical cyclone three-dimensional precipitation and thermal structure monitoring. |
| AOP9 | To enhance sharing knowledge and experience on awareness raising | To enhance quality of products | To enhance awareness with hydrological authorities to both local governments and public | To enhance awareness with hydrological authorities to both local governments and public | To develop and improve OSS-SR (Online Synthesis System for Sustainability and Resilience) which will integrate knowledge, technology, know-how, and experience of different disciplines related to flood disasters To conduct capacity development to foster local Facilitators utilizing OSS-SR as an E- |

| Item | Potential Areas to be enhanced to align with the Pillars of EW4All | | | | Implementation Plan in Future |
|-------|--|--|----------|----------|---|
| | Pillar 1 | Pillar 2 | Pillar 3 | Pillar 4 | |
| | | | | | <p>learning tool</p> <p>To cooperate with Facilitators for disseminating scientific knowledge and technology to local stakeholders relevant to water-related disaster management</p> <p>To cooperate to implement the activities above with other working groups of the Typhoon Committee</p> |
| AOP10 | | <p>To enhance typhoon analysis and intensity estimation using AI based satellite data processing in community level</p> <p>To enhance typhoon analysis skills using GK2A data and others satellite data in the training program.</p> | | | <p>GK2A data through NOAA's NODD in the U.S. starting in December 2023(https://www.noaa.gov/information-technology/open-data-dissemination)</p> <p>Distribution of a free viewer S/W of GK2A data operating on Mac, Windows 10, and Linux (2024)</p> <p>Sharing AI-based typhoon analysis data via Internet (2025 or 2026~)</p> |

Annex 4:

Draft Summary of WGH AOP Implementation Progress Questionnaire Review

WGH Chairperson: Dr. Mamoru MIYAMOTO

TCS Hydrologist: Dr. Jinping LIU

November 15, 2023

I. Background

1. AWG decided at its 2nd meeting held on 14 June 2023 in Ulsan, Republic of Korea to initiate a monitoring on the ongoing or previous efforts of TC Members in contributing to the four important pillars of the EW4all initiative, and consequently to enable an evaluation of the Committee's contributions to EW4All and identify opportunities for further enhancing its performance through Member's Report and WG's AOP specification.
2. Under the advice and guidance of AWG, TCS worked out the Work-plan for AOP evaluation and the Questionnaire.
3. AWG at its meeting on 26 Nov. 2023 advised TCS to use a term other than "Evaluation" to enhance Members' understanding and interpretation of the questionnaire.

II. Actions taken by WGH for AOP Implementation Review

4. Following the arrangement of the Work-plan, WGH took actions on AOP implementation review by TC 18th IWS as below:
 - TCS distributed the Questionnaire to all AOP leaders in the end of August;
 - All AOP leaders submitted the questionnaires by the end of September.
 - The initial progresses and information of WGH AOP implementation review were discussed at WGH 12th Working meeting which was held on 20-22 September 2023 in Bangkok, Thailand.
 - All AOP leaders updated their Questionnaires based on the discussion at WGH 12th Working meeting, and TCS distributed the filled-questionnaires by AOP leaders to WGH Chairpersons and Focal Points of all Members in the middle of October.
 - WGH Chairperson commented all filled-questionnaires by middle of November.
 - The focal points of 4 Members submitted their responses to all filled-questionnaires by middle of November, including: (1) Malaysia responded to AOP6; (2) Laos responded to all AOPs; (3) Philippines responded to AOP7; and (4) ROK responded to AOP2 and AOP3.
 - The draft summary report was discussed at WGH parallel session of TC 18th IWS which was held from 28 November to 01 December 2023 in UNCC, ESCAP, Bangkok, Thailand.

III. Synthesizing the Information from AOP Questionnaires

Currently, WGH has 9 AOPs on-going. The basic information of AOPs' implementation, including the

alignment with the pillars of EW4All and KRA is listed in [Table 3](#), while the potential areas to be enhanced for the plans to align with the pillars of EW4All with implementation plan in future is listed in [Table 4](#).

IV. Findings from WGH AOP Implementation Review

5. WGH AOP leaders have demonstrated excellent performance on responding to AOP questionnaires.
6. All WGH AOPs' leading Members made great efforts on AOP implementation and conducted a series of positive and practical activities in the past 5 years, to fulfill their annual success indicators which were approved at TC Annual Session.
7. The topics of all WGH AOPs closely aligns with the one or more KRA(s) of Typhoon Committee Strategic Plan. The implementation and achievements of all WGH AOPs have played very important roles on realizing the Mission and Goal of the Committee.
8. The topics of all WGH AOPs closely aligns with one or more pillar(s) of UN EW4All initiative. The implementation and achievements of all WGH AOPs contributed remarkably to the four important pillars of the EW4all initiative.
9. All WGH AOPs fulfilled the scheduled tasks, achieved the expected goals and results in the period of implementation. The rich outcomes and achievements boosted the capacity building in TC Members on typhoon-related disaster risk reduction, especially the flood forecasting and early warning, and water resources management.
10. The implementation of all WGH AOPs benefited TC Members remarkably in all aspects and enhanced extremely the cooperation on the aspects of technical exchange, personnel training, and knowledge sharing in hydrological component among TC Members.
11. The implementation of all WGH AOPs fully and effectively used the TCTF annual allocation as seed's money. AOP participating Members, particularly the AOP leading Members contributed huge in-kind contribution including funding and expertise, which is very important and should be encouraged for conducting the AOPs' activities in future.
12. The review of WGH AOP implementation clarified the potential areas to be enhanced for the AOPs to be linked to the pillar(s) EW4All, and identified how to enhance the alignment to contribute to the pillars of EW4All in future. This will greatly help WGH to improve its strategy and cooperation on the aspects of AOP proposal, Members' participation, implementation planning, budget estimation, and result review, etc.

V. Recommendation

13. The new proposed AOP should be closely aligned with the KRAs of TC Strategic Plan and the pillars of UN EW4All initiative.
14. The proposed AOP could involve 2 or more Members (including leading Member).
15. The AOP leading Member should ensure the AOP leader and/or the leader's representative taking part in the WGH annual working meeting and/or TC IWS.
16. The approved implementation plan (implementation activities) of AOP at TC Annual Session should be conducted on the base of the schedule with the close cooperation of leading Member, participating Members and TCS.

17. The AOP implementation activities should be conducted on the platform of the Committee as far as possible and keep TCS informed.
18. The AOP implementation status should be reviewed annually by the working group targeting the success indicators which were approved at TC Annual Session. The review and analysis of AOP implementation may be conducted in an alignment with the updating of the Strategic Plan of the Committee.

Table 3 The list of WGH on-going AOPs and the Basic Information

| Item | Projects | Driver | Duration | Alignment with KRA | Alignment with pillars of EW4ALL | Participating Members | Beneficiary Members |
|------|---|--------|-----------|--------------------|----------------------------------|-----------------------|---|
| AOP1 | Knowledge Sharing on Storm Surge Inundation Mapping | USA | 2020~2025 | KRA 1-4, 7 | EW1-4 | 3 | 4 TC Members |
| AOP2 | Improvement of Hydrological Data Quality Control System by Using AI technology | ROK | 2023~2027 | KRA2,3,4 | EW 2 | 5 | All TC Members |
| AOP3 | Improvement of Flood Forecasting modelling by Using AI technology | ROK | 2023~2027 | KRA2,3,4 | EW 1,2 | 4 | 4 TC Members |
| AOP4 | OSUFFIM Phase-II: Extension of OSUFFIM Application in TC Members | China | 2018~2023 | KRA 1-5, 7 | EW 1-4 | 5 | All TC Members and the regions out of TC |
| AOP5 | Impact Assessment of Climate Change on Water Resource Variability in TC Members | China | 2018~2024 | KRA 3,6 | EW 1,2,4 | 4 | 7 TC Members, and others countries out of TC region |
| AOP6 | Flood Risk Watch Project for Life-saving | Japan | 2019~2023 | KRA 1-5 | EW 2 | 2 | All Members |
| AOP7 | Flood resilience enhancement through Platform on Water Resilience and Disasters | Japan | 2023~2027 | KRA 1-5 | EW 2 | 3 | All Members |
| AOP8 | Training Course on Hydrological Monitoring and Flood Management for Developing Countries | China | 2023~2025 | KRA 1-5 | EW 1-4 | 7 | 7 TC Members and other countries out of TC region |
| AOP9 | Synergized Standard Operating Procedures for Coastal Multi-Hazard Early Warning System (SSOP)-Phase III | USA | 2023~2025 | KRA1,3,4,5 | EW 1-4 | 7 | All TC, PTC and TCC Members |

Table 4 The potential areas to be enhanced for WGH AOPs to be linked to the pillar(s) of EW4All and how in future

| AOP | The potential Area to be enhanced to align with the Pillars of EW4All | | | | Implementation Plan in future |
|------|--|---|---|---|---|
| | Pillar 1 | Pillar 2 | Pillar 3 | Pillar 4 | |
| AOP1 | <ul style="list-style-type: none"> Identify areas most at risk for storm surge inundation | <ul style="list-style-type: none"> Ability to forecast tentative inundation depths at target locations | <ul style="list-style-type: none"> Allow earlier dissemination of watches/warnings based on likelihood of TC approach | <ul style="list-style-type: none"> Allow Emergency Managers and DRR professionals to identify areas most likely to receive damage due to inundation, thus having resources available | <ul style="list-style-type: none"> Assist beneficiary Members with program setup and train to make changes as needed. Identify additional beneficiary countries based on success with China and Thailand. |
| AOP2 | <ul style="list-style-type: none"> To link to flood forecasting model in direct and can use high quality hydrological data in flood forecasting | <ul style="list-style-type: none"> To produce the high-quality hydrological data for flood forecasting and provide hydrological data report after adding the report module | | | <ul style="list-style-type: none"> Apply advanced technology such as AI and Big Data to improve the capacity of data quality control in TC Members |
| AOP3 | | <ul style="list-style-type: none"> To reduce the flood forecasting uncertainty and enlarge the flood leading time | | | <ul style="list-style-type: none"> Apply advanced technology such as AI and Big Data to improve the capacity of flood forecasting in TC Members |
| AOP4 | <ul style="list-style-type: none"> To enhance the knowledge dissemination at community, regional and national level | <ul style="list-style-type: none"> To enhance the training courses and workshops on flood modeling and operational flood forecasting system set up To enhance pilot studies in TC and PTC members | <ul style="list-style-type: none"> To enhance the dissemination of the operational flood forecasting results | <ul style="list-style-type: none"> To enhance the capability of urban flood hazards preparedness and response under rapid urbanization at community, regional and national level | <ul style="list-style-type: none"> To enhance the urban flood forecasting system already put into operation in China pilot study, and operate it continually, and to make it a flagship system for other TC and PTC members To finish the operational flood forecasting system for the pilot studies in Malaysia, Vietnam and Philippines, to make it operational as soon as possible To promote more pilot studies in other TC members, particularly in PTC members |
| AOP5 | <ul style="list-style-type: none"> To enhance quantitative risk assessment of climate change on water resources in the future training workshop. Aiming to help users to calculate quantitative risk of climate change one water resources variability. | | <ul style="list-style-type: none"> To enhance data acquisition, evaluation and fusion in the future training workshop. Aiming to inform user to know how to make full use of multiple data sources effectively. | <ul style="list-style-type: none"> To enhance quantitative impact assessment of climate change on water resources in the future training workshop. Aiming to help users to get more straightforward adaptive strategies to climate change. | <ul style="list-style-type: none"> To organize face to face or online training workshops in TC countries. Training workshops will focus on (1) Global data acquisition and evaluation, (2) Model calibration and application; To extend RCCC-WBM model application in pilot catchments in interested TC Members for assessing climate change impact; Capacity building on knowledge exchange, experiences and lessons sharing on climate impact assessment on water resources variation; |
| AOP6 | | <ul style="list-style-type: none"> Application of 3L WLGs to actual fields of hydrological observation in member countries to enhance the effectiveness and efficiency of the water level observation. | <ul style="list-style-type: none"> Application of 3L WLGs and its data collection, sharing and dissemination system in Members to enhance the opportunities to provide accessible water levels and related warning information to the residents. | | <ul style="list-style-type: none"> This theme will be completed in 2023 and the following themes will continue to be studied. New AOP6 theme; Flood Risk Mapping with Ground/Satellite Observation Data Opportunities for testing of 3L WLGs in member countries will continue to be sought. |

| AOP | The potential Area to be enhanced to align with the Pillars of EW4All | | | | Implementation Plan in future |
|------|--|---|---|--|--|
| | Pillar 1 | Pillar 2 | Pillar 3 | Pillar 4 | |
| AOP7 | <ul style="list-style-type: none"> Disaster risk and management can be learned through OSS-SR's learning functions to enhance disaster resilience by increasing disaster literacy | <ul style="list-style-type: none"> OSS-SR can hydrologically forecast floods and inundations by mobilizing all available rainfall inputs, and can show remote sensing images of clouds, inundation extents, and so on. | <ul style="list-style-type: none"> Warning information created by OSS-SR can be disseminated and used for risk communication with the translation by the "Facilitator" | | <ul style="list-style-type: none"> To develop and improve OSS-SR so that it can integrate more knowledge, technology, know-how, and experience of different disciplines related to flood disasters To conduct capacity development to foster local Facilitators utilizing OSS-SR as an E-learning tool To cooperate with Facilitators for disseminating scientific knowledge and technology to local stakeholders relevant to water-related disaster management To cooperate to implement the activities above with other working groups of the Typhoon Committee and international organizations |
| AOP8 | <ul style="list-style-type: none"> To enhance the training courses and workshops on the Manual and the materials; To enhance pilot study in community level; | <ul style="list-style-type: none"> To enhance the training courses and workshops on the Manual and the materials; To enhance pilot study in community level; | <ul style="list-style-type: none"> To enhance the training courses and workshops on the Manual and the materials; To enhance pilot study in community level; | <ul style="list-style-type: none"> To enhance the training courses and workshops on the Manual and the materials; To enhance pilot study in community level; | <ul style="list-style-type: none"> Apply for the 4th Training Course on Flood Control and Early-Warning and Forecasting and Hydrological Monitoring for Developing Countries in 2024. The 4th training course is scheduled for a face-to-face gathering in September, 2024, at NIHWA in Nanjing, China, with the funding supporting selected participants from members countries, communication materials and official documents Strengthen international exchanges and cooperation, truly embed our own development in global development, achieve mutual benefit and win-win cooperation in benign interaction with other countries under the support of Typhoon Committee. |
| AOP9 | <ul style="list-style-type: none"> Work with community leaders in determining local risk knowledge and advancing local hazard preparedness | <ul style="list-style-type: none"> Work with local community leaders to enhance early detection of local hazards through local knowledge and responding appropriately | <ul style="list-style-type: none"> Work with local community leaders to determine methods for receiving and disseminating warning and response information | <ul style="list-style-type: none"> Work with local communities to advance or develop MHEWSs, and explain how to exercise these plans | <ul style="list-style-type: none"> Based on the success of the initial results of SSOP-III, extensions to further years may be appropriate to allow for additional beneficiary Member countries participation. |

Draft Summary of WDRR AOP Implementation Progress Questionnaire Review

WDRR Chairperson: Dr. Jongseol Lee (Republic of Korea)
TCS DRR Expert: Michael FU

December 29, 2023

I. Background

1. AWG decided at its 2nd meeting held on 14 June 2023 in Ulsan, Republic of Korea to initiate a monitoring on the ongoing or previous efforts of TC Members in contributing to the four important pillars of the EW4all initiative, and consequently to enable an evaluation of the Committee's contributions to EW4All and identify opportunities for further enhancing its performance through Member's Report and WG's AOP specification.
2. Under the advice and guidance of AWG, TCS worked out the Work-plan for AOP evaluation and the Questionnaire.
3. AWG at its meeting on 26 November, 2023 advised TCS to use a term other than "Evaluation" to enhance Members' understanding and interpretation of the questionnaire.

II. Actions took by WGDRR for AOP Implementation Review

4. Following the arrangement of the Work-plan, WGDRR took actions on AOP implementation review by TC 18th IWS as below:
 - TCS distributed the Questionnaire to all AOP leaders in the end of August, 2023.
 - All AOP leaders submitted the questionnaires by the end of September, 2023.
 - The initial progresses and information of WGDRR AOP implementation review were discussed at WGDRR 18th Annual Meeting of the Working Group DRR which was held on 13-15th June 2023 in Ulsan, Republic of Korea.
 - All AOP leaders updated their Questionnaires based on the discussion at WGDRR 18th Working meeting, and TCS distributed the filled-questionnaires by AOP leaders to WGDRR Chairpersons and Focal Points of all Members in the middle of October.
 - WGDRR Chairperson commented all filled-questionnaires by middle of November.
 - The Chairman, focal points and project leaders all submitted their responses to all filled-questionnaires by middle of November, including: Republic of Korea, Japan, Thailand, Vietnam and Macao, China.
 - The draft summary report was discussed at WGDRR parallel session of TC 18th IWS which was held from 28th November to 1st December 2023 in UNCC, ESCAP, Bangkok, Thailand.

III. Synthesizing the Information from AOP Questionnaires

Currently, WGDRR has 6 on-going AOPs. The basic information of AOPs' implementation, including the alignment with the pillars of EW4All and KRA is listed in [Table 5](#), while the potential areas to be enhanced for the plans to align with the pillars of EW4All with implementation plan in future is listed in [Table 6](#).

IV. Findings from WGDRR AOP Implementation Review

5. WGDRR AOP leaders have demonstrated excellent performance on responding to AOP questionnaires.
6. All WGDRR AOPs' leading Members made great efforts on AOP implementation and conducted a series of positive and practical activities in the past 5 years, to fulfill their annual success indicators which were approved at TC Annual Session.
7. The topics of all WGDRR AOPs closely aligns with the one or more KRA(s) of Typhoon Committee Strategic Plan. The implementation and achievements of all WGDRR AOPs have played very important roles on realizing the Mission and Goal of the Committee.
8. The topics of all WGDRR AOPs closely aligns with one or more pillar(s) of UN EW4All initiative. The implementation and achievements of all WGH AOPs contributed remarkably to the four important pillars of the EW4all initiative.
9. All WGDRR AOPs fulfilled the scheduled tasks, achieved the expected goals and results in the period of implementation. Members believe that the AOP can enhance capacity building and disaster reduction risk reduction. It also helped to share knowledge such as politics and technology related to DRR issue and to build partnership and strengthen international cooperation between members.
10. AOP projects provides an easily accessible flood early warning service and offers equal opportunities for them to gain disaster and lifesaving information for the vulnerable. It can enhance the capacity building for dealing with flood and typhoon in communities. It can also help to learn and obtain new technologies on disaster risk reduction.
11. Hosting annual WGDRR meeting can improve the participant's own capabilities and adapt it in the communities. It also provides opportunity for members for communication and draw cooperation.
12. The result of the Benefit Evaluation of Typhoon Disaster Prevention and preparedness research is very useful to better understand the application of risk assessment, benefit evaluation technique etc. It will enhance the capacity of early warning and preparing. The results of the AOP, such as the damage data and policy sets, benefit evaluation technique about improvement of TC track and intensity forecast and a TC case is helpful to better understanding the contribution of endeavor in preparedness and response.
13. Having a platform for information exchange between members is essential for international organization and should be continued. Making educational videos is not complicated but very efficient and effective for expertise to be shared with public. The video is a great method for general public to understand and can be used for educational purpose as well.

V. Recommendation

14. Members suggest giving support to every member implementing the AOP and support TC members to join other international forum of DRR. Information shared is also recommended to upload to the TCS website.
15. Early Warning and Alert System can be integrated into other member country existing systems.

Feasibility study prior to implementation, should be conducted to tailor the technology to local conditions. It is also recommended to link the system to different early warning devices such as TV media to strengthen the announcement channel.

16. Members suggest adopting agenda that are up to date with recent DRR challenges (including growing frequency and strength of typhoon) and TCS can help to arrange live broadcast during the meeting. More field trip rather than focus on reporting is also suggested.
17. and application of risk pre-assessment and benefit assessment. Further suggestion regarding the restart of the fellowship plan and invite more members to take part in the AOP is also made.
18. Other members suggest coming up with effective database tools/system that could be useful for TC preparedness in Collection of TC damage data and TC policy enhance the sharing of data technique and the development other member countries, and this project should continue.
19. Linking relevant disaster data information system (e.g GLIDE) to the TCS website. Other channels such as Official Facebook Page should also be used for sharing information. Extension of other types and updated disaster such as New York Inundation and Turkey Earthquake 2023.
20. Adding different languages or use social platforms for disseminating the DRR video is recommended. It is also suggested to scale up practical messaging approach and translate technical terms into general language.
21. The AOP implementation status should be reviewed annually by its working group targeting the success indicators which were approved at TC Annual Session.

Table 5 Basic information of WGDRR Annual Operating Plans

| Item | Title | Organizer | Start Date | Alignment with KRA | Alignment with EW4ALL | Participating Members | Beneficiary |
|------|--|------------|------------|--------------------|-----------------------|-----------------------|--------------------------------------|
| AOP1 | Capacity Building/knowledge sharing (NDMI) | NDMI | 2014 | KRA3-7 | EW1 | 3 | South Korea and Lao PDR, Philippines |
| AOP2 | Installation of Early Warning systems related to typhoon disasters | NDMI | 2013 | KRA2-7 | EW1-4 | 2 | Philippines |
| AOP3 | WGDRR Annual Meeting | NDMI | 2005 | KRA1,4-7 | EW1,4 | All TC Members | All TC Members |
| AOP4 | Benefit Evaluation of Typhoon Disaster Prevention and Preparedness | STI, China | 2013 | KRA,2,4,6 | EW1,4 | 3 | All TC Members |
| AOP5 | Sharing information related to disaster risk management | NDMI, TCS | 2017 | KRA5,7 | EW1,3 | All TC Members | All TC Members |
| AOP6 | Making educational video related to DRR | HKO | 2014 | KRA7 | EW1,3,4 | 1 | All TC Members |

Table 6 Potential areas to be enhanced for WGDRR Annual Operating Plans to align with the pillars of EW4All with implementation plan in future.

| Item | Potential Areas to be enhanced to align with the Pillars of EW4All | | | | Implementation Plan in Future |
|-------|--|--|--|--|---|
| | Pillar 1 | Pillar 2 | Pillar 3 | Pillar 4 | |
| AOP 1 | Enhance capacity building and knowledge sharing | | | | To organize an expert team to member countries for DRR information and capacity building exchange. |
| AOP 2 | Enhance disaster risk knowledge and management | Help member state to detect, observe, monitor and forecast of disasters through the EW systems | Help to disseminate warning message to member state | Improve the capacity of resilience for typhoon related disasters. | To develop and improve the installed EW and Alert Systems in the members' state so as to improve the capacities of resilience for typhoon related disaster. |
| AOP 3 | Promote disaster risk knowledge and management skills among members. | | | Enhance preparedness and response capabilities among members. | To organize the annual meeting to follow up on the working group's activities and information exchange. |
| AOP 4 | Promote disaster risk knowledge and management skills among members. | | | Provide analysis for benefit evaluation of the typhoon disaster prevention and preparedness. | To promote the research concerning benefit evaluation of typhoon disaster prevention and preparedness. |
| AOP 5 | Promote disaster risk knowledge and management skills among members. | | Enhance preparedness and response capabilities among members. | | To share information such as policies or mechanism related to DRR among TC members via the forum established on TC website |
| AOP 6 | Promote disaster risk knowledge and management skills among members. | | Disseminate disaster preparedness knowledge among members in their local language. | Raise public awareness on DRR | To produce a video related to DRR education for raising public awareness. |

Summary of TRCG AOP Implementation Progress Questionnaire Review

TRCG Chairperson: Dr. Do Tien Anh
TCS Meteorologist: Mr. Clarence Fong

February 1, 2024

I. Background

1. During the AWG meeting on 14 June 2023 in Ulsan, Republic of Korea, AWG made the decision to initiate a monitoring process to assess the ongoing or previous efforts of TC Members in contributing to the four important pillars of the EW4all initiative, and to identify opportunities for further enhancing its performance. This evaluation will be facilitated through the submission of Member's Reports and the utilization of WG's AOP specifications.
2. Under the advice and guidance of the AWG, TCS worked on the development of a comprehensive work-plan for the AOP evaluation. In addition, a questionnaire was created to gather relevant information.
3. During the AWG meeting on 26 November 2023, AWG advised TCS to use an alternative term instead of "Evaluation" to ensure that TC Members have a clear and comprehensive understanding of the questionnaire's purpose and facilitate meaningful participation.

II. Actions took by TRCG for AOP Implementation Review

- TCS distributed the questionnaires to **Training and Research Coordination Group (TRCG)** Chairperson and Vice-Chairpersons in October 2023 to collect feedback from AOP leaders, and received all questionnaires by January 2024.
- TCS drafted the summary report for TRCG Chairperson's and Vice-Chairpersons' comments, and the report was finalized in early February 2024.

III. Synthesizing the Information from AOP Questionnaires

Currently, TRCG has 5 AOPs. The basic information of the AOPs including the alignment with the pillars of EW4All and KRA is listed in **Table 7**, while the potential areas to be enhanced for the plans to align with the pillars of EW4All with implementation plan in future is listed in **Table 8**.

IV. Findings from TRCG AOP Implementation Review

- (e) TRCG AOPs focus on training and research activities within Typhoon Committee. Organizers include TRCG as well as leading TC Members in rotation (such as AOP3 Roving Seminar). Both TRCG and the leading TC Members have demonstrated significant dedication and effort in implementing the AOP over the past years with focus on achieving the success indicators that were updated and approved during the TC Session annually.
- (f) The topics of the AOPs closely align with the one or more KRA(s) of Typhoon Committee Strategic Plan. The implementation and achievements of AOPs have played very important roles on realizing the Mission and Goal of the Committee.

- (g) The topics of the AOPs closely aligns with one or more pillar(s) of UN EW4All initiative. The implementation and achievements of all TRCG AOPs contributed remarkably to the four important pillars of the EW4all initiative.
- (h) The AOPs effectively enhance capacity building, knowledge/technology transfer, and strengthen collaborations between TC Members.

V. Recommendation

- (e) To encourage AOP leaders to continue organizing training and research activities for TC Members.
- (f) To encourage AOP leaders to invite more TC Members to organize and/or participate in the training and research activities for capacity building, knowledge/technology transfer, and other forms of collaborations.
- (g) To encourage AOP leaders to update and enhance their training and research topics to align with the KRA(s) and pillar(s) of UN EW4All initiative.
- (h) To encourage AOP leaders to share their training materials, research achievements and increase their visibility by submitting articles to relevant journals such as TCRR.

Table 7 Basic information of TRCG Annual Operating Plans

| Item | Title | Organizer | Start Date | Alignment with KRA | Alignment with EW4ALL | Participating Members | Beneficiary |
|------|------------------------------------|--------------------|------------|--------------------|-----------------------|---------------------------------------|----------------------------------|
| AOP1 | RSMC Tokyo Attachment Training | JMA | 2007 | KRA1,2,3 | EW1,2,3 | WMO and Japan | All TC Members and other regions |
| AOP2 | Research Fellowship | HKO and KMA (2023) | 2001 | KRA2,4,5 | EW2 | China and Thailand (2023) | All TC Members |
| AOP3 | Roving Seminar | Viet Nam (2023) | 2003 | KRA1,2,3 | EW1,2,3,4 | 6 TC Members (2023) | All TC Members and PTC Members |
| AOP4 | Typhoon Forecaster Training Course | CMA | 2016 | KRA1,2,3,4 | - | 6 TC Members and other regions (2023) | All TC Members and other regions |
| AOP5 | TRCG Forum | TRCG | 2009 | KRA1,2,3,4,5,7 | EW1,2,3,4 | 11 TC Members (2023) | All TC Members |

Remarks: Organizers for Research Fellowship (AOP2) and Roving Seminar (AOP3) may change from year to year.

Table 8 Potential areas to be enhanced for TRCG Annual Operating Plans to align with the pillars of EW4All with implementation plan in future

| Item | Potential Areas to be enhanced to align with the Pillars of EW4All | | | | Implementation Plan in Future |
|------|--|--|---|---|--|
| | Pillar 1 | Pillar 2 | Pillar 3 | Pillar 4 | |
| AOP1 | To enhance the knowledge in operational tropical cyclone forecasting. | To enhance the capacity in operational tropical cyclone forecasting. | To enhance the knowledge of warning dissemination and communication in operational tropical cyclone forecasting. | | The RSMC Attachment Training will continue to be conducted. |
| AOP2 | | To enhance TC analysis and forecasting | | | HKO will continue to offer research fellowship program |
| AOP3 | Enhance academic exchange activities among scientists, share experiences among member countries focusing on forecasting, warning, impact-based forecasting typhoon, application of advanced technology in forecasting, monitoring and observation typhoon. | Capacity improvement for members in observation and analysis is very essential. Especially, application of advance and innovative technologies such IOT, AI, satellites, UAV...is still needed to be shared among members. | Many NMHS in developing countries have primarily concentrated on observation and forecasting, yet they have not adequately prioritized attention to the communication and dissemination. These are needed to be addressed in the future | Same as Pillar 3 | To continue organize the Roving Seminar every year. |
| AOP4 | To share successful experience in meteorological disaster risk knowledge and management | To strengthen the introduction of new observations, new techniques and new methods in tropical cyclones. | To introduce and promote CMA-cast technologies and platforms | To promote the hierarchical management and response mechanism for typhoon disaster prevention in key coastal areas. | CMA International forecast training course in tropical cyclones will continue on a regular basis, covering more countries and regions. Strengthen the application of satellite technology and AI forecasting technology in developing countries. |
| AOP5 | Breakout group discussions and plenary discussion were arranged on the second day morning to discuss the challenges and opportunities as well as future development related to the three topics and the main theme. | Same as Pillar 1 | Same as Pillar 1 | Same as Pillar 1 | To continue organize the TRCG Forum once in the 4 th year |

