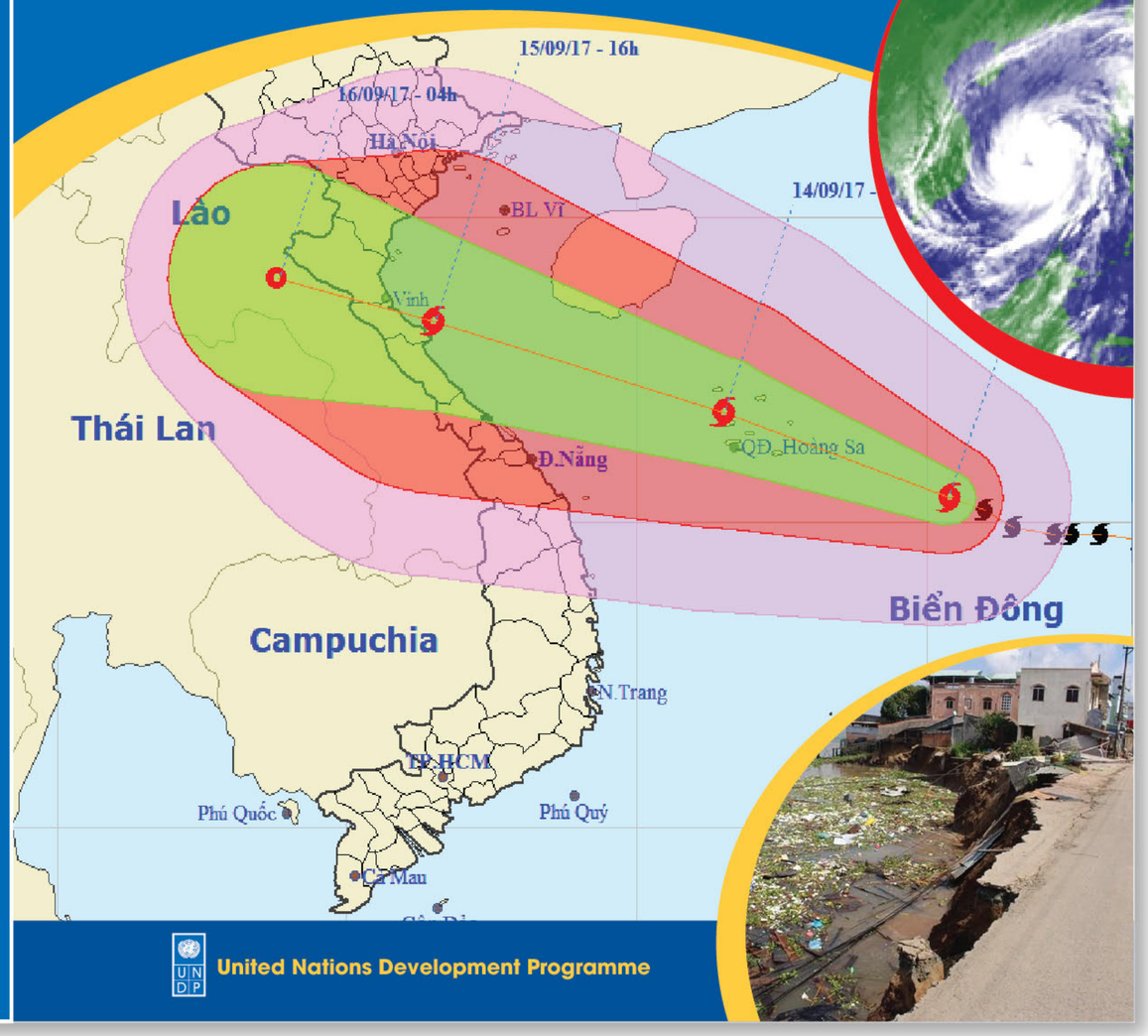
Bìa sách Khổ A4

CENTRAL STEERING COMMITTEE FOR NATURAL DISASTER PREVENTION AND CONTROL

NATURAL DISASTERS IN VIETNAM 2017



United Nations Development Programme

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Minister of Ministry of Agriculture and Rural Development Nguyen Xuan Cuong – Chairman

Vice Minister of MARD – Deputy Chairman
Hoang Van Thang

Deputy head of Prime Minister's Administrative Office –Deputy Chairman
Nguyen Cao Luc

Deputy Chief of General Staff of the Viet Nam People's Army – Deputy Chairman
Pham Ngoc Minh

Vice Minister of MARD - Member
Vu Van Tam

Vice president of Vietnamese Redcross-member
Tran Quoc Hung

Vice President of Vietnamese Fatherland Front-member
Truong Thi Ngoc Anh

Vice President of Vietnamese Women's Union-member
Nguyen Thi Tuyet

Deputy head of Office of VINASARCOM - Member
Truong Duc Nghia

Director General of General Department of State Reserve - Member
Le Van Thoi

Vice Minister of MONRE - Member
Nguyen Linh Ngoc

General Director of NCHMS - Member
Lê Công Thành

Vice Minister of MOFA - Member
Nguyen Quoc Dung

Vice Minister of MOT – Member
Le Dinh Tho

Deputy General Director of VTV - Member
Nguyen Thu Hien

Deputy General Director of VOV – Member Tran Minh Hung

Vice Minister of MPS - Member
Bui Van Thanh

Vice Minister of MIC– Member
Pham Hong Hai

Vice Minister of MOIT – Member
Hoang Quoc Vuong

Vice Minister of MOH - Member
Pham Le Tuan

Vice Minister of MOET - Member
Pham Manh Hung

Vice Minister of MOCST - Member
Huynh Vinh Ai

Vice Minister of MOLISA - Member
Dao Hong Lan

Vice Minister of MOC - Member
Le Quang Hung

Vice Minister of MOST- Member
Tran Van Tung

Vice Minister of MPI - Member
Nguyen Van Hieu

Vice Miniter of MOF - Member
Huynh Quang Hai

Vice Minister of MOHA Member
Nguyen Trong Thua

Secretary of HCM Communist Youth's Union - Member
Nguyen Anh Tuan

Director General of Vietnam Disaster Management Authority – Permanent Member
Tran Quang Hoai

Director General of Directorate of Water Resources - Member
Nguyen Van Tinh

Director General of Directorate of Fishery - Member
Nguyen Ngoc Oai

Commander of the Local Force – Member
Nguyen Duy Nguyen

Director of Institute for Geophysics – Member
Nguyen Xuan Anh

Deputy Commander of Vietnam Border Defence Force - Member
Nguyen Van Nam

VIETNAM DISASTER MANAGEMENT AUTHORITY
STANDING OFFICE OF THE NATIONAL STEERING COMMITTEE
FOR NATURAL DISASTER PREVENTION AND CONTROL

Director General – Chief of the Office Tran Quang Hoai

Deputy Director Gerneral - Deputy chief of the office
Vu Xuan Thanh

Deputy Director Gerneral - Deputy chief of the office
Nguyen Truong Son

Director of Agency for disaster response and recovery- deputy head of the office
Nguyen Duc Quang

Director of Department of Dyke managemetn
Pham Duc Luan

Director of Department of Disaster safety control
Tang Quoc Chinh

Director of Department of Community-based DRR
Dang Quang Minh

Head of the Admistration office of the VNDMA
Pham Hong Quang

Director of the Center for Disaster management Technologies and Policies
Nguyen Thanh Phuong

Director of Department of Science, Technology and International cooperation
Doan Tuyet Nga

Director of Department of Legislation and Inspection
Nguyễn Viết Tiến

TASKS AND MANDATES OF THE VIETNAM DISASTER MANAGEMENT AUTHORITY

1. To submit to Minister of Agriculture and Rural Development for promulgation:

a) Law projects, draft resolutions by the National Assembly; decree projects, draft resolutions by the Standing Committee of the National Assembly; draft decrees and resolutions by the Government; draft decisions, instructions by the Prime Minister, and other documents on natural disaster management activities.

b) Long-term, mid-term and annual development strategies, planning and development schemes; mechanisms, policies; and state-focused programs, projects and works in the field of natural disaster prevention control.

c) National standards, national technical codes and specialized economic-technical norms in the field of natural disaster management.

2. Technical instructions of natural disaster management.

3. Propagation, dissemination and education of law on natural disaster management.

4. To direct, monitor and organize the implementation of legal documents, mechanisms, policies, strategies, planning, programs and projects in the field of natural disaster management.

5. Management of natural disaster risks:

a) To submit to the Minister of Agriculture and Rural Development national strategies on natural disaster management; planning orientations, a list of fundamental research projects on natural disaster management; plans of prevention and control of natural disasters, floods, river bank and coastal landslide; plans of disaster management at the national level; Ministry of Agriculture and Rural Development's natural disaster management and disaster preparedness plans; instructions of procedures and methods of making and monitoring plans of preventing natural disasters, floods and riverbank and coastal landslide.

b) To instruct and monitor making, approval and implementation of disaster response plans and natural disaster management plans in accordance with socio-economic development plans and projects of localities, ministries and branches as assigned by the Minister of Agriculture and Rural Development.

c) To instruct and monitor implementation of law provisions on human resources, materials, means, equipment, essential supplies, and resources for natural disaster management activities; to monitor and supervise operations affecting works, measures of natural disaster management, and how households, individuals, domestic and international agencies and organizations operating in Vietnam comply to regulations on the natural disaster management;

d) To monitor compliance with natural disaster management regulations in construction and protection of disaster management works and works with disaster

management structures; to include the issue of natural disaster management in socio-economic and sectoral development plans; and to ensure that requirements of disaster management for new construction or upgrading of urban and rural residential areas and technical infrastructure works are met;

e) To organize implementation of national strategies and plans for natural disaster management;

f) To build and protect natural disaster management infrastructures and structures with disaster management components; to prepare human resources, materials, means, equipment, communication system, essential supplies, and resources for the natural disaster management operations by the Authority;

g) To establish and to operate a tsunami warning system and to deliver early warnings of tsunami in this system; to make response plans for natural disasters, typhoons, mega-typhoons and emergency response plans in case of floods exceeding the designed capacity or in other emergency cases.

6. Response to natural disasters:

a) To submit to the Minister measures of mobilizing human resources, materials, means for natural disaster management and to organize how to take these measure upon their approval;

b) To assist the Minister of Agriculture and Rural Development in directing natural disaster response plans in accordance with the law provisions;

c) To instruct and monitor implementation of regulations on emergencies of diverting floods, retarding floods, and measures of population evacuation and supports for disaster-affected people;

d) To instruct, monitor and organize preventing and controlling the erosion of river bank, coast, embankment on borders and other works of natural disaster management in accordance with the law provisions;

e) To monitor and update forecasts and warnings of natural disasters; to provide professional monitoring and supervision; to respond to climate changes and sea level rise in accordance with the Authority's duties.

7. Recovery from Natural disaster consequences

a) To submit to the Minister of Agriculture and Rural Development measures of recovery and summary reports, statistics for damage caused by natural disasters across the country, proposals of emergency aids and long-term and short-term support;

b) To assist the Minister of Agriculture and Rural Development in directing disaster recovery efforts in accordance with the law provisions;

c) To instruct and supervise gathering and assessment of statistics for damage caused by natural disasters and disaster recovery efforts in accordance with law provision.

8. Communication and community-based disaster risk management:

a) To organize disaster prevention popularization and education activities in accordance with law provisions; and to implement projects on public-awareness improvement and community-based disaster risk management.

b) To organize and participate in natural disaster management skill training courses and to organize training courses for those who are in charge of disaster management operations;

c) To supervise disaster prevention popularization and education operations in accordance with law provisions

9. Dykes management:

a) To submit the Minister of Agriculture and Rural Development the following documents:

Planning guidelines, list of fundamental research on dykes, flood prevention and control plans for dyke-bounded rivers, and dyke planning as regulated;

Regulations on dyke classification, load permits and license granting for vehicles travelling on dykes, legal documents confirming license granting for operations on special dykes at level I, level II and level III and for construction and upgrading of transportation works related to dykes as regulated by the law; dyke-related agreements; documents on appraisal of investment projects on using river banks without existing structures; dyke maintenance and mobilization of forces, materials and means for dyke protection in accordance with the regulations.

b) To implement the state management duty of planning flood prevention and control on dyke-bounded rivers and dyke planning; constructing, maintaining, upgrading, renovating and strengthening dykes; managing, maintaining and exploiting dykes in accordance with the law on dykes, – relevant law provisions and assignment by the Minister of Agriculture and Rural Development.

10. To assist the Minister of Agriculture and Rural Development in implementing the main duties of natural disaster management and implementing the main duty of the Steering Committee for Natural Disaster prevention and control, the Standing Office of Central Committee for Natural Disaster prevention and control.

11. To manage planning and fundamental-research projects which the Directorate is in charge of as assigned by the Minister of Agriculture and Rural Development.

12. To implement a duty of collecting and managing data in the field of natural disaster management.

13. To conduct scientific researches, natural-disaster management and dyke technology transfer and to implement duties of constructing new rural areas as assigned by the Minister of Agriculture and Rural Development.

14. International cooperation in natural disaster management:

a) To submit to the Minister of Agriculture and Rural Development reports on calling for, receiving and coordinating international aids of natural disaster management as a duty of Ministry of Agriculture and Rural Development;

b) To receive information of natural disaster forecasts and warnings and other natural disaster-related information from international agencies and organizations; provide information of natural disasters for international agencies and organizations in accordance with the law provisions;

c) To serve as a coordinator in natural disaster management, in ASEAN cooperation in disaster management, in the United Nations' framework of natural disaster mitigation and in other international cooperation in natural disaster management as regulated by law and as assigned by the Minister of Agriculture and Rural Development;

d) To organize implementation of international programs, projects and cooperation activities in natural disaster management and dykes as regulated by the law and as assigned by the Minister of Agriculture and Rural Development.

15. To implement the administrative reform in alignment with the administrative reform program of the Ministry of Agriculture and Rural Development.

16. To manage the organizational structure, state employees and labourers as regulated by the law and as assigned by the Minister of Agriculture and Rural Development; to apply encouragement and reward policies and punishment policies, to hold skill training and capability improvement training courses for the Directorate's state employees as regulated by the law.

17. To instruct and supervise associations' and non-government organizations' natural disaster management operations as assigned by Minister of Agriculture and Rural Development.

18. To implement the technical inspection in accordance with the law provisions; citizen reception, claim and complaint settlement, corruption prevention, law violation handling, and retrenchment and anti-lavishness policies as regulated by the law..

19. To manage allocated budget, properties and other resources in accordance with the law provisions.

20. To manage construction investment as assigned by the Minister of Agriculture and Rural Development and as regulated by the law.

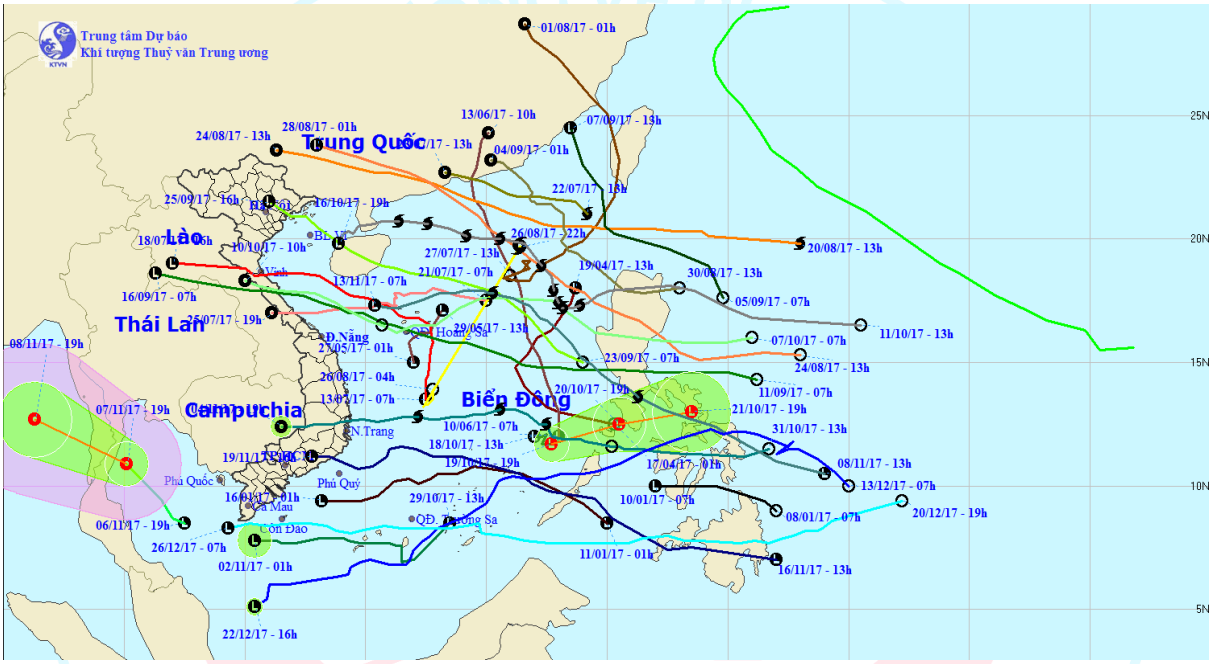
21. To implement other duties assigned by the Minister of Agriculture and Rural Development.

PART II: OVERVIEW OF NATURAL DISASTERS IN 2017

DETAILS OF SOME MAJOR DISASTER EVENTS IN 2017

TYPHOONS

In recent years, there have been an increasing numbers of heavy typhoons (aka.typhoons, cyclones) in the East Sea of Vietnam which have high intensity, unpredictable characteristics and often last for a longer period of time. Especially, there were some mega typhoons hitting areas where typhoons do not frequently visit. The hydro-meteorological specialists claim that. In 2017, there were 16 typhoons/typhoons and 04 Tropical depressions in the East Sea of Vietnam, however, among them only 5 typhoons and 03 Tropical depression hit our mainland of Vietnam directly which caused significant losses in terms of both Human aspect (33 deaths due to the typhoons) and Economic aspect (42,190 billionVND), moreover, the economic production was disturbed, well-being and environment of the affected area were seriously degraded.

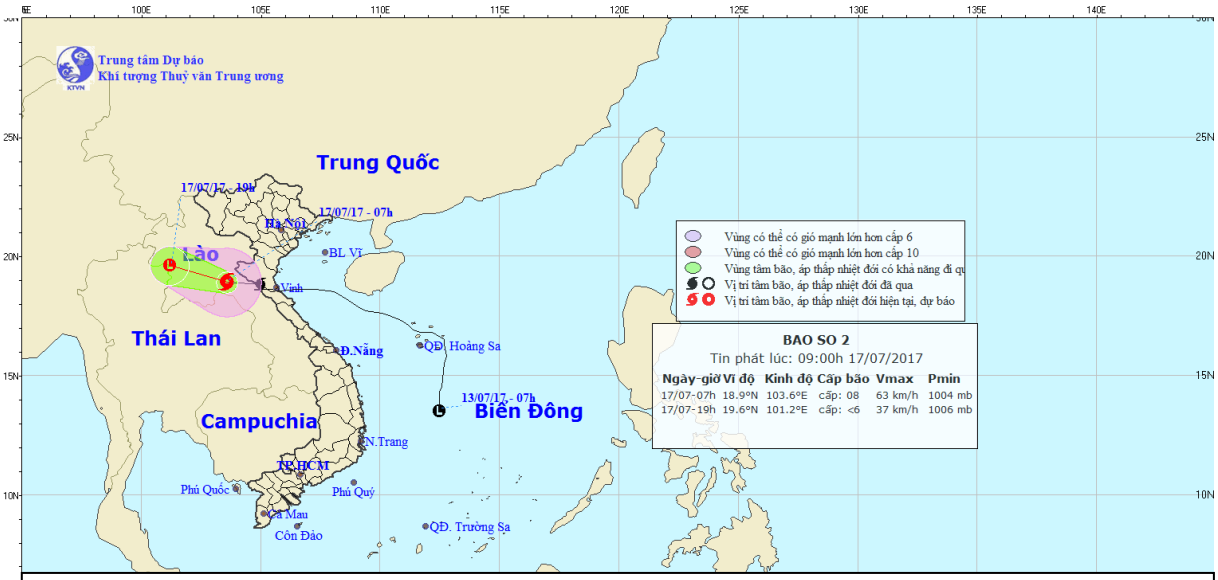


Pathways of 16 typhoons, 04 Tropical Depression in 2017 which appeared in the East Sea

THE TYPHOONS COMING DIRECTLY TO THE MAINLAND OF VIETNAM

1. Typhoon no. 2 (Talas)

1.1. Progression of the typhoon:



- On 13/7 the low pressure spot was formed in the East Sea.
- In the Afternoon of 14/7, the low pressure point was getting stronger to become tropical depression.
- In the Afternoon of 15/7, the tropical low pressure became typhoon no. 2
- On 17/7, at 01h00, the typhoon hit the mainland of Nghe An and Ha Tinh province, with the wind intensity at level 9-10.
- Level of disaster risk: level 3.

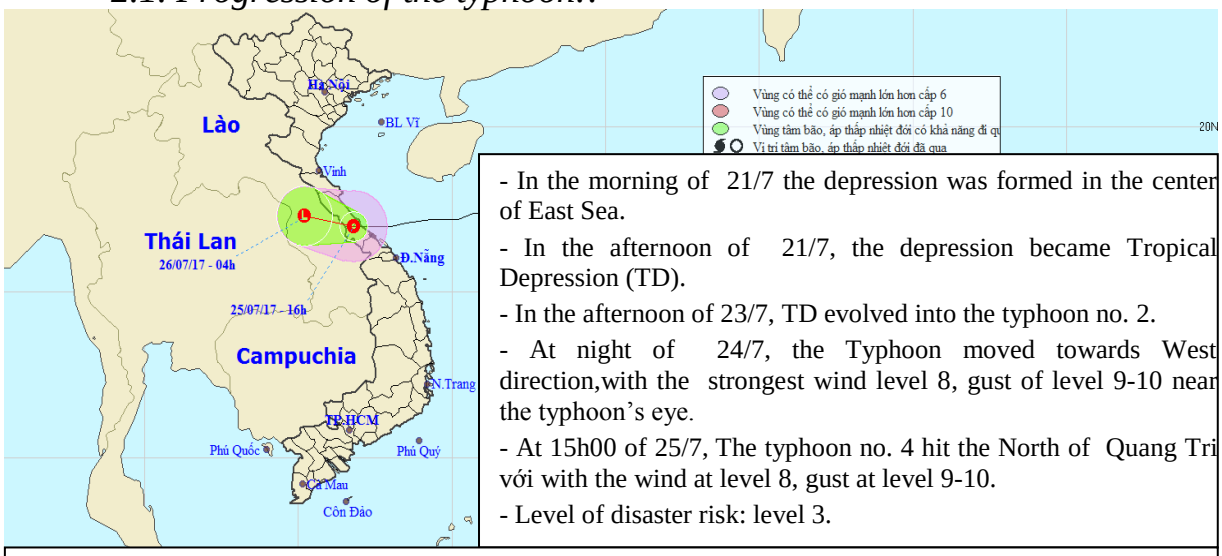
The Typhoons caused heavy rains from Thanh Hoa to Quang Binh provinces and other provinces in the North West . The total average rainfall on 16-17/7/2017 were 100-200mm. At some stations with heavy rain: Mai Chau (Hoa Binh): 207mm, KM46 (Son La): 206mm, Khau Pha (Yen Bai): 338mm; Tan My (Quang Binh): 404mm; Ba Don (Quang Binh): 322mm; Hoanh Son (Ha Tinh): 364mm.

1.2. Damages and losses:

10 deaths (Ha Giang: 01, Yen Bai: 01, Nghe An: 06, Thanh Hoa: 02); 03 missing persons, 28 injured persons; 175 collapsed houses; 6,183 damged houses; 52 dislocated houses; 4,554 electric poles were collapsed; 48,495 ha of paddy-field were inundated; 16.457 ha of vegetables were destroyed; 294,420 broken trees; 1943m of dykes eroded ; 57 sinked fishing boats; 02 barges và 01 navy ship were sinked; 813ha of damaged aqua-farms; 601 cattles and 24,203 poutry were killed. The total estimated loss **1183 billion VND**.

2. The Typhoon no. 4 (Sonca)

2.1. Progression of the typhoon::



- In the morning of 21/7 the depression was formed in the center of East Sea.
- In the afternoon of 21/7, the depression became Tropical Depression (TD).
- In the afternoon of 23/7, TD evolved into the typhoon no. 2.
- At night of 24/7, the Typhoon moved towards West direction,with the strongest wind level 8, gust of level 9-10 near the typhoon's eye.
- At 15h00 of 25/7, The typhoon no. 4 hit the North of Quang Tri với with the wind at level 8, gust at level 9-10.
- Level of disaster risk: level 3.

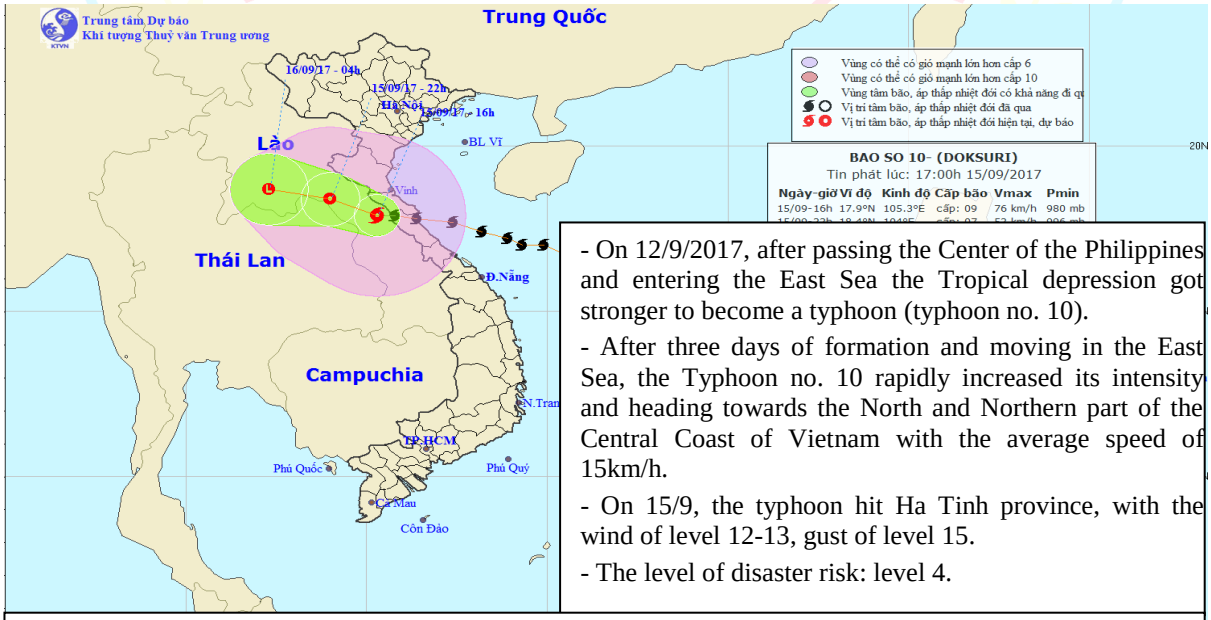
Typhoons caused heavy rains from Ha Tinh to Thua Thien Hue. The total average rainfall of days 25-26/7/2017 were from 100-150mm. Some stations with larger rainfall: Chu Le (Ha Tinh): 313mm; Huong Khe (Hà Tĩnh): 265mm; Thạch Hãn (Quảng Trị): 274mm; Đông Hà (Quảng Trị): 217mm; Kim Long (Thừa Thiên

2.2. Damages and losses:

57 damaged houses; 300m of damaged dykes; 300m of broken on-field dykes; many roads and routes of Hue cities were inundated in 0,2-0,6m of water; 176 ha of vegetables were flooded; 1.554 broken trees; 1.139 ha of perennial plants were affected and gave lower yield; 3278 ha of inundated rice. The total estimated loss: 3.3 billion VND.

3. Typhoon no. 10 (Doksuri)

3.1. Progression of the typhoon::



- On 12/9/2017, after passing the Center of the Philippines and entering the East Sea the Tropical depression got stronger to become a typhoon (typhoon no. 10).
- After three days of formation and moving in the East Sea, the Typhoon no. 10 rapidly increased its intensity and heading towards the North and Northern part of the Central Coast of Vietnam with the average speed of 15km/h.
- On 15/9, the typhoon hit Ha Tinh province, with the wind of level 12-13, gust of level 15.
- The level of disaster risk: level 4.

The typhoon caused heavy rains from the night of 14/9/2017 until the đến chiều tối night of 15/9 in a wide area from Ha Tinh to Quang Tri with the average rainfall from 200 to above 300 mm. At some stations with heavier rains: Huong Khe (Ha Tinh): 289mm, Dong Tam (Quang Binh): 404mm, Con Co (Quang Tri): 371mm,...

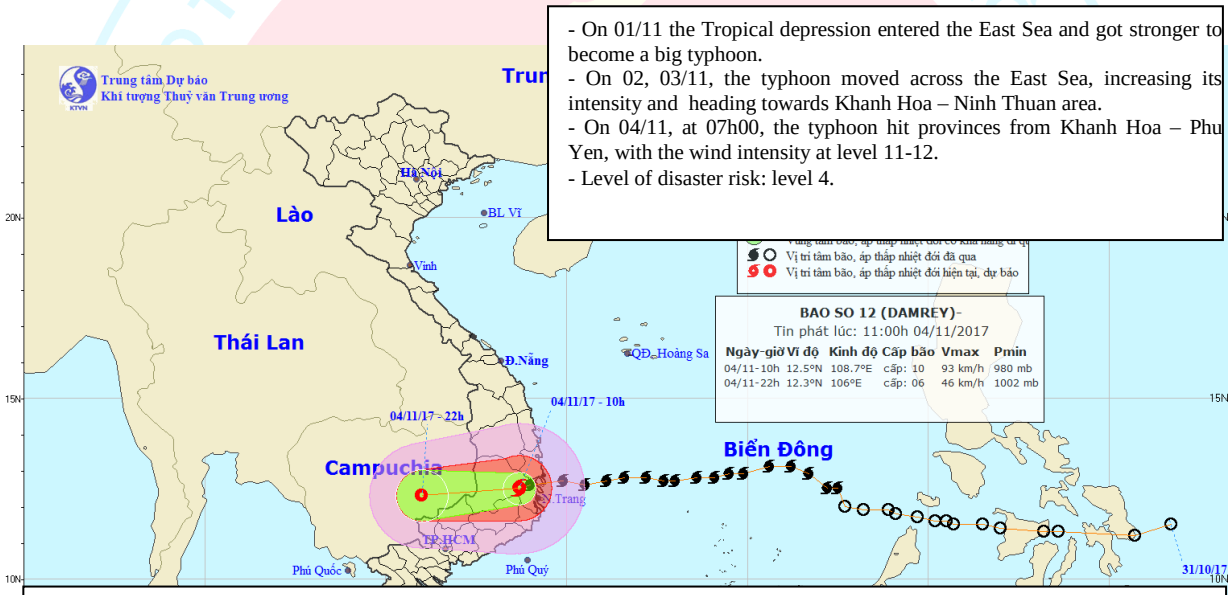
3.2. Damages and losses:

06 deaths, 152 injured persons; 3203 collapsed houses; 191,767 damaged houses; 7.807 broken electric poles; 808 boats and ships were sinked and destroyed ; 12,971 ha of paddy-field and 10,708 ha of vegetables were affected; 108,557 ha of industrial plants, perennial plants and plantation forests were destroyed; 15,154 ha of aqua-farms were affected; 902 fish cages were damaged; many routes are deeply inundated, provincial and local traffic were disturbed; many coastal dykes from Hai Phong to Thua Thien Hue were destroyed; 6284m of dykes of level III and above, 58,318 m of dykes at lower levels than III; 31,086 m of embankments and 132,877 m of canal, river bank and coasts were eroded.

- Total estimated loss: 18,329 billion VND

4. The typhoon no. 12 (Typhoon Damrey)

4.1. Progression of the typhoon:



- On 01/11 the Tropical depression entered the East Sea and got stronger to become a big typhoon.
- On 02, 03/11, the typhoon moved across the East Sea, increasing its intensity and heading towards Khanh Hoa – Ninh Thuan area.
- On 04/11, at 07h00, the typhoon hit provinces from Khanh Hoa – Phu Yen, with the wind intensity at level 11-12.
- Level of disaster risk: level 4.

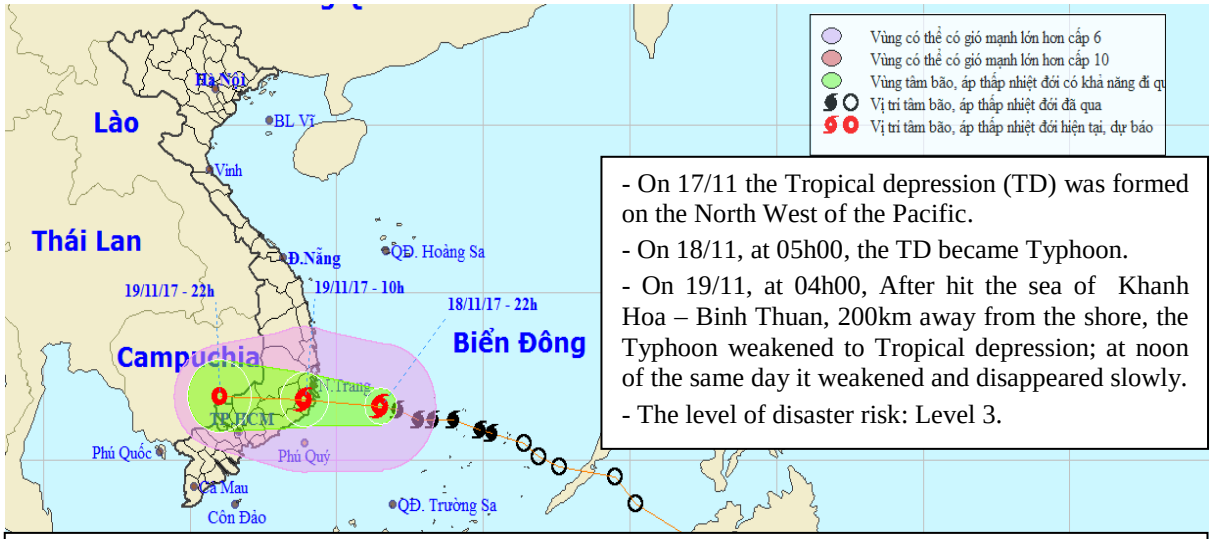
The typhoon caused extremely heavy rains from Quang Ngai to Khanh Hoa (many location had 1.000 mm and above rainfall) from 4-5/11/2017. The total average measured rainfall was 500mm to 700mm. Some places with heavier rainfalls: Tra My (Quang Nam): 1036mm; A Luoi (Thua Thien Hue): 969mm; Nam Dong (Thua Thien Hue): 852mm; Ta Luong (Thua Thien Hue) 745mm; Ba To (Quang Ngai): 723mm, Tra Bong (Quang Ngai) 776mm.

4.2. Loss and damage:

123 deaths and missing persons; 3,550 collapsed houses, 134,000 damaged houses; 11,327 ha of paddy-field, 27,301 ha of vegetables and flowers werer flooded; 38,629 fish cages; 1,809 boats and ships were sinked ; 05 points in electricity grid of 220kV, 19 points in electricity grid of 110kV and 39 of 110kV electricity poles were broken; causing blackout at 9555 substations, affecting 975,855 clients; besides many road systems, national highways, hydraulic works, dykes, as well as health and education infrstructures were damaged or broken. The total estimated loss: 22,680 billion VND.

5. The typhoon no. 14 (Kirogi)

5.1. Progression of the typhoon::



- On 17/11 the Tropical depression (TD) was formed on the North West of the Pacific.
- On 18/11, at 05h00, the TD became Typhoon.
- On 19/11, at 04h00, After hit the sea of Khanh Hoa – Binh Thuan, 200km away from the shore, the Typhoon weakened to Tropical depression; at noon of the same day it weakened and disappeared slowly.
- The level of disaster risk: Level 3.

The typhoons caused heavy rains in a wide area of Quang Ngai - Binh Thuan from 19-20/11/2017. The total average rainfall was 100-200mm. In some places, the rainfall was very high: A Luoi (Thua Thien Hue) 261mm; Dong Hà (Quang Tri) 249mm; Ba Tơ (Quang Ngai) 221mm; Quy Nhơn (Binh Dinh) 203mm; Tra My (Quang Nam) 206mm.

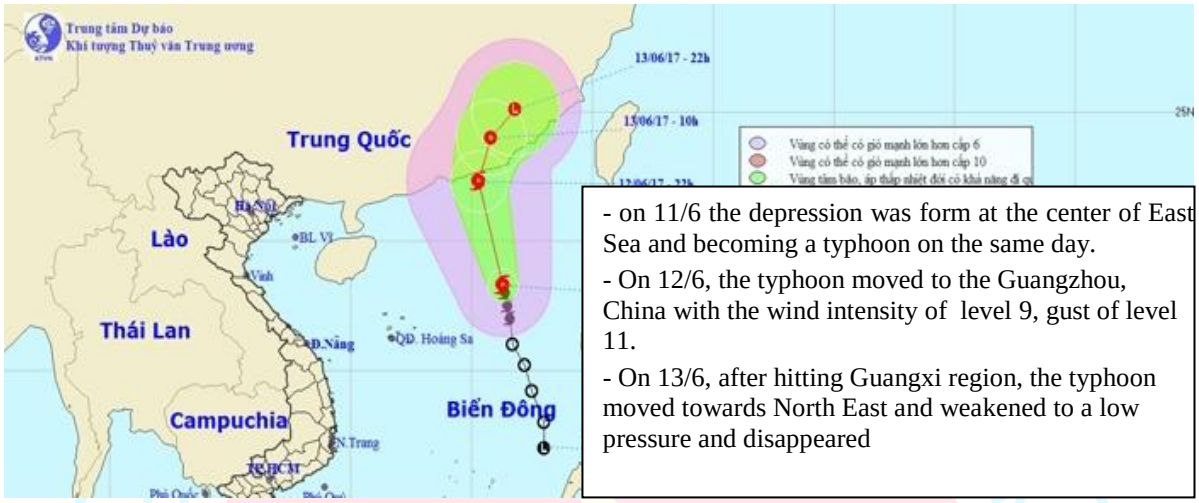
5.2. Damages and losses:

05 collapsed houses; 344 damaged houses; 519 broken trees; 106.2 ha of vegetables and 20 ha of rubbered trees were destroyed.

TYPHOONS WHICH APPEARED IN THE EAST SEA, NOT DIRECTLY HIT THE MAINLAND OF VIET NAM

1. The Typhoon no. 1 (Merbok)

1.1. Progression of the typhoon:



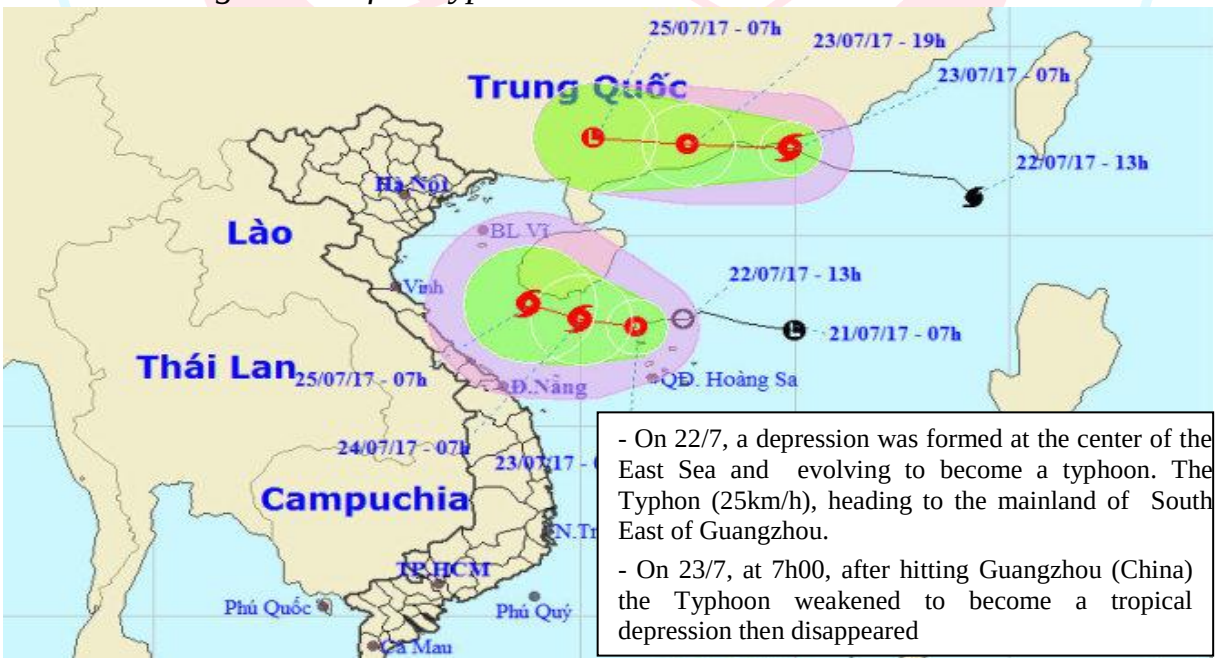
- on 11/6 the depression was form at the center of East Sea and becoming a typhoon on the same day.
- On 12/6, the typhoon moved to the Guangzhou, China with the wind intensity of level 9, gust of level 11.
- On 13/6, after hitting Guangxi region, the typhoon moved towards North East and weakened to a low pressure and disappeared

1.2. Damages and losses:

03 deaths struck by lightning; 02 missing persons; 06 injured persons; 04 collapsed semi-permanent houses; 42 damaged houses; 01 school, 30m of rural road và 550 m^3 of rock and soil along the communal roads were eroded; 0.5ha of vegetables and flowers were destroyed; 07 of water buffalos and cows were killed by lightning.

2. The Typhoon no. 3 (Roke)

2.1. Progression of the typhoon:

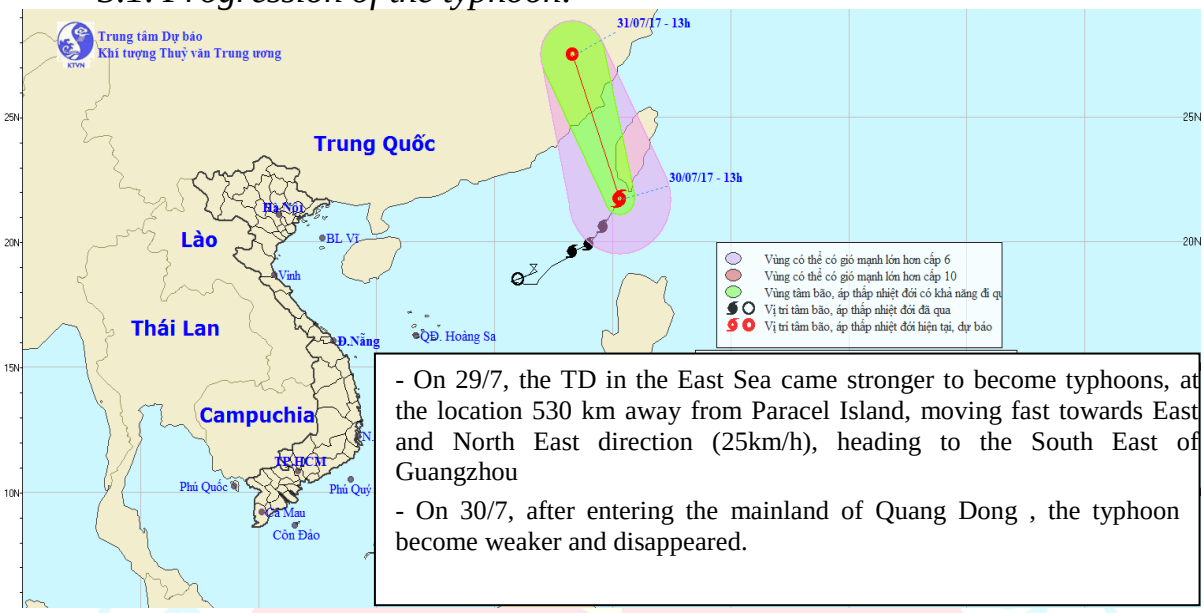


- On 22/7, a depression was formed at the center of the East Sea and evolving to become a typhoon. The Typhon (25km/h), heading to the mainland of South East of Guangzhou.
- On 23/7, at 7h00, after hitting Guangzhou (China) the Typhoon weakened to become a tropical depression then disappeared

2.2. Losses and damages: included in the losses and damages of the Typhoon no. 4.

3. The Typhoon no. 5 (HaiTang)

3.1. Progression of the typhoon:



- On 29/7, the TD in the East Sea came stronger to become typhoons, at the location 530 km away from Paracel Island, moving fast towards East and North East direction (25km/h), heading to the South East of Guangzhou
- On 30/7, after entering the mainland of Quang Dong , the typhoon become weaker and disappeared.

Path of the Typhoon no. 5 (HaiTang)

4. The Typhoon no. 6 (HaTo)

4.1. Progression of the typhoon:

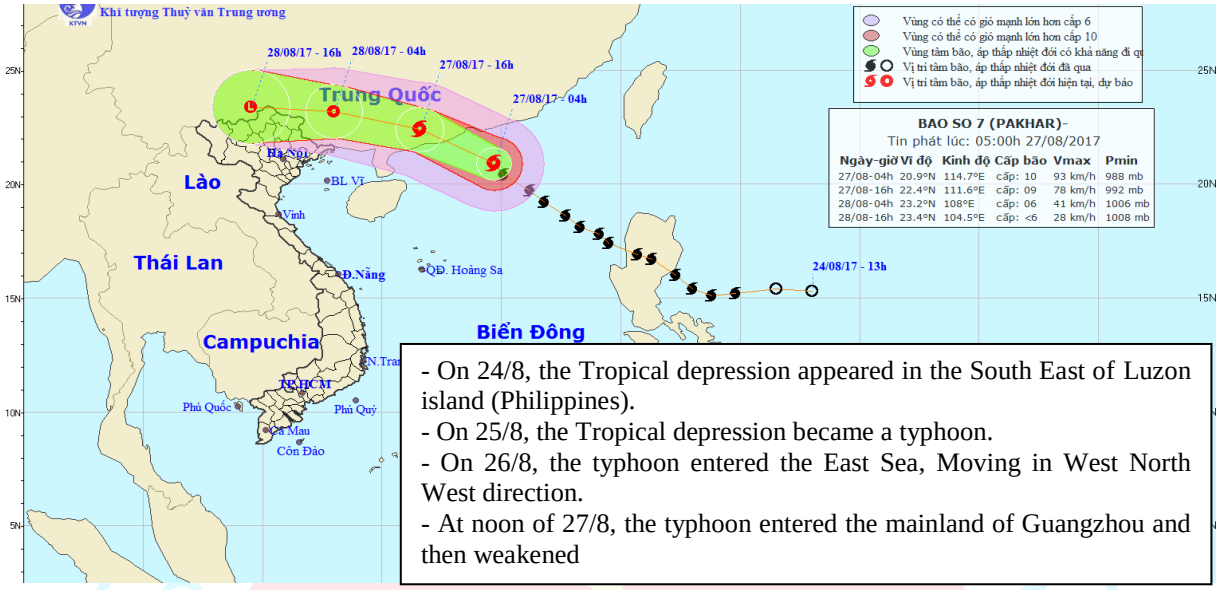
- On 20/8, there was a typhoon appearing in the North East part of Luzon island.
- On 21,22,23/8, the typhoon came to active in the East Sea, heading to the West, North West direction with the wind at level 13, gust at level 15.
- On 23/8,at 11h00, the typhoon entered the South of mainland Quangzhou and continued to move in West North West direction then weakened and disappeared.

4.3. Damages and losses:

03 deaths (Yen Bai: 01, Thai Nguyen: 02); 02 missing person (Ha Giang: 01, Lao Cai: 01), 2 injured persons; 7 collapsed houses; 428 damaged houses; 140 dislocated houses; 2819 ha of rice, vegetables and perennial crops were destroyed; 5137 cattles and, 7020 poultries were killed; 155 ha of aqua-farm were damaged. The total estimated loss: 82 billion VND.

5. The Typhoon no.7 (Pakhar)

5.1. Progression of the typhoon:



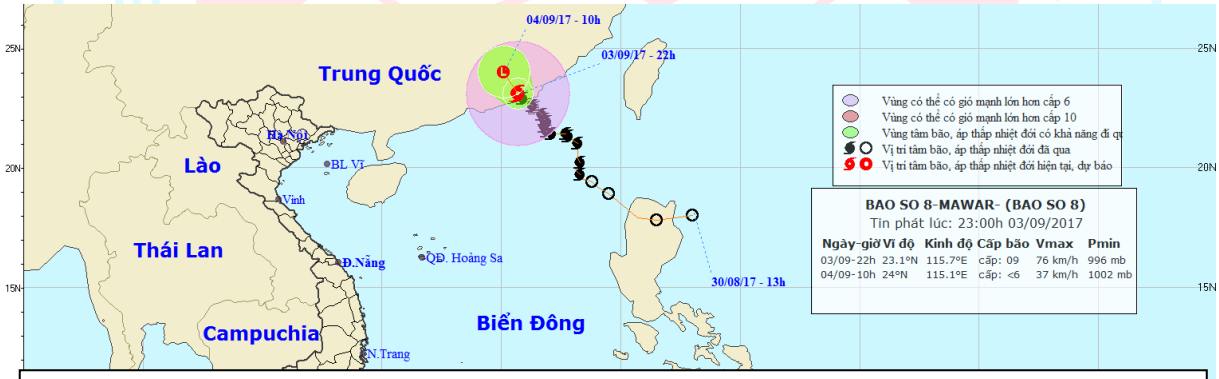
- On 24/8, the Tropical depression appeared in the South East of Luzon island (Philippines).
- On 25/8, the Tropical depression became a typhoon.
- On 26/8, the typhoon entered the East Sea, Moving in West North West direction.
- At noon of 27/8, the typhoon entered the mainland of Guangzhou and then weakened

5.2. Damages and losses:

The typhoon no. 7 appeared just 04 days after the typhoon no.6 and did not directly hit the mainland, therefore the main loss and damage caused by this typhoon was heavy rain causing floods in the rivers: Thao, Lo, and Chay from 27-28/08.

6. The Typhoon no. 8 (Mawar)

6.1. Progression of the typhoon:



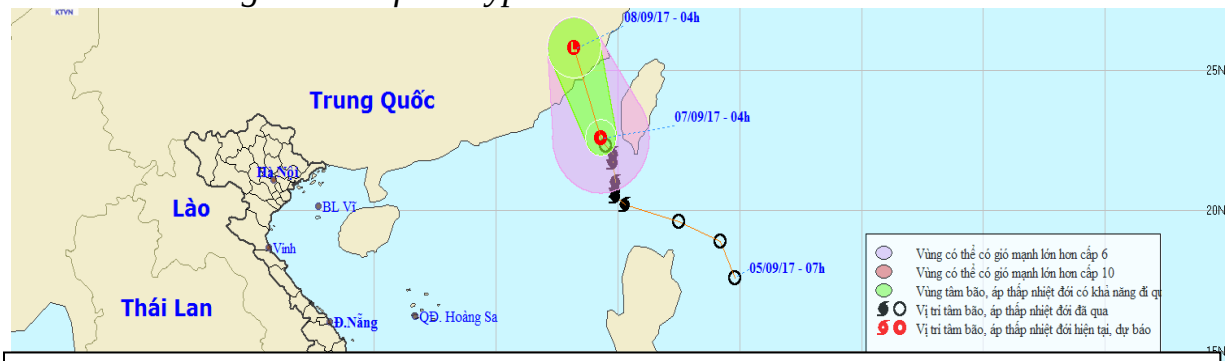
- On 30/8, the Tropical depression was active in the North West sea of the Luzon island (the Philippines).
- On 1/9, the Tropical depression became a typhoon heading North North West.
- On 02/9, the typhoon continued to move in North North West direction
- On 03/9 after entering the mainland of Guangzhou, the typhooned headed North West direction and then weakened.

6.2. Damages and losses:

During the time of the Typhoon no. 8, most areas of the country had rains, even some places had heavy rains affected and damaged some localities such as Tien Giang (34 damaged houses, total economic loss of 335 million VND), Bac Kan (landslide along the national road, the economic loss of 4.2 billion VND).

7. The Typhoon no. 9 (GuChol)

7.1. Progression of the Typhoon:



- On 05/9, the Tropical Depression became active in the East side of Luzon island (Philippines) heading North West and then became Typhoon
- On 06/9, after entering the North West part of the East Sea, the typhoon weakend back to a Tropical depression, moving towards North North West, then weakened and disappeared

8. The Typhoon no. 11 (Khanun)

8.1. Progression of the typhoon:

- On 12/10, a tropical depression was active in the East part of the Phillippines and became a typhoon.
- On 13,14,15, the typhoon was active in the East Sea Đông, heading West North West, with the wind of level 12, gust of level 15 at the typhoon's center.
- On 16/10, at 04h00, after passing the South of Leizhou Peninsula (China), weakened to tropical depression and disappeared
- Level of disaster risk: level 3

8.2. Damages and losses:

The typhoon Khanun occured near the time of another Tropical depression which caused heavy rains and floods in a wide area of Da, Thao, Hoang Long, and Red river and other rivers from Thanh Hoa to Quang Nam. As the results, the loss and damage caused by heavy rain and flood were very significant and can be calculated through the flood event from 09-13/10.

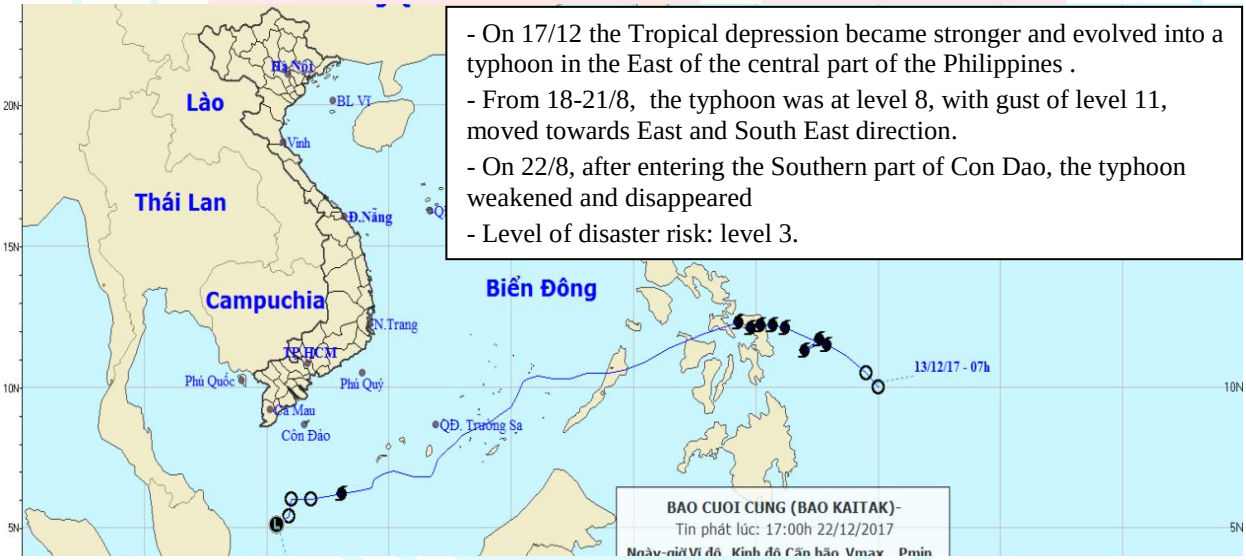
9. The Typhoon no. 13 (HaiKui)

9.1. Progression of the typhoon::

- On 09/11 The Tropical Depression (TD) was formed in the central region of the Philipines and becoming a big typhoon.
- From 10,11,12,13/11 the TD was moving towards North West direction, with the wind intensity of level 8, gust at level 11.
- On 13/11 after entering the North West of Paracel island, the tropical depression weakened to become a low pressure
- Level of disaster risk: level 3.

10. The Typhoon no. 15 (Kaitak)

10.1. Progression of the typhoon::



- On 17/12 the Tropical depression became stronger and evolved into a typhoon in the East of the central part of the Philippines .
- From 18-21/8, the typhoon was at level 8, with gust of level 11, moved towards East and South East direction.
- On 22/8, after entering the Southern part of Con Dao, the typhoon weakened and disappeared
- Level of disaster risk: level 3.

10.2. Damages and losses:

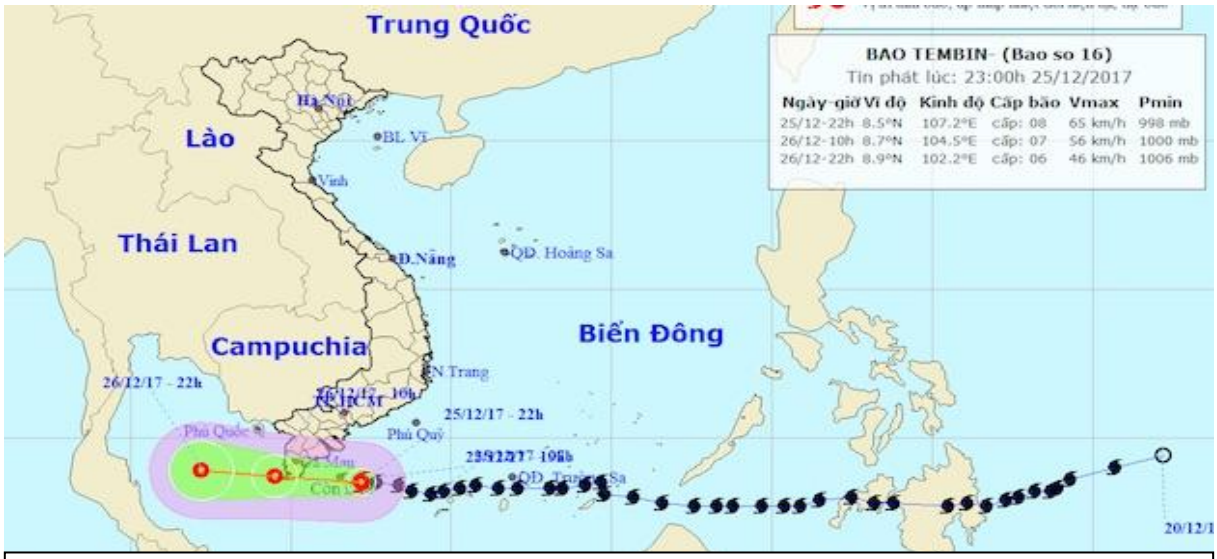
Under the impact of this typhoon there were 18 boat accidents in the East Sea, however all people on the board were rescued.

Other damages:

- 20 collapsed houses; 76 dislocated houses.
- 1.542m of eroded coast.
- 1.200m of damaged sea dykes.

11. The Typhoon no. 16 (TemBin)

11.1. Progression of the Typhoon:



- On 21/12 the Tropical depression in the South East deep sea of the Philippines evolved to become a typhoon.
- On 22,23,24/12, the typhoon headed West and become active in the East Sea with the wind at level 12 and gust at level 14.
- On 26/12, at 01h00 the Typhoon weakened to become Tropical Depression in the Coast of Bac Lieu, Ca Mau and disappeared slowly.

Typhoon Tembin is the last typhoon of the year, which had very fast movement, a wide affected area, strong intensity – similar level with the Typhoon Linda in 1997 and the Typhoon Durian in 2006, at the risk level 4 (highest level of risk in this region). Besides, the location of affected area had not been frequently hit by typhoons, therefore, the local community has limited experience in emergency response to the typhoon so the consequence of this typhoon can be tremendous as the typhoon no.12 in Khanh Hoa province.

11.2. Damages and losses:

- 16 collapsed houses; 54 damaged houses;

- 31,570 ha of paddy-field were destroyed; 20 ha of paddy-field and 202 ha of vegetables and flowers were flooded; 744.5 ha of flooded fruit trees;

- 13 broken fishing boats

- Broken traffic poles; 01 medium voltage electric pole collapsed.

HEAVY RAINS, FLOODS, FLASH FLOODS, AND LANDSLIDES/DEBRIS FLOW

In 2017, heavy rains have caused floods, flashfloods and landslides in the river systems of Northern provinces and the mountainous areas of Vietnam with higher intensity and frequency. The North witnessed 13 heavy rains and floods; in addition, the Central Coast and Central Highlands also had 09 heavy rains and floods, causing major human losses (150 deaths, 49 missing persons/ the total of 386 deaths and missing persons due to disaster) economic loss (13,579/ the total 60,000 billion VND).

1. Floods in the Da river from 24-25/5, affected and damaged provinces Thai Nguyen, Lai Chau, Phu Tho, Ha Giang.

Damages and losses: 03 deaths; 01 missing person; 5,793 ha of rice paddy và 247ha of vegetables were damaged; 210m of canals were damaged. Total loss: estimated to be 36.58 billion VND.

2. Floods in the Da river and Gam river and from 12-22/6, affected and damaged provinces of Thai Nguyen, Lai Chau, Cao Bang, Ha Giang.

Damages and losses: 02 missing persons, 05 collapsed houses, 65 flooded and damaged houses; 03 buffalos were swept away; 13.14 ha of paddy-field; 1.4 ha of corn field; 0.5 ha of vegetables were damaged; 12m of eroded dyke, 50m of eroded canals; 0.52 ha of aquacultural farm was destroyed; 01 mobile broadcast station, 02 power stations were damaged. The total loss: 1.59 billion VND;

3. Floods in Da, Gam, Nam Mu and Lo river from 27-30/6, affected and damaged provinces of Thai Nguyen, Tuyen Quang, Ha Giang.

Damages and losses: 01 death, 01 missing person; 04 collapsed houses, 214 damaged houses, 579 flooded houses and 27 dislocated households; 1,533 ha of paddy-field 106,65 ha of vegetables were destroyed; 5.700 of fruit trees were inundated; 12m of damaged dyke, 8,979m of eroded canals; 23 other structures were destroyed; 121,916m^3 of rock and soil were eroded; 3,025m of roads were eroded; 06 bridges were destroyed. The total estimated loss: 56.87 billion VND;

4. Floods in Da, Gam, Nam Mu, Thao and Lo river, from 03-06/07, affected and damaged provinces of: Yen Bai, Thai Nguyen, Lai Chau, Cao Bang, Ha Giang, Bac Can, Lao Cai, Vinh Phuc.

*Damages and losses:*12 deaths; 02 missing persons; 329 damaged and eroded houses; 93 flooded houses ;30 dislocated houses; 2, 323 ha of paddy-field, 193 ha of vegetables, 17 ha of aqua-farms were destroyed; 169 m of dykes, 1.311 m of canals were eroded and damaged; 04 temporary irrigation dams and 07 hydraulic works were damaged; 107,048 m^3 of rock and soil were eroded; 2410 m of eroded road; 11 destroyed bridges. The total estimated loss: 40.108 billion VND;

5. Floods in Da, Nam Mu, Gam, Lo, Thao, Chay, Cam Ly rivers and other river systems in provinces from Thanh Hoa to Quang Binh from 08-14/07,

affected and damaged provinces of: Ha Giang, Lao Cai, Lai Chau, Son La, Dien Bien, Cao Bang, Bac Kan, Thai Nguyen, Pho Tho, Ha Nam, Nam Dinh, Hoa Binh, Ca Mau and provinces from Thanh Hoa to Quang Binh.

Damages and losses: 14 deaths; 01 missing persons; 16 collapsed houses; 481 damaged and eroded houses; 72 inundated houses; 66 dislocated houses; 1,439 ha of damaged paddy-field; 43 ha of damaged vegetables; 82 ha of damaged aqua-farms; 404 m of destroyed and eroded dykes; 176 m of eroded and damaged canals; 03 temporary irrigation dams and 46 hydraulic works were affected; 176,148 m^3 of rock and soil were eroded; 331m eroded road; 04 destroyed bridges. The total estimated loss: 42.904 billion VND;

6. Floods in the rivers Da, Thao, Chay, Gam, Hoang Long, Hong, Day from 17-24/07, affected and damaged provinces of: Cao Bang, Bac Can, Ha Giang, Lao Cai, Yen Bai, Phu Tho, Ha Nam, Nam Dinh, Thanh Hoa, Nghe An, Hà Tinh, Quang Binh.

Flashfloods and landslide/debrisflows occured in the Sa Pa district, Lao Cai province (on 17/7); Xin Man district, Hà Giang province (on 20/7) and Ky Son district, Nghe An province (on 21/7);

Damages and losses: included in the losses of the Typhoon no. 2 (1,183 billion VND).

Flashflood in Sapa district, Lao Cai province

Flashflood in Xin Man district, Hà Giang province

7. Floods in the rivers of provinces from Ha Tinh to Quang Binh and the Central Highlands from 25-27/7, affected and damaged provinces of those river basins.

Damages and losses: included in the loss and damage calculation for the Typhoon no. 4 (3.3 billion VND).

8. Floods in the Da river and Thao river from 31/7-07/8, affected and damaged provinces of: Lai Chau, Dien Bien, Yen Bai, Son La, Cao Bang, Lao Cai, Bac Can, Thai Nguyen.

Flashfloods and landslide occured in the National route no 12 và 4H, Nam Po district, Dien Bien province (on 02 and 03/8); Thong Nong district, Cao Bang province (on 02/8); Mu Cang Chai district, Yen Bai province (on 03/8); Muong

La district, Son La province (on 03/8).

Damages and losses: 27 deaths; 15 missing persons; 239 collapesed houses; 470 nhà bị sạt, hư hỏng damaged and eroded houses; 398 dislocated houses; 538 ha of damaged paddy-field, 353 of damaged vegetatbles, 128 ha of damaged aqua-farms; 2,152 m of eroded and damaged dykes; 1110 m of canals and 154 of hydraulic works were destroyed and eroded: 187,069 m^3 of rock and soil were eroded; 98,430m of damaged roads, 06 bridged were broken. The total estimated loss: 884,428 billion đồng;

9. Floods in Dà, Nam Mu, Gam, Lo, Chay, Thao and Red rivers from 11-19/08, affected and damaged provinces of Yen Bai, Thai Nguyen, Lai Chau, Cao Bang, Ha Giang, Bac Can, Lao Cai, Vinh Phuc;

Flashfloods and landslides occured in: Ngan Son district, Bac Can province (on 14/8); Bac Ha, Bao Yen, Muong Khuong, Si Ma Cai districts of Lào Cai province (on 16/8);

Damages and losses: 02 deaths; 01 missing person; 71 damaged houses; 138 flooded houses; 32 dislocated houses; 708 ha of paddy-field, 42 ha of vegetables and flowers, 20 ha of aqua-farms were destroyed; 2,705 m of dykes; 04 temporary irrigation dams and 02 other irrigation works were broken; 37,395 m^3 of eroded soil and rock; 5,392 m of landslided roads; 07 broken bridges. Total estimated loss: 35.981 billion VND;

10. Floods in the Da, Nam Mu, Gam, Lo, Chay, Thao, and Red rivers from 23-25/08, affected and damaged provinces of: Yen Bai, Thai Nguyen, Lai Chau, Cao Bang, Ha Giang, Bac Can, Lao Cai, Vinh Phuc, Ha Noi;

Flashfloods and landslides occured in: Phu Luong and Dinh Hoa districts of Thai Nguyen (on 25/8); National Highway 3C, Bac Can province (on 25/8), Bat Xat district, Lao Cai province (on 26/8).

Damages and losses: 03 deaths; 02 missing persons; 454 damaged and eroded houses; 514 flooded houses; 140 dislocated houses; 2,558 ha of paddy-field, 295 ha of vegetables, 155 ha of aqua-farms were damaged; 5,161 cattles, 7020 poultries were killed; 1.000 m of canals were eroded and damaged; 75.567 m^3 of rock and soil were eroded; 2.306 m of eroded roads; 14 broken bridges. The total loss: 83.3 billion VND;

11. Floods in Thao, Lo, and Chay rivers from 27-30/08, affected and damaged provinces of: Tuyen Quang, Yen Bai, Thai Nguyen, Lai Chau, Lao Cai, Vinh Phuc;

Flashfloods and landslides occured in: Meo Vac district, National highway 4C, Ha Giang province (on 30/8).

Damages and losses: 01 death; 82 damaged houses; 02 flooded houses; 437 ha of paddy-field, 258 ha of vegetables and flowers, 04 ha of aqua-farms were destroyed; 03 cattles, 7,.020 poultries were killed; 45 m of dykes, 200m of canals were damaged and eroded; 10.300 m^3 of eroded rocks and soils; 03 broken bridges. The total estimated loss: 9.25 billion VND;

12. Floods in the Da, Thao and Hoang Long rivers, other rivers in provinces from Thanh Hoa to Quang Nam from 11-13/09, affected and damaged provinces of: Tuyen Quang, Yen Bai, Ha Giang, Bac Can, Thai Nguyen, Lai Chau, Lao Cai, Vinh Phuc and other provinces from Thanh Hoa đến Quang Nam.

*Damages and losses:*01 death; 104 damaged houses; 127 ha of damaged paddy-field; 607 m^3 of eroded rocks and soil; 03 broken bridges. The total estimated loss: 4.875 billion VND;

13. Floods in Thao, Hoang Long river, and other rivers of provinces from Thanh Hoa to Quang Nam from 16-17/09, affected and damaged provinces of Hai Phong, Nam Dinh, Thai Binh, Hoa Binh, Vinh Phuc and provinces from Thanh Hoa to Quang Nam;

Damages and losses: included in the total damage of the typhoon no. 4 (18.329 tỷ đồng):

14. Floods in Da, Thao, Hoang Long, Red river and rivers of provinces from Thanh Hoa to Quang Nam from 09-13/10, affected and damaged provinces of: Hoa Binh, Yen Bái, Phu Tho, Son La, Ha Giang, Ninh Binh, Thai Binh, Ha Noi and provinces fromThanh Hoa to Quang Bình;

Flashfloods and landslides occured in: Nghia Lo town, Yen Bai province (on 11/10) và Kim Boi, Tan Lac, Lac Son, Mai Chau, Ky Sơn districts of Hoa Binh (from 11-12/10).

Damages and losses: 81 deaths, 22 missing persons; 354 collapsed houses; 69,270 houses were flooded and damaged; 123,039 ha of rice, 64,691 ha of vegetables were flooded or damaged; 22,710 ha of industrial plants and fruit trees were collapsed or damaged; 40.993 of livestock were killed (mainly pigs); 1,041,908 of poutry were killed; 252 points of the dyke system were affected; 55,046m of dyke and 160,055m of canal were eroded. The total estimated loss: 12,383 billion VND;

Flood in Ngoi Thia river, Yen Bai province

Flash floods in Tram Tau, Yen Bai province

15. Floods in the rivers of provinces from Quang Nam to Khanh Hoa the North of Central Highland from 30/10-02/11, affected and damaged provinces of Quảng Ngai, Binh Dinh, Phu Yen và the Central Highlands;

Damages and losses: 01 collapsed house, 01 damaged house; 516 households and 11 communes were flooded; 1,296 ha of paddy-field and 615 ha of vegetables were flooded; 201 cattles and 4,360 poutries were killed; 553 m of concrete canals were destroyed; 150 m of river bank eroded; 10.504 m^3 of soil in canals were eroded; 25 ha of aquacultural farms were damaged; for transportation: 300 m^3 of rocks and soil were eroded along the provincial traffic routes.

16. Floods in rivers of provinces from Quang Binh to Ninh Thuan and the Central Highlands from 04-08/11, affected and damaged provinces from Quang Binh to Ninh Thuan and the Central Highlands;

Damages and losses: included in the loss of the typhoon no. 12 (22, 680 billion VND).

17. Floods in rivers of provinces from Quang Tri to the North of Phu Yen and the North of the Central Highlands from 19-21/11, affected and damaged provinces from Quang Tri to the North of Phu Yen and the North of the Central Highlands.

Damages and losses: 05 deaths, 02 missing persons; 8,289 inundated houses; in Quang Tri, Thua Thien Hue province many traffic routes were inundated.

18. Floods in the rivers of Thua Thien Hue to Khanh Hoa and the North of Central Highland from 22-26/11, affected and damaged provinces from Thua Thien Hue to Khanh Hoa and the North of the Central Highlands.

*Damages and losses:*08 deaths, 02 missing persons; 2,076 inundated houses, 4 houses need to be relocated; in Quang Tri, Thua Thien Hue province many traffic provincial and district routes were inundated.

Flood in Thua Thien Hue province

Flood in Hoi An, Quang Nam province

19. Floods in river from Quang Nam to Ninh Thuan and the Northern part of the Central Highlands from 01-05/12, which affected and damaged provinces of Quang Ngai, Binh Dinh and others in Nothern of the Central Highlands.

Damages and losses: 01 person missing; 4,207 collapsed houses; some traffic routes was flooded.

The loss due to other types of disasters are estimated to be of around 4.231/60.000 billion VND of total loss.

OTHER TYPES OF NATURAL DISASTERS

1. Coastal and Riverbank erosion:

River bank erosion, sedimentation and shoreline moving seaward or landward are natural phenomena, however, due to the impacts of human activities such as socio-economic development, building works on rivers, building houses alongside rivers and coastline, natural resources exploitation activities in the river basins, as well as the impacts of climate change and sea level rise, river bank and coastal erosion have become an increasingly complex and critical issue. According to reports from all provinces and cities, there are 2,055 erosion sites with the total length of approximately over 2,710 km nation wide, of which 91 sites are considered extremely dangerous with total length of 218 km, 735 dangerous sites of 911 km long; and 1229 normal sites of 1,581 km in length, as classified in Decision No. 01 / 2011 / QĐ-TTg dated 04/01/2011 of river bank and coastal erosion as stipulated in Decision No. 01 / 2011 / QĐ-TTg dated 04/01/2011 of the Prime Minister.

1.1. River bank erosion in Northern Viet Nam (From Ha Tinh Province)

Red River – Thai Binh River system:

- In recent years, many extremely dangerous and dangerous river erosions sites have appeared. The erosions have the length dozens to hundreds meter, some areas even having continuous erosion of of 3 to 5 km long.

- Recently, many embankments have been built and consolidated to prevent erosion and protect the dyke system, residential areas, infrastructure alongside river and coastal areas. However, due to budget constraints, only some urgent key areas are being focused on, leading to a nonsynchronous solution. On the other hand, due to new more complex and vigorous impacts, the erosion situation is also more complicated, potentially riskier and unsafe with many new shaped erosion. Some embankments built in previous years are also damaged, in which typical are in the following areas: Nang river, Ba Be district (Bac Kan); Ky Cung river bank, Na Sam town (Lang Son province); Boi river bank, Kim Boi district (Hoa Binh); Quy Phu (Nam Dinh); Phu Hung Cuong (Hung Yen); Thanh Quang (Hai Duong); etc.;

- In addition, the riverbank erosion along the border of Viet Nam and China is occurring complicated, as the consequences of natural impacts and the influence of massive construction in and along the river in China, which directly affects to the security of transportation infrastructure and works along the borderline, particularly the Red River bank erosion of Milestone M93 (2), from Lao Cai province M96 (2) to M97 (2); erosion occurring in Ka Long river bank of Binh Lieu district (Quang Ninh province), in Ma-lu-Thang (Lai Chau province) border gate, in Quay Son river bank of Ha Lang district, and Bac Vong river bank of Phuc Hoa district (Cao Bang province)

In the Ma River - Ca River system:

Among 567 erosion sites with total length of 481 km, based on criteria on classification of erosion levels stipulated in Decision No. 01/2011/QĐ-TTg dated 04/01/2011, there are:

- 31 sites/53km of extremely dangerous erosion;

- 345 sites/345km of dangerous erosion;

- 191 sites/83km of normal erosion.

1.2. River bank and coastal erosion in Central Coast (from Quang Binh province to Binh Thuan province) and Central Highland

According to statistic data from provinces, there are 809 erosion sites with total length of 1,279km along the river system and coastline of Central Viet Nam, based on criteria on classification of erosion levels stipulated in Decision No. 01/2011/QĐ-TTg dated 04/01/2011

- 15 sites/30km of extremely dangerous erosion;

- 209 sites/412km of dangerous erosion;

- 585 sites/837km of normal erosion.

Coastal erosion in Binh Thuan province

Coastal erosion in Cua Dai, Quang Nam province

1.3. River bank and coastal erosion in Southern of Viet Nam (From Ba Ria - Vung Tay down to the South)

According to statistic, there are 679 erosion sites with total length of 949km along the river system and coastal of Southern Viet Nam (Mekong Delta having 562 sites of total 788km in length), based on criteria on classification of erosion levels stipulated in Decision No. 01/2011/QĐ-TTg dated 04/01/2011

- 45 sites/135 km of extremely dangerous erosion (Mekong Delta having 40 sites/131km);

- 181 sites/154km of dangerous erosion (Mekong Delta having 154 sites/116km) ;

- 453 sites/660km of normal erosion (Mekong Delta having 368 sites/539 km).

1.4. Achievement in handling and preventing erosion and lanslide:

1.4.1 Erosion management and prevention:

- Completing the legal framework and documents step-by-step each levels and sectors to serve as basis for the management and prevention of river bank and coastal erosion;

- Clarifying responsibilities of all levels and sectors in the management, prevention and handling of river bank and coastal erosion;

- Identifying criteria for determining the nature of river bank and coastal erosion as a basis for prioritizing investment;

- Firmly implementing removal at landslide sites, thus minimizing damage to life and property;

- Step-by-step raising public awareness of riverbank and coastal erosion.

1.4.2 Erosion handling:

From 2011 to the present, with the budget sources from central and local governments, support of international organizations, 130 projects to prevent river bank and coastal erosion in provinces and cities have been implemented. Up to now, 856 projects have completed, with the total length reaching 1,068km, total investment up to VND 26,472 billion.

From 2008 to date, 26 over 28 coastal provinces / cities have planted a total number forest of 26,461ha, of which 24,022ha is newly planted, 2,439ha is reforested.

In furtherance of the Prime Minister's Decision No. 1776/QD-TTg dated 21/12 2012 on approval of the Program on arrangement of residents living in natural disaster area, particularly difficulty areas, border and island areas, special-used forest and freely migrating in the period of 2013-2015 and with the view to 2020, from 2013 to date, 55 over 63 provinces/cities have relocated 33,866 households out of the natural disasters hit areas (areas having high risk of landslide, frequent flooding) to safe places, thereby significantly limiting damage to human and property caused by erosion and landslide.

Most of the erosion and landslide prevention works built are stable and effective.

By observing, evaluating and gaining practical experience from existing coastal anti-erosion systems nationwide (model 1/1), the construction of embankments for erosion control mainly is embankment slope protection, only reinforced with some welding torches at key locations. As for prevention of shoreline erosion, there are integrated solution combining tilted embankment slope solution to protect embankment slope, beach and construction of welding system, sea waves reduction dyke or planting form a shield against wave, protecting the bank.

Based on science and practical experience, in the past few years, the design and construction of anti-erosion works have made improvement in term of technology, material and construction method, which suited conditions of each area

in order to increase stability, integrate multi-purpose, ensure environmental sanitation and economic conditions, and has delivered remarkable effects, typical works to mentioned are embankments of the Hoa Binh township, Bac Kan township, the cities of Lao Cai, Yen Bai, Phu Tho township, Thai Nguyen, Phu Ly, Nam Dinh, Thai Binh, Hoi An town, Da Nang Sa Dec, Long Xuyen township, Tra Vinh township etc. As for high risk areas, thanks to resolutely directs, complicated erosion and landslide locations were treated successfully, such as Red river bank of Tan Duc, Thuy Van, Phong Van (Ha Tay), Trung Ha (Vinh Phuc); Ma river bank in Vinh Thanh commune (Thanh Hoa); River bank of Tien River (An Giang).

Overall, both structural and non-structural solutions have been comprehensively developed; initially integrating planning and construction of river bank and coastal erosion prevention works into socio-economic development master plan, combining multi-targets. Particularly, various sources of funding have been mobilized, including Governmental supports via consultations of the related ministries and sectors.

2. Thunders, typhoons, whirlwinds and hails:

During the transition of seasons in early 2017, extreme disasters such as thunder, typhoons, whirlwinds and hails often occur with strong intensity and wide ranges. In 2017, 80 thunder, typhoons, whirlwind and hail occurred across the country that killed 24 people (including 7 female, 1 child and 16 others subjects), caused 1 missing case and injured 30 people. Those events also caused serious damage in property with 515 houses completely destroyed, 152 severe destroyed and 3244 seriously damaged. There were also other losses and damage for agriculture, forestry, salt production, irrigation, aquaculture, transportation etc., which costed approximately VND 130 billion.

In 2013, the People's Committee of Dong Thap province promulgated the Project called "Prevention of lightning strikes in Dong Thap province up to 2020". Up to now, 04 lightning alert stations have been built in Hoi An Dong – Lap Von district, Phuong Thinh – Cao Lanh district, Truong Xuan – Thap Muoi district and Phu Cuong – Tam Nong district. The Project is very effective in the early warning of thundertyphoons and whirlwind and rainy events, helping people in preparedness and minimizing damage caused by various types of natural disasters. .

3. Severe and extreme cold:

In 2017, there were 22 cold and heavy cold snaps affecting our country, including 04 heavy cold resulting into extreme and severe cold snaps in the Northern and North Central provinces of Viet nam, specifically:

- First Snap: During 12-13/01/2017, hitting Northern and North Central provinces, lowest temperatures recorded as: Sa Pa 6.5^{0}C, Dong Van 5.9^{0}C, Tam Dao 7.3^{0}C, Mau Son 3.2^{0}C, Thanh Hoa 12.9^{0}C;

- Second Snap: During 24-26/02/2017, hitting Northern and North Central provinces, lowest temperatures recorded at some places as: Sa Pa 4.8^{0}C, Dong Van 5.9^{0}C, Tam Đao 6 ^{0}C, Mau Son 2.1^{0}C, Hoi Xuan 12.6^{0}C;

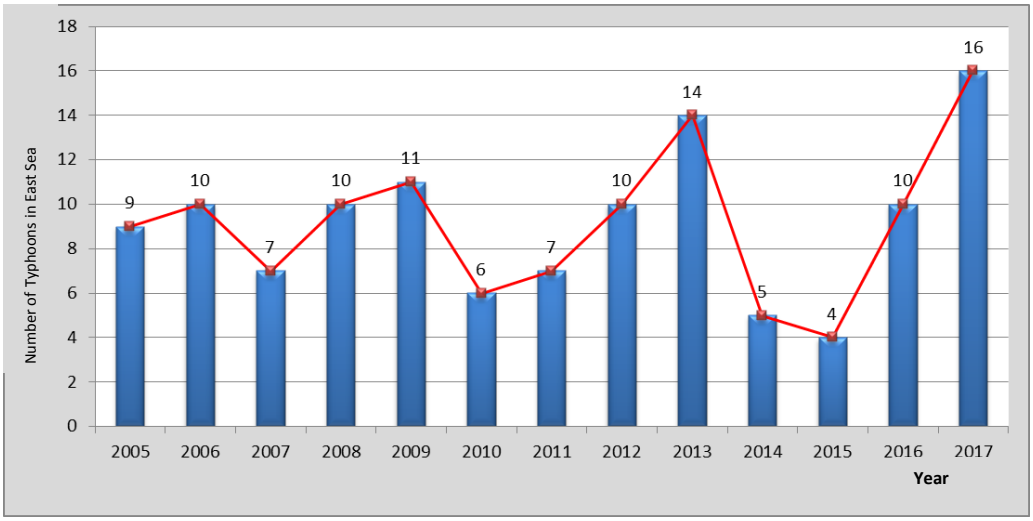
- Third Snap: During 25-26/11/2017, hitting Northern and North Central provinces, lowest temperatures recorded at some places as: Sin Ho 5.4^{0}C, Sapa 3.4^{0}C, Mau Sơn 1.9^{0}C, Ba Vi 13.4^{0}C;

- Forth Snap: During 17-20/12/2017, hitting Northern and North Central provinces, lowest temperatures recorded at some places as: Sin Hồ 6,3^{0}C, Sapa 5^{0}C, Mau Sơn 3.8^{0}C.

Severe cold and extreme cold weather in 2017 were not too harsh and caused negligible damage.

2017 NATURAL DISASTER RECORDS IN VIET NAM

RECORDS ON DISATER OF 2017



Number of Typhoons happened in East Sea 2005 - 2017

16 storms and 4 tropical depressions

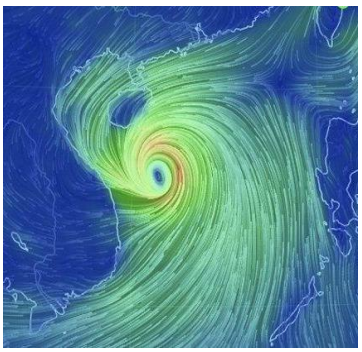
First time warning on disaster at level 4 (Typhoon number 10, 12, 16)

Heaviest typhoons in the past years affecting Centre and Central Highland (Typhoon no. 10, no. 12); hit at high tides

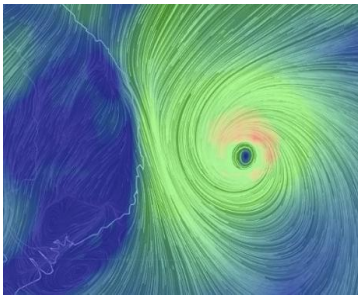
History has never recorded a level 12 typhoon hitting East Sea in December (Typhoon no. 16)

Typhoon no. 12 (Damrey) and heavy rain and flood afterward causing highest death toll (123 dead and missing)

In 2017, largest number of People's Army and policemen were mobilized: 318.740 military men and more than 10,000 policemen



Typhoon no. 10 strongest in the past 30 years in Hà Tĩnh – Quảng Bình



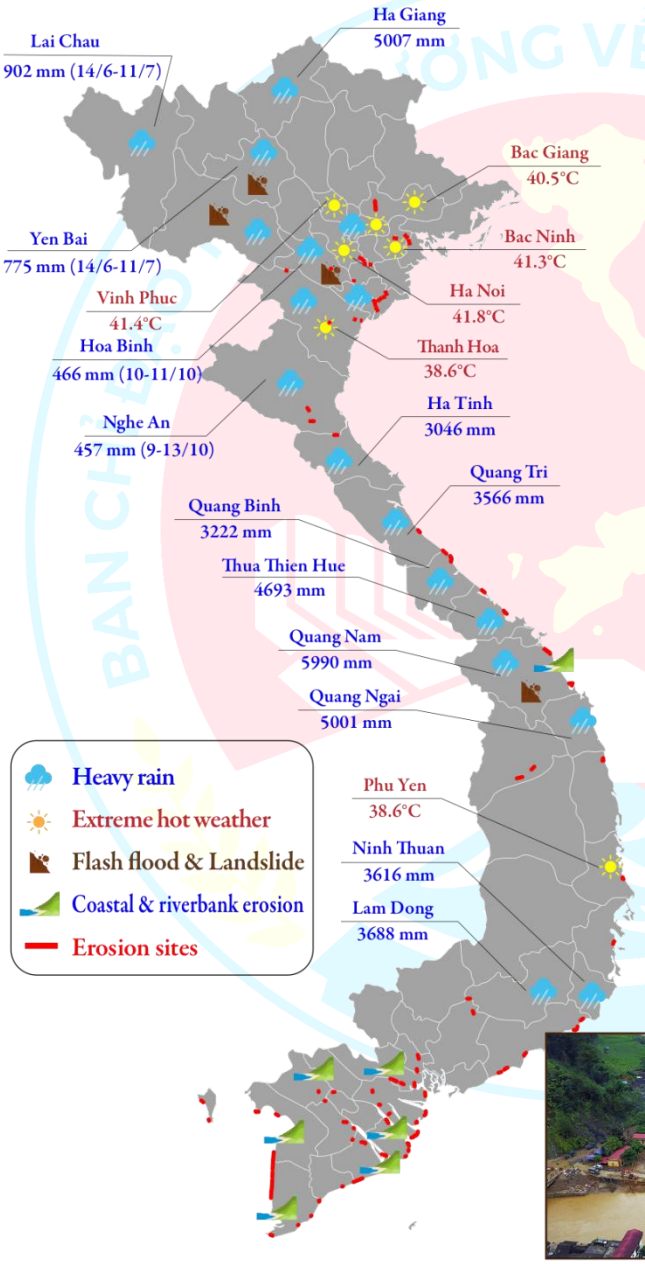
Typhoon no. 12 strongest in history of South Central Viet Nam

DISASTER RECORDS IN 2017

RAIN, FLOOD, FLASHFLOOD, LANDSLIDE, EXTREME HOT

RECORD OF 2017 NATURAL DISASTERS

HEAVY RAIN, FLOOD, FLASH FLOOD,LANDSLIDE & HOT WEATHER



RECORD OF FLOOD & HEAVY RAIN

- Big flood in Hoang Long river (Ninh Binh);
- Flood peak at Ben De station was 5.53m, 1.53m higher than alarm level 3 and 0.29m higher than record of 1985.
- Heavy and unusual rain in the area of Hoa Binh hydropower reservoir, causing big flood. The water flow to the reservoir was 15940m ^{3}/s.
- Hoa Binh hydropower plant opened 8 flood gates to discharge water.

COASTAL & RIVERBANK EROSION

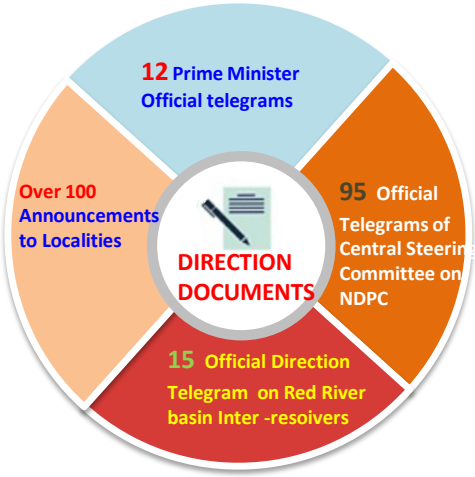
- Coastal and riverbank erosion has become severe, especially in central coastal area and in the Mekong delta.

Coastal erosion in CuaDai (Quang Nam)

FLASH FLOOD AND LANDSLIDE

- 02-04/8/2017 in Muong La district (Sơn La), Mu Cang Chai district (Yen Bai) (32 deaths and missing persons);
- 10-12/10/2017 in Tan Lac, Da Bac districts, Hoa Binh city (Hoa Binh) (20 deaths and missing persons);
- 04-05/11/2017 in Bac Tra My & Nam Tra My districts (Quang Nam) (11 deaths and missing persons).

RECORDS IN 2017 DIRECTION AND COMMAND



12 Steering Meetings chaired by Government's leaders

Over 41 missions of Steering Committee to supervise and urge the localities

More than 20 missions lead by Government's leaders

PREVENTION AND RESPONSE TO NATURAL DISASTERS

Over 28 million SMS messages for alert, especially to district level

For the first time in history Hoa Binh hydropower dam discharged water from its 8 sluice gates during 16h30min

Established a consultancy team for calculating and managing reservoirs in Central Vietnam and the Central Highlands

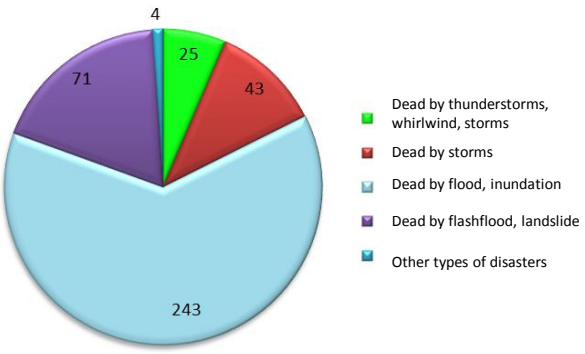
Properly managed the reservoirs operation, reducing Huong River and Bo River flood peak by nearly 60cm and 35cm respectively

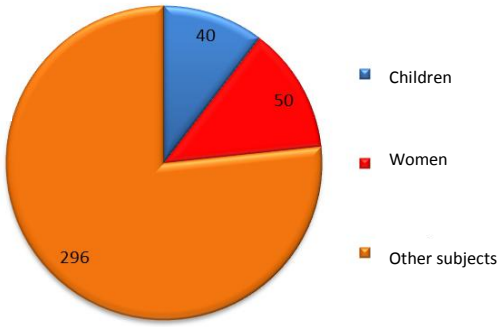
DAMAGE CAUSE BY DISASTERS IN 2017

DEATH TOLL

386 dead and missing

664 injured





PROPERTY DAMAGE

8.166 houses completely damaged

363.890 hectares of rice, crops damaged

Estimate of Economic loss
VND 60,000 billion

LOCALITY MOST EFFECTED IN 2017

Yen Bai province 53 dead and missing

Hòa Bình 38 dead and missing

KHANH HOA

2.817 houses completely damaged

70.900 cages and rafts destroyed

14,7 billion in VND

RECORDS IN REMEDY OF DISASTERS' CONSEQUENCES

DOMESTIC SUPPORT

VND 4,605 billion; 14,674 tons of rice; 3.376 tons rice seeds; 300 tons of corn seed; 37,7 tons of vegetable seeds, thousands kinds of vaccines, drugs, fumigation chemicals

Emergency relieft received above VND 191,76 billion (Red Cross Society: VND 124 billion, Fatherland Front Central Committee: VND 67,76 billion)

INTERNATIONAL SUPPORT

ONE ASEAN ONE RESPONSE

- 27.6 tons of commodity valued USD 146 thousand to remedy consequences of flashflood and landslide
- 40 tons of commodity valued USD 175 thousand to remedy Typhoon 12 and flood

- 10 tons of commodity valued USD 130.4 thousand USD in remediation of Typhoon 10
- 0.6 tons of commodity cost USD 200 thousand in remediation of Typhoon 12 and flood

40 tons of commodity + medical supply + USD 5 million to support victims of Typhoon 12 and flood

100 tons of commodity cost valued USD 450 thousand for victims of Typhoon 12 and flood

260 tons of commodity valued USD 1.5 million for Typhoon 12

200,000 USD

44 tons of commodity valued USD 166 thousand for Typhoon 12 and flood

10,000 tons of rice

USD 4.21 million from Central Emergency Response Fund(CERF)

ACHIEVEMENTS OF NATURAL DISASTER MANAGEMENT ACTIVITIES

Thanks to great and joint efforts of the entire political system from central to local levels, in recent years, disaster management activities have achieved remarkable results as follows:

1. Significant reduction in human losses compared to the previous periods, the average number of deaths and missing persons during the 10 year period from 1998-2007 is 497 persons/year and 303 people/year during 2008-2017, equivalent to a decrease of 39%.

2. Nearly 110,000 vessels operating on the sea received typhoon and tropical depression forecast and warning information so that they could actively move out of dangerous areas. The number of vessels and ships sunk due to typhoons, typhoons and tropical depressions has decreased significantly compared to the previous period.

3. Strengthen resilience of disaster management works such as river dykes, sea dykes, reservoirs (which have been built during the last 10 years) before typhoons, typhoons, floods and droughts

4. Ensure safety, social security and order, evacuate hundreds of thousands of people, and ensure disease free evacuation in the event of major disasters such as typhoons and floods on large scale.

5. Timely stabilize daily lives and recover production activities, environment and health of people and communities following natural disasters, especially electricity and transport systems to ensure sustainable agriculture and economic growth.

6. The participation of communities, enterprises, national and international organizations in disaster recovery and reconstruction has been ever expanded and diversified, contributing significantly stabilized and recovered livelihood and production activities of people, especially in 2017.

MAIN CAUSES

1. The entire political system and Vietnamese people have taken rigorous actions to respond to and recover natural disaster consequences. There has been a profound change in the perception and awareness of people, even ones living in rarely affected area (after Typhoon Linda, people and local governments in the Mekong Delta actively evacuated and displaced 353,000 people when the typhoon No. 16 is expected to land with extreme magnitude).

2. Legislation system on natural disaster management has been step by step supplemented and improved to create a legal corridor to improve the management and direction of natural disaster management activities. There exists Laws on Natural Disaster management, Law on Dyke Management, Law on Hydraulic works. There are also other sub-law documents to guide the enforcement of Laws, including decrees, decisions of the Prime Minister, circulars and strategies and

disaster management plans at national level, disaster preparedness and response plans, etc. which have been developed and implemented.

3. Organizational structure:

- At the central level, the newly established Vietnam Disaster Management Authority under the Ministry of Agriculture and Rural Development has promoted its advising role to the MARD and the GoV in terms of state management functions in disaster management. The Vietnam Disaster Management Authority also performs the task of a Standing office which advises and assists the Central Steering committee for natural disaster prevention and control.

- At local level, the Chairmen of People's Committees are also Chairman of the Steering Committees for Natural disaster management at provincial level and can mobilize the entire local society in the disaster management activities.

4. Natural disaster forecasting and warning activities have seen positive changes when disaster information has been timely and accurately disseminated to the natural disaster management agencies. Earthquake and tsunami alert systems have begun to operate. The Central Steering Committee for Disaster Prevention and Control regularly monitors and refers to such international and regional forecast stations as Windy, Philippines Radio, US Navy, Japanese Radio etc. in order to actively produce response guides to natural disasters.

5. Natural disaster management infrastructure for has been step by step invested, strengthened and upgraded, especially river dykes, sea dykes, reservoirs, canals, irrigation works and boat shelters[1]. Other infrastructure such as rescue roads, community evacuation shelters, safe schools in disasters, communication, etc. have also been built using different sources of fundings and have been brought into play to mitigate damages caused by natural disasters.

6. Advising and directing activities during natural disasters, especially at the central level, have been significantly effective and innovative to overcome difficult conditions in terms of infrastructure, equipment, supporting tools etc. to

7. The search and rescue work has been paid more attention through large investments in search and rescue equipment and 04 modernized search and rescue regional centers and 07 SAR ships. Search and rescue force as police and military regularly carried out training and manoeuver activities for capacity building with thousands of participations of officers and soldiers every year.[2]

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[1] So far, 5,212 km of river dykes, 2,681 km of sea dykes; 6,648 reservoirs with a total capacity of about 12.5 billion m3 and 56 cascade hydropower reservoirs with total flood control capacity of 9.35 billion m3; 64 ship anchorages have been built among them 51 ship anchorages have been completed which can provide shelter for 40,000 ship; 1,349 meteorological stations; 857 population clusters and 119 embankments protecting residential areas have been built to ensure the safety of 191,000 households in flooded areas; 12,937 out of 25,137 poor households in the Central region have been supported to build their houses with typhoons and floods resistant features..

[2] In 2017 alone, 443,740 officers and soldiers (144,985 soldiers, 173,755 militia, 125,000 police men) and 10,597 vehicles have participated in the disaster management to timely deploy response and rescue actions in case of emergency. Also in the year, for the first time, the Vietnam Disaster Management Authority developed and endorsed a program to coordinate with the militia force to improve the operation of disaster response forces at grassroot level.

8. The training and capacity building activities for communities have been ever strengthened which resulted in improved perception and awareness of local authorities and people on natural disaster management[3]. Communications have created great changes, contributing effectively to the transmission of information during the directions of natural disaster responses and providing guides on disaster response skills to communities. Specialized equipment has been provided for online meetings on disaster prevention and response directions. Telecommunication operators have been asked to send messages to communities in dangers in major disasters (in 2017, about 28 million subscribers in disaster areas have received warning messages as requested by the Central Committee).

9. The application of science and technologies in natural disaster management has been stepped up and strengthened in recent years. National disaster databases have been initially developed and decision making support tools have been established. Solutions applying sciences and technologies for landslide and flash flood prevention and control in mountainous areas have been initially implemented.

10. International cooperation has seen many active and effective activities relating to natural disaster management. Vietnam has actively joined international and regional organizations and forums relating to natural disaster prevention and mitigation. Cooperation in the Mekong River Commission is strengthened. Especially calls for international assistance to disaster affected localities have been launched.

11. Remediation activities for disaster consequences have been urgently and effectively deployed by mobilizing all available foreign and domestic resources including international organizations, donators and enterprises who bear love and sympathy towards affected people, have timely and jointly support and visit affected people during natural disasters with a hope they will soon overcome the disaster and stabilize their lives soon.

[3] So far, nationwide awareness raising campaigns have been launched in 1,900 communes out of 6,000 communes which are regularly affected by natural disasters. 1,320 communes have developed disaster risk maps; 1,475 trainers at provincial level have been trained; 24,023 training materials have been prepared and transferred to local authorities and relevant agencies; 50 short films have been aired on television channels.

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CHALLENGES AND LIMITATIONS

In addition to the above achievements, current natural disaster management activities still reveal following shortcomings:

1. Challenges:

- Human damages are still quite high, especially due to typhoons, floods, flash floods, landslides;

- Physical damages are increasingly serious due to expanded economic scale, especially in the fields of agriculture, fisheries, dykes, irrigation, transportation, electricity grids.

- The resilience of infrastructure to major natural disasters such as strong typhoons is quite limited, especially in the Mekong Delta and coastal areas or Central region and the Red River delta during big floods.

- Although many dykes and reservoirs are weak and risky, adequate funding is not available to repair or upgrade them which may result in failure (244 km of dykes are in danger of being overflowed, 750 km of dykes are in danger of failure, 700 reservoirs are damaged and become risky).

- There are a large number of fishing boats and aquaculture cages which will become risky during large typhoons and economic losses if any will take time and cost to restore.

- Although Year 2017 with many disasters has passed, 13,246 households in 20 provinces and cities are still relocated, homeless or living in unsafe places.

- Landslide and flash floods are becoming more frequent and serious in mountainous areas, yet no effective solution has been worked to ensure safety for people living here.

- Riverbank and coastal erosion tends to rise, especially in the Mekong Delta and Central Coast;

- Inundation in urban and coastal areas is intensifying and there are no effective measures for the situation;

- Focal agencies for natural disaster management have not fulfilled their mandates by synthesizing, coordinating and speeding up post-disaster recovery and reconstruction activities.

- Forecasts have been improved to a certain extent in terms of accuracy; yet many types of natural disasters such as hail, flash flood, landslides have not been effective prevented and controlled;

- Awareness, skill and preparedness for disaster management of governments and people in less affected areas are limited.

- Communication and education on natural disaster management have not been effectively implemented at community level.

2. Limitations

2.1 Objective reasons:

- Climate change is characterized by abnormal, irregular, extreme aspects and increased intensity. Resistance of infrastructure is limited, disaster forecasting and warning science and technology are lowly developed and forecast quality and accuracy are not ensured for a large geographical area. Heavy rains, flash flood

and landslides in small areas have not been timely forecasted, prepared and responded[4];

- Natural conditions of different regions also explain for strongly divided and dense river systems and long coastline.

- Overexploitation of water in the upstream of the Red River and Mekong River has altered natural laws and increased natural disaster risks in downstream areas.

2.2 Subjective reasons:

a) Awareness:

- The awareness of the local authorities and state management agencies on disaster management is still limited; mainly focusing on responses rather than due prevention and remediation activities;

- Investments in the strengthening relevant mechanisms, institutions and policies have not been adequate; attention to the disaster preparedness and reconstruction following disasters is not enough; appropriate measures and solutions have not been worked out; natural disaster risks become more popular.

- Habits and customs of residing and producing along riverbanks and coasts of some communities explain their high risk to strong impacts of major natural disasters and human and property damage.

- The awareness of some enterprises and people on the risk and danger of natural disasters is limited, especially during their production activities and lives.

b) Legal system, mechanisms and policies:

- Legislations on disaster management have many inappropriate provisions and lack synchronism; they are either not promptly promulgated or amended. Actual enforcement thus is challenged in practice;

- Disaster management strategies, planning and plans have incompatible contents. Planning and actual implementation are not matched. Integrated disaster risk management is not taken into account seriously.

- There are no preferential and incentive policies for staff working in disaster management sector, so it is difficult to attract highly qualified staff who will be dedicated to their work.

c) Organizational structure:

- Most of the state management agencies for natural disaster management are located in ministries and in local administrations are cum positions. Full-time staff is not available

- Members of the Steering Committee and Command, Ministries and local governments are part-time positions. They do not spend all of their time on natural disaster management activities. Especially capacity of responsible staff at

[4] Density of rainfall gauging stations is about 250km^2 per station and these stations are unevenly distributed, i.e. 1,000km^2 per station in the Northern mountainous area and the Central Highlands. Effective rainfall monitoring needs a rainfall gauging station density of 40-120km^2 per station (in Japan, Korea: 25-35km^2 per stations).

commune and district levels is quite limited.

- Task allocation is not effective for different disaster prevention and response situations or different disaster levels. This is very important for active development of effective disaster risk preparedness and response scenarios.

d/ Organization of natural disaster management tasks:

- The development of population arrangement plans for natural disaster prone areas is still inadequate, especially in frequently flooded areas in the Central Region, areas highly risky of flash floods and landslides in the northern mountainous areas and canals along the Mekong delta.

- The integration of disaster management activities into socio-economic development planning of ministries, sectors and local governments has not got due attention, especially the construction of disaster prevention infrastructure. This results in higher risks for local infrastructure and community;

- Disaster management infrastructure is not well developed: a number of river dykes, sea dykes, reservoirs, ship anchorage etc. cannot ensure safety in disasters. The construction of these works is also delayed.

- The management, operation and exploitation of reservoirs, irrigation works and dyke systems are limited. Some operation agencies/entities are not qualified or accountable, leading to poor management and degraded works.

- Information, communication, skill instruction, community awareness activities are not effective. Some information has not reached the target groups in remote areas. Influence and magnitude of wind and typhoon levels on infrastructure are not highlighted and well explained.

- Disaster prevention, preparedness and response are not effective in terms of the preparedness of human resources, materials, means, equipment, and essential commodities adopting 4-on-the-spot approach;

- Remediation activities are delayed which mainly focus on immediate solutions for production restoration rather than on sustainable and long-term solutions;

- Disaster management science and technologies are not well developed. Many researches and studies are far from practical and difficult to apply;

- Inspection, examination and handling violations in the field of disaster management are not adequate and effective. Coordination mechanism between relevant sectors and stakeholders is not clearly developed.

e) Resources:

- Human resources of the sector are insufficient in terms of quantity and quality, especially ones working at grassroots level;

- Disaster management facilities and equipment are insufficient and out of date which showed is a huge gap in the region;

- There is no separate budget line for natural disaster management so that annual plans can be effectively developed and unusual situations can be responded.

- The development of disaster prevention and disaster risk insurance fund has been slow. There is no national disaster prevention fund which is the main reason to ineffective mobilization of resources at the central level and poor coordination between localities as well as slow implementation of disaster management tasks.

- Socialization and encouragement of private sector participation in the development of disaster prevention works are not as desired.

- The sanctions in natural disaster management are not strong enough to lead to limited law enforcement.

PART III

SOME PHOTOS OF DISASTER MANAGEMENT ACTIVITIES IN 2017

V. PHOTOS OF DISASTER PREVENTION, CONTROL AND RESPONSE DIRECTIONS

Photo:Prime Minister Nguyen Xuan Phuc chaired an online conference to direct responses to Typhoon 16

Photo: Prime Minister Nguyen Xuan Phuc inspected the remediation activities to overcome aftermath of Typhoon No. 10 in Quang Binh province

Photo: Deputy Prime Minister Trinh Dinh Dung hosted online conference with 25 provinces and cities to direct responses to typhoon No. 10

Photo: Vice Prime Minister Trinh Dinh Dung checked the erosion status in Khanh Tien commune, U Minh district, Ca Mau in May 2017

Photo: Minister of MARD - Chairman Nguyen Xuan Cuong and Vice Minister Hoang Van Thang supported flood victims

Photo: On the morning of 25 July 2017, Minister of MARD - Chairman Nguyen Xuan Cuong chaired an online meeting with 6 coastal provinces from Thanh Hoa to Thua Thien Hue on response directions to Typhoon 04.

Photo: Deputy Minister Hoang Van Thang - Standing Deputy Chairman of the Central Steering Committee for Natural disaster prevention and control chaired an online meeting to direct responses to Typhoon No. 2 on July 16.

Photo: Director General Tran Quang Hoai - Standing Member of Central Steering Committee for Natural disaster prevention and control presided over the online meeting to direct responses to Typhoon No. 12 and typhoon related flood and rains

Photo: Responsible forces urgently evacuated people out of highly risky area of Typhoon No. 10.

Photo: Responsible forces persuading ships to anchor in safe places before Typhoon No.16

Photo: Dam and sea embankment in Thanh Hoa are broken by Typhoon No. 10

Photo: Dam and sea embankment in Thanh Hoa are broken by Typhoon No. 10

Photo: Electricity pole broke down due to Typhoon No.2 in Ha Tinh province

Photo: Many fishing boats anchored in Hon La are completely damaged by Typhoon No. 2

Photo: Wrecks following Typhoon No. 12 in Hon Ro, Nha Trang, Khanh Hoa province

Photo: Damages caused by Typhoon No.14 in Ho Chi Minh City

Photo: Wrecks following storm No. 12 in Hon Ro, Nha Trang, Khanh Hoa province

Photo: Nearly 500,000 people are relocated to safe place by the local authorities before the Typhoon no. 16

Photo: Scene of landslide aftermaths in Block 12, My Hoi hamlet, My Hoi commune, Cho Moi district in April 2017

Photo: Many districts in Thai Nguyen province were flooded under more than 1 m of water in July 2018 and emergency state has been declared by many localities.

Photo: People in Quang Dien commune (Krong Ana district) harvest rice before the flood in May 2017

Photo: Landslide in Ha Tinh province (21 July)

Photo: Flashflood and landslide in Ha Giang province (20 July)

Photo: Landslide in Ha Giang province (9 July 2017) claimed the death of two children

Photo: Flooding caused by heavy rain following Typhoon No. 4 (Sonca) in Hai Lang and Trieu Phong districts, Quang Tri province

Photo: Leaders of Ha Tinh People's Committee inspected and direct functional forces to ensure safety of ships and be well prepared to respond to super typhoon Doksuri

Photo: People in Tran De district (Soc Trang) braced their houses to actively respond to Typhoon No. 16.

Photo: House damaged, roof blown off due to Typhoon No. 10 (Doksuri) in Ky Anh, Ha Tinh province

Photo: People in Can Thanh Town, Can Gio District (Ho Chi Minh City) are relocated to safe place before the Typhoon No.16

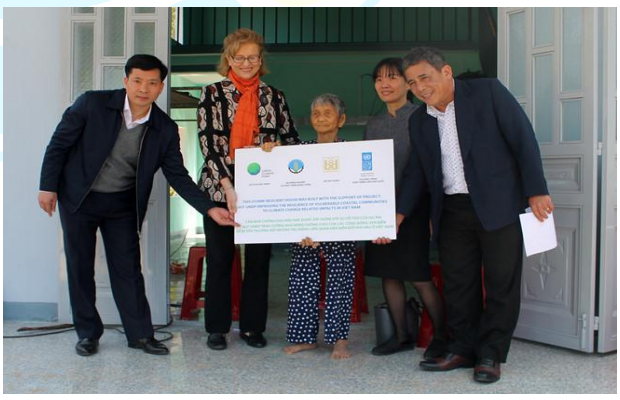


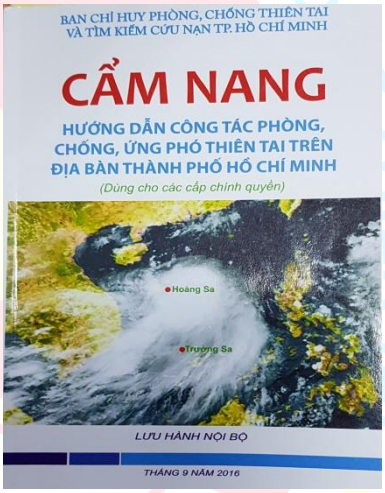
Photo: Representative of MARD leaders and UNDP handed over safe houses to coastal people in Duc Phong commune, Mo Duc district, Quang Ngai province.

PART IV: INTRODUCTION OF SOME GUIDLINE, EDUCATIONAL AND COMMUNICATION DOCUMENTS

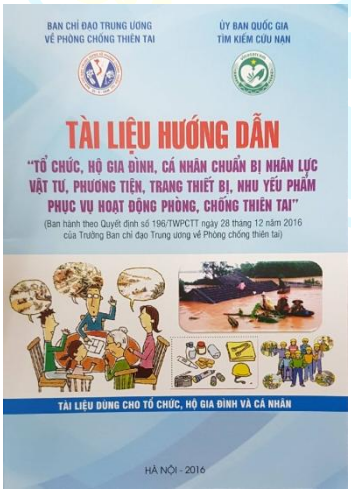
Legal documents on flood and storm prevention and control and disaster mitigation

Legal documents on flood and storm prevention and control and disaster mitigation

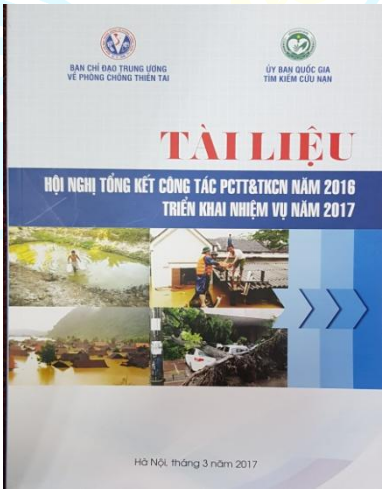
Handbook on natural disaster management information in the Central Coast.



Handbook on Guide to natural disaster prevention, control and response in Ho Chi Minh City



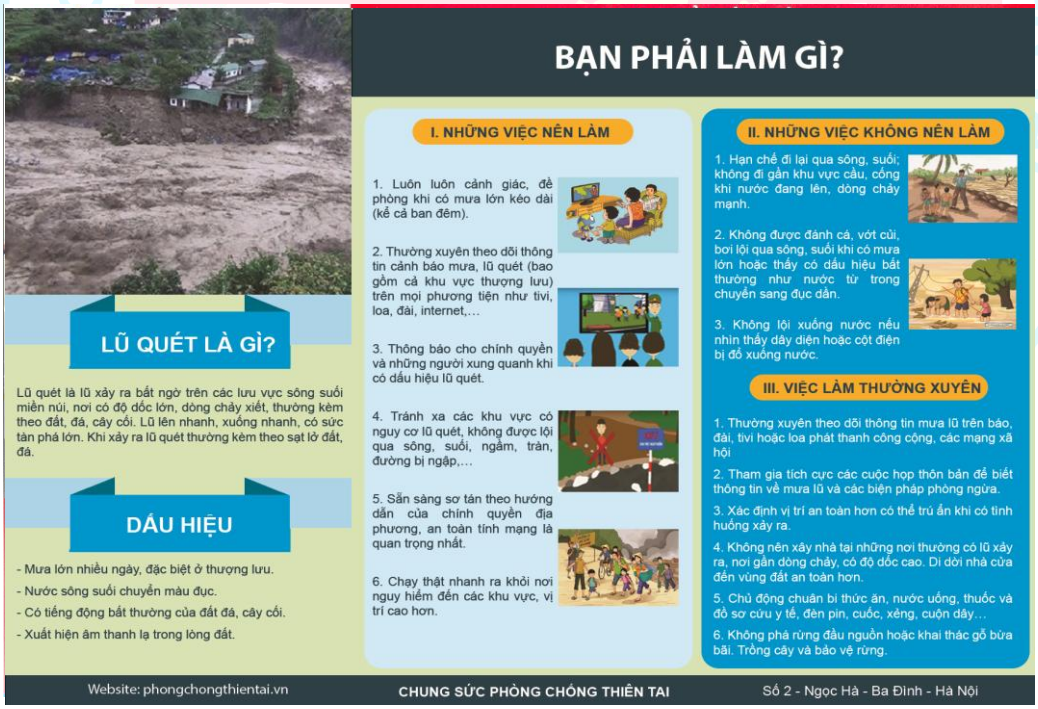
Guide to "Support households and individuals in the preparation of materials, equipment and essential goods serving natural disaster management activities"



Proceedings of End of the Year Conference on disaster management, search and rescue in 2016 and work plans for 2017

The Central Steering Committee for Natural disaster management
http://www.phongchongthientai.vn

INSTRUCTIONS FOR FLOODS AND INUNDATION



Ban Chỉ đạo TW về PCTT http://vndma.gov.vn Số 2 Ngọc Hà, Ba Đình, Hà Nội

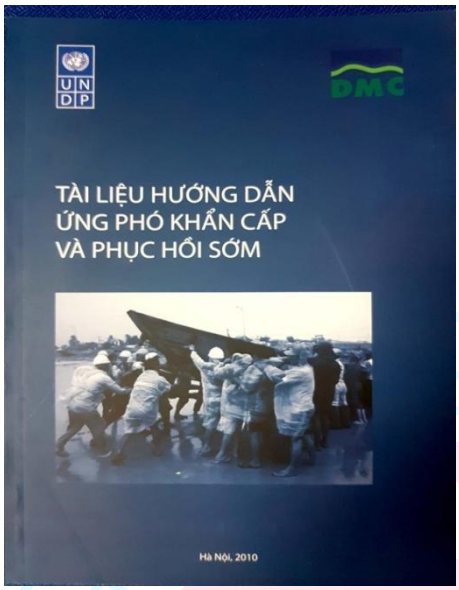
INSTRUCTIONS FOR FLASHFLOOD

INSTRUCTIONS FOR STORMS

INSTRUCTIONS FOR LANDSLIDE

INSTRUCTIONS FOR EARTHQUAKE EVENTS

INSTRUCTIONS FOR TSUNAMI EVENTS



Guide to Emergency response and early recovery

Guide to Community-Based Disaster Risk Management