

MEMBER REPORT

ESCAP/WMO Typhoon Committee
7th TC Integrated Workshop

26 – 30 November 2012
Nanjing, China

(MALAYSIA)

SUMMARY OF TYPHOON COMMITTEE REPORT 2012

I. Meteorology

There were 23 typhoons and tropical storms developed over the western Pacific Ocean, South China Sea and the Philippines regions in 2012. The total number of 23 typhoons and tropical storms so far in 2012 is slightly lower than the normal of 25.6 recorded from 1981 to 2010. The 2012 season is more active than 2011 as there are four more typhoons in 2012.

Out of the 23 typhoons and tropical storms in 2012, 16 of them warranted the issuance of both the strong wind/rough sea warnings over the marine regions under the Malaysian Meteorological Department (MMD) responsibility and tropical cyclone advisories. Another two warranted the issuance of only the tropical cyclone advisories.

MMD performs continuous monitoring of the weather and sea conditions especially in the Malaysian Exclusive Economic Zone (EEZ) covering the Straits of Malacca, South China Sea, Sulu Sea and Celebes Sea. In addition, monitoring of weather and sea conditions outside the EEZ is also conducted to identify meteorological and oceanographic phenomena which may affect waters in the EEZ in the next few days.

Six meteorological officers from MMD were sent separately in 2012 to attend the 44th Typhoon Committee Session, Hangzhou, China; 2012 APEC Typhoon Symposium (2012 APTS), Taipei, Taiwan; Typhoon Committee Research Fellowship Scheme for 2012: Enhancement of Rainfall Nowcast in Tropical Cyclone Situations, Hong Kong Observatory, Hong Kong, China; Typhoon Committee Roving Seminar 2012, Seoul, Korea; 7th Typhoon Committee Integrated Workshop – Effective Warning, Nanjing, China. Two research papers directly related to tropical cyclone impacts in Malaysia were completed and presented in international conferences by the Research Division in MMD in 2012.

ICT Division has upgraded the MMD Headquarters Internet leased line from 8Mbps to 40Mbps in October 2012 to support the increasing usage of the Internet line mainly for data transmission, department Intranet and web portal. The upgrading of the Internet line is also to cater the requirement by the Numerical Weather Prediction Section to receive large volume of data from ECMWF daily for their operational use.

II. Hydrology

Malaysia experiences Northeast Monsoon which is from November to January every year. The Northeast Monsoon brings prolonged heavy rainfall to the northern and eastern regions of Peninsular Malaysia and causes severe floods in low-lying area. The monsoon heavy rainfall is unrelated to tropical cyclone.

The Department of Irrigation and Drainage (DID) to-date has installed and operates about 476 telemetry stations in 38 river basins. Besides, 1694 manual flood gauges and 93 flood warning boards had been set up in flood prone areas so as to provide additional information during the flood seasons. As part of the local early flood warning system, DID operates about 423 automatic flood warning sirens installed in flood prone areas. At the moment, the mobile phone text messages and emailing are the tools for dissemination information to the authorities and public.

DID has developed several models in the year 2011 and the models are operational to date. These models are Integrated Flood Forecasting and River Monitoring System (iFFRM) for Klang Valley, Atmospheric Model-Based Rainfall & Flood Forecasting System (AMRFF) for Pahang, Kelantan and Johor and Integrated Flood Forecasting and Warning System for Muda River Basin. In 2012, DID continues to develop flood forecasting and warning systems in several river basins in Malaysia which are Sarawak River, Padas River and Dungun River. The flood forecasting and warning system for Dungun River in Terengganu is expected to be completed by end of September/October 2012 and is expected to be ready with functionality of simulation and forecasting of flood condition for the upcoming Northeast Monsoon by the end of 2012. The model will provide hourly updated river level forecasting with 6 hours lead time. Both the flood forecasting models for Sarawak River and Padas River are expected to be completed by year 2013.

The Infobanjir website <http://infobanjir.water.gov.my> continues to be 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. Recently, a new website which was an enhancement of the Infobanjir website had been developed and designed to give relevant flood information to the general public. It is now available at <http://publicinfobanjir.water.gov.my>.

Thirteen courses and workshop were organised throughout the country by DID in 2012. Critical areas such as storm water management, flood forecasting and warning and flood mitigation were covered during these courses and conferences.

III. Disaster Prevention and Preparedness (DPP)

The Emergency Command Centre (ECC) was completed in the 3rd quarter of 2012 to become the main centre at national level in coordinating disaster management activity. During the calm period (no disaster), the centre will monitor the mitigation and preparedness activity such as flood mitigation construction, awareness campaign, drills etc. Meanwhile, at the time of disaster occurrence, a representative of related agencies involved with the disaster will be located at the centre as a liaison to collaborate with other agencies in gathering appropriate information and monitoring the current situation, which at the same time will aid in reporting and decision making.

The development of ECC's System takes into consideration the four (4) major stages of disaster management process, that is Mitigation (prevention), Preparedness, Response (relief) and Rehabilitation (recovery). In order to ensure the successful implementation of ECC, relevant data and information is critical. Therefore, cooperation and collaboration with related agencies will be sought to provide relevant and meaningful data to ECC. Hence, secured communication link (leased line) will be build to connect the centre with those agencies. ECC's system is targeted to be operational by the end of this year on 24th December 2012.

The Department of Social Welfare, subjected to the directive from The National Security Council Directive (NSC) No. 20 (Revised): *The Policy and Mechanism for National Disaster Management*, is in charge and responsible to provide and manage relief/evacuation centers and forward-supply bases, to prepare and distribute food, clothing and other essential items to the affected victims, to register the disaster victims for the purpose of rehabilitation, and to provide guidance, advice/counseling services to the affected victims.

Currently, the Department of Social Welfare has identified a total of 5,068 evacuation centers located in each district across the country with a capacity that can cater for up to 1.3 million people. At the same time, the Department also identifies the list of suppliers of goods, rationing and other related needs. Currently, the number of suppliers is 1,183 suppliers.

The Department of Social Welfare has five depots for food and other necessities storage divided by zone such as North, South, Middle, East 1, and East 2. A total of 480 Stockpiles are specifically meant for remote areas. The Stockpiles means store/place for storage of food supplies and the 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.

The Department of Social Welfare also establishes and coordinates task force of volunteers. The volunteers must be registered with the Department. The current registered volunteers are 2,473 people.

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I Overview of tropical cyclones which have affected/impacted Member's area since the last Typhoon Committee Session

1. Meteorological Assessment

The number of tropical cyclones reaching tropical storm intensity which developed in the western Pacific Ocean, Philippines and South China Sea regions in 2012 until end of October is 23. Among them, 13 are typhoons and the remaining 10 are tropical storms. Seven of the typhoons were formed in the Philippines region, four in the western Pacific Ocean region and the remaining two in the South China Sea region. The total number of 23 typhoons and tropical storms so far in 2012 is slightly lower than the normal of 25.6 recorded from 1981 to 2010. The current season is more active than 2011 as there are four more typhoons in 2012. The typhoons and tropical storms observed in 2012, together with details regarding their lifetimes, regions of formation, starting and ending dates and attained maximum wind speeds, are listed in **Table 1**.

Out of the 23 typhoons and tropical storms in 2012, 16 of them warranted the issuance of both the strong wind/rough sea warnings over the marine regions under the Malaysian Meteorological Department (MMD) responsibility and tropical cyclone advisories. Another two warranted the issuance of only the tropical cyclone advisories. The numbers of tropical cyclone advisories and strong wind/rough sea warnings issued by MMD are listed in **Table 2**. The marine regions under MMD responsibility for issuing sea state conditions are shown in **Figure 1**. Tracks of six typhoons or tropical storms that were relatively close to the Malaysia region are shown in **Figure 2**. No tropical cyclone warning in regard to significant weather impacts was issued as none of the typhoons or tropical storms was close enough to directly caused significant loss of lives and properties in the country.

The impacts of tropical storms and typhoons over the Malaysia region are restricted to rainfall events and severe gusting due to the tail effects of the tropical storms and typhoons. These tail effects are generally responsible for enhancing the afternoon convective weather over the Malaysia region, especially in the northern Peninsular Malaysia, Sabah and coastal Sarawak. Due to the presence of the typhoons and tropical storms in the South China Sea and the Philippines regions, the resulting southwesterly wind flow over the Malaysia region to a certain extent does influence the rainfall patterns on the coastal areas of Sarawak, west coast of Sabah and northern Peninsular Malaysia. The satellite imageries of the rain cloud clusters over the Malaysia region associated with the tail effects of the typhoons and tropical storms are shown in **Figure 3**. These imageries were obtained from the infrared channel of the MTSAT-1R geostationary satellite. The other typhoons and tropical storms which are not shown in **Figure 2** and **Figure 3** were located too far away to have any significant impact on Malaysia.

Rainfall events due to the tail effects of typhoons and tropical storms are also depicted with daily rainfall charts of selected meteorological stations in the northern Peninsular Malaysia, Sarawak and Sabah. The daily rainfall charts for the months of March to October 2012 are as shown in **Figures 4a to 4l**. Large spatial variation associated with rainfall may result in some of the selected stations not showing any significant rainfall, although the satellite imageries may indicate so.

From the satellite imageries (**Figure 3**) and rainfall charts (**Figures 4a to 4l**), it was found that the rain cloud bands associated with the typhoons and tropical storms are generally more intense in Sarawak and Sabah as compared to that of the Peninsular Malaysia. Nevertheless, there are exceptions as depicted in the case of Typhoon Vicente. The satellite imageries and the rainfall charts (**Figures 4g and 4h**) clearly show much more significant rain clouds and rainfall amounts respectively, for Peninsular Malaysia as compared to those in Sabah and Sarawak.

Based upon satellite imageries in **Figure 3** and rainfall data in **Figure 4**, Typhoon Tembin had more significant impact in term of weather in Malaysia. Large rainfall amounts were recorded during Typhoon Tembin events; Rainfall amounts of more than 80mm/day were recorded in Miri (Sarawak) and more then 100mm/day in Langkawi (northern Peninsular Malaysia). The average rainfall amount of most meteorological stations in Peninsular Malaysia was only 5.8 to 20.6 mm/day during the events. For Sabah and Sarawak, the average rainfall amount of most meteorological stations was only 1.9 to 15.3 mm/day during the events.

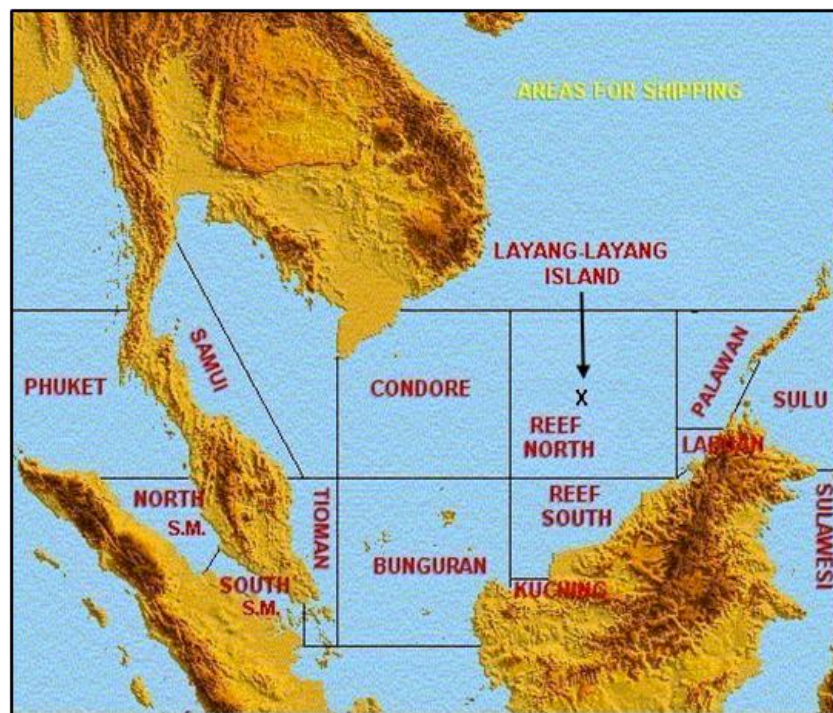


Figure 1: Marine Regions under MMD Responsibility for Issuing Sea State Conditions

Table 1: Typhoons and Tropical Storms in 2012

No.	Tropical Cyclone	JTWC Classification	Date		Max Wind (knots)
			Birth	Death	
1	Pakhar [@]	Tropical Storm	29/3/2012	2/4/2012	40
2	Sanvu [*]	Tropical Storm	22/5/2012	27/5/2012	60
3	Mawar [#]	Typhoon	1/6/2012	6/6/2012	75
4	Guchol [#]	Typhoon	13/6/2012	20/6/2012	100
5	Talim [@]	Tropical Storm	17/6/2012	20/6/2012	50
6	Doksuri [#]	Tropical Storm	26/6/2012	30/6/2012	40
7	Khanun [*]	Tropical Storm	16/7/2012	19/7/2012	50
8	Vicente [@]	Typhoon	21/7/2012	24/7/2012	80
9	Saola [#]	Typhoon	28/7/2012	3/8/2012	70
10	Damrey [*]	Typhoon	28/7/2012	3/8/2012	70
11	Haikui [*]	Typhoon	3/8/2012	9/8/2012	65
12	Kirogi [*]	Tropical Storm	6/8/2012	10/8/2012	50
13	Kai-Tak [@]	Typhoon	13/8/2012	18/8/2012	65
14	Tembin [#]	Typhoon	19/8/2012	30/8/2012	90
15	Bolaven [*]	Typhoon	20/8/2012	29/8/2012	100
16	Sanba [#]	Typhoon	11/9/2012	18/9/2012	110
17	Jelawat [#]	Typhoon	20/9/2012	1/10/2012	110
18	Ewiniar [*]	Tropical Storm	24/9/2012	30/9/2012	50
19	Maliksi [*]	Tropical Storm	1/10/2012	4/10/2012	50
20	Gaemi [@]	Tropical Storm	1/10/2012	6/10/2012	50
21	Prapiroon [*]	Typhoon	7/10/2012	19/10/2012	90
22	Maria [*]	Tropical Storm	14/10/2012	19/10/2012	50
23	Son-Tinh [@]	Typhoon	23/10/2012	29/10/2012	85

Remarks:

1. Numbers of tropical cyclones formed:-

- * Western Pacific Ocean region : 10
- # Philippines region : 7
- @ South China Sea region : 6

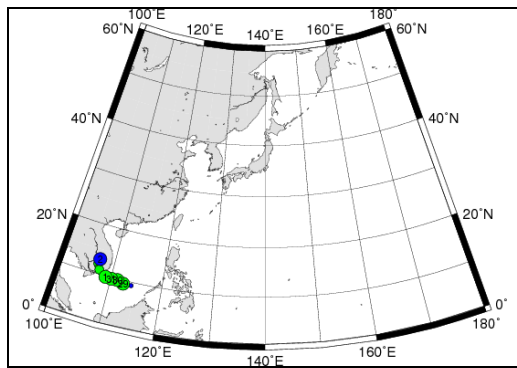
2. JTWC: Joint Typhoon Warning Centre

Table 2: Number of Tropical Cyclone Advisories and Warnings Issued by MMD in 2012

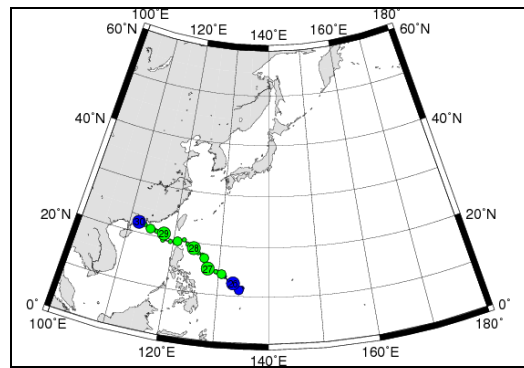
No.	Name	Category	Start Date	End Date	Total No. of Advisories	Total No. of Strong Wind/Rough Seas Warnings due to Tropical Cyclones (area affected)
1.	Pahkar	Tropical Storm	29/3/2012	2/4/2012	32	35 (Condore, Reef North, Reef South, Layang-Layang, Kelantan, Terengganu, Pahang, East Johore, Sarawak, Labuan, Sabah, Tioman, Bunguran, Samui and Palawan)
2.	Mawar	Tropical Storm	1/6/2012	3/6/2012	17	26 (Phuket, Sabah, Sarawak, Labuan, Bunguran, Condore, Reef South, Reef North, Layang-Layang and Palawan)
		Typhoon	3/6/2012	5/6/2012	14	
		Tropical Storm	5/6/2012	6/6/2012	6	
3.	Guchol	Tropical Storm	15/6/2012	15/6/2012	4	9 (Phuket, Condore, Reef North, Layang-Layang, Palawan, Langkawi, Perlis, Kedah, Penang and Sabah)
		Typhoon	16/6/2012	19/6/2012	23	
4.	Talim	Tropical Storm	18/6/2012	20/6/2021	22	17 (Phuket, Condore, Reef North, Layang-Layang, Palawan, Langkawi, Perlis, Kedah, Penang and Sabah)
5.	Doksuri	Tropical Storm	27/6/2012	30/6/2012	25	17 (Condore, Reef North, Reef South, Layang-Layang, Palawan and Sabah)
6.	Vicente	Tropical Storm	21/7/2012	23/7/2012	15	19 (Sabah, Phuket, Condore, Reef North, Palawan and Layang-Layang)
		Typhoon	23/7/2012	24/7/2012	4	
		Tropical Storm	24/7/2012	24/7/2012	7	

No.	Name	Category	Start Date	End Date	Total No. of Advisories	Total No. of Strong Wind/Rough Seas Warnings due to Tropical Cyclones (area affected)
7.	Saola	Tropical Storm	28/7/2012	31/7/2012	30	54 (Sabah, Phuket, Condore, Reef North, Layang-Layang, Palawan, Sulu, West Johore, Kelantan and Malacca)
		Typhoon	1/8/2012	2/8/2012	15	
		Tropical Storm	2/8/2012	3/8/2012	9	
8.	Haikui	Tropical Storm	5/8/2012	7/8/2012	21	36 (Reef North, Layang-Layang, Palawan, Sabah, Labuan, Phuket, Condore, Sulu, Terengganu, Kelantan, Samui, Selangor, Negeri Sembilan, Malacca and Southern Straits of Malacca)
		Typhoon	7/8/2012	8/8/2012	4	
		Tropical Storm	8/8/2012	10/8/2012	13	
9.	Kai-Tak	Tropical Storm	13/8/2012	18/8/2012	40	Nil
		Typhoon	17/8/2012	17/8/2012	2	
10.	Tembin	Tropical Storm	19/8/2012	20/8/2012	8	29 (Phuket, Langkawi, Perlis, North Kedah, Condore, Reef North, Reef South, Layang-Layang, Palawan, Selangor, Negeri Sembilan, Malacca, West Johore and Sarawak)
		Typhoon	20/8/2012	24/8/2012	31	
		Tropical Storm	24/8/2012	26/8/2012	13	
		Typhoon	26/8/2012	28/8/2012	24	
		Tropical Storm	28/8/2012	29/8/2012	10	
11.	Bolaven	Typhoon	26/8/2012	27/8/2012	11	7 (Phuket, Langkawi, Perlis, North Kedah, Condore, Reef North, Reef South, Layang-Layang, Palawan, Langkawi, Johore, Strait of Tebrau, Southern Strait of Malacca and Tioman)

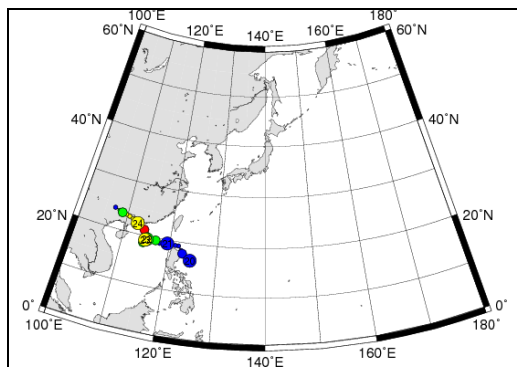
No.	Name	Category	Start Date	End Date	Total No. of Advisories	Total No. of Strong Wind/Rough Seas Warnings due to Tropical Cyclones (area affected)
12.	Sanba	Tropical Storm	13/9/2012	13/9/2012	1	Nil
		Typhoon	13/9/2012	16/8/2012	26	
13.	Jelawat	Tropical Storm	21/9/2012	23/9/2012	19	41 (Reef North, Layang-Layang, Palawan, Sabah, Condore, Sulu, Sulawesi, Kedah, Penang, Perak, Selangor, Negeri Sembilan, Malacca, Labuan, Sabah and Sarawak)
		Typhoon	23/9/2012	29/9/2012	47	
14.	Gaemi	Tropical Storm	1/10/2012	2/10/2012	4	29 (Phuket, Condore, Reef North, Reef South, Layang-Layang, Palawan, Sulu, Sulawesi, Labuan, Sabah and Sarawak)
		Typhoon	2/10/2012	2/10/2012	2	
		Tropical Storm	2/10/2012	6/10/2012	32	
15.	Prapiroon	Tropical Storm	16/10/2012	18/10/2012	12	36 (Sarawak, Labuan, Sabah, Condore, Reef North, Reef South, Layang-Layang, Palawan, Phuket, Johore, Southern Straits of Malacca and Tioman)
		Typhoon	10/10/2012	14/10/2012	28	
16.	Son-Tinh	Tropical Storm	24/10/2012	27/10/2012	29	28 (Kelantan, Terengganu, Pahang, Sarawak, Labuan, Sabah, Samui, Condore, Reef North, Layang-Layang and Palawan)
		Typhoon	27/10/2012	29/10/2012	10	
		Tropical Storm	29/10/2012	29/10/2012	3	



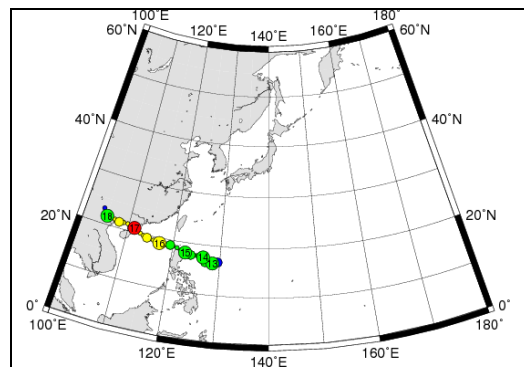
PAHKAR



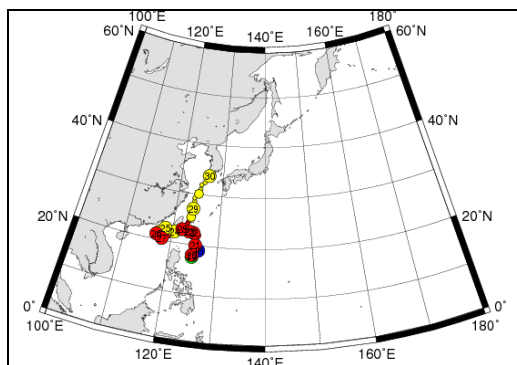
DOKSURI



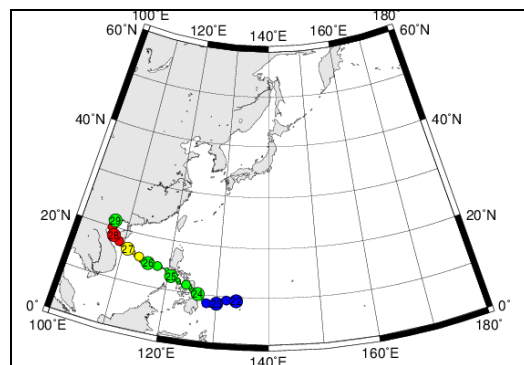
VICENTE



KAI-TAK

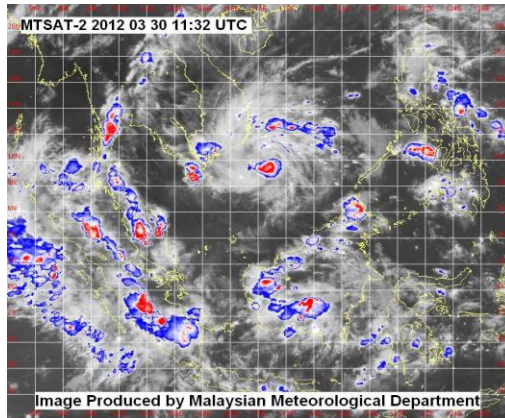


TEMBIN

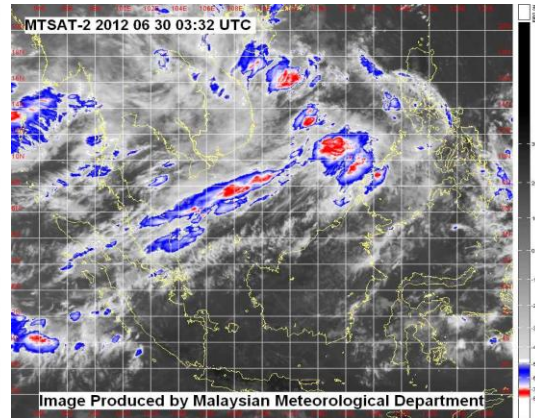


SON-TINH

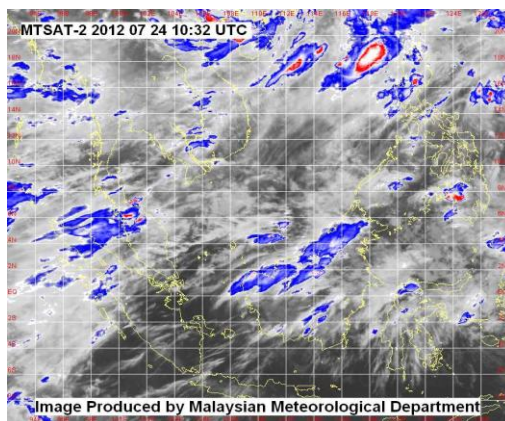
Figure 2: Tracks of six (6) tropical storms and typhoons closest to Malaysia in 2012. The number in the circle represents the date of occurrence of the tropical storms and typhoons. (Source: National Institute of Informatics (NII), Research Organization of Information and Systems (ROIS), Japan <http://agora.ex.nii.ac.jp/digital-typhoon/latest/track>)



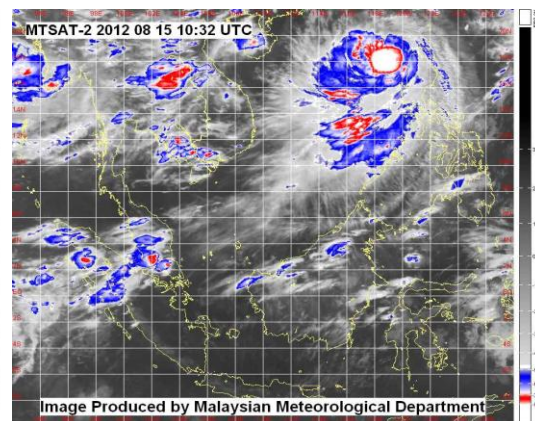
PAHKAR



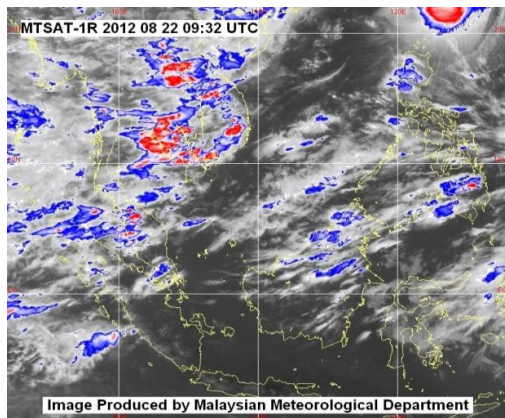
DOKSURI



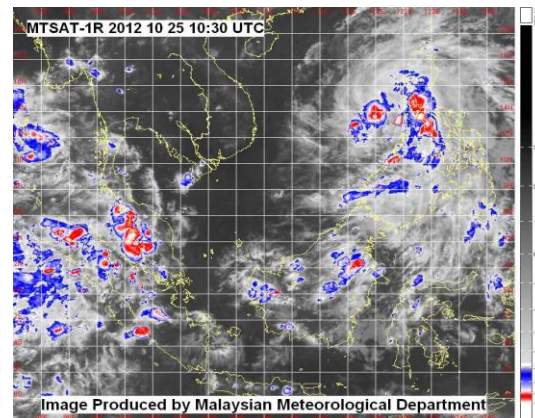
VICENTE



KAI-TAK



TEMBIN



SON-TINH

Figure 3: MTSAT-1R satellite imageries showing the rain cloud clusters associated with some of the selected tropical storms and cyclones over the Malaysian region from 1 March to 31 October 2012

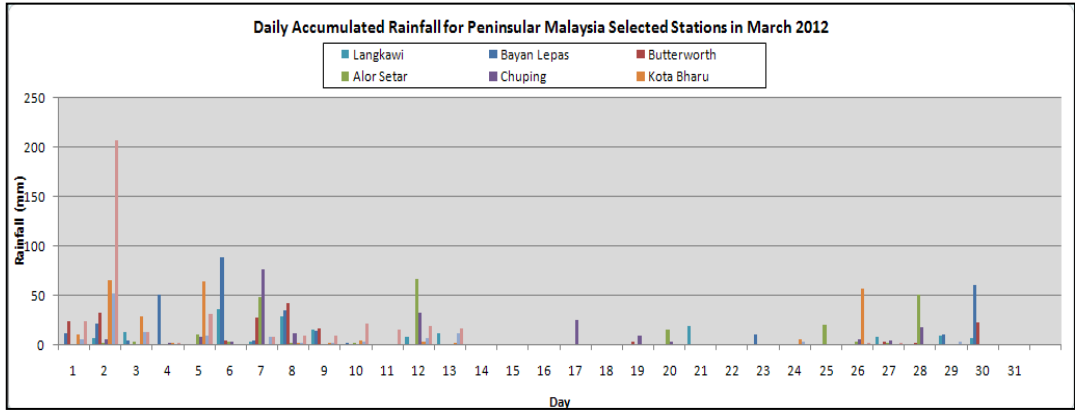


Figure 4a: Daily rainfall chart of selected meteorological stations in Peninsular Malaysia for March 2012: Tropical Storm Pahkar (29/03/2012 – 02/04/2012)

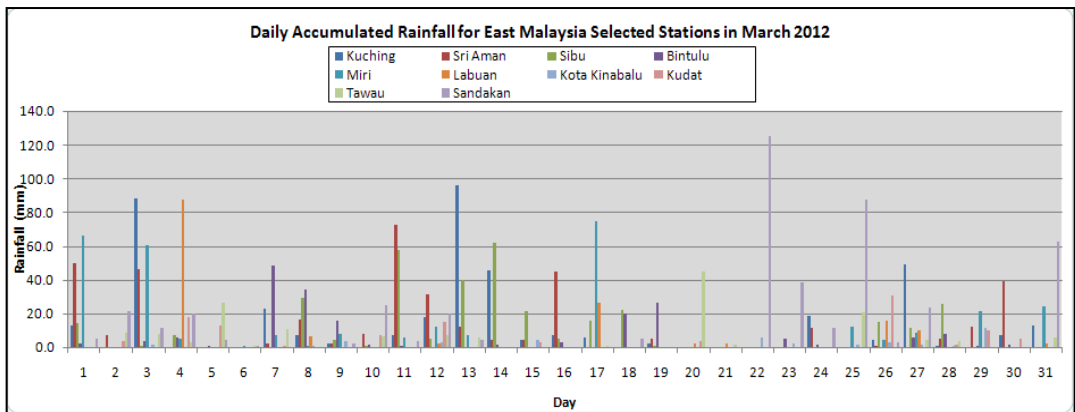


Figure 4b: Daily rainfall chart of selected meteorological stations in East Malaysia for March 2012: Tropical Storm Pahkar (29/03/2012 – 02/04/2012)

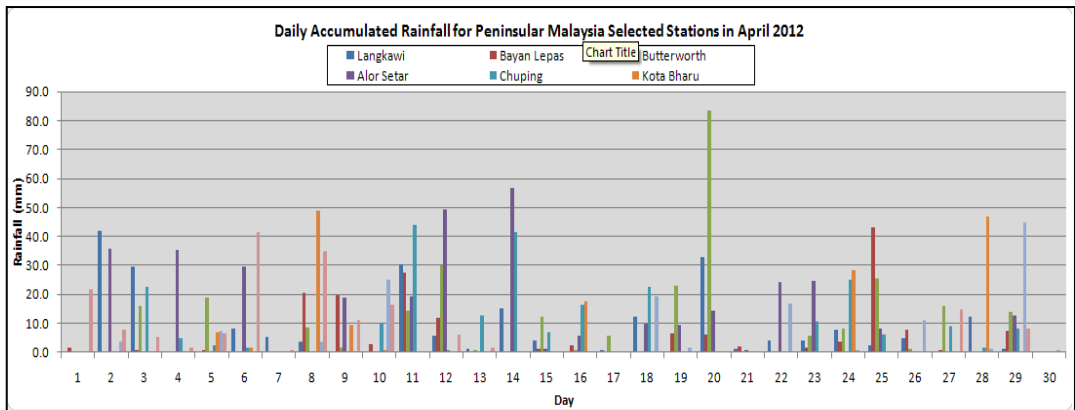


Figure 4c: Daily rainfall chart of selected meteorological stations in Peninsular Malaysia for April 2012: Tropical Storm Pahkar (29/03/2012 – 02/04/2012)

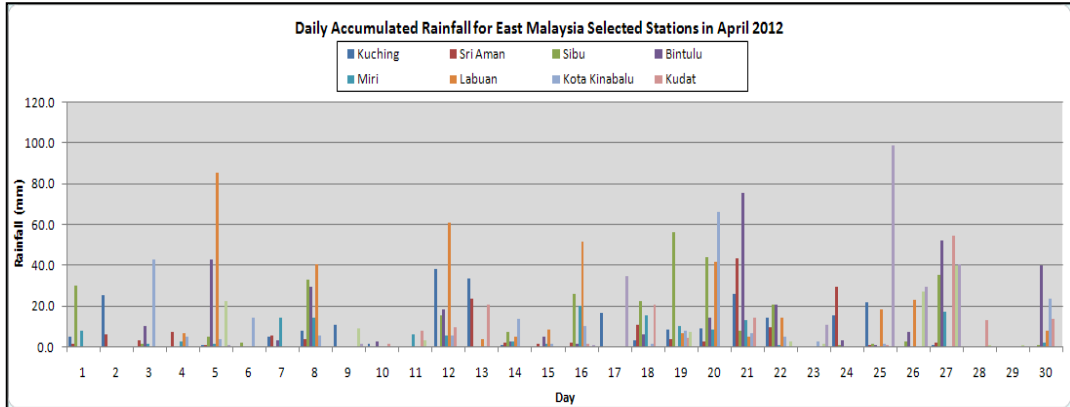


Figure 4d: Daily rainfall chart of selected meteorological stations in East Malaysia for April 2012: Tropical Storm Pahkar (29/03/2012 – 02/04/2012)

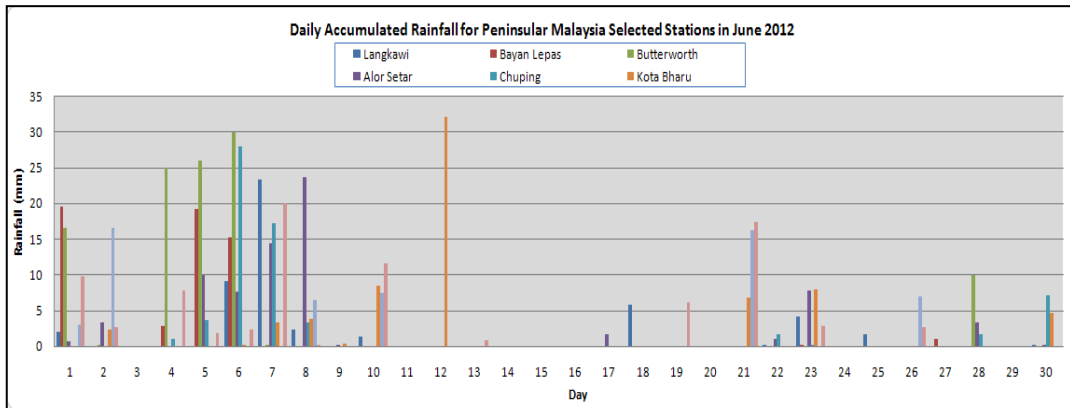


Figure 4e: Daily rainfall chart of selected meteorological stations in Peninsular Malaysia for June 2012: Tropical Storm Doksuri (26/06/2012 – 30/06/2012)

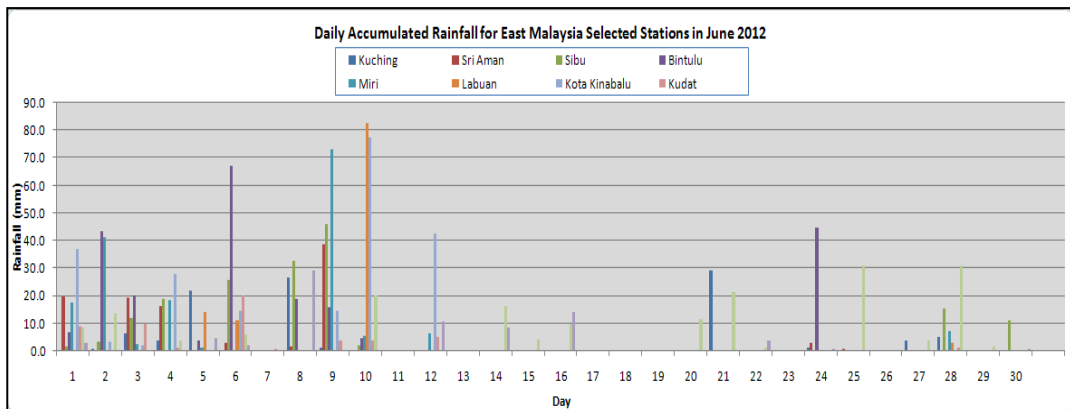


Figure 4f: Daily rainfall chart of selected meteorological stations in East Malaysia for June 2012: Tropical Storm Doksuri (26/06/2012 – 30/06/2012)

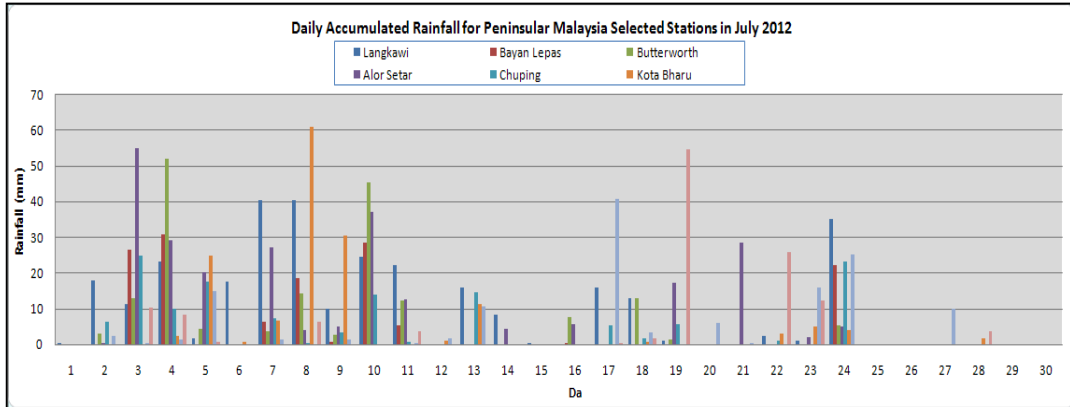


Figure 4g: Daily rainfall chart of selected meteorological stations in Peninsular Malaysia for July 2012: Typhoon Vicente (21/07/2012 – 24/07/2012)

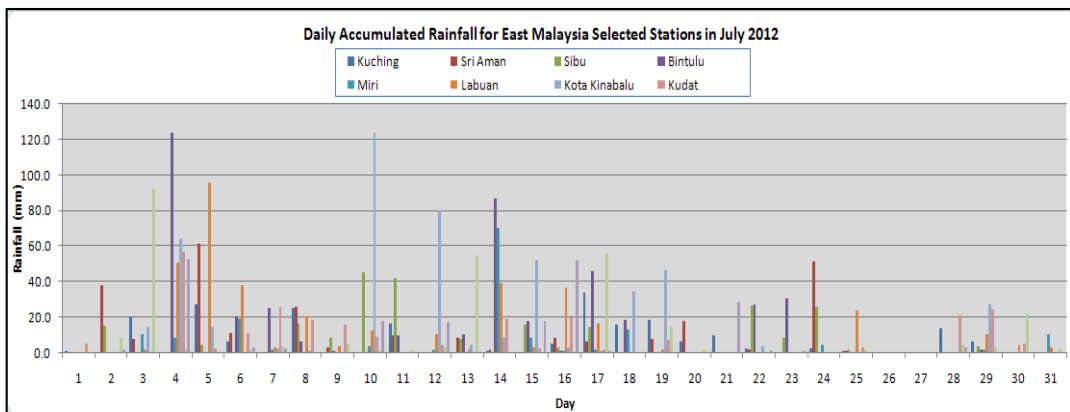


Figure 4h: Daily rainfall chart of selected meteorological stations in East Malaysia for July 2012: Typhoon Vicente (21/07/2012 – 24/07/2012)

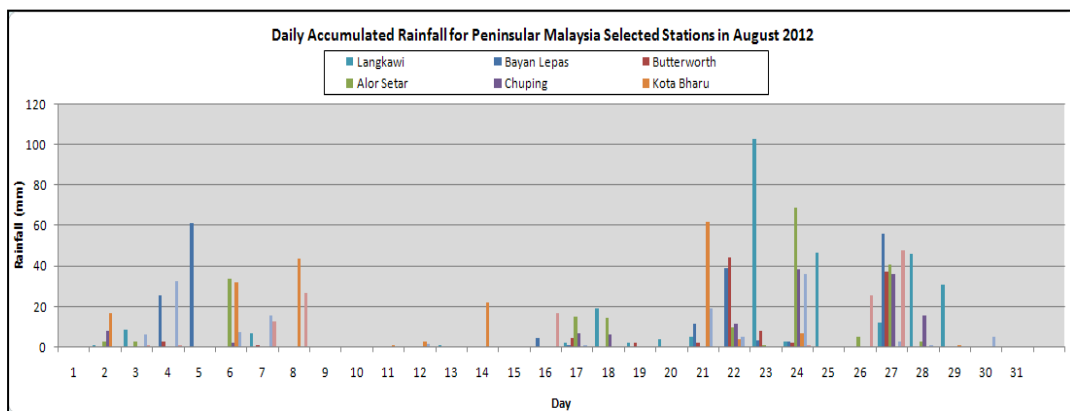


Figure 4i: Daily rainfall chart of selected meteorological stations in Peninsular Malaysia for August 2012: Typhoon Kai-Tak (13/08/2012 – 18/08/2012) and Typhoon Tembin (19/08/2012 – 30/08/2012)

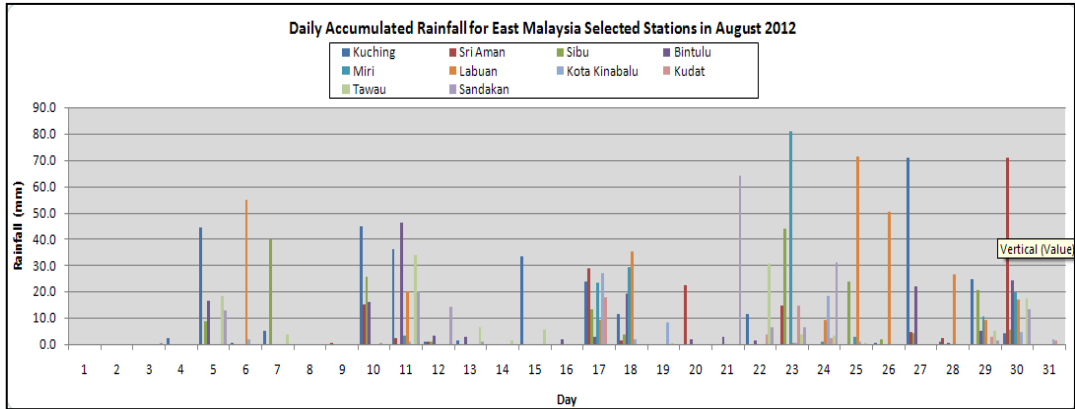


Figure 4j: Daily rainfall chart of selected meteorological stations in East Malaysia for August 2012: Typhoon Kai-Tak (13/08/2012 – 18/08/2012) and Typhoon Tembin (19/08/2012 – 30/08/2012)

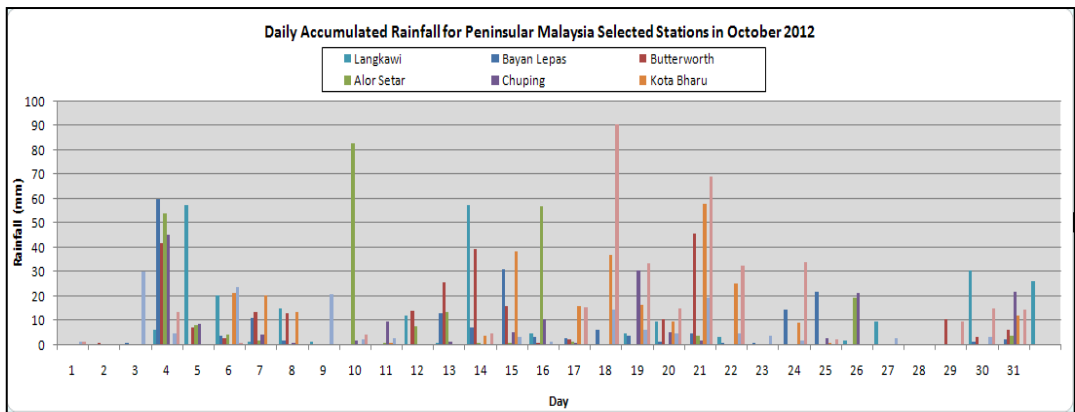


Figure 4k: Daily rainfall chart of selected meteorological stations in Peninsular Malaysia for October 2012: Tropical Storm Son-Tinh (23/10/2012 – 29/10/2012)

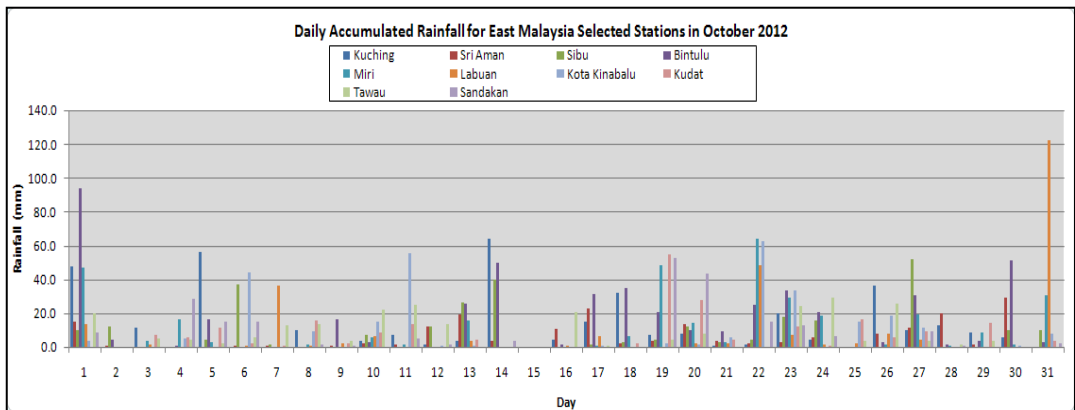


Figure 4l: Daily rainfall chart of selected meteorological stations in East Malaysia for October 2012: Tropical Storm Son-Tinh (23/10/2012 – 29/10/2012)

2. Hydrological Assessment

Malaysia experiences the Northeast Monsoon season from November to January every year. The Northeast Monsoon brings prolonged heavy rainfall to the northern and eastern regions of Peninsular Malaysia and causes severe floods in low-lying areas. The monsoon heavy rainfall is unrelated to tropical cyclone.

The States of Kelantan and Terengganu received three periods of heavy rainfall during the Northeast Monsoon as shown in **Table 3** below while **Table 4** shows several flood reports recorded in 2011. These three periods of heavy rain had caused floods in the low lying areas with a maximum of 10 days inundation. Other states like Johor was also hit by flood for 12 days during monsoon season and all the districts were inundated except Muar. The national hydrological rainfalls recorded for capital cities in Malaysia are presented in **Figure 5** while **Figure 6** shows the rainfalls recorded in Selangor. Selangor is the capital state of Malaysia in which Kuala Lumpur is located.

Table 3: The States of Kelantan and Terengganu received three periods of heavy rainfall during the Northeast Monsoon

State	Period	Highest Recorded Daily Rainfall (mm)
Kelantan	i. 22 Nov 2011 – 30 Nov 2011	245
	ii. 1 Jan 2012 – 4 Jan 2012	
	iii. 13 Jan 2012 – 17 Jan 2012	
Terengganu	i. 22 Nov 2011 – 30 Nov 2011	264
	ii. 1 Jan 2012 – 4 Jan 2012	
	iii. 13 Jan 2012 – 17 Jan 2012	
Johor	i. 18 Dec 2011 – 30 Dec 2012	175

Table 4: The flood inventory report from March 2011 – October 2011

No.	Year	State	District	Date of flood	Rainfall (mm)	Flood depth (m)	ARI (year)	Sub river basin	River basin
1	2011	Johor	Segamat and Kluang	26/01/2011	121 – 195/3 days	1.5 – 3	3 - 25	Lenik @ kangkar Chaah, Segamat rivers	Segamat / Muar
2	2011	Johor	Segamat	30/01/2011	80 – 274/3 days	0.3 – 1	1 - 82	Segamat, Juaseh, Muar.	Segamat / Muar
3	2011	Johor	Muar	30/01/2011	68 – 471/3 days	0.6 – 1	1 - 271	Muar, Segamat.	Segamat / Muar
4	2011	Johor	Johor Bahru	30/01/2011	68 – 471/3 days	0.6 – 1	1 - 271	Muar, Segamat.	Segamat / Muar
5	2011	Johor	Kluang	30/01/2011	68 – 471/3 days	0.3 – 0.7	1 - 271	Mengkibol	Mengkibol
6	2011	Johor	Kota Tinggi	30/01/2011	68 – 471/3 days	0.3 – 0.7	1 - 271	Telor, Semangar, Berangan and Tembiah	Johor
7	2011	Kuala Lumpur	Kuala Lumpur	13/12/2011	36 - 71	0.1 – 1	Normal - 80	Bonus / Kolam Boyan	Kelang
8	2011	Sarawak	Samarahan	25/12/2011	20 - 610.5/3 days	0.1 – 4	5 - >100 tahun.	Batang Samarahan, Tajor Besar, Sabang, Sabir, Subi, Sebandi, Moyan	Sarawak
9	2011	Selangor	Petaling	14/09/2011	51 - 134	0.5 – 1	Normal - 50	Buloh	Selangor
10	2011	Selangor	Kuala Selangor	14/09/2011	51 - 134	0.5 - 1	Normal - 50	Buloh	Selangor
11	2011	Selangor	Kelang	14/09/2011	51 - 134	0.5 – 1	Normal - 50	Buloh	Selangor
12	2011	Kedah	Langkawi	29/6/2011	111/2 hrs	0.5	52	Kg. Bayas, Kg. Mata Air, Bendang Lubuk Setol, Kg. Bohor, Kg. chandek Kura, Kg. Ewa Ayer Hangat	Melaka

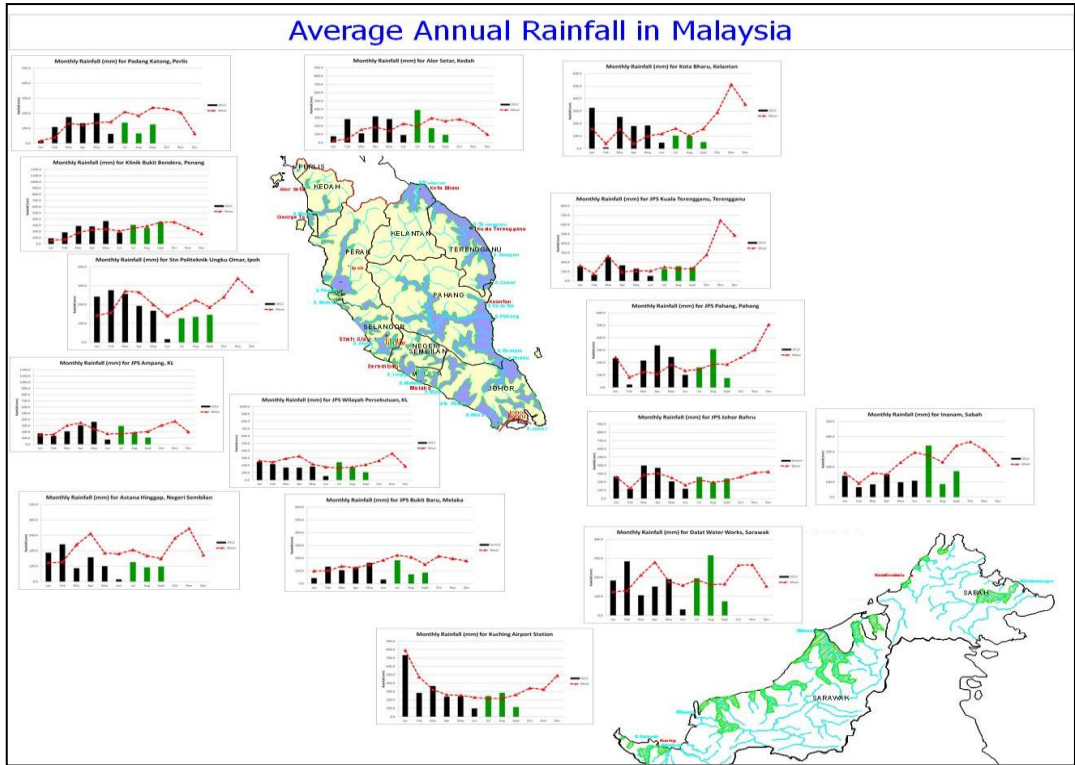


Figure 5: Long term monthly rainfalls against the 2012 rainfalls recorded for Malaysian State Capital Cities

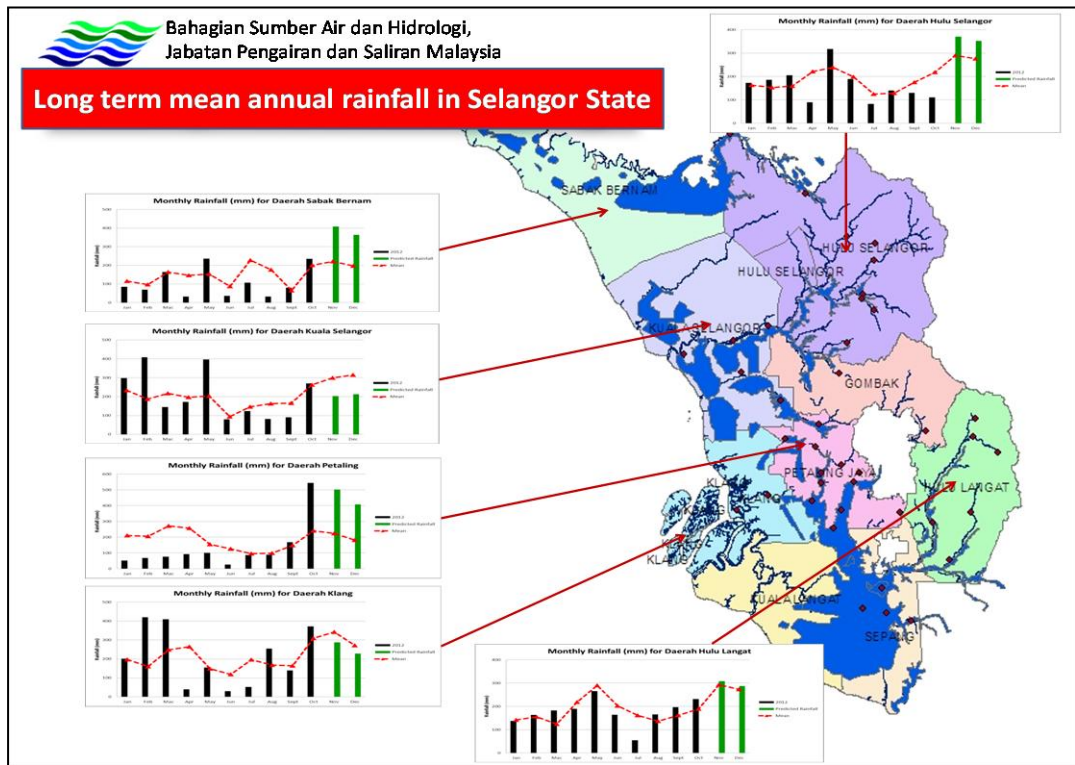


Figure 6: Long term monthly rainfalls against the 2012 rainfalls recorded in Selangor State Boundary

II Summary of progress in Key Result Areas

1. Reduced Loss of Life from Typhoon-related Disasters.

1.1 Hydrological Achievements/Results

Improvement of Facilities

The Department of Irrigation and Drainage (DID) to-date has installed and operates about 476 telemetry stations. Besides, 1694 manual flood gauges and 93 flood warning boards had been set up in flood prone areas. The hydrological telemetric stations developed are mainly to provide additional information during flood seasons which are intensity of rainfall, situation of river level, siren and web camera. As part of the local early flood warning system, DID operates about 423 automatic flood warning sirens installed in flood prone areas. At the moment, the mobile phone text messages and emailing are the tools for disseminating information to the authorities and public.

Development of Operational Flood Forecasting and Warning Systems

DID has developed several models in the year 2011 and the models are operational to date. These models are Integrated Flood Forecasting and River Monitoring System (iFFRM) for Klang Valley, Atmospheric Model-Based Rainfall & Flood Forecasting System (AMRFF) for Pahang, Kelantan and Johor and Integrated Flood Forecasting and Warning System for Muda River Basin. These models are currently being assessed. The iFFRM model has to be calibrated from time to time since there are several projects in the Klang Valley rivers such as River of Life (RoL project), which focuses on water quality of the river, will affect on the initial condition of the river that subsequently will affect the hydrodynamic of the rivers.

In 2012, DID continues to develop flood forecasting and warning systems in several river basins in Malaysia which are Sarawak River (catchment area of 1726.8 km²), Padas River (8822.2 km²) and Dungun River (1828.1 km²). The Sarawak River and Padas River are located in East Malaysia while Dungun River is located in the East Coast of Peninsular Malaysia. These river basins are often affected by floods during the monsoon season. The flood forecasting and warning system for Dungun River in Terengganu is expected to be completed by end of September/October 2012 and is expected to be ready with functionality of simulation and forecasting of flood condition for the upcoming Northeast Monsoon by the end of 2012. The model will provide hourly updated river level forecasting with 6 hours lead time. Both the flood forecasting models for Sarawak River and Padas River are expected to be completed by year 2013.

The Sarawak river basin project which is called the development of Integrated Atmospheric and Radar-Satellite Model Based Rainfall and Flood Forecasting for Sarawak River Basin is currently being developed and the approach is similar to that of Atmospheric Model-Based Rainfall and Flood Forecasting (AMRFF) System for Pahang river, Kelantan river and Johor river basins in Peninsular Malaysia. The Sarawak River has a medium scale catchment area of approximately 2,460 km². To develop the flood forecasting model, several types of data have been used which are observed rainfall, Kuching weather radar, Global Forecast System (NOAA) and Tropical Rainfall Measuring Mission (TRMM-NASA). Similar to AMRFF System for Pahang river, Kelantan river and Johor river, the objective of this model is to provide flood flow forecasting every 6 hours, with a 60 hours (2.5 days) lead-time, at hourly time increments.

DID is also developing an Integrated Flood Forecasting and Warning (IFFW) System for the Padas River Basin. Padas river in Sabah is located at the eastern region of Malaysia. The Padas river basin is the second largest river basin in Sabah with a total catchment area of 8,785 km². This model comes with a real-time radar rainfall analyser and integrator for Padas River in order to derive gridded areal rainfall distribution for the river basin. The developed real-time flood forecasting system for the Padas river basin aims to provide real-time flood warning and emergency response with a sufficient lead time.

2. Minimized Typhoon-related Social and Economic Impacts.

2.1 Meteorological Achievements/Results

Weather Monitoring Area

MMD performs continuous monitoring of the weather and sea conditions especially in the Malaysian Exclusive Economic Zone (EEZ) covering the Straits of Malacca, South China Sea, Sulu Sea and Celebes Sea. In addition, monitoring of weather and sea conditions outside the EEZ is also conducted to identify meteorological and oceanographic phenomena which may affect waters in the EEZ in the next few days. The monitoring activity covers (but is not limited to) the waters shown in **Figure 1** (Page 4).

Tropical Depression/Storm/Typhoon Advisories/Warnings

A tropical depression/tropical storm/typhoon advisory/warning is issued based on analysis of satellite imageries, wind charts, NWP products and information from tropical cyclone monitoring centres such as RSMC Tokyo-Typhoon Center, JTWC and RSMC Tropical Cyclones New Delhi. The advisory/warning is issued for tropical depression/tropical storm/typhoon in the Malaysian EEZ, Straits of

Malacca, Indian Ocean, South China Sea, Sulu Sea and the western North Pacific Ocean. Special attention is given to tropical depression/tropical storm/typhoon which will impact the weather and sea condition in the Malaysian EEZ.

As of 25 October 2012, MMD has issued 639 tropical depression/tropical storm/typhoon advisories based on information from RSMC Tokyo-Typhoon Center. A total of 288 advisories/warnings on strong winds and rough seas due to the effect of these tropical depression/tropical storm/typhoon were issued.

Malaysia also participated in the WMO's SWidget Project, which is a widget that allows users to obtain local severe weather warnings issued by official weather services. The following advisories/warnings issued by the MMD are accessible through SWidget:

- i) **Heavy Rain/Thunderstorm Warning**
- ii) **Strong Winds and Rough Seas Warning**
- iii) **Tropical Cyclone and Storm Warning**

3. Improved Typhoon-related Disaster Risk Management in Various Sectors

3.1 Disaster Prevention and Preparedness Achievements/Results

Malaysia is geographically located just outside the "Pacific Rim of Fire" and is generally free from severe natural disasters such as earthquake, volcanic eruption and typhoon. Although Malaysia is spared from the threats of severe natural disasters and calamities, Malaysia is nonetheless not spared from other disasters such as flood, man-made disaster, landslide and severe haze.

The worst experience was when the tsunami struck in 26th December 2004. The 9.3 Richter scale magnitude of earthquake occurred 680 kilometres from Kuala Lumpur caused an unprecedented tsunami that killed hundred thousands of people and massive destruction of properties in several countries bordering the Indian Ocean including Malaysia. A total of 74 persons were killed/ lost and many properties were destroyed along the northwest coastal areas in Peninsular Malaysia. Relief efforts were deployed by various government agencies such as Royal Malaysian Police, Malaysian Fire and Rescue Department, Malaysian Armed Forces, Social Welfare Department as well as Non-Governmental Organizations (NGOs), among others.

In the past few years, Malaysia has experienced several extreme weather and climatic events, ranging from freak thunderstorms to monsoonal floods which have caused havoc in the country. The country experiences monsoonal floods annually which vary in terms of

severity, place and time of occurrences. The recent flood, which happened in December 2006 and lasted until February 2007, was among the worst floods ever experienced by the country. The worst affected state was Johor in the south Peninsular of Malaysia where more than 65,000 families were evacuated to evacuation centres. The total economic loss was estimated at RM1.2 billion. 19 casualties were reported and 4 of them were foreigners. The financial burden on the government was enormous.

Severe haze happens almost every year during the south-westerly monsoon (Mei – September) season. The recent haze that struck Peninsular Malaysia in 2005 is one of the worst incidents that happened in the country. Although the phenomenon happens every year but it was the worst after 1997. Forest fires in peat soil forest in the state of Selangor and Pahang since early August 2005 caused the Air Pollution Index (API) to deteriorate to dangerous level. A state of emergency was declared at Port Kelang and Kuala Selangor in the state of Selangor from 11 to 13 August 2006 when the Air Pollution Index (API) increased to 500. The API was frequently publicized by the government through the mass media to inform people on the level of air quality. To overcome the problem, cloud seeding operation costing RM900,000 were done to instigate rain. The inhaling of these thick hazy smoke poses a health hazard to the community living in the haze affected area. In addition, the deterioration of health caused economic losses especially in the industrial sector.

Other than flooding, the country also from time to time, experiences some man-made disasters, which caused considerable damage to properties and loss of lives.

Malaysia experiences various natural disasters such as floods, fire, landslide, typhoon, tsunami etc. However, disasters in Malaysia are minor compared to many other countries in this region. In the year 2011, several states in Malaysia such as Kelantan, Terengganu, Pahang, Perak, Selangor, Melaka, Johor, Sarawak and Sabah were affected by minor floods from November to December 2011. About 26,059 people were affected and received services provided by various government agencies and NGO's at the evacuation centres and their relative houses.

For flood disaster preparation, before the start of the northeast monsoon, the Honourable Minister in the Prime Minister Department as the Chairman of National Disaster Management and Relief Committee, will chair the flood disaster preparation and mitigation meeting. All disaster management agencies involved would assess and report on their preparedness on emergency response, recovery and rehabilitation for the victims. Similar preparation and mitigation meetings were held at the state and district levels.

3.2 Progress in Member's Regional Cooperation, Important, High-Priority Goals and Objectives

(a) Hardware and/or Software Progress

Emergency Command Centre (ECC)

The Emergency Command Centre (ECC) has been approved during the Mid-Term Review of the Ninth Malaysia Five Year Plan. The Government of Malaysia through the National Security Council has agreed to start the development of the centre early 2011.

When completed by the 3rd quarter of 2012, ECC will be the main centre at national level in coordinating disaster management activity. During the calm period (no disaster), the centre will monitor the mitigation and preparedness activity such as flood mitigation construction, awareness campaign, drills etc. Meanwhile, at the time of disaster occurrence, a representative of related agencies involved with the disaster will be stationed at the centre to liaise with other agencies in gathering appropriate information and monitoring the current situation, which at the same time will aid in reporting and decision making.

The development of ECC's System will take into consideration the four (4) major stages of disaster management process that is Mitigation (prevention), Preparedness, Response (relief) and Rehabilitation (recovery). In order to ensure the successful implementation of ECC, relevant data and information is critical. Therefore, cooperation and collaboration with related agencies will be sought to provide relevant and meaningful data to ECC. Hence, secured communication link (leased line) will be built to connect the centre with those agencies.

ECC's system is targeted to be operational by the end of this year on 24th December 2012.

Malaysian Emergency Response System (MERS 999)

The establishment of a single emergency number "999" for the entire nation will make it easier for the public to contact emergency service providers, namely the police, ambulance, fire station and civil defence rescue units. With the new system, specially-trained service professionals from the 999 Emergency Call Service Centre would handle all emergency calls and reroute them to respective emergency service providers, complete with digital data on the type of emergency and location.

The 999 emergency number is free and any emergency call will be answered and vetted within 10 seconds. All 99 call centres are

connected to the agencies through a virtual private network. The telephone number and location of callers will be identified through automatic number identification and automatic location identification with the help and sharing of information between telecommunication service providers.

Government Integrated Radio Network (GIRN)

A Government Integrated Radio Network (GIRN) project was recently introduced to provide secure digital trunk radio system between the various government agencies in Malaysia as a study shows that there are currently more than 12 radio networks used by the various agencies.

The current radio networks have several limitations:

- a) Limited radio network coverage over the country;
- b) Ineffective radio network coverage resulting in limitation for facilities sharing;
- c) Networks are using various type of technology and do not adhere to any standard;
- d) Lack of capability due to outdated technology; and
- e) Frequencies used are not as recommended in “Standard Radio System Plan” by the Malaysia Communication and Multimedia Commission (MCMC).

The introduction of the GIRN project preserves the autonomy and freedom of the various agencies while providing a unified network of shared infrastructures.

The benefits of the GIRN approach are:

- a) Shared infrastructure creates “economies of scale”, and coverage for the whole country can be achieved at a reasonable cost;
- b) Digital Technology enables the sophisticated and integrated audio and data services;
- c) The technology used standardized and the level of “interoperability” increased without interrupting the autonomy;
- d) The level of security increased in radio and data communication;
- e) Frequencies used as recommended in Standard Radio System Plan by MCMC and communication services in the government can be restructured.

GIRN will certify that every agency’s network would be physically and virtually separated. Every agency would manage the equipment and assets on its own. It can utilise and manage the network using its own and unique command and control policy.

The network is virtually separated by using different System Number for each agency.

GIRN is targeted to cover 95% of Malaysia's populated land and areas extending 10 nautical miles from the shoreline.

Fixed Line Alert System (FLAS)

Fixed line alert system (FLAS) or disaster alert system (DAS) will enable the government (National Security Council and Malaysian Meteorology Department) to disseminate early warning message to the selected community who subscribe to fixed line telephone i.e. Telekom Malaysia Berhad (TM), when a disaster occurs. Currently, FLAS is being tested to be incorporated for early tsunami warning dissemination.

The advantages of using the FLAS are short and precise message dissemination, quick, 24 hours operations, pre-recorded message or real-time message and specific area for dissemination. Currently, the system can simultaneously broadcast 5,280 calls at any one time. The system will be able to generate statistic or report for successful, unanswered and failed calls. The potential of FLAS is huge and if proven will be utilised for other disaster management activities.

(b) Implications on Operational Progress

Disaster Management and Relief Committee

For the year 2011, YB Dato' Seri Mohamed Nazri Abdul Aziz, Minister at the Prime Minister's Department, chaired the National Disaster Management and Relief Committee meeting to look into the preparedness among disaster management agencies in emergency response, recovery and rehabilitation for the flood victims.

State and District Disaster Management and Relief Committee are also been held at the respective states and districts level. The committee is responsible to evaluate a situation and to determine the level and scope of disaster; to formulate plan of action; to determine capability in handling disaster and the need to request for assistance whether from within or outside the country.

Reviewing the Directive No. 20 of the National Security Council (NSC)

To facilitate the management of disasters, NSC is tasked to coordinate efforts among the various agencies involved in disaster management. The National Security Council Directive No. 20: *The Policy and Mechanism on National Disaster and Relief*

Management was established on 11th May 1997 to provide inter-agency coordination in disaster management.

Due to the high intensity, complexity and occurrences of disasters, measures are taken to review and upgrade Directive No. 20 to ensure that it remains relevant and up to date in meeting these challenges. After an extensive discussion with related agencies, the reviewed Directive No. 20 was finally signed by the Prime Minister on 30th March 2012.

Standard Operating Procedure in Handling Earthquake

In light of the increasing occurrences of earthquakes happening in areas surrounding Malaysia, there is a need for a clear and concerted actions from various Government departments/agencies as well as non-Governmental bodies, the private sector and the public to be mobilized on earthquake disaster.

As such, the Standard Operating Procedure (SOP) in Handling Earthquake Disaster was prepared in accordance with the National Security Council Directive No. 20. This is to ensure that the mechanisms to manage earthquakes are in line and proper with the overarching mechanism. The SOP covers the management and handling of earthquakes from the stage of prevention to post disaster recovery. The SOP in handling earthquake was signed by the Minister in the Prime Minister's Department on 28th December 2011.

Standard Operating Procedure in Handling Tsunami

The only tsunami incident that affected Malaysia was the 26th December 2004 Indian Ocean Tsunami. The tsunami incident is a testimony that Malaysia is not immune to major disasters. Bordering with countries that sits on active tectonic plates like Indonesia and the Philippines increases the chances for this type of disaster to inflict Malaysia at any time.

In this light, cooperation and concerted actions from various Government departments/agencies as well as non-Governmental bodies, the private sector and the public need to be mobilized during tsunami disasters.

As such, the Standard Operating Procedure (SOP) in Handling Tsunami Disaster was prepared in tune with the National Security Council Directive No. 20. This is to ensure that the mechanisms to manage tsunami disasters are in line and proper. The SOP in handling tsunami was signed by the Minister in the Prime Minister's Department on 28th December 2011.

Standard Operating Procedure in Handling Drought

Malaysia in general rarely experience prolonged droughts. However, the El-Nino episodes in 1982 – 1983 and 1997 – 1998 caused droughts in certain areas in Malaysia and shortage of water in almost all states especially in Sabah and Sarawak. It is expected that with the onslaught of global warming, extreme weather patterns will occur more frequently as well as the El-Nino phenomena.

The Standard Operating Procedure in Handling Drought was prepared as a guide to enhance the efficiency of departments/agencies involved in the management of drought in executing their duty. The SOP in handling drought was signed by the Minister in the Prime Minister's Department on 28th December 2011.

National Disaster Relief Trust Fund (NDRF)

National Disaster Relief Trust Fund was changed from a normal fund to a trust fund in 2005 which enables the general public and the private sector to contribute in assisting disaster victims. Financial sources for the fund comprise of both annual budget allocation from the government and contribution from public and private sectors. The types of financial assistance provided are for the following eventualities:

- i) loss of Income;
- ii) damaged/demolished House;
- iii) agricultural damage;
- iv) livestock and aquaculture damage; and
- iv) burial cost for fatalities due to disasters

The trust fund is administered in accordance with a letter of trust which is subjected to Section 10 of the Financial Procedure Act 1957. The letter allows the usage of the trust fund for extending financial aid and relief supplies to foreign countries affected by disasters.

For the year 2010, Malaysia has contributed more than USD 15 million in terms of cash money to more than 90,000 families in Malaysia which were affected by disasters mostly floods.

Central Store

During the National Disaster Management and Relief Committee Meeting No. 1/2006 on 5 January 2006, the Prime Minister of Malaysia, as chairman of the committee highlighted the need to relocate and deploy search and rescue (SAR) assets in a strategic location/storage facility.

At the National Disaster Management and Relief Committee meeting No. 1/2007, the Prime Minister requested that a centralised store for SAR utilities and equipments should be established. This storage facility is to be managed together by the National Security Council, the Armed Forces, the Welfare Department and the Royal Malaysia Police.

The establishment of this facility at the Defense Supplies Depot in Sungai Buloh allows centralised procurement of much needed assets and equipments for disaster relief operations such as rescue boats, mobile toilets and heavy trucks as required at the local level all across Malaysia. These assets are managed by state offices of the National Security Council and coordinated in their deployment via the role of the NSC as secretariat for the Disaster Management and Relief Committee at the district and state levels respectively.

The Department of Social Welfare, Ministry of Women, Family and Community Development

The Department of Social Welfare, subjected to the directive from The National Security Council Directive (NSC) No. 20 (Revised): *The Policy and Mechanism for National Disaster Management*, is in charge and responsible to provide and manage relief/evacuation centers and forward-supply bases, to prepare and distribute food, clothing and other essential items to the affected victims, to register the disaster victims for the purpose of rehabilitation, and to provide guidance, advice/counseling services to the affected victims.

The Department of Social Welfare's roles and responsibilities in disaster management consist of three levels, namely:-

- i. Preparedness Stage
- ii. Response Stage
- iii. Recovery/Restoration Stage

Preparedness Stage

The Department has well prepared a list of officers on standby at all District, State and Centre Levels and can be contacted at any time in case of disaster. The Department is responsible for identifying suitable evacuation centres. The criteria and guidelines for the selection of evacuation centres are as follows:

- i. The building has enough space and is safe to use in terms of structure.
- ii. Location/position are safe from potential disaster area.
- iii. Facilities and basic amenities such as water supply, electricity and etc.

Currently, the Department of Social Welfare has identified a total of 5,068 evacuation centres located in each district across the country with a capacity that can cater for up to 1.3 million people. At the same time, the Department also identify the list of suppliers of goods, rationing and other related needs. Currently, the number of suppliers is 1,183 suppliers.

The Department of Social Welfare has five depots for food and other necessities storage divided by zone such as North, South, Middle, East 1, and East 2. A total of 480 Stockpiles are specifically for remote areas. The Stockpiles means store/place for storage of food supplies and the 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.

The Department of Social Welfare also establishes and coordinates task force of volunteers. The volunteers must be registered with the Department. The current registered volunteers are 2,473 people.

Response Stage

When disasters happen, upon getting instructions to open Disaster Evacuation Centres from Disaster District Chairman or Disaster Operations Commander, 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.

Roles and duties of The Department of Social Welfare while in the disaster evacuation centre is as follows:

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 kits 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.

Recovery/Restoration Stage

During Recovery/Restoration Stage, The Department of Social Welfare is responsible:

- To evaluate the damages involved, including the damage to houses, crops and livestock.
- To propose and draw up appropriate rehabilitation programmers/plans.
- 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

Six types of recovery financial aid:

Type of Assistance	Financial Aid
Schooling	Stationery - RM50 (USD 15.367) per person Uniforms - RM70 (USD 21.93) per person

Type of Assistance	Financial Aid
Clothing	RM70 (USD 21.93) per person
Family	RM40 (USD 12.54) per person
Essential needs for home/kitchen	RM100 (USD 31.33) per family
Repair houses	Maximum RM2,500 (USD 782.21)
Recovering Small Scale Business	Maximum RM3,000 (USD 939.61) per person

Note: Every Family: Maximum RM5,000 (USD 1,567.67)

(c) Interaction with users, other Members, and/or other components

Enhancement of Public Education and Awareness

As the lead agency in disaster management, the National Security Council (NSC) has been organising Community-Based Disaster Management programmes in collaboration with other agencies such as the Malaysian Meteorological Department (MMD), the Department of Town and Country Planning Peninsular Malaysia, the Ministry of Health, the Department of Irrigation and Drainage and the Department of Social Welfare throughout the country. The program is aligned with the official slogan: “Community Resilience through Disaster Awareness”. As a continuation for the 8 series of Community-Based Disaster Management (CBDM) programme which conducted in 2010, the programme was further conducted in 2011 at various risk prone areas around Malaysia involving around 854 participants. This programme will continue to be conducted throughout the year 2012 at various risk prone areas.

The CBDM is a two-pronged programme whereby not only does it serve as a platform to convey information on disasters to communities at risk prone areas, but also to build a community that is resilient and able to act to save themselves, family, neighbours and community members when disaster strikes.

The objectives of this program are to enhance understanding, knowledge and capacity of the government agencies, non-government organisation (NGO), community leaders and public to face the impacts of earthquake and tsunami.

Besides that, this program is designed to introduce targeted groups to the Malaysian Tsunami Early Warning System, its function and the location of the system. This module is combined with the public education program on disaster prevention for people living in flood prone areas in order to protect human lives and property as well as minimize or avoid social disruption and economic losses.

Table 5: Community-Based Disaster Management Programme in 2012

State (District)	Date	Location	Community Participation
Perlis	8 th April 2012	Timah Tasoh Dam	1,125
Perlis	12 th April 2012	Kuala Perlis	250
Pulau Pinang	29 th April 2012	Batu Feringhi	1,050
Melaka	16 th June 2012	Ayer Keroh	269
Sabah	7 th July 2012	Kunak	352
Sabah	8 th July 2012	Kunak	1,125
Sarawak	14 th July 2012	Miri	225
Negri Sembilan	16 th July 2012	Port Dickson	280
Selangor	16 th July 2012	Hulu Langat	172
Kedah	6 th October 2012	Kuala Kedah	218
Kedah	13 th October 2012	Sungai Petani	193
Perak	20 th October 2012	Kerian	369
Perak	21 st October 2012	Kerian	1,083
Sabah	10 th November 2012	Sandakan	310
TOTAL			5,938

To enhance the level of awareness among the masses, Disaster Awareness Day is celebrated annually since 2005 in commemoration of tropical storm Greg and the great Indian Ocean Tsunami which struck the nation on 26 December 1997 and 2004 respectively. This event is organized annually by the NSC with the main objective to inform the public on the Government's efforts in disaster management as well as to create awareness and strengthen national resilience to disasters. The 2011 National Disaster Awareness Day was held in Melaka from 18-19 February 2011. The main objective for this year's event is to

integrate the strength and effort of the Government agencies at the National, State and District levels to come together and be seriously involved in disaster management especially in preparing for and mitigating the impacts of disaster in accordance with the priorities of the Hyogo Framework for Action (HFA).

To further solidify Malaysia's commitment towards achieving the strategic goals and priorities of the HFA, the 2011 National Disaster Awareness Day culminated with the Melaka Declaration on Disaster Risk Reduction. This declaration will be a further action plan guided by the HFA Implementation Regional Action Plan (HIRAP) and the previous Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR) declarations including the Kuala Lumpur Declaration of 2007. In addition to identifying Malaysia's own national priorities and strategies to ensure the timely implementation of HFA, the action plan will act as general guideline to establishing a National Platform for Disaster Risk Reduction in Malaysia. The declaration will also pave way for enhanced partnership with the private sector and civil society for DRR through public-private-partnership initiatives such as corporate social responsibility (CSR), philanthropy and voluntarism in the different phases of disaster management.

Disaster Awareness Day 2011 also saw the launching of the UNISDR World Disaster Reduction Campaigns namely the "1,000,000 Safe Schools and Hospitals Campaign" and "Resilient Cities: My City is Getting Ready" with a high level launching ceremony officiated by the Deputy Prime Minister, Minister of Health, Chief Minister of Melaka and Miss Helena Molin Valdes from UNISDR. As a start, Kuala Lumpur, Melaka and Putrajaya were declared as Role Model Cities for the campaign. ASEAN also took part in the occasion by organizing the ASEAN Lesson-Learning Workshop on Best Practices in Establishing Safe Schools with participants from all ASEAN member countries. The workshop was officiated by Dato' Misran Karmain, the Deputy Secretary General of ASEAN.

3.3 Regional Cooperation Achievements/Results

At the regional level, Malaysia is an active member of the Association of South East Asia Nations (ASEAN) and is a member of the ASEAN Committee on Disaster Management (ACDM). In ensuring cooperation among Member States, the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) was signed on 26 July 2005. The agreement has entered into force on 24 December 2009.

In line with the Agreement, States are called upon to designate National Focal Point and competent authorities to coordinate regional Humanitarian Assistance and Disaster Relief Operations

(HADR); to support the establishment of ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre) as well the ASEAN Standby Arrangements for Disaster Relief and Emergency Response (SASOP). The standby arrangements require Malaysia to earmark assets on voluntary basis to be shared with other Member States in need of assistance.

The Third Session of the Global Platform for Disaster Risk Reduction (GPDRR)

Malaysia participated in the Third Session of the Global Platform for Disaster Risk Reduction (GPDRR) which took place at Geneva, Switzerland from 8-13 May 2011. The Third Session, convened in conjunction with the World Reconstruction Conference aimed at building on existing commitments and set priorities and actions that will help to strengthen resilience to disaster at the local level. The Third Session also reflected on the outcomes of the Midterm Review of the Hyogo Framework for Action and start setting priorities and processes for meeting the recommendations.

The theme for the Third Session is “Invest Today for a Safer Tomorrow – Increased Investment in Local Action”. The local level is where the impact of disaster is most felt and where risk reduction impact and results must be realized. More effective support is required to empower local communities. Local authorities (including mayors, city administrators and other civic leaders) play an essential role in ensuring their cities are made more resilient to disasters. A main objective for the Third Session is to encourage stronger political commitment to local action. Additionally, the role of the private sector, especially in the local setting is a key feature at the Global Platform 2011.

Several other topics that have also been given attention at the Third Session include infrastructure and reconstruction; the economics of disaster risk reduction; and building alliances and partnerships in climate change adaptation.

Typhoon Committee Expert Mission to Malaysia on the Web GIS Based Typhoon Committee Disaster Information System (WGTCDIS)

The Forty-fourth Session of the Typhoon Committee was successfully implemented at Hangzhou, China, from 6 to 11 February 2012. During the session, the Working Group on Disaster Risk Reduction had agreed to make an expert mission to Malaysia, Philippines and United States (Guam). The main objectives of the visit are to build the platform for experiences sharing, to create potential simulation of WGTCDIS application,

introducing new system for flash flood and rainfall prediction in urban areas. For the purpose of development of the WGTCDIS, Malaysia had submitted disaster data in Malaysia for 2005 to 2012 on 2nd November 2012 to Typhoon Committee secretariat.

Fifth Asian Ministerial Conference on Disaster Risk Reduction

Malaysia participated at the Fifth Asian Ministerial Conference on Disaster Risk Reduction (5th AMCDRR) which took place in Yogyakarta, Republic of Indonesia from 22 – 25 October 2012 with the main theme “Strengthening Local Capacity in Disaster Risk Reduction” will address key issues such as integration of local level Disaster Risk Reduction and Climate Change Adaptation into national plan, local risk assessment and financing and local risk governance. Malaysia’s participation in the said conference was deemed important to the country as it is a continuation of Malaysia’s initiatives through the hosting of the previous 3rd AMCDRR.

4. Strengthened Resilience of Communities to Typhoon-related Disasters.

4.1 Hydrological Achievements/Results

The Infobanjir website <http://infobanjir.water.gov.my> continues to be 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. To meet the challenges, the new server will be installed by the end of this year and the older server will be upgraded to ensure all the hydrological data can be collected and published on time. The <http://publicinfobanjir.water.gov.my> website which had been developed and designed to be easy understood by public compared to Infobanjir website continues to give relevant flood information to the general public.

4.2 Research, Training, and Other Achievements/Results

Enhancement of Public Education and Awareness

Like previous years, MMD had carried out various initiatives to instil disaster risk reduction awareness among students, government staff and the general public. These initiatives include exhibitions and public awareness campaigns on disasters due to earthquakes, tsunami and extreme weather. These initiatives were mostly conducted in schools, colleges, hospitals and government agencies.

In 2012, MMD had organized a total of 4 public awareness campaigns for the general public. A total of 717 participants took part in these

campaigns. MMD also participated in 15 exhibitions organized by other organizations to disseminate disaster risk information. A total of 9,497 people comprising school and university students as well as the general public attended the exhibitions.

5. Improved Capacity to Generate and Provide Accurate, Timely, and understandable Information on Typhoon-related Threats.

5.1 Meteorological Achievements/Results

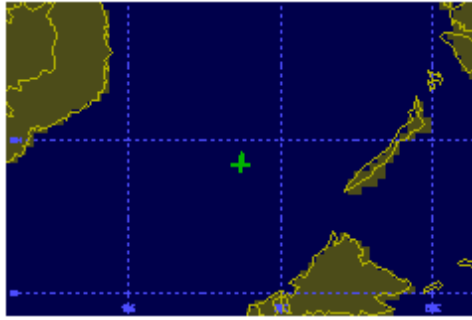
MMD operated the following wave and storm surge models on a 24x7 basis:

- i) Global MMD-WAM Model, resolution $1^{\circ} \times 1^{\circ}$, $80^{\circ}\text{S}-80^{\circ}\text{N}$, $180^{\circ}\text{E}-180^{\circ}\text{W}$, output up to 192 hours of wave heights and periods;
- ii) Regional MMD-WAM Model; Coverage $10^{\circ}\text{S}-15^{\circ}\text{N}$, $95^{\circ}-120^{\circ}\text{E}$, resolution $0.25^{\circ} \times 0.25^{\circ}$, output up to 384 hours of wave heights and periods;
- iii) Regional MMD-JMA MRI III Model; Coverage $5^{\circ}\text{S}-17^{\circ}\text{N}$, $95^{\circ}-124^{\circ}\text{E}$, resolution $0.25^{\circ} \times 0.25^{\circ}$, output up to 384 hours of wave heights and periods;
- iv) Regional MMD-JMA Storm Surge Model, $0^{\circ}-20^{\circ}\text{N}$, $93^{\circ}-123^{\circ}\text{E}$, resolution $1' \times 1'$, output up to 192 hours of sea level rise.

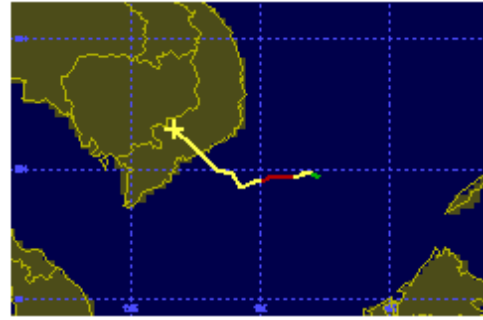
The outputs of the models were used as guidance in the issuance of forecasts, advisories and warnings for the surrounding seas especially in the Malaysian Exclusive Economic Zone (EEZ) covering the Straits of Malacca, South China Sea, Sulu Sea and Celebes Sea.

In 2012, a total of 124 advisories and warnings on strong winds and rough seas were issued for the Malaysian EEZ and the adjacent seas. The advisories and warnings were disseminated to the public and disaster management agencies through various communication channels such as the Internet, short message system (SMS), facsimile, live media broadcast and print media.

MMD also monitored the development of 16 tropical depressions of which four developed into tropical storms and seven reached typhoon intensity while five reached the highest intensity as super typhoons mainly in the western North Pacific region. During this period, there were two tropical depressions which formed over the South China Sea that were close to Malaysia waters namely tropical depression ONE which formed at 9.2°N 113.7°E on the 17th Feb 2012 and typhoon PAKHAR formed at 9.7°N 112.3°E on the 29th Mac 2012 as shown below:-



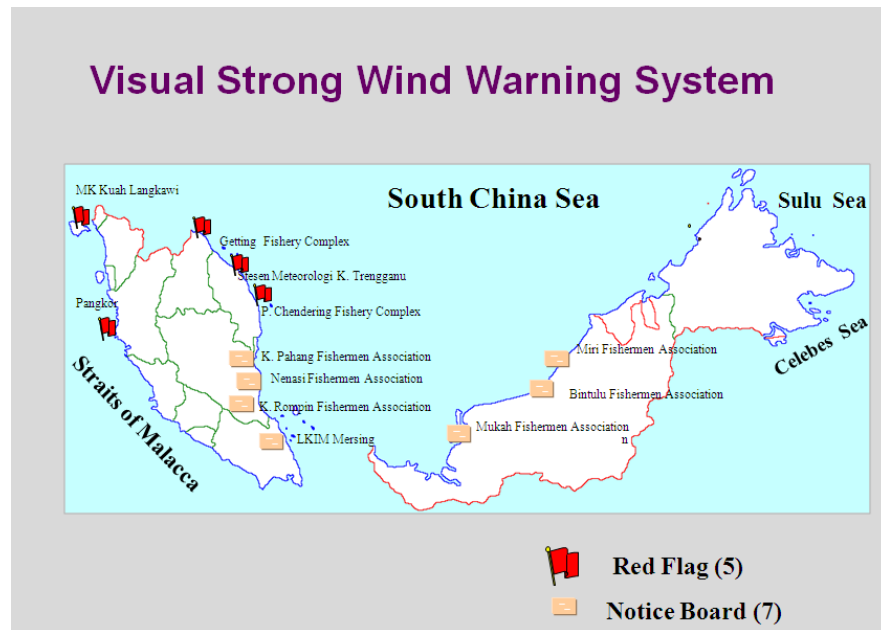
Tropical Depression ONE
(17th Feb 2012)



Typhoon PAKHAR
(29th Mac – 1st April 2012)

Among the tropical storms/typhoons that caused strong winds and rough seas over Malaysia waters were super typhoon Guchol (11 – 19 Jun 2012), tropical storm Talim (17 – 21 Jun 2012), typhoon Vicente (20 – 24 July 2012), typhoon Saola (28 July – 3 Aug 2012), typhoon Haikui (2 – 8 Aug 2012), typhoon Tembin (19 – 30 Aug 2012), super typhoon Jelawat (20 – 30 Sept 2012) and tropical storm Gaemi (1 – 6 Oct 2012).

The advisories and warnings are disseminated to the public and disaster management agencies through various communication channels such as the Internet, short message system (SMS), facsimile, live media broadcast and the print media. MMD also uses notice boards and flags over several locations over the coastal areas in the dissemination of strong winds and rough seas advisory/warning as shown below:



Visual warning on strong winds and rough seas system consisting of notice boards and flags

5.2 Research, Training, and Other Achievements/Results

Research and Training

For capacity building, six officers from MMD had respectively attended the following symposium, seminar and workshops in 2012:

- i. 44th Typhoon Committee Session, 6-11 February 2012, Hangzhou, China
- ii. 2012 APEC Typhoon Symposium (2012 APTS) 4-7 June 2012, Taipei, Taiwan
- iii. Typhoon Committee Research Fellowship Scheme for 2012: Enhancement of Rainfall Nowcast in Tropical Cyclone Situations, Hong Kong Observatory, 22 October - 22 December 2012, Hong Kong, China
- iv. Typhoon Committee Roving Seminar 2012, 30 October - 1 November 2012, Seoul, Korea
- v. 7th Typhoon Committee Integrated Workshop – Effective Warning, 26-30 November 2012, Nanjing, China

In 2012, MMD Research Section had completed and presented in international conferences the following two papers which are directly related to tropical cyclones.

- i. The Impact of Tropical Cyclone in the Bay of Bengal on the Rainfall in Peninsular Malaysia.
- ii. Comparison of Performance of Various Multiple-model Ensemble Techniques in Forecasting Intensity of Tropical Cyclone.

The first paper was presented in the Second WMO International Conference on Indian Ocean Tropical Cyclones and Climate Change, 14 – 17 Februari 2012, New Delhi, India. The last paper is a Journal of Tropical Cyclone Research and Review: ESCAP/WMO Typhoon Committee.

Capacity Building in Hydrology

Several courses and conferences were organised throughout the country by DID in 2012. Critical areas such as storm water management, flood forecasting and warning and flood mitigation were covered during these courses and conferences.

Courses/Program	Organiser	Date
Asia Water Resources 2012 Expo and Forum (AWARE 2012)	DID	26-27 Mar 2012
Technical Talk: Decision support System (DSS for water resources) and Sustainability in Development	Unesco-IHP	2 Mar 2012
Course on Telemetry System	DID	8-10 May 2012
Technical Talk: R&D Opportunities in Flood Forecasting	IHP	14 Jun 2012
Workshop on Operational of iFFRM	DID	7-14 May 2012
Course on Equipment Operations and Maintenance of Hydrology Equipment	DID	29-31 May 2012
Workshop on Development of Flood Forecasting model	DID	15-17 May 2012
Course on HEC-RAS SIM Model	DID	5 Mar 2012
SEA Regional TOT Course Ecosystem Services & IWRM	DID and MyWP	18-21 Mar 2012
Water Resources Management	DID	21-23 Feb 2012
Workshop On Domestic Water Management	DID, USM, IHP and UNESCO	23 Mar 2012
Course on Hydrology Fundamental	DID	24-26 Apr 2012
Course on HEC-RAS model	DID	5 Mar 2012

5.3 Information and Communication Technology (ICT)

For the infrastructure of ICT, ICT Division has upgraded the MMD Headquarters Internet leased line from 8Mbps to 40Mbps in October 2012 to support the increasing usage of the Internet line mainly for data transmission, department Intranet and web portal. The upgrading of the Internet line is also to cater the requirement by the Numerical Weather Prediction Section to receive large volume of data from ECMWF daily for their operational use. In order to increase security of the information system and network, ICT section is in the process of obtaining Information Security Management System, ISMS (MS ISO/IEC 27001:2005) certification by next year.

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