

MEMBER REPORT

CAMBODIA

Forty-fifth Session of the ESCAP/WMO
Typhoon Committee

Hongkong, China

29 January-1 February 2013

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I. Overview of tropical cyclone which have affected /impacted Kingdom of Cambodia in 2012

1. Meteorological Assessment (highlighting forecasting issues/impacts)

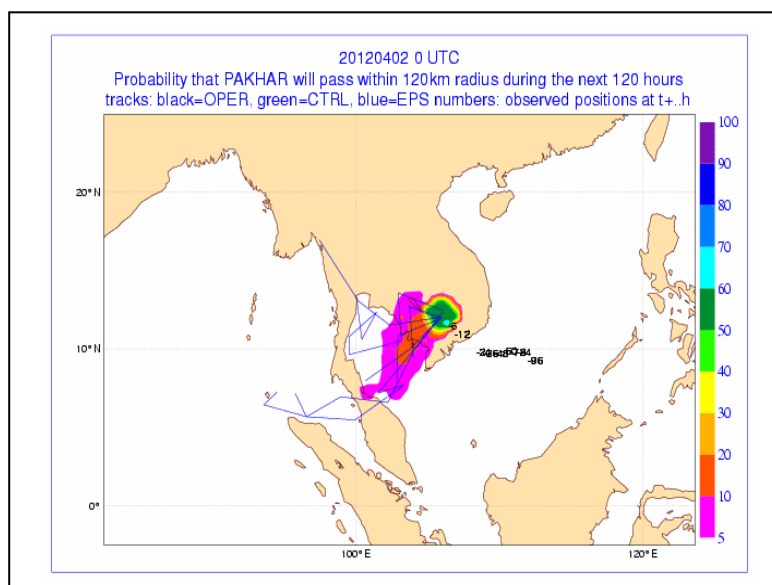
Cambodia is affected by two Tropical Storms during the season of the year 2012, such as:

- Tropical Storm PAKHAR (1201), 29 MAR (12:00:00UTC)- 02 APR (00:00:00 UTC), 2012
- Tropical Storm GAEMI (1220), 01 OCT (12:00:00 UTC)-06 OCT (12:00:00 UTC), 2012

- Tropical Storm PAKHAR and impacted area in Cambodia

Tropical Storm PAKHAR formed tropical storm in the South China Sea on March 29 at 12:00:00UTC. The intensifying storm has wind speeds of about 45 knots (52 mph/83 kph) and was moving toward the west-northwest. On March 30, 2012 at 03:20 UTC TS PAKHAR moved through the South China Sea toward Vietnam. On March 30 at 09:00UTC, PAKHAR has maximum sustained winds at Typhoon strength, near 65 knots (75 mph/120.4 kph) and located near 9.7 North and 111.0 East, about 481.5 km east-southeast of Ho Chi Minh, Vietnam. Through Joint Typhoon Warning Center forecasting expected the storm to peak near 80 knots (90 mph/148 kph) before landfall. Landfall is forecast to occur near Phan Thiet, Vietnam around 18:00UTC on Sunday, 1 April 2012 (Fig1). After landfall on Monday, 2 April, the influence of PAKHAR Depression effected to the coastal area of Cambodia, specially it caused injured 5 people and destroyed 145 home at Kampot Province (See Cambodia Daily dated on 5 April, 2012). In response to this severe weather the Ministry of Water Resources has provide the official announcement for the early warning to the public for take action and preparedness (See Announcement 1).

Fig1: Tropical Cyclone PAKHAR make Landfall
Source of ECMWF



Khuon Narim, The Cambodia Daily, April . 05 2012

Tropical Storm in Kampot Injures Five People, Destroys 145 Homes

BY KHUON NARIM
THE CAMBODIA DAILY

Five people were injured and 145 homes were damaged Tuesday in Kampot province's Dang Tong district by heavy rains and winds caused by Tropical Storm Pakhar, the district governor said.

The storm, which originated in the South China Sea and wreaked havoc in southern Vietnam earlier this week, hit Cambodia in a milder form on Sunday and continued to cause rain and winds in about a dozen central and coastal provinces until Tuesday.

Three of the injured in Kampot were hit by lightning, while two others were hurt by falling debris when their homes collapsed, district governor Muong Chhut said.

"The victims were aged 10 to 60 and sustained minor injuries,"

he said.

"Three were struck by lightning, two others had their homes collapse, and 17 homes were completely destroyed."

In a separate case, a 57-year-old woman was killed Tuesday by lightning as she was trying to bring her cow in from a rice paddy, local police said.

Choem Simorn was killed at about 6 p.m. in Batheay district's Chealea commune, according to commune police chief Luy Tong Chhe.

Oum Ryna, deputy director of the Ministry of Water Resources and Meteorology's department of meteorology, said that Tropical Storm Pakhar had moved over Cambodia as of Tuesday.

"The storm will not affect us anymore, but we will continue to face occasional rains," he said.

- **Anouncement1: Ministry of Water Resources and Meteorology for TS PAKHAR**



ព្រះរាជាណាចក្រកម្ពុជា
ជាតិ សាសនា ព្រះមហាក្សត្រ
នាយកដ្ឋាន អាកាសធាតុ

ក្រសួងធនធានទឹក និងឧតុនិយម

លេខ ០២៧/២០១២ ចមទ

សេចក្តីជូនដំណឹង

ក្រសួងធនធានទឹក និងឧតុនិយមសូមជម្រាបជូនដល់សាធារណជនឱ្យបានជ្រាបថា បន្ទាប់ពីធ្វើការសង្កេត តាមដានលើស្ថានភាពអាកាសធាតុរួចមក ឃើញថា នៅវេលាម៉ោង 10 h 30 នាទីព្រឹក ថ្ងៃទី 30 ខែមីនា ឆ្នាំ 2012 នេះ មានព្យុះមួយឈ្មោះ **ប៉ាកហា** (PAKHAR) បានកើតឡើងនៅក្នុងសមុទ្រចិនខាងត្បូង ត្រង់ខ្សែវិទ្យុទី 09,7 នៃរយៈទទឹងខាងជើង និងស្រប 111,2 នៃរយៈបណ្តោយខាងកើត ។ ព្យុះនេះមានកម្លាំងខ្យល់តូច 65 Km/h និងកំពុងធ្វើដំណើរសន្លឹមៗឆ្ពោះទៅទិសពាយ័ព្យ ។ តាមការព្យាករណ៍ ព្យុះ**ប៉ាកហា** នឹងធ្វើដំណើរមកដល់ឆ្នេរសមុទ្រប្រទេសវៀតណាមភាគខាងត្បូង នៅថ្ងៃទី 02 ខែមេសា ឆ្នាំ 2012 ។

ព្យុះ**ប៉ាកហា** នឹងមានឥទ្ធិពលមកលើព្រះរាជាណាចក្រកម្ពុជា ចាប់ពីថ្ងៃទី 01 ដល់ថ្ងៃទី 03 ខែមេសា ឆ្នាំ 2012 ដោយបង្កឱ្យ : ផ្ទៃមេឃមានពពកច្រើន , ខ្យល់បក់មកពីទិសនិរតីមានល្បឿនពី 15-25 km /h , មានភ្លៀង ផ្លូវ រន្ទះច្រើន ព្រមជាមួយនឹងខ្យល់កម្តៅក្នុងស្ទឹងពី 25-35 km/h នៅតាមបណ្តោយរាជធានី ខេត្តមួយចំនួនដូចជា : រាជធានីភ្នំពេញ កណ្តាល កំពង់ស្ពឺ តាកែវ ព្រៃវែង ស្វាយរៀង កំពង់ធំ កំពង់ចាម កំពង់ឆ្នាំង ពោធិ៍សាត់ កោះកុង កែប កំពត និង ខេត្តព្រះសីហនុ ។ រលកសមុទ្រអាចមានកំពស់ពី 1,50 – 2,00 ម៉ែត្រ ។

យោងលើស្ថានភាពអាកាសធាតុ ដូចបានជម្រាបជូនខាងលើ ក្រសួងធនធានទឹក និងឧតុនិយម សូមអំពាវនាវដល់អាជ្ញាធរដែនដី និងប្រជាពលរដ្ឋដែលរស់នៅតាមបណ្តោយរាជធានី ខេត្ត ដូចបានជម្រាបជូនខាងលើ ពិសេសបងប្អូនប្រជានេសាទសមុទ្រ សូមបង្កើនការយកចិត្តទុកដាក់ប្រុងប្រយ័ត្នខ្ពស់ ដើម្បីចៀសវាងនូវគ្រោះថ្នាក់ផ្សេងៗ ដែលអាចកើតមានឡើងជាមួយថាហេតុ ។

ក្រសួងធនធានទឹក និងឧតុនិយម នឹងបន្តធ្វើការតាមដានជាប់ជាប្រចាំលើស្ថានភាពអាកាសធាតុនេះ និងធ្វើសេចក្តីជូនដំណឹងបន្ថែមជាបន្តបន្ទាប់ ក្នុងករណីចាំបាច់ ។

រាជធានីភ្នំពេញ, ថ្ងៃទី ៣០ ខែមីនា ឆ្នាំ ២០១២

លីម គាន់ហោ

Tropical Cyclone GAEMI and its affected to Cambodia

Through the Tropical Cyclone Ensemble Track Information The low Pressure cell in the middle South China Sea was rapidly developed as the Tropical Cyclone namely TS GAEMI at 12:00 UTC, 01 OCT 2012, and become stronger as Severe Tropical Storm moved Southeastward and Eastward with its maximum sustained wind 50 knots. It was landfall Vietnam on 06 OCT, 2012 and after entered Cambodia (Fig2, 3, 4). GAEMI produced heavy rain over coastal area and some provinces of the country such as Kandal, Kampong Speu, Kampong Chhnang, Prey Veneng, Svay Rieng, Battambang and Oddarmeanchey, but it did not cause the damage or destroy in Cambodia. Due to the vast of TS GAEMI hit to Cambodia, The Royal Government of Cambodia had provided officially announcement to the public for preparedness (See Announcement 2).

Fig2: Track of TS GAEMI entered Cambodia

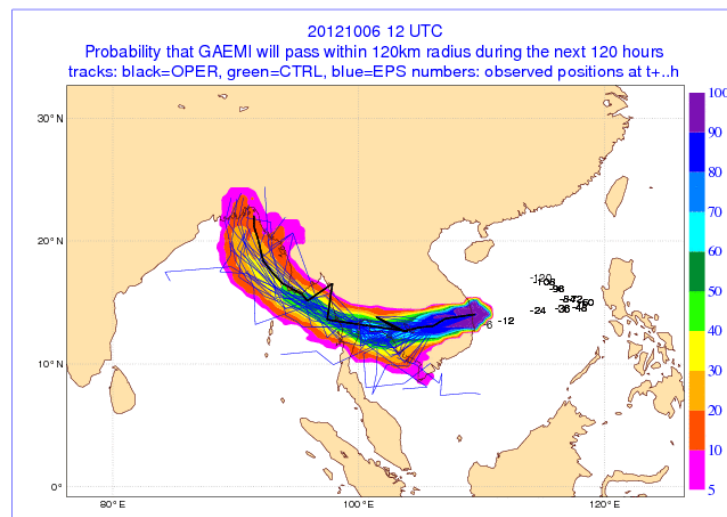


Figure3: Satellite Imagery and Clouds Image during TS GAEMI cross into Cambodia at 12 UTC, 06 October, 2012. (Source of Department of Meteorology, Cambodia)

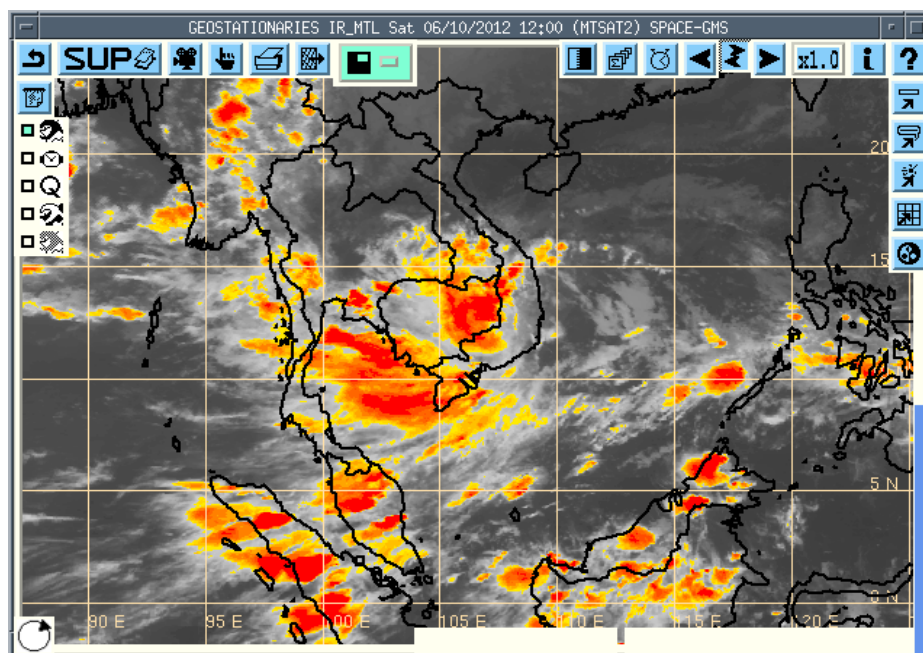
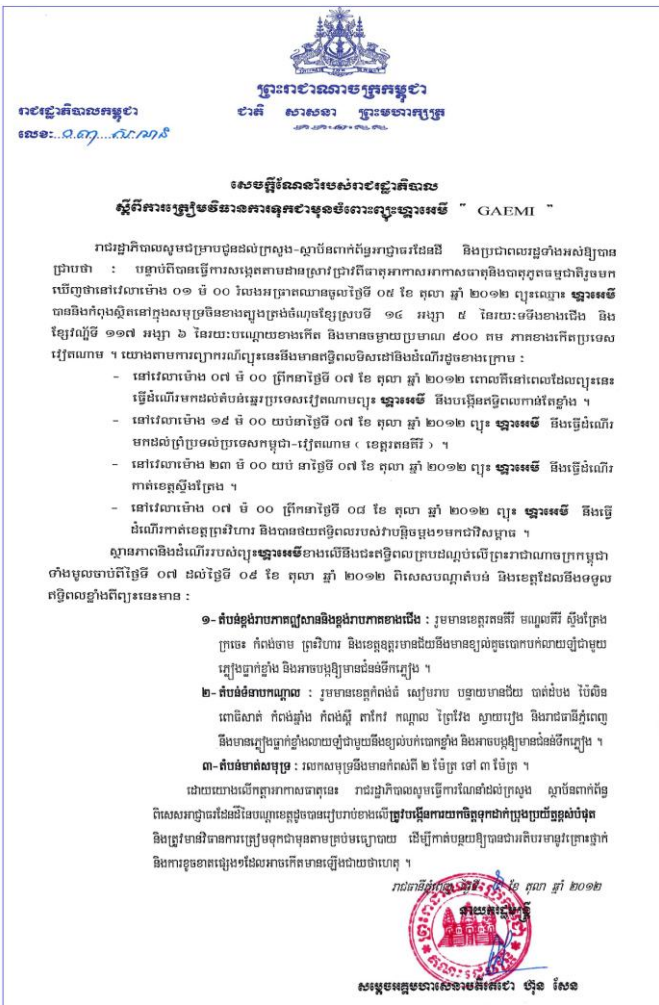
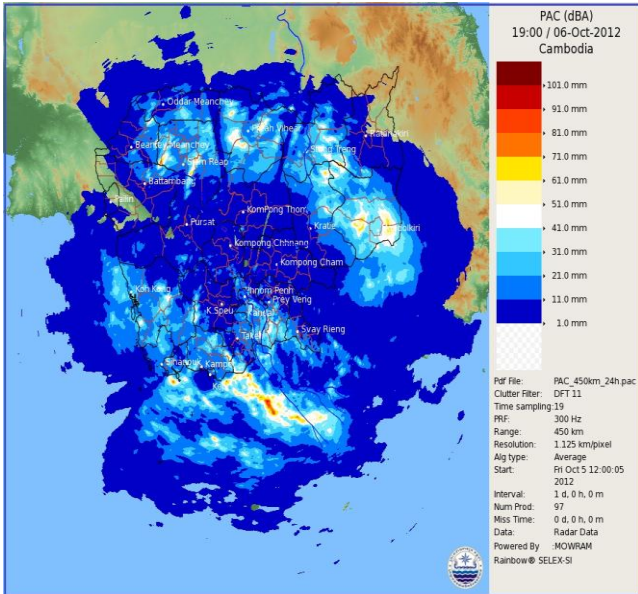


Figure4: Accumulative rainfall during GAEMI Cross into Cambodia at 12 UTC (19:00 Local Time in Cambodia), 06 Oct, 2012. (Source of Department of Meteorology, Cambodia)

Announcement2: Royal Government of Cambodia
Announcement for the Sever Tropical Storm GAEMI



2. Hydrological Assessment

During the monsoon season of the year 2012, Cambodia was impacted both of drought and flash flood condition. The reported from the Ministry of Agriculture-forest and fishery indicated that this year, Cambodia was impacted by drought in the 14 provinces; it was impacted to the rice land about 140.647 hectares, it is equal to 6% of the rice field in 2012 and it caused the damage on rice crop of 20.246 hectares . The provinces that worse impacted such as Oddar Meanchey, Battambang, Svay Rieng, Prey Veng and Takeo (See Map1), and furthermore, some part of Banteay Meanchey Province was also impacted by flash flood according to the frequently of rainfall at place and the heavy rain in the area of Thailand nearby the border of Cambodia.

On the other hand, even though Cambodia was hit by two storms (TS PAKHAR and TS GAEMI), Cambodia was not impacted by flash flood from these storms, but it was only receiving the heavy rain due to GAEMI entered and affected in some area of the North and South part of Cambodia (See Fig.5).

MAP1:

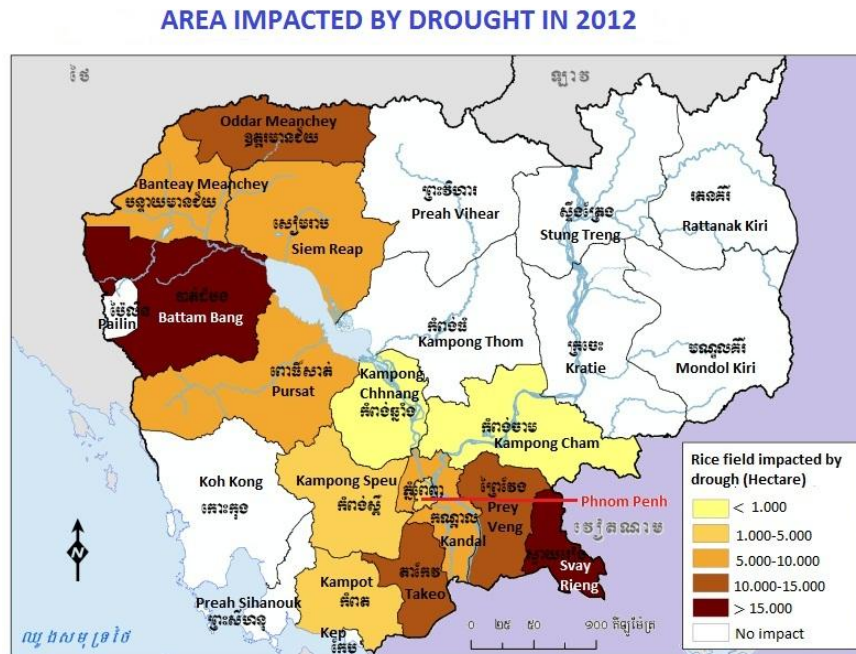
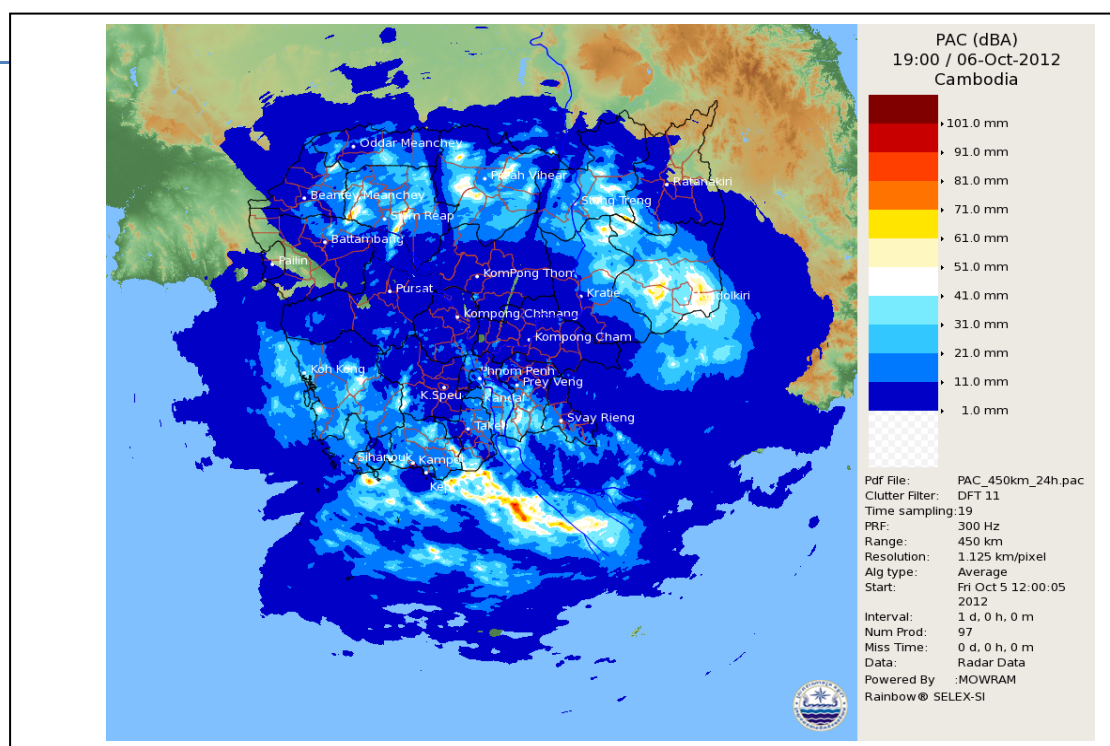


Fig.5: Accumulative rainfall during TS **GAEMI** cross into CAMBODIA at 12 UTC (19:00 Local Time in Cambodia), 06 Oct, 2012. (Source of Cambodia Meteorology Department)



3- Socio-Economic Assessment

The Drought and Flood are the main physical hazards in Cambodia, linked its key sectors: agriculture and fisheries. About 80 percent of the Cambodia's territory lies within the Mekong River, flowing directly from the north to Mekong Delta of Vietnam in the south. The Mekong River has large fluctuations of water levels between the dry and wet seasons, causing agricultural production and livelihoods and constraining Cambodia socio-economic development. In each year, it is estimated that floods kill about 100 people annually and cause agricultural losses of 100 to 170 million USD. The main type of flash flood from the tributaries and Mekong river cause by heavy rains from the Typhoon or Tropical Cyclone and from the monsoon trough. It is estimated that floods kill about 100 people annually and cause agricultural losses of 100 to 170 million USD each year.

The severe flooding occurred from September to November 2011, which affected 18 out of 24 Provinces, 122 districts (out of 183 districts) and 687 communes (out of 1633 communes) across Cambodia. The flood killed more than 250 people (52% were children), and caused damage to schools, pagodas, hospitals, roads, bridges and other infrastructure worth more than US \$ 500 million. In addition, 267,184 ha of paddy fields were destroyed (~10% of the total cultivated area).

4- Regional Cooperation Assessment

In 2012, National Meteorology Service is completely in installation of the Doppler Weather Radar, and the station is operated since the 4th of April 2012. The objective is to enable the department of meteorology to produce and broadcast weather forecasts thanks to high-performance facilities. The decision has been taken to equip Cambodia with a "Doppler weather radar meteo 650C", fully financed by the **Government of Cambodia**. The project contract was signed on January 21, 2011, in Phnom Penh with the selected partner, MFI (Meteo France International): staff training for radar maintenance, data analysis and processing and forecast production (Meteo-Synergy and Meteo-Factory) are insured by Meteo-France International (MFI).

The Sever Weather related to Typhoon or Tropical Cyclone information, Cambodia use the information through the GTS system, Numerical Weather Prediction product of GFS, Typhoon Warning Center and other sources from JMA Tropical Cyclone Information, TMD, Hong Kong and ECMWF.

National Meteorology Cambodia has sent 2 participants to attend in the Typhoon Roving Seminar that be held at Seoul, Republic of Korea, 30 October-1 November 2012.

According to the requirement of World Meteorological Organization (WMO), Cambodia has developed the Table-Driven Code Form (TDCF) in order to sharing its data through the GTS system.

II. Summary of progress in Key Result Area

1. Reduced Loss of Life from Typhoon-related Disasters

National Meteorology and Hydrology Cambodia has improved its capacity in forecasting and the information providing procedure for the immediate weather warning and severe weather warning such tropical storm or typhoon to the public and for all concerned sectors. The royal government of Cambodia, has been considered in the natural disaster prevention, in fact after Cambodia has experience in Typhoon affected to the country, Cambodia Red Cross and National Disaster Committee, Local authority with NGO and other contributor has been considered and paid attention to prevention of the damages from severe weather, especially for the Typhoon that affected to the Country.

2- Minimized Typhoon-related Social and Economic Impacts

The regular occurrence of floods and droughts in Cambodia, often within the same year, Typhoon or Tropical Cyclone is the major that caused to be flood and flash flood through the country. The occurrence of flood and drought is often within the country. This situation has important implications for Cambodia's economy and food security. First, an estimated eighty percent (80%) of the country's 14 million people depends heavily on fisheries and agriculture – two most seriously hit economic sectors during disasters - as their primary means of livelihood. A slight change in the predictability of floods and droughts can seriously disrupt livelihoods and food security. Second, with high poverty incidence in the country, insecure livelihoods and food sources contribute further to increased vulnerability, as many of these families rely on the Tonle Sap and Mekong rivers. Previous emergency response efforts on regular droughts and flooding focused on giving temporary provisions of food, shelter, health services and sanitation to communities. The government of Cambodia cooperated with the non-government have established disaster preparedness, mitigation and prevention mechanisms at all levels in order response to the Typhoon disaster and other hazard that can cause the damage eventually. Flooding this year cost the government significantly less than expected due to better preparation and lower water levels than in previous years.

3- Enhanced Beneficial typhoon-related effects for the betterment of quality of life

The Royal Government of Cambodia is always paid attention and takes measure in preventing the natural hazard, especially for the Typhoon event. In response to the early warning information, National Meteorology and Hydrology Cambodia has leaded the observation, collection and dissemination of meteorological and hydrological information to all government ministries, stakeholders and communities which are necessary for disaster and typhoon preparation in order to enhanced beneficial typhoon-related effect for the betterment of quality of life and response in the communities.

4- Improved Typhoon-related Disaster Risk Management in Various sectors

The Ministry of Water Resources and Meteorology (MOWRAM), National Committee for Disaster Management (NCDM), Flood Management Center, Agriculture Forestry and Fishery, Ministry of Heath, Ministry of Information, Local authority, None Government Organization, and other stakeholder, make recommendations to the Royal Government and issue principles,

main policies and warnings on Disaster Preparedness and Management in order to response to the Emergency Response and interventions in evacuation and preparedness for the severe weather will occur eventually.

Actually in 2012, Ministry of Water Resources and Meteorology have improved of warning service, conducted the job training course on site of Meteorology and Hydrology on Severe weather Forecasting and Flood forecasting through the use of model, observation and past event.

5- Strengthened Resilience of Communities to typhoon-related disasters.

National Committee for Disaster Management (NCDM) and Cambodia Red-Cross cooperated with None Government Organization (NGO), have provided the public awareness to the communities, and prepare the evacuation camp and evacuation elevated with other tools to be preparedness in case of Typhoon hit or other hazard will occur.

6- Improved capacity to Generate and Provide Accurate, Timely, and understandable Information on Typhoon-related Threats

According to the numerous of damage caused by natural disaster such severe weather frequently occurred in the Country the Government of Cambodia have considered and provide own budget to invest and installed the Weather Doppler Radar included capacity building on weather forecast to the staff of Department of Meteorology of the Ministry of Water Resources and Meteorology in order to improve the weather forecast and weather warning are timely and more accuracy.

Actually, this year, TS PAKHAR and TS GAEMI and other weather hazards were informed by the Ministry of Water Resources and the Royal Government of Cambodia through via TV, Radio, computer network and direct to local authority by timely.

7- Enhanced typhoon committee's effectiveness, Efficiency and international collaboration

The Government of Cambodia has strong collaboration with all of Countries to be enhance and sharing in weather information each other.

The Government of Cambodia highly appreciate and would like to thank very much for Typhoon Committee that always have kind supported and provide the opportunity to the staffs of Cambodia and also for other Countries to attend in training and each event of Typhoon committee activities.

III. Resource Mobilization Activities

- The Government of Cambodia has established an alternative or reserve program on National Disaster Management that will effectively carry out immediate response to natural disaster at commune, district, municipalities, cities and province.
- Collaboration with NGOs Partners in order to conduct training and disseminate weather information and disaster preparedness to the community.
- Ministry of Water Resources and Meteorology cooperated with Regional integrated Multi-Hazard Early Warning System (RIMES) and Food and Agriculture organization (FAO) to prepared and conduct the National Monsoon Forum on the Pre and Seasonal Forecast and other issue related hazard specially Typhoon.

IV. Update of Cambodia's Working Groups representatives

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