MEMBER REPORT

ESCAP/WMO Typhoon Committee 9th Integrated Workshop

(MALAYSIA)

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CO	NTE	NTS	Page
I	Ov are	erview of tropical cyclones which have affected / impacted Member's ea since the last Typhoon Committee Session	i ugo
	1.	Meteorological Assessment	1
	2.	Hydrological Assessment	12
	3.	Socio-Economic Assessment	12
	4.	Regional Cooperation Assessment	12
II	Su	mmary of progress in Key Result Areas	
	1.	Improvement of Weather and Typhoon Warning System	13
	2.	Improvement of Flood Forecasting (caused by typhoon and monsoonal surges)	15
	3.	Enlightening the public on flood information (caused by typhoon and monsoonal surges)	17
	4.	Disaster Preparedness related to typhoons and monsoonal flooding	18
	5.	Disaster Management related to typhoons and monsoonal flooding	20
	6.	Recovery / Restoration from disasters related to typhoons and monsoonal flooding	23
	7.	The Forty-sixth Session of the ESCAP/WMO Typhoon Committee	25
	8.	ESCAP/WMO Typhoon Committee Attachment Training 2014	27
	9.	Expert Mission Team Visit under the ESCAP/WMO Typhoon Committee Synergized Standard Operating Procedures for Coastal Multi-Hazards Early Warning System (SSOP) Project	29
Ш	Up	odate of Members' Working Group representatives	31

I. Overview of tropical cyclones which have affected/impacted Malaysia in 2014

1. Meteorological Assessment (highlighting forecasting issues/impacts)

In total seven typhoons and eight tropical storms (tropical storm intensity or higher) developed over the western Pacific Ocean, the Philippines region, and the South China Sea from January to September 2014. Three typhoons developed in July 2014 followed by two typhoons and one tropical storm in August 2014. It was less active in both of the months this year as compared to the averages of 4.25 and 6.00 respectively for July and August recorded from 1951 to 2010.

Typhoons and tropical storms close to the South China Sea lead to strong winds and rough seas over the east coast of Peninsular Malaysia and also in the coastal areas of Sabah and Sarawak. The arrival of typhoons or tropical storms into the South China Sea and the Philippine archipelago in general led to stronger westerlies with enhanced afternoon convection over Malaysia. The observed typhoons and tropical storms are listed along with details regarding their lifetimes, regions of formation, starting and ending dates as well as their highest wind speeds in **Table 1**.

Three typhoons and three tropical storms, respectively, warranted the issuance of strong wind/rough sea warnings over marine regions under the responsibility of the Malaysian Meteorological Department (MMD). **Table 2** recounts the number of warnings issued by MMD for each typhoon and tropical storm. The trajectories of the six typhoons or tropical storms closest to Malaysia are illustrated in **Figure 1**. However, none of these typhoons or tropical storms was close enough to directly or indirectly cause significant loss of neither life nor properties within Malaysia.

The impacts of typhoons and tropical storms over the Malaysian region were restricted to rainfall events and gusting due to the tail effect of the typhoons and tropical storms. The tail effect is generally responsible for enhancing afternoon convective weather over Malaysia, especially in northern Peninsular Malaysia, Sabah and coastal Sarawak. The satellite imageries of rain cloud clusters centered upon the Malaysian region during the transits of typhoon or tropical storms close to Malaysia are shown in **Figure 2**. The images were derived from the MTSAT-1R geostationary satellite infra-red channel. The other typhoons and tropical storms which are not shown in **Figure 1** and **Figure 2** are located too far away to have any significant impact on Malaysia.

Figure 3 illustrates the wind flow at 850hPa atmospheric pressure level during the transits of typhoons or tropical storms closest to Malaysia. The images were derived from the Global Forecast System (GFS) analysis. Daily rainfall graphs of chosen meteorological stations in the northern Peninsular and east Malaysia were used to depict rainfall events induced by the tail effect of typhoons and tropical storms. Monthly rainfall charts in January, February, July, August and September 2014 covering the typhoon or tropical storm events affecting the country are shown in **Figures 4a** to **4h**.

Qualitative analysis of **Figure 2** (satellite imageries) as well as **Figures 4a** to **4h** (daily rainfall charts) revealed rain cloud bands associated with typhoons and tropical storms over Malaysia. However, the rainfall charts of January 2014 (**Figures 4a**) clearly showed a long dry period over the north and the east coast of Peninsular Malaysia, but a significant amount of rainfall was observed in East Malaysia. The enhanced rainfall intensity in East Malaysia happened over the same time as tropical storm Lingling.

The satellite imageries in **Figure 2**, also displayed the tail effect of typhoon Neoguri over Malaysia and subsequent examination of rainfall charts in **Figures 4e** to **4f** showed a spike in daily rainfall over all selected stations in the north and east coast of Peninsular Malaysia along with the west coast of East Malaysia during the event of typhoon Neoguri. Nevertheless, typhoons and tropical storms are not the only factors contributing to heavy rainfall in Malaysia. There are cases whereby severe rainfall occurred during typhoon events but may not be associated with it. Along with this, MMD has also upgraded it satellite applications to receive and process data from Terra, Aqua, Metop-A, Metop-B, NPP, FY3 and NOAA series satellite.

Table 1: List of typhoons and tropical storms with JTWC classification, date of birth and death and maximum wind from January to September 2014

No	No. Tropical JTWC Classification		Da	Date		
110.	Cyclone		Birth	Death	(knots)	
1	LINGLING#	Tropical Storm	18/01/2014	20/01/2014	35	
2	KAJIKI#	Tropical Storm	31/01/2014	01/02/2014	35	
3	FAXAI*	Typhoon	28/02/2014	05/03/2014	65	
4	PEIPAH*	Tropical Storm	05/04/2014	05/04/2014	35	
5	TAPAH*	Severe Tropical Storm	28/04/2014	01/05/2014	50	
6	MITAG*	Tropical Storm	11/06/2014	12/06/2014	40	
7	HAGIBIS@	Tropical Storm	14/06/2014	17/06/2014	40	
8	NEOGURI*	Typhoon	03/07/2014	11/07/2014	100	
9	RAMMASUN@	Typhoon	12/07/2014	19/07/2014	90	
10	MATMO*	Typhoon	17/07/2014	25/07/2014	70	
11	HALONG*	Typhoon	29/07/2014	11/08/2014	105	
12	NAKRI*	Tropical Storm	29/07/2014	03/08/2014	55	
13	GENEVIEVE!	Typhoon	07/08/2014	12/08/2014	110	
14	FENGSHEN*	Severe Tropical Storm	07/09/2014	10/09/2014	55	
15	KALMAEGI#	Typhoon	12/09/2014	17/09/2014	75	

Remarks:

- 1. Number of tropical cyclones originated from:
 - * Western Pacific Ocean region : 9
 ! Central Pacific region : 1
 # Phillipines region : 3
 @ South China Sea region : 2
- 2. JTWC: Joint Typhoon Warning Centre

 Table 2: Tropical Cyclone Advisories and Warnings Issued by MMD from January to

 September 2014

Na	Nama		Da	ate	Total No. of Strong Wind / Rough Seas Warnings
NO.	Name	Category	Start	End	due to Tropical Cyclones (area affected)
1.	LINGLING	Tropical Storm	18/01/2014	20/01/2014	10 (Kelantan, Terengganu, Pahang, East Johore, Sabah, FT Labuan, Sarawak, Phuket, Sulawesi, Reef South & Sulu)
2.	KAJIKI	Tropical Strom	31/01/2014	01/02/2014	4 (Kelantan, Terengganu, Pahang, East Johore, Sarawak, FT Labuan, Sabah, Samui, Tioman, Bunguran, Reef South, Sulu & Sulawesi)
3.	FAXAI	Typhoon	28/02/2014	05/03/2014	NIL
4.	PEIPAH	Tropical Storm	05/04/2014	05/04/2014	NIL
5.	ТАРАН	Severe Tropical Storm	28/04/2014	01/05/2014	NIL
6.	MITAG	Tropical Storm	11/06/2014	12/06/2014	NIL
7.	HAGIBIS	Tropical Storm	14/06/2014	17/06/2014	NIL
8.	NEOGURI	Typhoon	03/07/2014	11/07/2014	12 (Perlis, Kedah, Pulau Pinang, Sarawak, Sabah, FT Labuan, West Johore, Phuket, Condore, Layang-Layang, Reef North, Palawan, Samui, Labuan, Northern Straits of Malacca & Sulu)
9.	RAMMASUN	Typhoon	12/07/2014	19/07/2014	31 (Perlis, Langkawi, Sarawak, Sabah, Phuket, Reef North, Reef South, Condore)
10.	МАТМО	Typhoon	17/07/2014	25/07/2014	33 (Palawan, Reef North, Condore, Layang-Layang, Phuket, Sabah, Perlis & Kedah)
11.	HALONG	Typhoon	29/07/2014	11/08/2014	NIL
12.	NAKRI	Tropical Storm	29/07/2014	03/08/2014	14 (Phuket, Condore, Reef North, Layang-Layang, Palawan, FT Labuan, Reef South, Perlis, Kedah, Sabah & Sarawak)
13.	GENEVIEVE	Typhoon	07/08/2014	12/08/2014	NIL
14.	FENGSHEN	Severe Tropical Storm	07/09/2014	10/09/2014	NIL
15.	KALMAEGI	Typhoon	12/09/2014	17/09/2014	NIL



Figure 1: Tracks of six typhoons and tropical storms affecting Malaysia from January until September 2014. The circled numbers represents the date of occurrence of the typhoons and tropical storms (Source: National Institute of Informatics (NII), Research Organization of Information and Systems (ROIS), Japan http://agora.ex.nii.ac.jp/digital-typhoon/latest/track).



Figure 2: MTSAT-1R satellite imageries showing the rain cloud clusters associated with some of the selected tropical storms and cyclones over the Malaysian region.



Figure 3: 850hPa wind charts from the Global Forecast System (GFS) showing wind patterns during the passage of tropical storms Lingling and Kajiki followed by typhoons Neoguri, Rammasun, Matmo, and Nakri.



Figure 4a Daily rainfall chart of selected meteorological stations in Peninsular Malaysia for January 2014: Tropical storms LINGLING (18/01/2014 – 20/01/2014) and KAJIKI (31/01/2014 – 01/02/2014)



Figure 4b Daily rainfall chart of selected meteorological stations in East Malaysia for January 2014: Tropical storms LINGLING (18/01/2014 – 20/01/2014) and KAJIKI (31/01/2014 – 01/02/2014)



Figure 4c Daily rainfall chart of selected meteorological stations in Peninsular Malaysia for February 2014: Tropical storm KAJIKI (31/01/2014 - 01/02/2014)



Figure 4d Daily rainfall chart of selected meteorological stations in East Malaysia for February 2014: Tropical storm KAJIKI (31/01/2014 - 01/02/2014)



Figure 4e Daily rainfall chart of selected meteorological stations in Peninsular Malaysia for July 2014: Typhoon NEOGURI (03/07/2014 - 11/07/2014), typhoon RAMMASUN (12/07/2014 - 19/07/2014), typhoon MATMO (17/07/2014 - 25/07/2014) and typhoon NAKRI (29/07/2014 - 03/08/2014)



Figure 4f Daily rainfall chart of selected meteorological stations in East Malaysia for July 2014: Typhoon NEOGURI (03/07/2014 - 11/07/2014), typhoon RAMMASUN (12/07/2014 - 19/07/2014), typhoon MATMO (17/07/2014 - 25/07/2014) and typhoon NAKRI (29/07/2014 - 03/08/2014)



Figure 4g Daily rainfall chart of selected meteorological stations in Peninsular Malaysia for August 2014: Typhoon NAKRI (29/07/2014 – 03/08/2014)



Figure 4h Daily rainfall chart of selected meteorological stations in East Malaysia for August 2014: Typhoon NAKRI (29/07/2014 – 03/08/2014)

2. Hydrological Assessment (highlighting water-related issues/impact)

Lengthy spells of heavy rainfalls during the Northeast monsoon have caused severe inundation over low-lying areas in the northern part of the Peninsular Malaysia east coast and also in East Malaysia in the months of December 2013. However, these heavy rainfall episodes are unrelated to tropical cyclones. They are caused by monsoonal cold surges. On the other hand, Malaysia also faces flash floods due to heavy thunderstorms of a convective nature.

3. Socio-Economic Assessment (highlighting socio-economic and DRR issues/impacts)

Although there were six typhoons and tropical storms close to Malaysia from January to September 2014, there was no socio-economic damage suffered by the country. There were no typhoons or tropical storms which directly affected Malaysia. Major flood disasters only occurred during the Northeast Monsoon (October 2013 until February 2014) in few states in Malaysia. About 129,673 people were affected and received services at the evacuation centers provided by various government agencies and NGO's.

4. Regional Cooperation Assessment (highlighting regional cooperation successes and challenges)

Typhoon information issued by the Regional Specialized Meteorological Centre (RSMC) – Tokyo Typhoon Centre and JTWC as well as numerical weather prediction products of European Centre for Medium-Range Weather Forecasts (ECMWF) and Japan Meteorological Agency (JMA) are used in analysis and forecasting of weather during a typhoon passage close to Malaysia.

II. Summary of progress in Key Result Areas

1. Improvement of Weather and Typhoon Warning System

MMD continuously monitors weather and sea conditions within the Malaysian Exclusive Economic Zone (EEZ) covering the Straits of Malacca, South China Sea, Sulu Sea and the Celebes Sea. Additionally, sea and weather conditions outside the EEZ are also kept track of to identify meteorological and oceanographic events which may affect waters in the EEZ.

Tropical depressions / tropical storms / typhoon warnings are issued based on the analysis of satellite imageries, wind charts, Numerical Weather Prediction (NWP) products used in conjunction with information from tropical cyclone monitoring centres such as RSMC Tokyo-Typhoon Center, JTWC and RSMC Tropical Cyclones New Delhi. Each advisory or warning is issued for tropical depression/tropical storm/typhoon in the Malaysian EEZ which covers the Straits of Malacca, Andaman Sea, South China Sea, and the Sulu Sea. As of 17 September 2014, the MMD issued a total of 104 warnings on strong winds and rough seas due to the effect of these tropical depressions / tropical storms / typhoons.

The accuracy of radar echo display is currently being upgraded with help from the Japan Meteorological Agency (JMA). Meanwhile, operational radar Quantitative Precipitation Estimation (QPE) and Quantitative Precipitation Forecasting (QPF) is being developed. Finally, four new radar stations to enhance radar coverage as well as severe weather monitoring is due to be operational by 2015.

Identified opportunities/challenges, if any, for further development or collaboration:

NIL

Summary Table of relevant KRAs and components (please tick boxes, can be more than one, as appropriate):

KRA =	1	2	3	4	5	6	7
Meteorology	\checkmark			\checkmark		\checkmark	
Hydrology							
DRR							
Training and research							
Resource mobilization or regional collaboration							

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2. Improvement of Flood Forecasting (caused by typhoon and monsoonal surges)

To date the Department of Irrigation and Drainage (DID) has 489 telemetry stations, 1223 manual flood gauges, 153 flood warning boards and 438 automatic flood warning sirens in flood prone areas. Several flood forecasting models have been developed to support flood forecasting tasks in DID, namely:

- Integrated Flood Forecasting and River Monitoring System (iFFRM) for Klang Valley
- 2. Atmospheric Model Based Rainfall & Flood Forecasting System (AMRFF) for Pahang, Kelantan and Johor rivers
- 3. Integrated Flood Forecasting and Warning System for Muda river basin
- 4. Integrated Atmospheric and Radar-Satellite Model-Based Rainfall and Flood Forecasting for Sarawak river basin
- 5. Integrated Flood Forecasting and Warning System Based on Real Time Radar Rainfall for Padas river basin
- 6. Integrated Flood Forecasting and Warning (IFFW) System for Dungun river basin
- 7. Integrated Flood Forecasting and Warning System for Kerian river basin

Malaysia is committed to WMO's Working Group on Hydrology (WGH) Annual Operating Plan (AOP) 4 Development which begins in October 2014 with a preliminary site visit by Prof. Yangbo Chen. Also, the application of Operational System for Urban Flood Forecasting and Inundation Mapping (OSUFFIM) and AOP 5 Extension of Xin'anjiang Model Application are in the pipeline. The second training on Xin'anjiang Model is expected to be carried out by November 2014.

Identified opportunities/challenges, if any, for further development or collaboration:

Hydrodynamic characteristics of a river in rapidly urbanizing areas change rapidly. Thus, hydrologic models in such an area requires constant calibration. Currently, another flood forecasting model is being developed by the DID, namely the Integrated Flood Forecasting and Warning System for the Muar river basin and is expected to be completed by August 2015. Summary Table of relevant KRAs and components (please tick boxes, can be more than one, as appropriate):

KRA =	1	2	3	4	5	6	7
Meteorology							
Hydrology		\checkmark				\checkmark	\checkmark
DRR							
Training and research							
Resource mobilization or regional collaboration							

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3. Enlightening the public on flood information (caused by typhoon and monsoonal surges)

Water level and flood information are disseminated to the authorities and public via mobile phone text emailing and the website messages, http://infobanjir.water.gov.my. This website has been enhanced and improved in terms of IT technology, hardware, procurement and network expansion as well as its contents to meet the requirements of technical staff in monitoring the flood situation in the country. The http://publicinfobanjir.water.gov.my website was developed and designed to be more public-friendly. Besides that, MMD also constantly holds exhibitions to educate the public on severe weather conditions and the precautions to be taken.

Identified opportunities/challenges, if any, for further development or collaboration:

Remote areas in Malaysia that lack access to the media facilities are often caught unaware of these information. Therefore, the Government of Malaysia is working to widen the broadband coverage across the country to better disseminate these information.

<u>Summary Table</u> of relevant KRAs and components (please tick boxes, can be more than one, as appropriate):

KRA =	1	2	3	4	5	6	7
Meteorology							
Hydrology		\checkmark			\checkmark		
DRR							
Training and research							
Resource mobilization or regional collaboration							

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4. Disaster Preparedness related to typhoons and monsoonal flooding

For flood related disaster preparation, the Honourable Minister in the Prime Minister Department as the Chairman of National Disaster Management and Relief Committee, chaired the flood disaster preparation and mitigation meeting. All the related disaster management agencies involved reported on their preparedness on emergency response, recovery and rehabilitation for the victims. The same preparation and mitigation meetings were held at the state and district levels.

Relief centres have been established by the government in each district across the country. Currently, the Department of Social Welfare has identified a total of 4,969 evacuation centres with a capacity that can cater for up to 1.3 million people. These centres are structurally sound and located at a safe distance from potential disaster areas. It is equipped with basic amenities such as water and electricity. Concurrently, the Department has identified suppliers for goods, ration and other related needs. Currently, the numbers of suppliers are 1,069.

The Department has five Depots for food and other necessities stored and divided into zone such as North, South, Middle, East 1, and East 2. A total of 513 Stockpiles are specifically allocated for the remote areas. The Stockpiles are store / place of storage of food supplies and needs for disaster victims in high-risk areas particularly those identified to be inaccessible during disaster. These Stockpiles are well prepared and stocked by the Department all year round. And there are 5108 volunteers to distribute these supplies.

Identified opportunities/challenges, if any, for further development or collaboration:

Lead of forecast may occasionally be late which contributes to delay in receiving the aides.

Summary Table of relevant KRAs and components (please tick boxes, can be more than one, as appropriate):

KRA =	1	2	3	4	5	6	7
Meteorology							
Hydrology							
DRR							
Training and research							
Resource mobilization or regional collaboration							

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5. Disaster Management related to typhoons and monsoonal flooding

When disaster or flood related to typhoons or monsoon happens, the Disaster Evacuation Centres are opened. The Department of Social Welfare is responsible for organizing disaster evacuation centres to perform the following functions:-

- i. Registration of disaster victims.
- ii. Distribution of food, clothing, blankets, mats and other necessities.
- iii. Coordinate and mobilize a task force of volunteers to assist in registration, cooking, food distribution work etc.
- iv. Organize suitable activities for the evacuees in the evacuation centres such as indoor games, religious activity, motivational talk, storytelling for children etc.
- v. Provide advice, guidance and 'post-trauma' counselling services to victims suffering from trauma, depressions etc.

Evacuation Centres will be managed by a committee which is made up of local leaders, volunteers, community members, government agencies, private sector and other agencies and headed by local leaders. To facilitate the implementation of Disaster Evacuation Centres, several Sub-Committees have been formed under this Committee, namely: -

- a) Subcommittee on Registration of Disaster Victims
 - The registration counters are divided into three types, namely:
 - i. Registration Counter for Disaster victims;
 - ii. Registration Counter for Persons with Disabilities and older persons;
 - iii. Information Counters
- b) Subcommittee on Needs and Food Supply
 - Division of duties is as follows:
 - i. Preparation of meals and menu settings of at least 4 meals a day breakfast, lunch, evening tea and dinner.
 - ii. Scheduling cooking tasks.
 - iii. To ensure that the quantity of raw materials is sufficient in Evacuation

Centres.

iv. To distribute supplies to disaster victims.

- Work closely with The Subcommittee on Registration of Disaster Victims to coordinate supplies and food provided
- To ensure a balanced diet and the supply of food in Evacuation Centres is sufficient.
- To ensure hygienic food preparation.
- Ensure that each of the victims are given the proper attention in terms of food supply especially to:
 - i. Infants and Children
 - ii. Pregnant Women and Postnatal Mothers
 - iii. Older Persons
 - iv. Chronically ill victims
- To monitor the process of food preparation and food quality in Evacuation Centres through collaboration with the Ministry of Health Malaysia (MOH).
 - Coordinate volunteers from The Malaysian Red Crescent Society (MRCS) and other volunteers in food preparation area such as:
 - i. Distributing food to disaster victims
 - ii. Cleanliness of food preparation area
- c) Subcommittee on Cleanliness
 - Maintain cleanliness in Evacuation Centres.
 - To ensure visible proper signage and specific prohibitions are displayed in Evacuation Centres. For example, "No Smoking", female toilet, male toilet, prayer rooms, etc.
- d) Subcommittee on Safety and Health
 - To create a perimeter of Evacuation Centres.

- Schedule Security Patrol in the Evacuation Centres.
- Control and secure the movement of the victims and personnel in and out of the Evacuation Centre
- Traffic Control and Road Safety Control.
- Ensure that first-aid kit are always available and sufficient
- e) Subcommittee on Activities
 - Ensure various programs are held to provide activities for the victims whilst in the Evacuation Centre to reduce depression and effects of trauma.
 - Among the activities are indoor or outdoor activities, handicraft, watching video or television, religious activities, motivational activities etc.

Identified opportunities/challenges, if any, for further development or collaboration:

NIL

<u>Summary Table</u> of relevant KRAs and components (please tick boxes, can be more than one, as appropriate):

KRA =	1	2	3	4	5	6	7
Meteorology							
Hydrology							
DRR				\checkmark			
Training and research							
Resource mobilization or regional collaboration							

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6. Recovery / Restoration from disasters related to typhoons and monsoonal flooding

Department of Social Welfare is also responsible to evaluate the damages involved, including the damage to houses, crops and livestock, to propose and draw up appropriate rehabilitation programmes/ plans and to provide "short-term" or "long-term" relief/ aid from the existing financial aid schemes.

Short Term Assistance Plan

Food supplies for 3 to 7 days will be provided to family members returning to their homes. They will also be provided with hygiene and cleaning kit items.

Long Term Assistance Plan

Long term assistance for victims consists of 6 types of financial aid schemes:

Type of Assistance	Financial Aid
Schooling	Stationery - RM50 (USD 15.40) per person Uniforms - RM70 (USD 21.56) per person
Clothing	RM70 (USD 21.56) per person
Family	RM40 (USD 12.32) per person
Essential needs for home/kitchen	RM100 (USD 30.81) per family
Repair houses	Maximum RM2,500 (USD 770.06)
Recovering Small Scale Business	Maximum RM3,000 (USD 924.07) per person

Note: Every Family: Maximum RM5,000(USD 1,540.12)

A disaster prevention and preparedness sustainable disaster management involves an outreach approach and inter-agency collaboration as well as support from the private sector, Non-Governmental Organizations (NGO's) and the community. Various efforts are being carried out by the government through relevant agencies including NGO's to ensure that vulnerable groups are not marginalized or left behind in the efforts of the country moving towards a caring society.

Identified opportunities/challenges, if any, for further development or collaboration:

The success and effectiveness of disaster prevention and preparedness depends on the cooperation, understanding and capabilities of all the agencies.

<u>Summary Table</u> of relevant KRAs and components (please tick boxes, can be more than one, as appropriate):

KRA =	1	2	3	4	5	6	7
Meteorology							
Hydrology							
DRR				\checkmark			
Training and research							
Resource mobilization or regional collaboration							

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7. The Forty-sixth Session of the ESCAP/WMO Typhoon Committee

The 46th Session of the ESCAP / WMO Typhoon Committee was held in Bangkok, Thailand from 10 February 2014 to 13 February 2014. The session was aimed at allowing participants to attend technical presentation from the *Regional Specialized Meteorological Center (RSMC)-Tokyo* concerning the *Summary of the 2013 Typhoon Season*. Members are also given the opportunity to discuss the development status of the *Synergized Standard Operating Procedures for Coastal-Hazards Early Warning System (SSOP)*. In addition, attendees have the chance to present the Working Committee report titled *Meteorology, Hydrology* and *Disaster Risk Reduction* apart from discussing activities in coordination with the WMO *Tropical Cyclone Programme*. Issues highlighted were the *Typhoon Committee Trust Fund (TCTF)*, publications, programmes of year 2014, and the implementation of the Strategic Plan 2012-2016.

The participation of Malaysia in this 46th Session benefits the country in terms of reducing adverse effects due to typhoons. Malaysia's involvement in this meeting is crucial in giving important agencies such as the National Security Council (NSC), Department of Irrigation and Drainage (DID), as well as the Ministry of Women, Family and Community Development useful knowledge and information from the technical discussions presented in the meeting session. The presence of the Malaysian delegates in this meeting is extremely vital because Malaysia is also at risk from typhoon-related disasters.

Identified opportunities/challenges, if any, for further development or collaboration:

NIL

Summary Table of relevant KRAs and components (please tick boxes, can be more than one, as appropriate):

KRA =	1	2	3	4	5	6	7
Meteorology				\checkmark		\checkmark	
Hydrology					\checkmark	\checkmark	
DRR						\checkmark	
Training and research							
Resource mobilization or regional collaboration							

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The training cum attachment programme namely *ESCAP/WMO Typhoon Committee Attachment Training 2014* was organized by the Typhoon Committee and hosted by the *Regional Specialized Meteorological Centre* (RSMC) in Tokyo, Japan from the 23rd of July to the 1st of August 2014. This event was designed to give in depth exposure to operationtal procedures and accustomizing the participants to the products of the Tokyo RSMC through a hands-on-the job training approach. Bilateral ties between the Tokyo RSMC and MMD will also be enhanced through this training and attachment programme.

The Meteorological Officer who attended this course focused on the analysis of tropical cyclones using the Dvorak Technique. It included EDA (Early-stage Dvorak Analysis) with SATAID (Satellite Image Viewer Software) as used by the Tokyo RSMC. Additionally, extensive training on QPE and also QPF (Quantitative Precipitation Estimation and Quantitative Precipitation Forecasting respectively), storm surge models, and the WMO SWFDP (Severe Weather Forecasting Demonstration Project) were also provided.

Identified opportunities/challenges, if any, for further development or collaboration:

NIL

<u>Summary Table</u> of relevant KRAs and components (please tick boxes, can be more than one, as appropriate):

KRA =	1	2	3	4	5	6	7
Meteorology		\checkmark		\checkmark		\checkmark	
Hydrology							
DRR							
Training and research						\checkmark	\checkmark
Resource mobilization or regional collaboration							

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9. Expert Mission Team Visit under the ESCAP/WMO Typhoon Committee Synergized Standard Operating Procedures for Coastal Multi-Hazards Early Warning System (SSOP) Project

The expert team visit was hosted by the Malaysian Meteorological Department (MMD) under the ESCAP/WMO Typhoon Committee Synergized Standard Operating Procedures for Coastal Multi-Hazards Early Warning System (SSOP) Project at MMD's Headquarters in Petaling Jaya, Malaysia from 28 to 29 August 2014.

The purpose of the visit was to review and synergize existing SOPs for coastal multi-hazard Early Warning System (EWS) in the Typhoon Committee Members and develop the Manual of Synergized SOPs (SSOP) for Coastal Multi-Hazards EWS.

The mission team members consist of Dr. Tokiyoshi Toya (Japan), Mr. Abdul Majid (Pakistan) and Mr. Amir Ali Khan (India), the experts who are specialized in meteorology, hydrology and disaster risk reduction, respectively.

The two-day meeting cum discussion was attended by 33 participants from the local agencies/departments, namely the Department of Information, Department of Social Welfare, Drainage & Irrigation Department, National Security Council and Malaysian Meteorological Department.

Identified opportunities/challenges, if any, for further development or collaboration:

NIL

Summary Table of relevant KRAs and components (please tick boxes, can be more than one, as appropriate):

KRA =	1	2	3	4	5	6	7
Meteorology	\checkmark						
Hydrology	\checkmark					\checkmark	
DRR		\checkmark					
Training and research			\checkmark				\checkmark
Resource mobilization or regional collaboration				\checkmark			\checkmark
Resource mobilization or regional collaboration				\checkmark			\checkmark

Member:	Malaysia	Name of contact for this item:	Mr. Alui bin Bahari
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