MEMBER REPORT

ESCAP/WMO Typhoon Committee
9th Integrated Workshop

LAO PDR

20 – 24 October 2014
ESCAP – UN Conference Center, Bangkok, Thailand

CONTENTS

I. Overview of Tropical Cyclones which have affected/impacted Member's area since the last Typhoon Committee Session

1.1. Meteorological Assessment (highlighting forecasting issues/impacts)

In year 2014, the monsoon activity over the Lao PDR has been different from the north to the south, the monsoon mostly started fourth week of May and finished third week of September, by comparing the climate characteristic, the rainy season started late than normal and finished early than normal, table 1 shown the monsoon activity over Lao PDR in 2014 by September 2014:

Part	Start – End	Mean (mm/day)	Annual (mm)	Max. Rain (mm)	No. rainy (day)	Extreme (>100 mm) (day)
NE	20 May – 27 Sep 2014	4.8	1536.2	122.0	123.3	2
NW	31 May – 23 Sep 2014	3.9	1419.4	137.4	112	5
Central	31 May – 22 Sep 2014	4.9	1770.5	135.4	105.8	9
South	30 May – 20 Sep 2014	5.5	2011.4	203.0	108.0	4
Remark	NE: Northeastern, NW: Northwestern					

Table1: the monsoon activity over Lao PDR in 2014

From January to October 2014, there was not any direct tropical cyclones impacted Lao PDR, however there were two tropical cyclones have indirect affected Lao PDR, namely: RAMASUN (1409) in July and KALMEAGI (1415) in September. Other disasters impacted were not direct related to tropical cyclone but related to weather phenomena such as: local storm, landslides, monsoon trough or monsoon rain.

1.1.1. **Local Storm:**

During the hottest period of the year, there were 3 local storms occurred in some areas of southern part caused by strong wind with moderate thundershowers, one district affected, namely: Lamam District, Sekong Province, table 2 shown the observation data for 3 local storms. DMH issued the strong wind warning over southern part but could not specify the risk areas.

Date	Wind speed (km/h)	Rainfall (mm)
20 March 2014	54	7.1
20 April 2014	83	49.6
13 May 2014	---	---

Table 2: the observation data for 3 local storms

1.1.2. **Landslides:**

during mid-July to August, the southwest monsoon were very active, resulted, continuous moderate rain over northern and central parts, especially in mountainous areas had landslides such as: Oudomxai, Xaiyabouly, Luangprabang, Xiengkhuang, and Vientiane Provinces. DMH issued the some warnings for landslides over these areas based on accumulated rainfall.

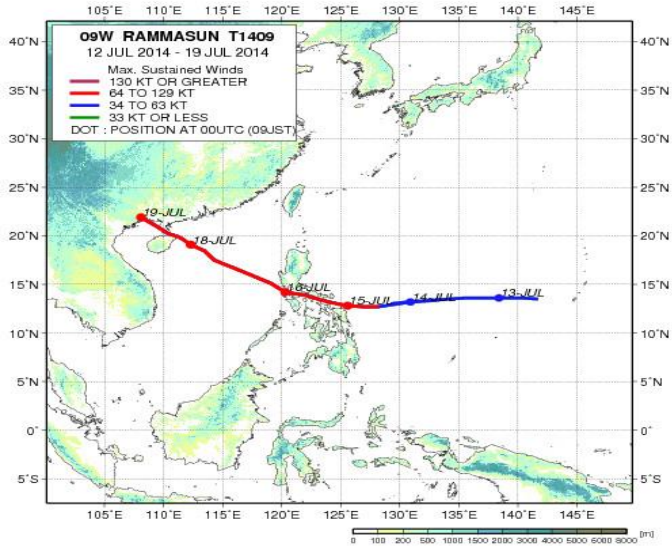
1.1.3. **Monsoon rain:**

In year 2014, monsoon rain was more active from July to August, resulted the accumulated rainfall for 5 days was more 600 mm, there were flooded in some areas of central and southern parts. DMH had been successful in issuing the flood warnings over these areas.

1.1.4. TY RAMMASUN (1409):

RAMMASUN was formed as a Tropical Depression (TD) over the western North Pacific about 400 km southeast of Guam in the morning of 11 July, it intensified gradually and moved westwards steadily in the following days. RAMMASUN developed into a severe typhoon and turned west-northwestwards on 15 to 16 July, moving across the central part of the Philippines and entering the East Sea. After weakening over terrain, RAMMASUN re-organized over the South China Sea and intensified into a super typhoon on 18 July just few hours before passed through north-east of Hainan Island. RAMMASUN made landfall over south of Guangxi, moving along the boundary of Vietnam and China.

During the passage of TY RAMMASUN over the South China Sea and made landfall Vietnam, the southwest monsoon over the Bay of Bengal is very strong and covered all part of Lao PDR. As a result, there were moderate rain continuously in some areas more two week, and caused by flood and landslides.



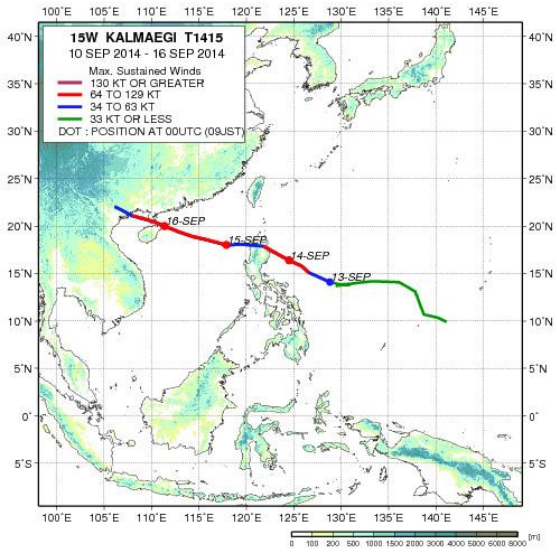
The best track of TY RAMMASUN (1409)

1.1.5. TY KALMEAGI (1415):

KALMEAGI was formed as a tropical depression over the western North Pacific about 1200 km southeast of Luzon (Philippines) on the noon of 12 September, it intensified gradually and moved westward steadily in the following days with average speed over 30km/h. Kalmeagi made landfall over the northern part of Philippines on 15 September after that Kalmeagi re-organized over the South China Sea and intensified on 16 September and it made landfall at Quangninh Province of Vietnam on the evening of the same day then moved westward and dissipated over the north-west part of Vietnam on morning 17

September, and it downgraded to low pressure system cover northern part of Lao PDR.

During the passage of Kalmeagi over the northern part of Vietnam and associated with strong southwest monsoon over the central and northern parts of Lao PDR. As a result, moderate to heavy rain over northern and central parts of Lao PDR with strong wind, it made flash flood and landslide in some provinces.



The best track of TY KALMEAGI (1415)

1.2. Hydrological Assessment (highlighting water-related issues/impacts)

1.2.1. Flood events

In Lao PDR, Flood and drought are the main natural disasters resulting directly from the hydrological extreme events. However, the reoccurrences of different magnitude of flood and flash flood from the Mekong and its tributaries are still the main hazard in the rainy season which is a cause by heavy rainfall from southwest monsoon and typhoon.

In the last decade, Lao PDR has affected by serious flood and flash flood with an average of occurrence in every 1.5 years.

This table showed the affected provinces by flooding in rainy season 2014:

No	Name of provinces	Flash flood	Flood inundation
Northern part			
1	Phongsaly	Flash flood	
2	Luangnamtha	Flash flood	
3	Bokeo	Flash flood	
4	Oudomxay	Flash flood	
5	Luangprabang	Flash flood	
6	Xayabouly	Flash flood	

7	Huaphane	Flash flood	
8	Xiengkhuang	Flash flood	
Central part			
9	Vientiane	Flash flood	Flood inundation
10	Vientiane Capital	No	No
11	Bolikhamxay	Flash flood	
12	Khammuane	Flash flood	Flood inundation
13	Savannakhet		Flood inundation
Southern part			
14	Saravane	Flash flood	Flood inundation
15	Champasack		Flood inundation
16	Sekong	Flash flood	
17	Attapeu	Flash flood	

In an effort to reduce the impact of the natural disasters in the future, the Lao Government is focusing on natural disaster management issues, prioritizing the need for early warning systems and natural disaster preparedness for communities by establishing an emergency group that consisted the representative of ministries and other organizations concerned to manage and solve the problems encountered.

Department of Meteorology and hydrology (DMH) is mandated by the government to take regular observations in the field of meteorology, hydrology and earthquake.

DMH also play a key role in developing and disseminating flood forecasting and provides appropriate early warning at the time of the relevant natural disasters.

1.2.2. **The activities of flood forecasting and warning system are under taken in 201**4:

- The nearly real time data collection from more than 40 stations.
- Flood forecasting for 6 key stations along Mekong River for 2 days ahead (Luangprabang, Vientiane, Paksane, Thakhek, Savannakhet and Pakse).
- Use MRC FFG for flash flood watch and flash flood warning for 1, 3, 6, 12 and 24 hours.
- Inflow forecast to Nam Ngum reservoir for dam operation (daily, weekly, and monthly).
- Use MRC URBS model to forecast the water level in Sebangfai river basin for 7 days ahead.
- Issues flood bulletins and warning information.

- Disseminate flood bulletins and warning information to the organizations concerned and via the mass-media (TV, Radio and Newspaper).
- DMH divides the flood warning in to criteria:
    - Nearly warning: In case of the forecast water level will be expected 0.50 m below the warning level, DMH provides nearly warning.
    - Urgent warning: When the water level exceeded the warning level, DMH provides the urgent warning.

1.2.3. **The hydrological situations in the monsoon 201**4:

- For the Mekong River:

  In this year, the water level of Mekong River was mostly below warning level equal the average of last 10 years from northern to central parts (Luangprabang, Vientiane, Paksane, Khammuane and Savannakhet provinces, whereas in the southern part was above danger level more than 10 days (Champasack province).

- For the main tributaries:

  The flash flood occurred in the northern and central parts (Oudomxay, Xayabouly, Luangprabang, Vientiane, Xiengkhuang and Bolikhamxay provinces), while in the southern part affected by inundation flood due to heavy rainfall and typhoon (Khammuane, Savannakhet, Saravane and Champasack provinces).

No	Name of station	Peak of water level 2014 (m)	Warning level (m)	Danger level (m)
	For the Mekong			
1	Luangprabang	13.20 (23/09/2014)	17.50	18.50
2	Vientiane	9.33 (25/09/2014)	11.50	12.50
3	Paksane	11.61 (06/09/2014)	13.50	14.50
4	Thakhek	11.39 (10/08/2014)	13.00	13.50
5	Savannakhet	9.40 (08/08/2014)	12.00	13.00
6	Pakse	11.78 (07/08/2014)	11.00	12.00
	For the tributaries			
7	Nam Ngiep, M. Mai	11.16 (19/09/2014)	10.00	11.00

8	Nam Sane, M. Kao	7.76 (08/08/2014)	7.00	8.00
9	Sebangfai, Mahaxay	13.85 (10/08/2014)	14.00	15.00
10	Sebangfai, Khoase	19.05 (7-8/08/2014)	17.50	18.50
11	Sedone, Saravane	8.80 (04/08/2014)	10.50	11.50
12	Sedone, Khongsedone	12.56 (05/08/2014)	12.30	13.30
13	Sekong Attapeu	14.48 (05/08/2014)	15.00	16.00

1.3. Socio-Economic Assessment (highlighting socio-economic and DRR)

Even there have been no any direct tropical cyclone affected Lao PDR but there were 5 people death, 19 districts have been affected by flash floods, landslides, floods and local storm:

1.3.1. **Strong Wind:**

Lamam District of Sekong Province (located in southern part) has affected by strong wind in March, April and May which has impacted to properties of the people, government and private offices were damaged, the total damages is about 6,535,379,560 LAK which is equivalent $ US 816,992

Event	Date	Impacts	Total (LAK)
Local Storm	20 Mar 2014	Football's Stadium	1,268,095,685
Local Storm	20 Apr 2014	The properties of people, government and private offices, and others.	5,267,286,875
Local Storm	13 May 2014		
Total damages (LAK)			**6,835,379,560**

Source: Hydro-meteorological Office of Sekong

1.3.2. **Landslides:**

In northern part and some provinces of central part have been affected by landslides caused by cut off transportation in some areas**.**

Landslides in Luangprabang Province

1.3.3. Monsoon rain:

From June to September, a trough of low pressure laid from the north to the south and associated with southwest monsoon, as a result, there were widespread rain with continuously rain over the country, and some areas lasted more than two weeks. The central and southern regions were flooded inundation which has impacted to agriculture sectors, transportation, irrigations, and livestock, houses, schools, Markets, and fish ponds.


Flood by monsoon rain

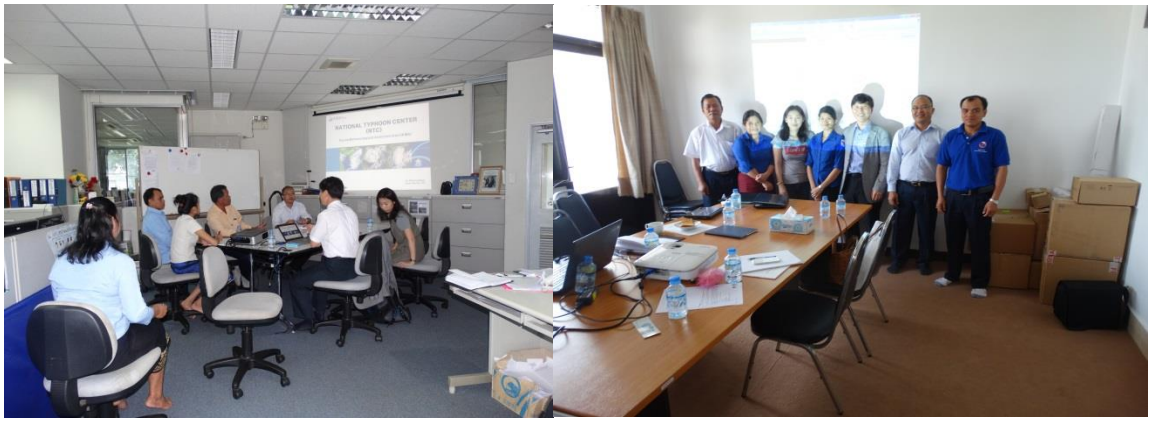
Event	Date	Province	Impacts	Total (LAK)
Flood	1 – 5 Aug 14	Sekong	Road, irrigation, agriculture, houses, livestock	10,933,773,698
Flood	3 – 7 Aug 14	Salavanh	2 districts, infrastructure, agriculture, irrigation, livestock, bridges, properties of people, etc.	NA
Flood		Khammouane	NA	NA
Flood		Savannakhet	NA	NA
Flood	1 – 12 Aug 14	Chmapasack	10 districts, household (13,086), 1 house wash away, 2 death, school (1), agriculture (7391 ha), fish ponds (41), irrigation (10), Livestock, roads (6)	NA

1.3.4. TY KALMEAGI (1415)

Typhoon Kalmeagi has been indirect affected to the northern part of Lao PDR, especially Luanprabang Province, caused by flash flood, landslides and gusty winds. There were 3 districts and 13 villages affected, 357 household including 1,384 people, 1 bridge damage, 2 houses washed away and 2 people death.

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

1.4.1. KMA's mission for Implementation of Typhoon Analysis and Prediction System (TAPS) to DMH Lao PDR: DMH Lao PDR welcomed and received two experts from National Typhoon Center (NTC) of Korea Meteorological Administration (KMA), the purpose of mission to provide the transfer of the technology of Typhoon Analysis and Prediction System (TAPS) including training of the typhoon forecasters to TC members. NTC/KMA carried out the TAPS technology transfer to Lao PDR from 29 September to 2 October, 2014. It included three lectures and two practice classes for staff of the Weather Forecasting and Aeronautical Division of DMH in Lao PDR.



Pictures of KMA's mission in DMH, Lao PDR (29 Sep – 2 Oct, 2014)

1.4.2. WGH's mission for Structural and Nonstructural Measurements to Extreme Floods: DMH welcomed and received to WGH's mission, the purpose of this mission is to investigate and assess the occurrence of extreme floods and flood preparedness system of pilot application country. The mission team (including Korea, Thailand, Lao PDR, Philippines, China) carried out field site survey from 15 July to 18 July 2017, the field site survey was conducted to investigate the method of structural flood response that experienced extreme flood events in the past, identify the status of dams, embankments, and drainages, the flood design standards of the Lao PDR, and floods that exceeded the standard.

1.4.3. Regional Training Workshop on Weather Radar Basis and Routine Maintenance and Real-Time Radar Rainfall Estimation and Forecast: This workshop was held in Bangkok, Thailand, from 24 February – 7 March 2014. There were two people from DMH-Lao PDR participated.


1.4.4. 14th Typhoon Committee Attachment Training at the RSMC-Tokyo-Typhoon Center: This attachment training course was held at JMA Headquarter from 23 July to 1 August 2014. Mr. Vanhdy DOUANGMALA from DMH-LAO PDR participated.


II. Summary of progress in Key Result Areas

Nill

III. Update of Member's Working Groups representatives

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