MEMBER
REPORT
Thailand

ESCAP/WMO Typhoon Committee
20th Integrated Workshop
Macao, China
2 - 5 December 2025

CONTENTS

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

1. Meteorological Assessment

1.1 Summary of tropical cyclones affecting Thailand from 1 November 2024 to 15 November 2025

In this period, Thailand was directly affected by KALMAEGI (2525), a tropical cyclone that originated in the western North Pacific. It intensified into typhoon and moved across the Philippines into the South China Sea before making landfall in Vietnam. The storm move further into Cambodia and Laos, and eventually entering northeastern Thailand. KALMAEGI was the only tropical cyclone that entered Thailand during this period.

In addition, the remnants of six tropical cyclones affected Thailand rainfall. These included tropical storm WIPHA (2506), which brought fairly widespread rain to the upper northern region in late July; Typhoon KAJIKI (2513) and tropical storm NONGFA (2514), both of which produced abundant rainfall across the lower northern and upper northeastern regions in late August; and Typhoon TAPAH (2516), which enhanced the southwest monsoon and caused abundant rainfall along both the eastern region and western coast of southern Thailand in early September. Moreover, Typhoon RAGASA (2518) and BUALOI (2520) intensified the monsoon trough over upper Thailand, leading to widespread rainfall across the northern and northeastern regions at the end of September.

1.2 Brief descriptions of the tropical cyclones that entered Thailand between 1 November 2024 and 15 November 2025

KALMAEGI was the only tropical cyclone that moved into Thailand in this period. It initially formed as a tropical depression over the western North Pacific, intensified into tropical storm on 2 November, and further strengthened into Typhoon on the following day. Typhoon "KALMAEGI" moved across the Philippines into the South China Sea and made landfall in Binh Dinh, Vietnam on 6 November. On 7 November, the storm weakened into a tropical storm over Cambodia at 04:00 a.m., and further weakened into a tropical depression over Laos at 07:00 a.m. before entering the northeastern region of Thailand at Sirindhorn District, Ubon Ratchathani Province at 09:30 a.m. Later that day, at 05:00 p.m., it degenerated into an active low-pressure cell over Si Sa Ket Province. The remnant of the storm continued moving across the northeastern and northern regions during 7-8 November, and covered Myanmar on the following day. The storm brought widespread rainfall in many areas of the northern and northeastern regions, causing flooding in Lamphun Province on 8 November and in Lampang province on 9 November with a landslide reported in Lampang Province on 8 November.

1.3 Brief descriptions of the tropical cyclones that affected Thailand between 1 November 2024 and 15 November 2025

During this period, Thailand has been affected by six tropical cyclones: 'WIPHA' (2506), 'KAJIKI' (2513), 'NONGFA' (2514), 'TAPAH' (2516), 'RAGASA' (2518) and 'BUALOI' (2520). Figure 1 shows the tracks of tropical cyclones originating over the South China Sea and the western North Pacific that influenced Thailand rainfall from 1 November 2024 to 15 November 2025, as described below.

1.3.1 Tropical cyclone 'WIPHA' (2506)

Tropical storm WIPHA (2506) over the upper South China Sea first made landfall in southern Guangdong Province, China, before moving into the Gulf of Tonkin and making a second landfall at Thai Binh, Vietnam on 22 July. This storm weakened into a tropical depression as it moved across Laos, and subsequently downgraded into a low-pressure cell and covering the upper northern region of Thailand on July 23, before moving further into upper Myanmar. WIPHA brought widespread rainfall in the northern and northeastern Thailand, with heavy to very heavy rainfall reported in several provinces, especially Chiang Rai, Nan, and Phayao provinces, which experienced intense rainfall and severe flooding. According to the Department of Disaster Prevention and Mitigation (DDPM), prolonged flooding occurred in parts of the northern region as a result of the storm.

1.3.2 Typhoon 'KAJIKI' (2513)

The tropical depression over the upper South China Sea developed into the tropical storm KAJIKI (2513) on 23 August and moved westward before subsequently intensifying into the severe tropical storm and typhoon on the following day. KAJIKI moved slightly northwestward and made landfall over Vinh, Vietnam on 25 August. It then weakened into a tropical storm and subsequently a tropical depression over Laos, before degenerating into an active low-pressure cell covering northern Thailand during 26-27 and later upper Myanmar. Under the influence of KAJIKI and its remnant low-pressure cell, the northern and northeastern regions experienced abundant rainfall, with fairly widespread rain and heavy to very heavy rainfall in several areas throughout much of the period. In particular, between 25–27 August, many areas of the upper northern and upper northeastern regions received heavy to very heavy rainfall. Flash floods and landslides were also reported in parts of the northern and northeastern regions.

1.3.3 Tropical cyclone 'NONGFA' (2514)

In late August 2025, a tropical depression formed from a disturbance over the middle of South China Sea on 29 August and gradually intensified into tropical storm NONGFA (2514) over the upper South China Sea in the morning of 30 August. This storm then moved westward and made landfall over Ha Tinh, Vietnam, at 3.00 pm on the same day. It weakened into a tropical depression over Laos in the evening, then downgraded into an active low-pressure cell over Nakhon Phanom province, before moving westward to cover Nong Khai, Loei provinces and the lower northern region. NONGFA brought abundant rainfall to northern and northeastern Thailand, with fairly widespread rain and heavy to very heavy rainfall in several areas, especially in the lower northern and upper northeastern regions on 30–31 August.

1.3.4 Typhoon 'TAPAH' (2516)

In early September 2025, Typhoon TAPAH (2516) originated on 6 September as a tropical depression from a low-pressure cell over the upper South China Sea. It moved westward and intensified into a tropical storm later that evening. TAPAH subsequently moved northwestward, and strengthening into a severe tropical storm and eventually a typhoon by the morning of 8 September. It made landfall in Guangdong Province, China, before weakening into the tropical storm, then to the tropical depression and finally an active low-pressure cell over southern China in the evening on the same day. The influence of this storm enhanced the southwest monsoon over the Andaman Sea, Thailand, and the Gulf of Thailand, resulting in widespread and heavy rainfall along the eastern coast and the west coast of southern Thailand.

1.3.5 Typhoon 'RAGASA' (2518)

In the second half of September 2025, Typhoon RAGASA (2518) over the upper South China Sea made landfall in southern Guangdong, China at 7:00 p.m. on 24 September. The storm then moved along the coast of southern China and weakened into the tropical storm, before further downgraded into the tropical depression and active low-pressure cell over Vietnam on 25 Sep. This storm enhanced the monsoon through which lay across upper northern and upper northeastern regions of Thailand and strengthened the southwest monsoon which prevailed over the Andaman Sea, Thailand and the Gulf of Thailand, causing widespread rainfall across the northern and northeastern regions.

1.3.6 Typhoon 'BUALOI' (2520)

Typhoon BUALOI (2520) was located over the upper South China Sea, moving slightly to the west-northwest. In the early morning of September 29, it made landfall near Quang Binh, upper Vietnam and weakened into a severe tropical storm. The storm then moved into Laos and further weakening into a tropical storm and later tropical depression on the same day. By the early morning of September 30, it weakened into an active low-pressure cell over Luang Namtha, Laos and subsequently moved to cover upper Myanmar and upper Laos. The influence of this storm intensified the monsoon trough over upper Thailand, and strengthened the southwest monsoon over the Andaman Sea, Thailand, and the Gulf of Thailand, resulting in abundant rainfall primarily across the northern, northeastern regions as well as the west coast of southern Thailand.

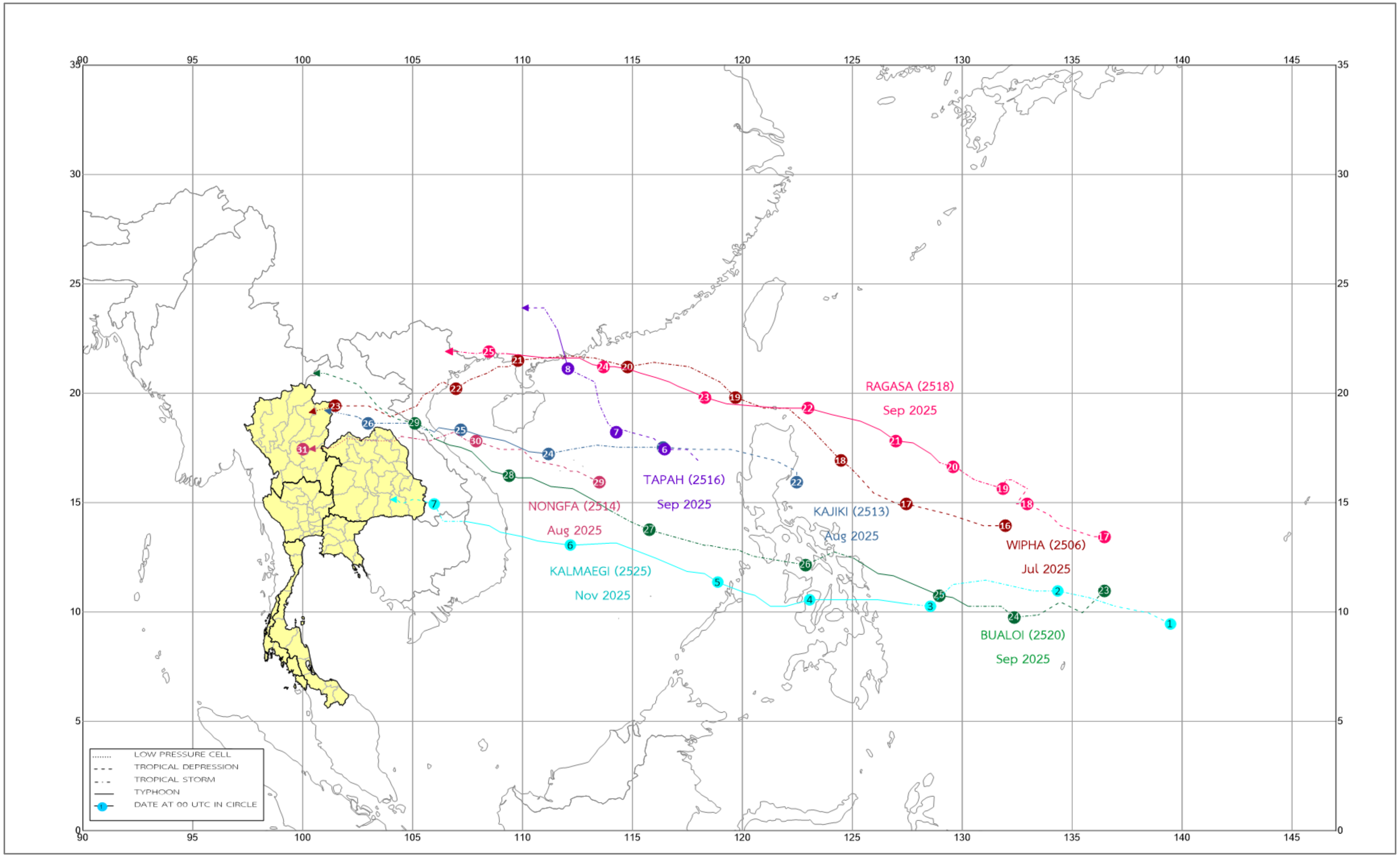


Figure 1: The tracks of tropical cyclones originating over the South China Sea and the western North Pacific and affecting Thailand rainfall from 1 November 2024 to 15 November 2025

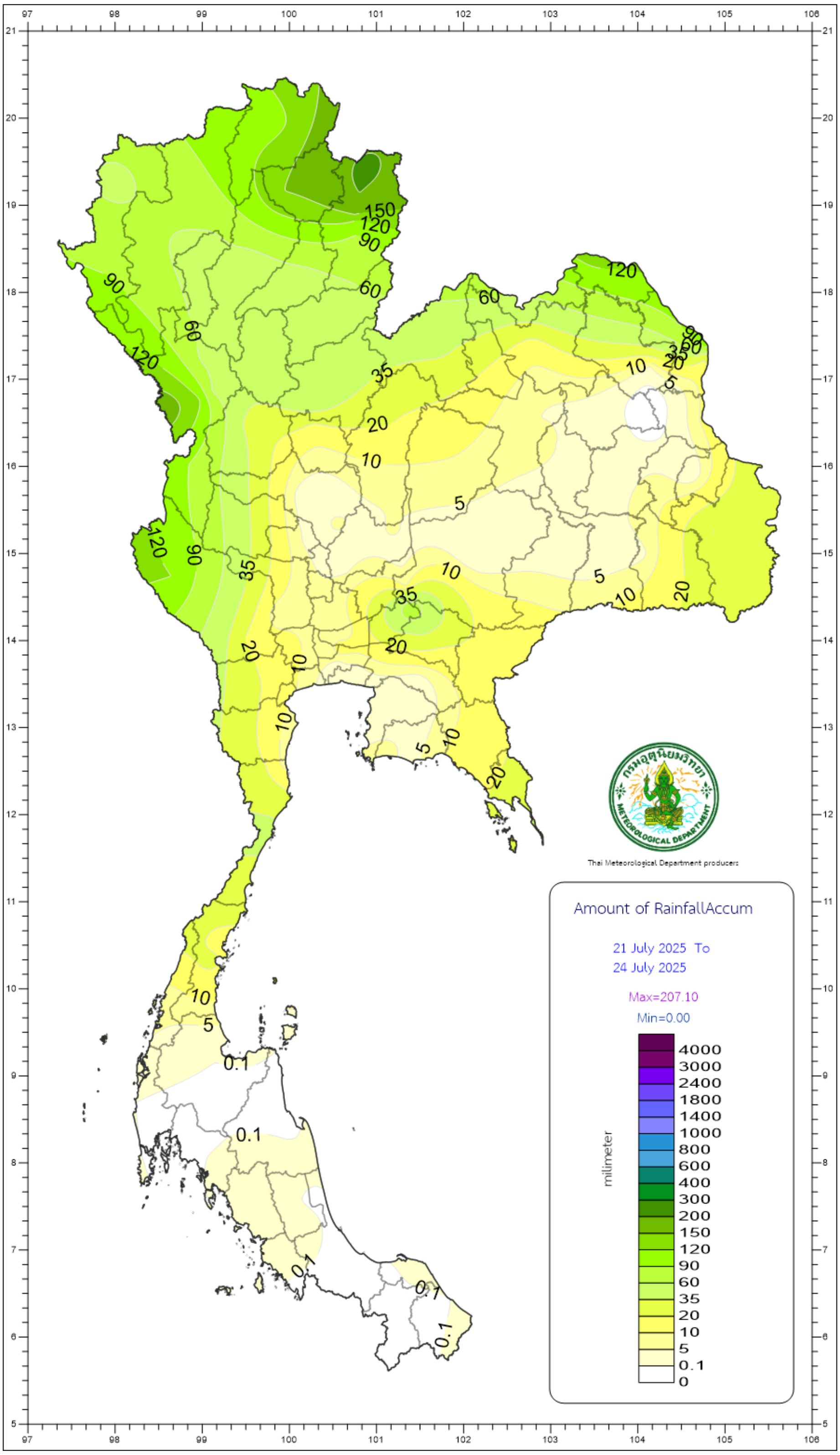


Figure 2: Accumulated rainfall from 21 to 24 July 2025
under the influence of WIPHA (2506).

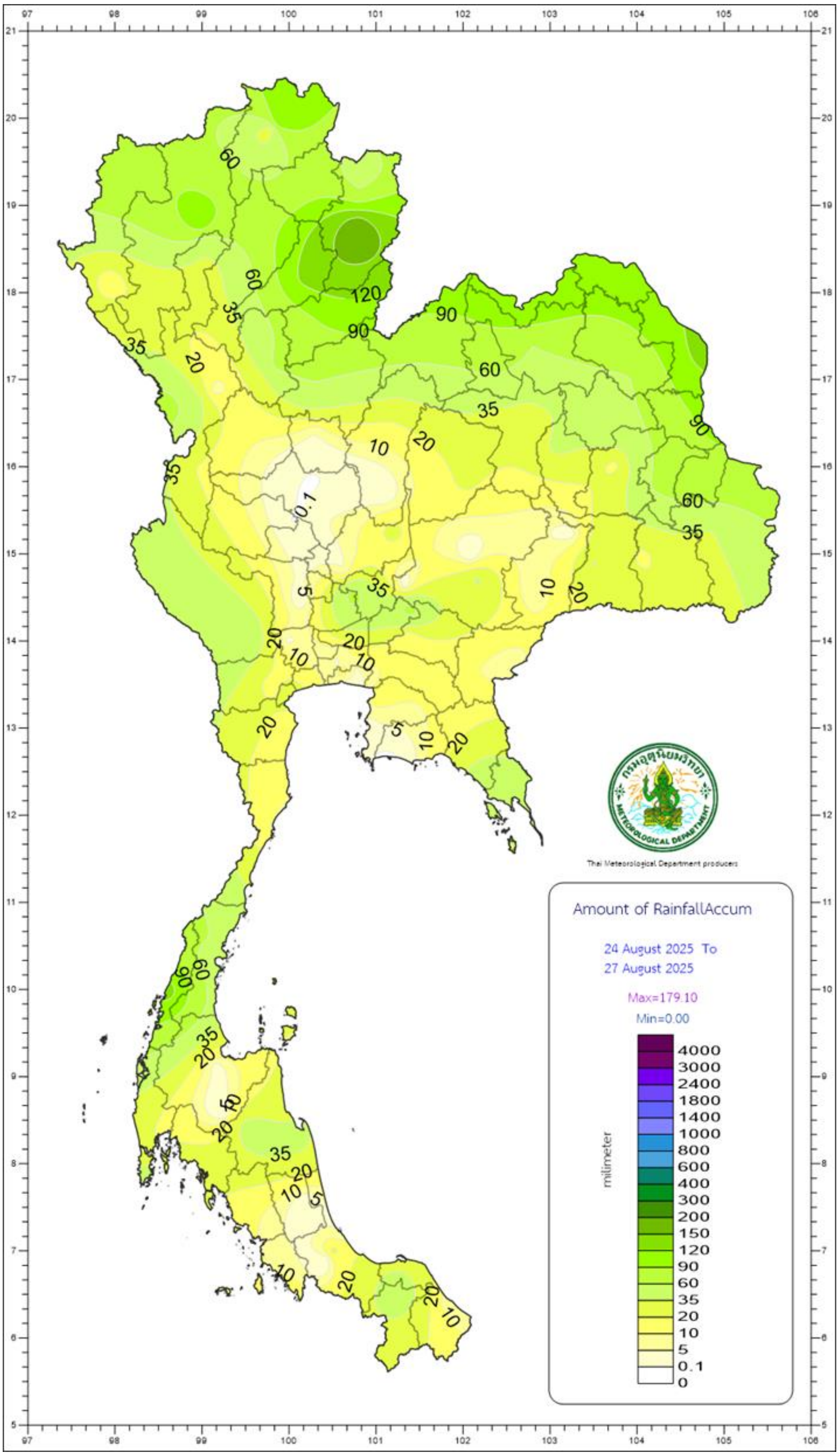


Figure 3: Accumulated rainfall from 24 to 27 August 2025
under the influence of KAJIKI (2513).

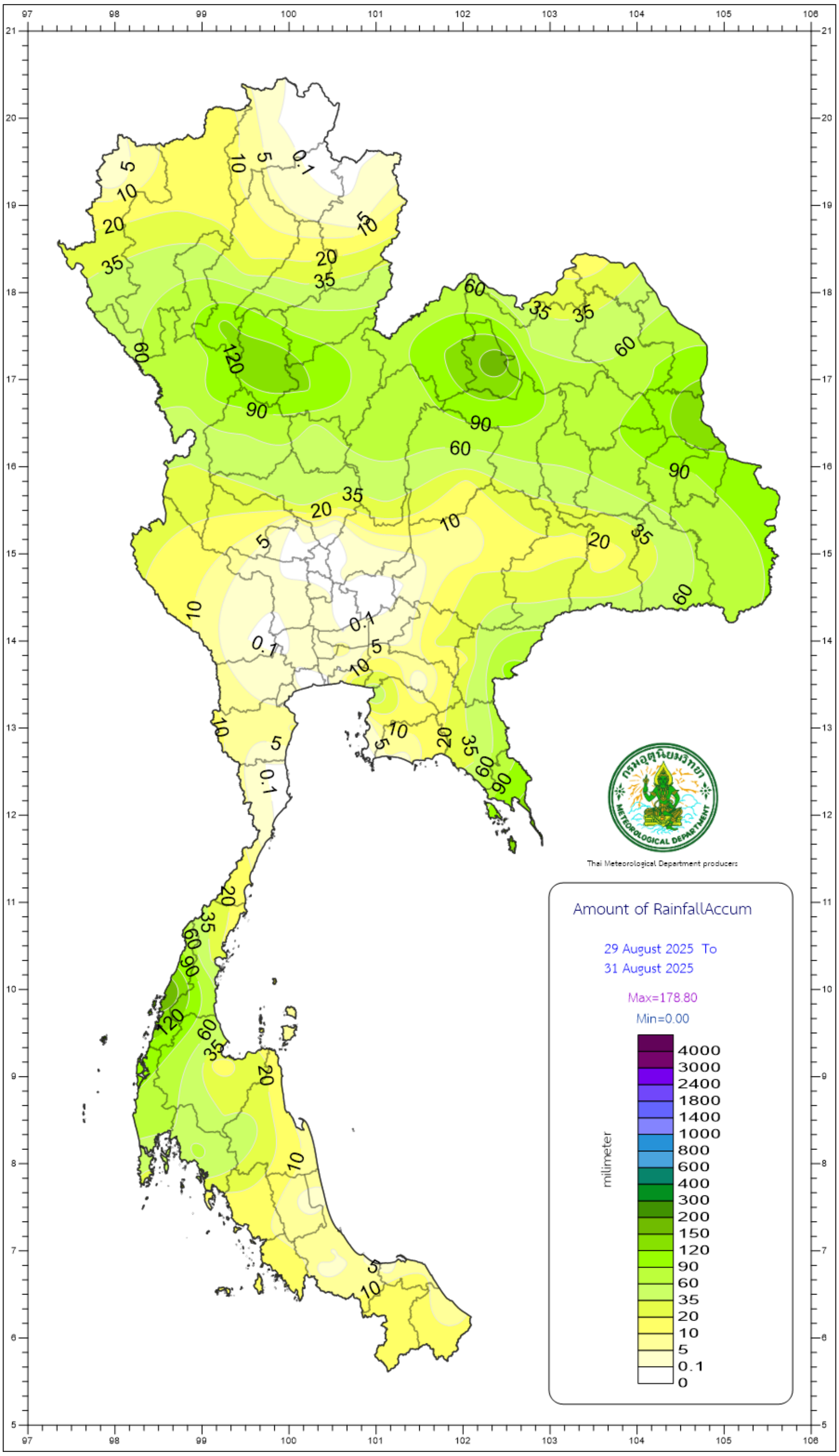


Figure 4: Accumulated rainfall from 29 to 31 August 2025
under the influence of NONGFA (2514).

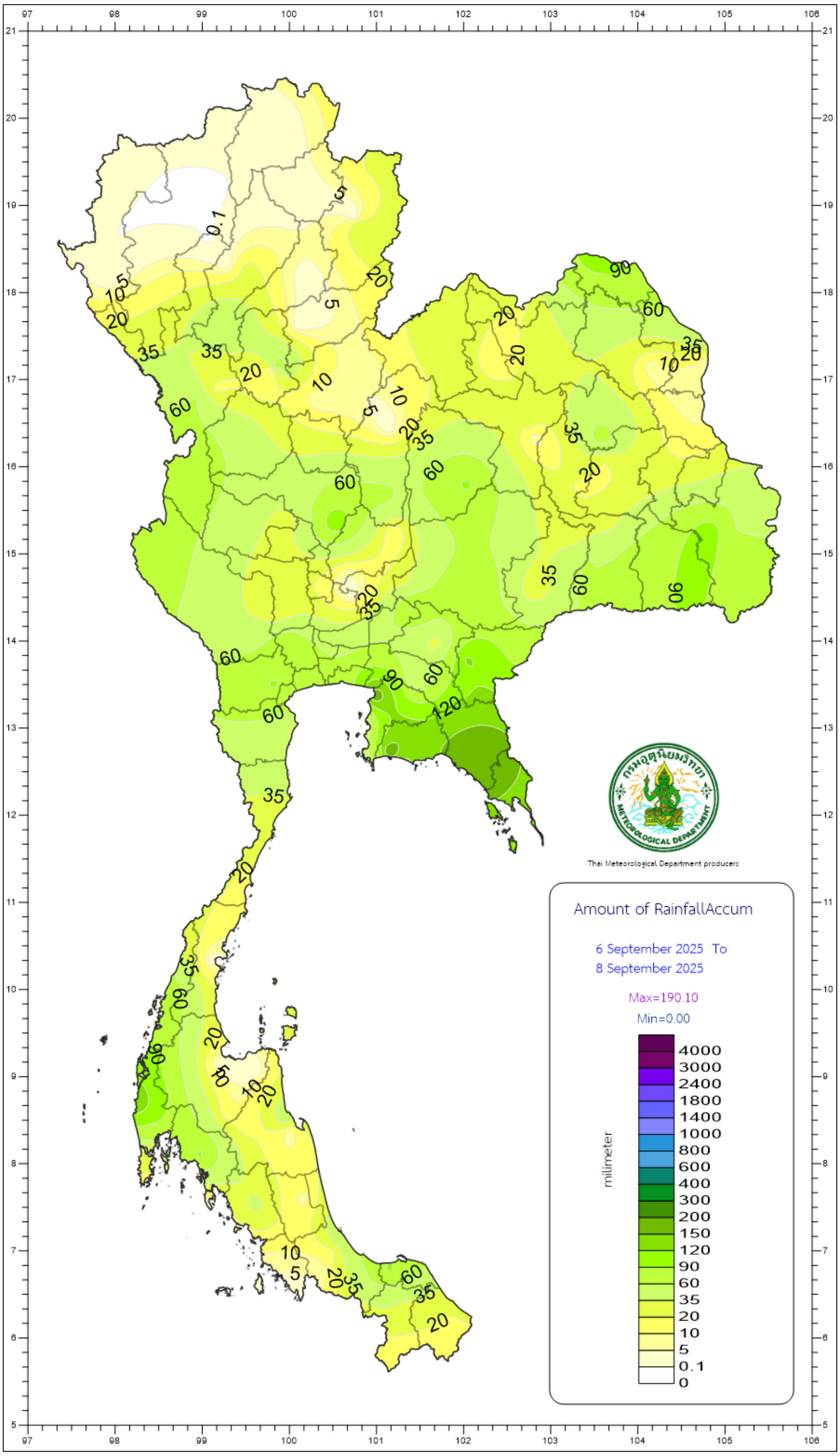


Figure 5: Accumulated rainfall from 6 to 8 September 2025
under the influence of TAPAH (2516).

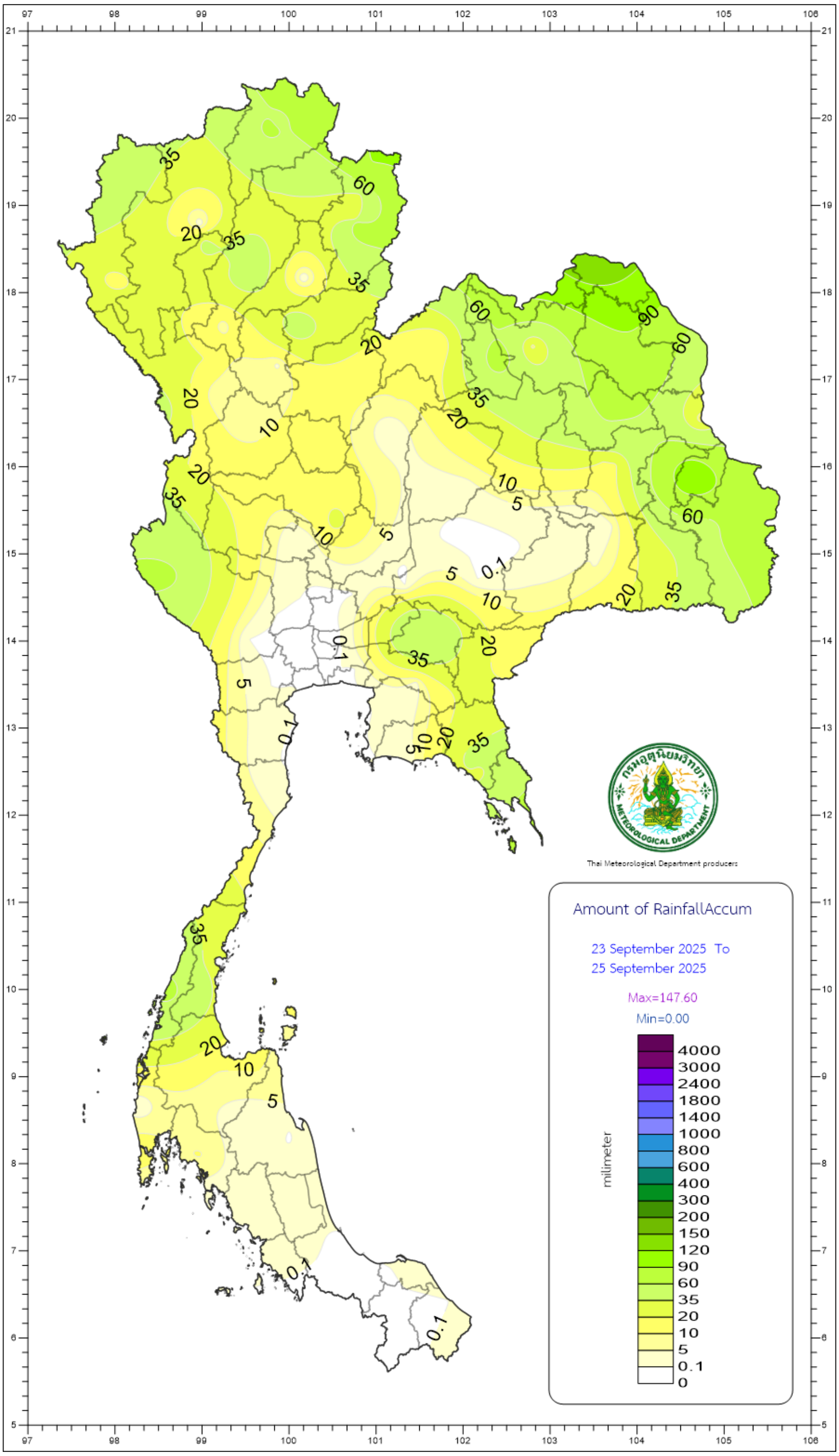


Figure 6: Accumulated rainfall from 23 to 25 September 2025
under the influence of RAGASA (2518).

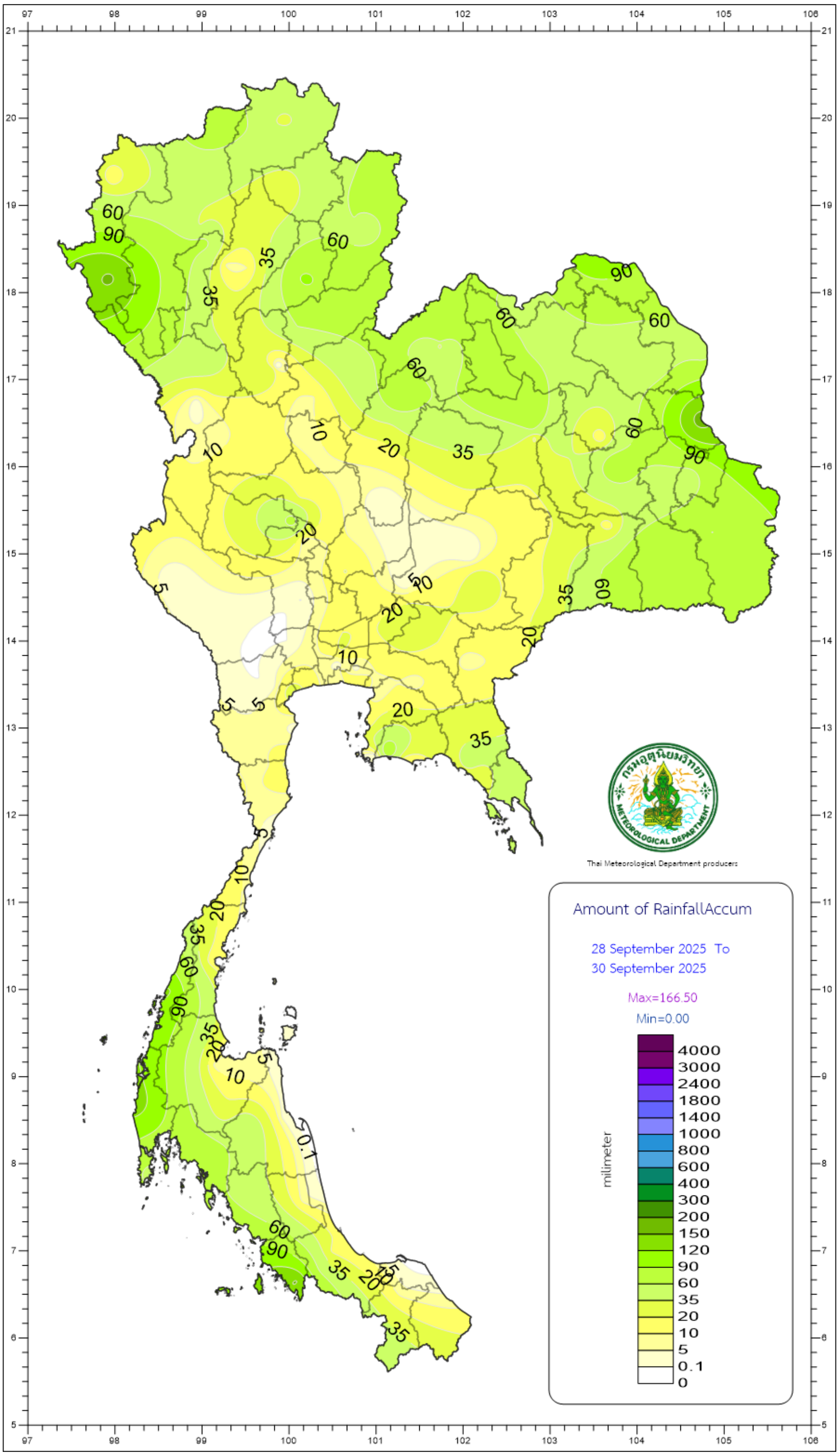


Figure 7: Accumulated rainfall from 28 to 30 September 2025 under the influence of BUALOI (2520).

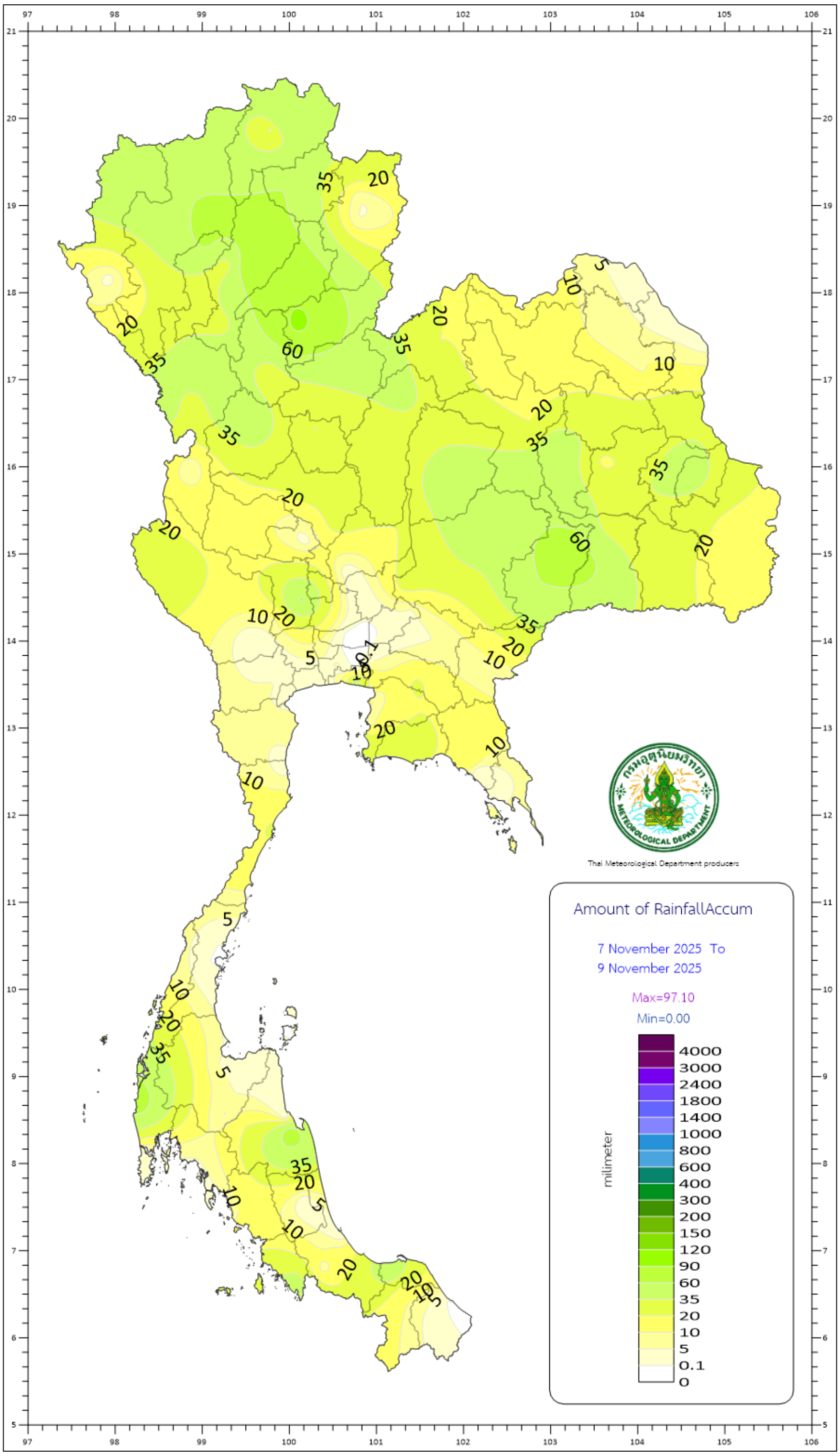


Figure 8: Accumulated rainfall from 7 to 9 November 2025
under the influence of KALMAEGI (2525).

2. Hydrological Assessment

Thailand is located in a tropical monsoon climate zone, characterized by abundant rainfall during the rainy season, which typically lasts from May to October each year. One of the major factors contributing to heavy rainfall and flooding in Thailand is the influence of tropical cyclones, which form over the western Pacific Ocean and the South China Sea — particularly between July and October, when the monsoon trough becomes more intense and extends across the country.

In 2025, tropical cyclones once again brought widespread heavy rainfall, leading to severe flooding in several areas. The following is a summary of the major and significant flood events in 2025, occurring from July to October.

2.1 Tropical cyclone "WIPHA"

The influence of Tropical cyclone "WIPHA" caused very heavy rain over the eastern part of the Northern Region on July 22, 2025, especially in Nan, Chiang Rai, and Phayao provinces, where very heavy rain occurred in a wide area. Subsequently, the heavy to very heavy rain spread to the western part of the Northern Region, covering Ching Mai, Lamphun, Lampang, Mae Hong Son, and Tak Provinces on July 23, 2025, rainfall more than 90 millimeters per day included: 1) Nan Province 2) Chiang Rai 3) Phayao Province 4) Chiang Mai Province 5) Lampang Province 6) Phrae Province 7) Tak Province

This resulted in accumulated rainfall on July 22–23, 2025 of 427.0 millimeters at Pua District and 340.6 millimeters at Chiang Klang District in Nan Province. The rainfall recorded at these two stations was classified as extremely severe, with a return period of more than 1,000 years (probability of occurrence 0.1%).

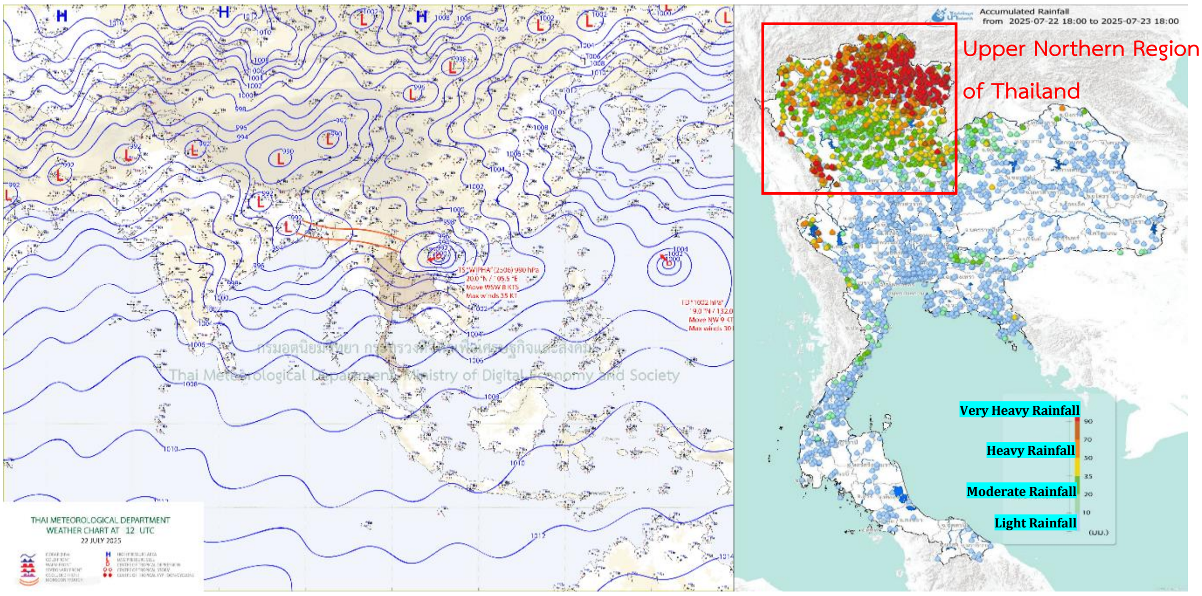


Figure 9: Surface Weather Map and 24 Hr. Accumulated Rainfall on July 22, 2025

Heavy rain also resulted in increased inflow to large dams in the North. During July 22-August 3, 2025, Sirikit Dam received an accumulated inflow of approximately 2,300 million cubic meters (mcm) of water, followed by Bhumibol Dam and Kwae Noi Bamrung Daen Dam with cumulative inflow of 841 and 130 mcm respectively. Particularly, Sirikit Dam experienced a higher inflow than during the Tropical cyclone "HAIMA" event in June 2011. The highest daily inflow during the Tropical cyclone "WIPHA" event reached 300.42 mcm. On July 26, 2025, compared to only 214.42 mcm during Tropical cyclone "HAIMA", as shown in Figure 10

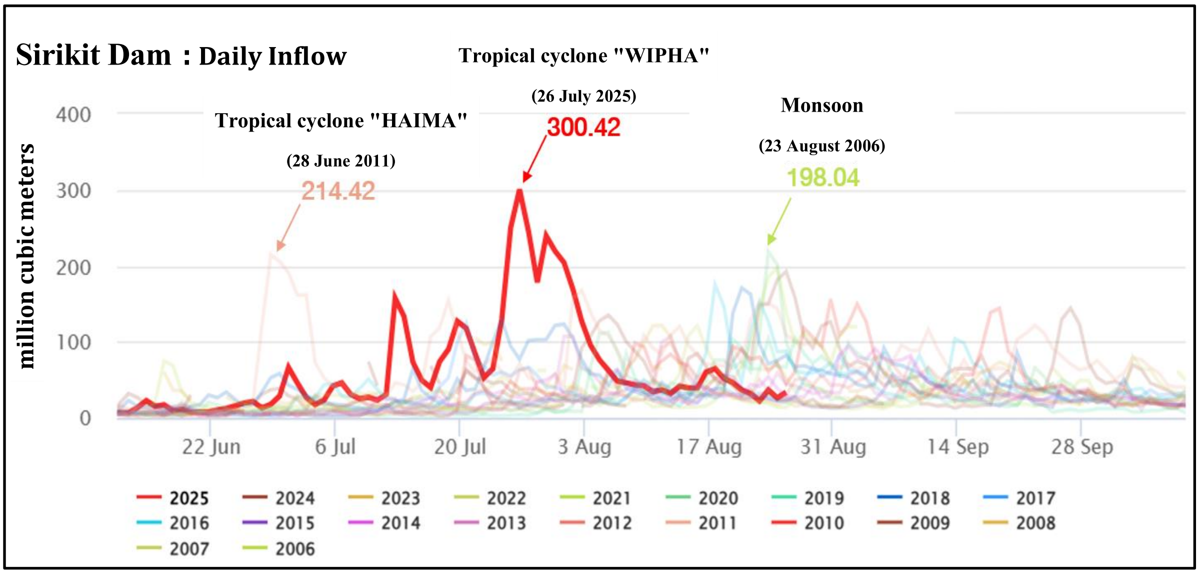


Figure 10: Comparison of the maximum inflow volume into Sirikit Dam

Moreover, tropical cyclone "WIPHA" also caused the water level in Sirikit Dam to rise to 84% of its capacity, or approximately 7,960 million cubic meters, on 3 August 2025, compared to 63% on July 22, 2025. The total storage capacity of Sirikit Dam is 9,510 million cubic meters, as shown in Figure 11.

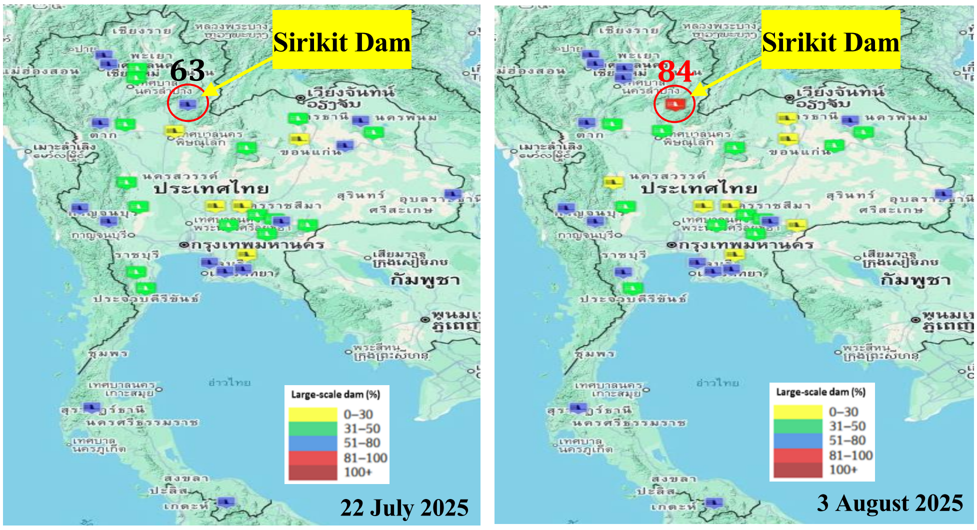


Figure 11: Comparison of the water volume in Sirikit Dam
between July 22, 2025 and August 3, 2025

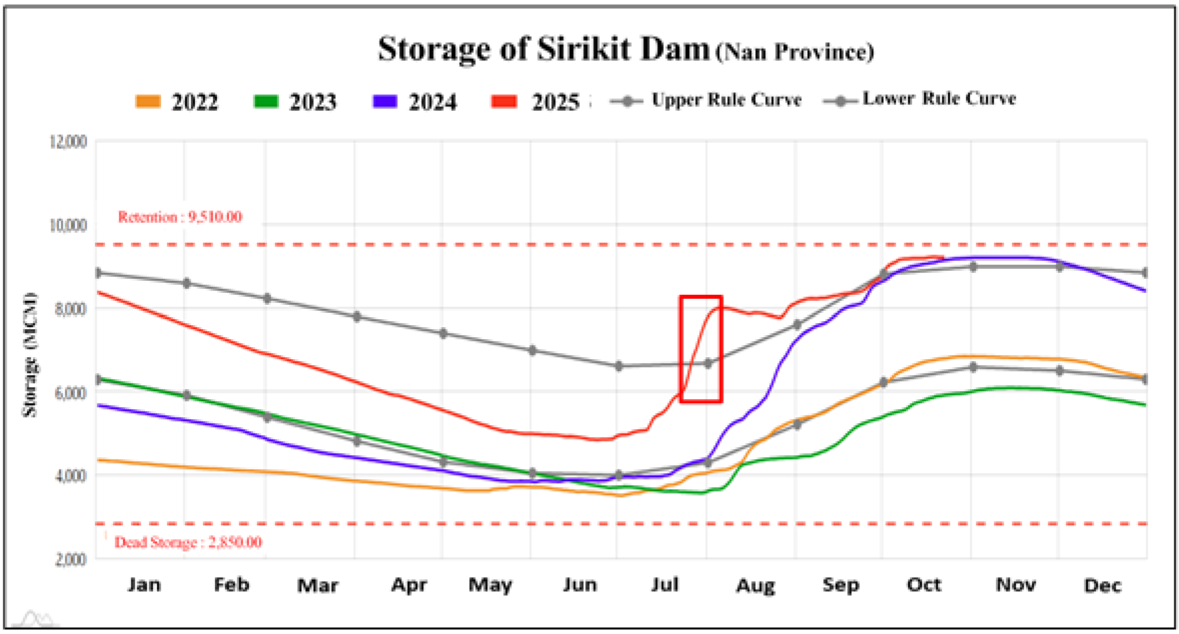


Figure 12: Water Storage at Sirikit Dam increases after tropical cyclone "WIPHA"

Not only that, but tropical cyclone "WIPHA" also caused widespread flooding and resulted in the highest recorded water level in the Nan River at the Nan Hydrological Station (N.1), Mueang Nan District, Nan Province. This was the highest water level ever recorded, reaching 9.49 meters (A.D.) or 201.69 meters (M.S.L.), with a discharge rate of 2,735.50 cubic meters per second on July 24, 2025, rising sharply from approximately 400 cubic meters per second in the days. The storm also caused the river to overflow its banks by up to 2.49 meters in Mueang Nan District, located in the upper northern region of Thailand, as shown in Figure 13 and Figure 14.

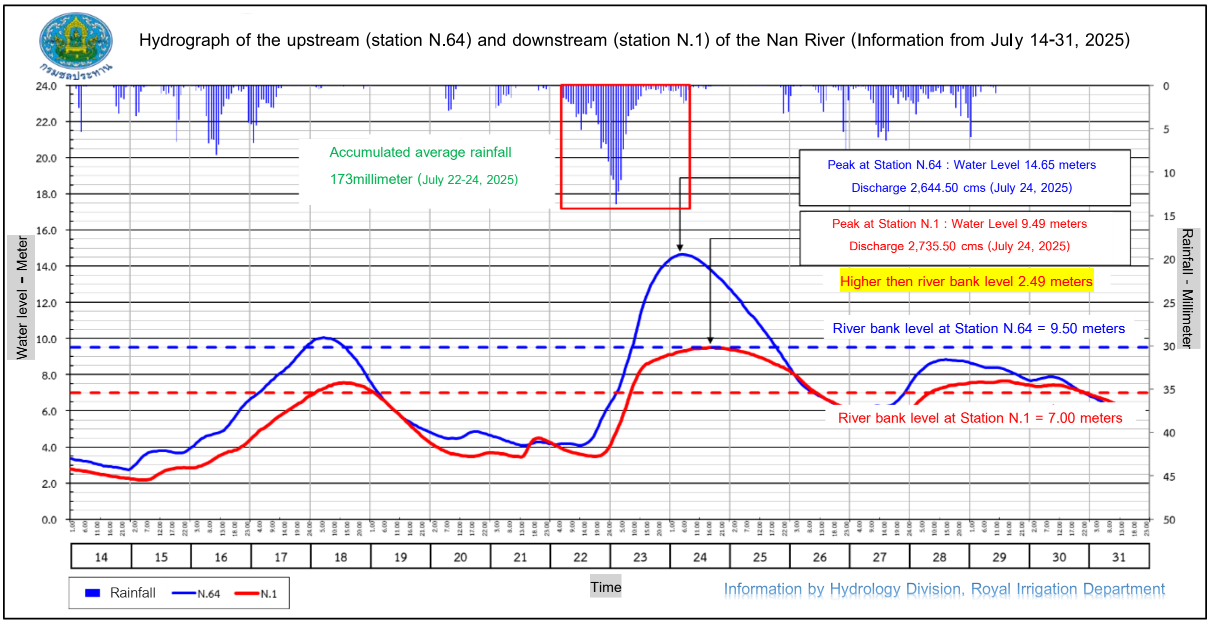


Figure 13: Hydrograph of the upstream and downstream stations of the Nan River during the storm.

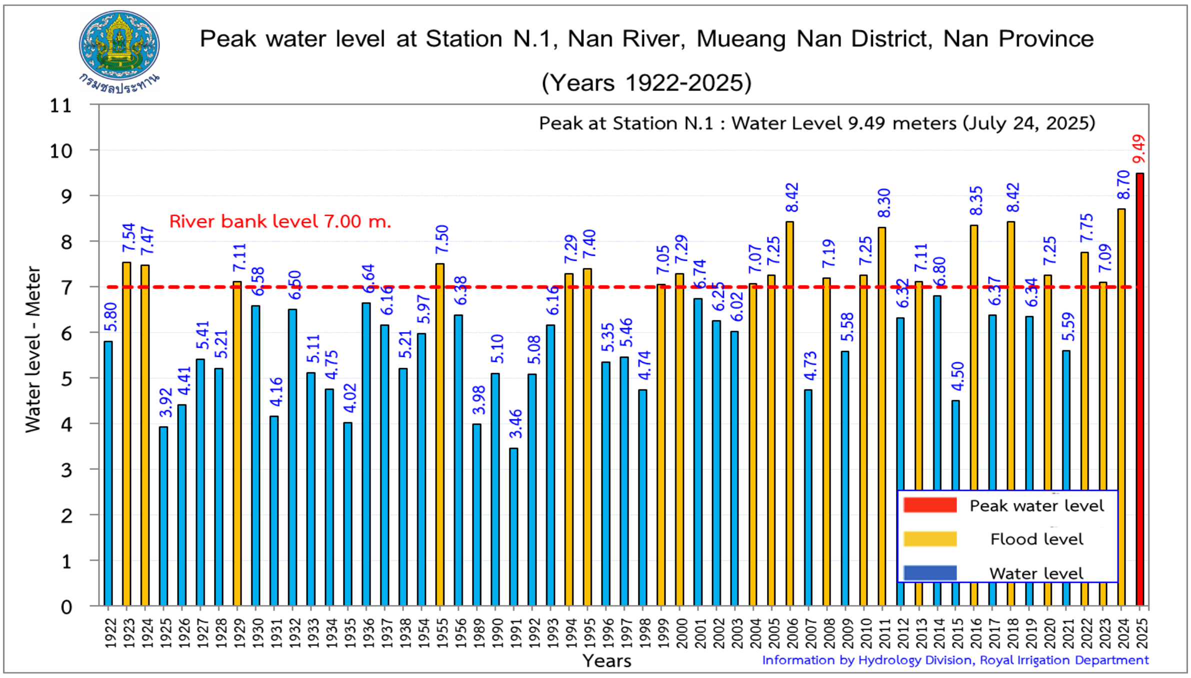


Figure 14: Peak water level at Station N.1 (Years 1922-2025)

2.2 Typhoon "KAJIKI"

Under the influence of Typhoon "KAJIKI", continuous heavy to very heavy rainfall occurred during August 25-27, 2025 in the northern and northeastern regions of Thailand, resulting in flash floods and river overflows in several northern provinces, including Lamphun, Chiang Mai, Phrae, and Nan.

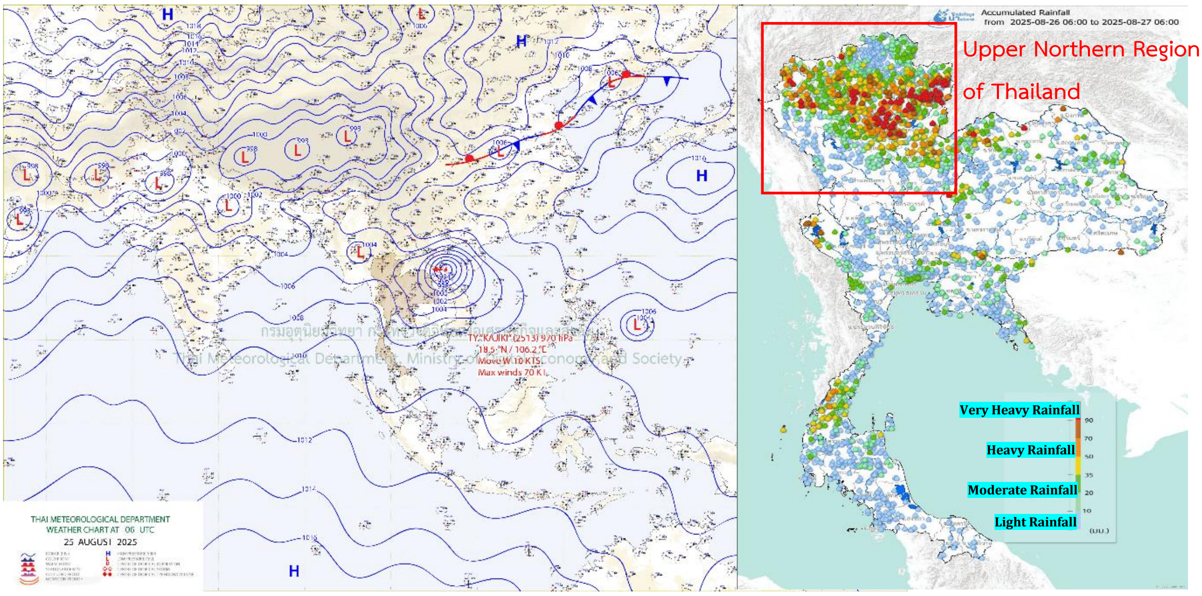


Figure 15: Surface Weather Map and 24 Hr. Accumulated Rainfall on August 26, 2025

In particular, the Nan River in Nan Province overflowed its banks due to the typhoon's impact, generating an estimated 480 million cubic meters of runoff between August 27-31, 2025, which subsequently flowed into the Sirikit Dam. Similarly, the Yom River in Phrae Province also overflowed its banks. The accumulated runoff from these rivers is expected to flow downstream toward the central region, within the Chao Phraya River Basin of Thailand.

2.3 Tropical cyclone "NONGFA"

Tropical cyclone "NONGFA" developed after Typhoon "KAJIKI" had dissipated. This storm brought widespread heavy to very heavy rainfall over the upper northeastern region and the lower northern region of Thailand during August 30-31, 2025. The storm caused river overflows in several basins, including the Wang River Basin and Pa Sak River Basin in the lower northern region, as well as the Eastern Mekong Basin and Chi River Basin in the upper northeastern region.

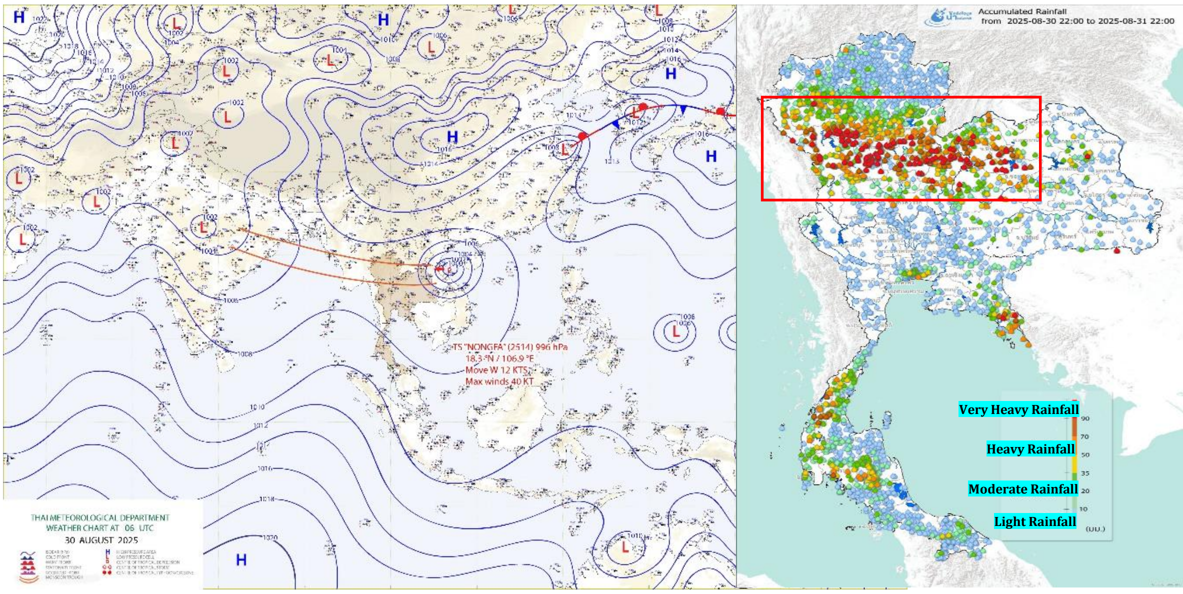


Figure 16: Surface Weather Map and 24 Hr. Accumulated Rainfall on August 30, 2025

Hydrological stations in key areas reported river overflow conditions, with recorded water levels and discharges as follows:

1. Pa Sak River Basin – Station S.3 (Pa Sak River, Lom Sak District, Phetchabun Province), the maximum water level 9.62 meters, with a peak discharge of 159.2 cubic meters per second on 1 September 2025.

2. Chi River Basin – Station E.29A (Phong River, Phu Kradueng District, Loei Province), the maximum water level 12.74 meters, with a peak discharge of 427.9 cubic meters per second on 1 September 2025.

3. Wang River Basin – Station W.4A (Wang River, Sam Ngao District, Tak Province), the maximum water level 7.15 meters, with a peak discharge of 607.9 cubic meters per second on 2 September 2025.

4. Northeastern Mekong River Basin – Station Kh.58A (Loei River, Mueang Loei District, Loei Province), the maximum water level 10.56 meters, with a peak discharge of 765.10 cubic meters per second on 2 September 2025.

2.4 Typhoon "TAPAH"

This storm did not have a direct impact on Thailand, but it intensified the southwest monsoon prevailing over the country, resulting in increased rainfall across many areas of Thailand, particularly in the eastern region.

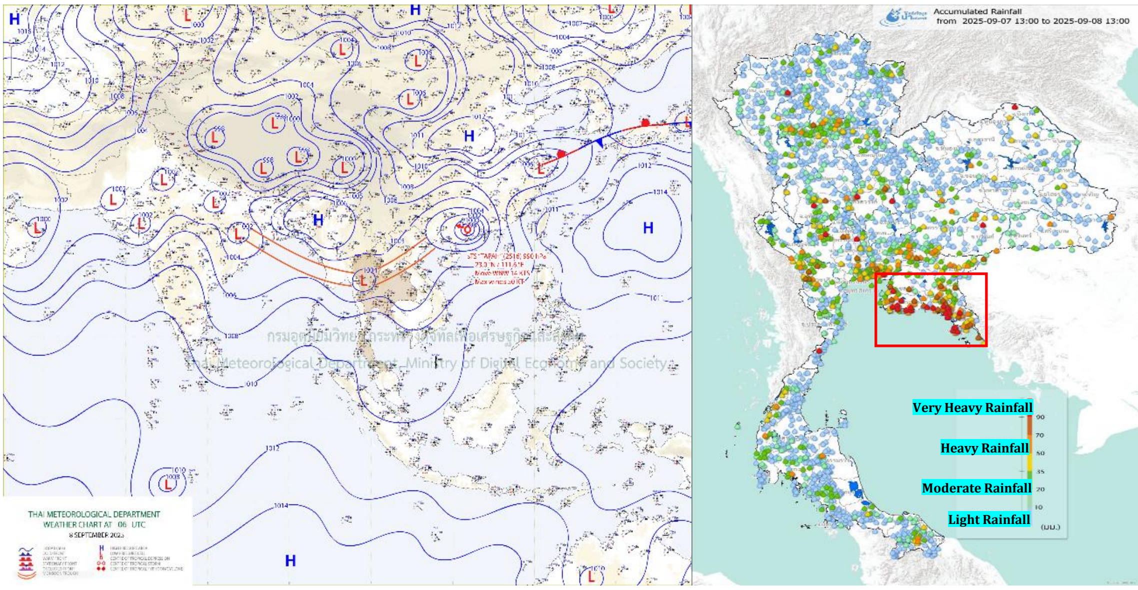


Figure 17: Surface Weather Map and 24 Hr. Accumulated Rainfall on September 8, 2025

Hydrological stations in key areas reported river overflow conditions, with recorded water levels and discharges as follows:

1. East Coast Gulf River Basin – Station Z.38 (Thap Ma River, Mueang Rayong District, Rayong Province), the maximum water level 3.12 meters, with a peak discharge of 71.7 cubic meters per second on 8 September 2025.

2.5 Typhoon "RAGASA"

This storm did not have a direct impact on Thailand, but it strengthened the monsoon trough and the southwest monsoon, causing heavy to very heavy rainfall in many areas of the country, especially in the northern region.

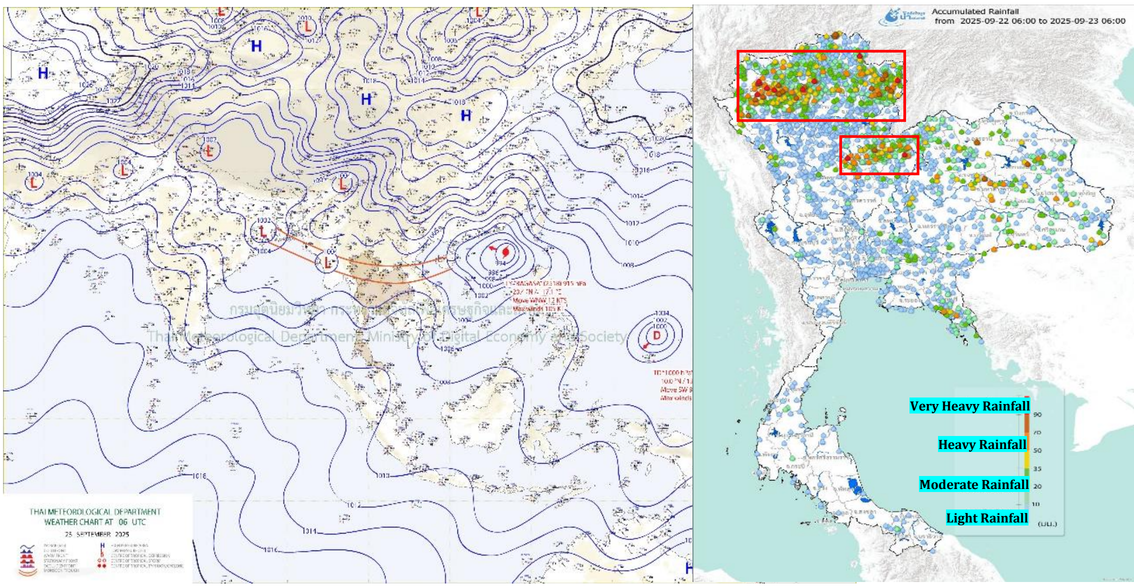


Figure 18: Surface Weather Map and 24 Hr. Accumulated Rainfall on September 23, 2025

Hydrological stations in key areas reported river overflow conditions, with recorded water levels and discharges as follows:

1. Ping River Basin – Station P.71A (Mae Khan River, San Pa Tong District, Chiang Mai Province), the maximum water level 5.48 meters, with a peak discharge of 157.28 cubic meters per second on 23 September 2025.

2. Pa Sak River Basin – Station S.3 (Pa Sak River, Lom Sak District, Phetchabun Province), the maximum water level 9.68 meters, with a peak discharge of 163.73 cubic meters per second on 23 September 2025.

During the period between the dissipation of Typhoon "RAGASA" and the formation of Typhoon "BUALOI", the monsoon trough continued to lie across Thailand, causing heavy to very heavy rainfall in the upper northern region. Reports indicated riverbank overflows in Lamphun and Chiang Mai provinces within the Ping River Basin, as follows:

1. Ping River Basin – Station P.67 (Mae Nam Ping, San Sai District, Chiang Mai Province), the maximum water level 3.24 meters, with a peak discharge of 415.50 cubic meters per second on 27 September 2025.

2. Ping River Basin – Station P.1 (Mae Nam Ping, Mueang Chiang Mai District, Chiang Mai Province), the maximum water level 3.93 meters, with a peak discharge of 441.60 cubic meters per second on 27 September 2025.

3. Ping River Basin – Station P.5 (Mae Kuang River, Mueang Lamphun District, Lamphun Province), the maximum water level 5.18 meters, with a peak discharge of 126.40 cubic meters per second on 28 September 2025.

2.6 Typhoon "BUALOI"

The influence of Typhoon "BUALOI" caused heavy to very heavy rainfall in many areas of Thailand, particularly in the lower northern, upper central, and northeastern regions. This resulted in flash floods, forest runoffs, and widespread flooding in several areas.

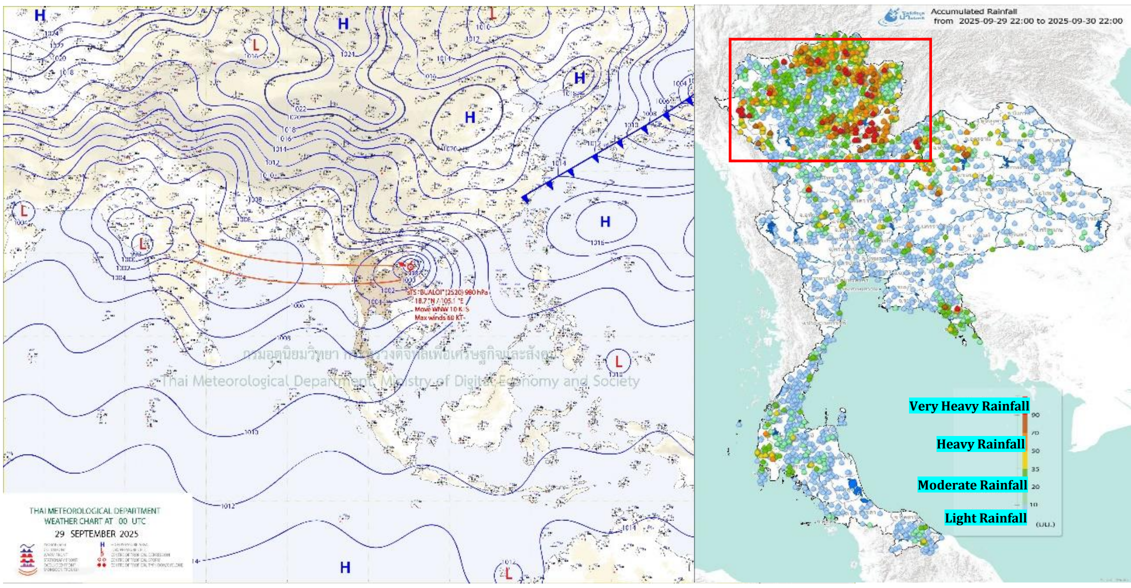


Figure 19: Surface Weather Map and 24 Hr. Accumulated Rainfall on September 29, 2025

Hydrological stations in key areas reported river overflow conditions, with recorded water levels and discharges as follows:

1. Yom River Basin – Station Y.31 (Yom River, Chiang Muan District, Phayao Province), the maximum water level 6.06 meters, with a peak discharge of 521.00 cubic meters per second on 30 September 2025.

2. Pa Sak River Basin – Station S.33 (Pa Sak River, Lom Kao District, Phetchabun Province), the maximum water level 10.14 meters, with a peak discharge of 772.20 cubic meters per second on 30 September 2025.

3. Pa Sak River Basin – Station S.3 (Pa Sak River, Lom Sak District, Phetchabun Province), the maximum water level 9.80 meters, with a peak discharge of 154.80 cubic meters per second on 30 September 2025.

4. Ping River Basin – Station P.71A (Mae Khan River, San Pa Tong District, Chiang Mai Province), the maximum water level 5.58 meters, with a peak discharge of 163.20 cubic meters per second on 1 October 2025.

5. Ping River Basin – Station P.87 (Maetha River, Pa Sang District, Lamphun Province), the maximum water level 4.92 meters, with a peak discharge of 138.40 cubic meters per second on 1 October 2025.

6. Yom River Basin – Station Y.33 (Yom River, Si Samrong District, Sukhothai Province), the maximum water level 11.72 meters, with a peak discharge of 777.00 cubic meters per second on 3 October 2025.

7. Nan River Basin – Station N.27A (Nan River, Phrom Phiram District, Phitsanulok Province), the maximum water level 10.42 meters, with a peak discharge of 1194.00 cubic meters per second on 3 October 2025.

2.7 Typhoon "KALMAEGI"

Typhoon "KALMAEGI" was the first storm to enter Thailand in November. Normally, based on historical records, tropical cyclones that affect Thailand in November mostly make landfall in the southern region. The impacts of this typhoon occurred during 7–10 November 2025, bringing increased rainfall across all regions of Thailand, with heavy to very heavy rainfall particularly in the northern region. This resulted in continuously rising water levels in the tributary basins of the Chao Phraya River, located in the central part of the country.

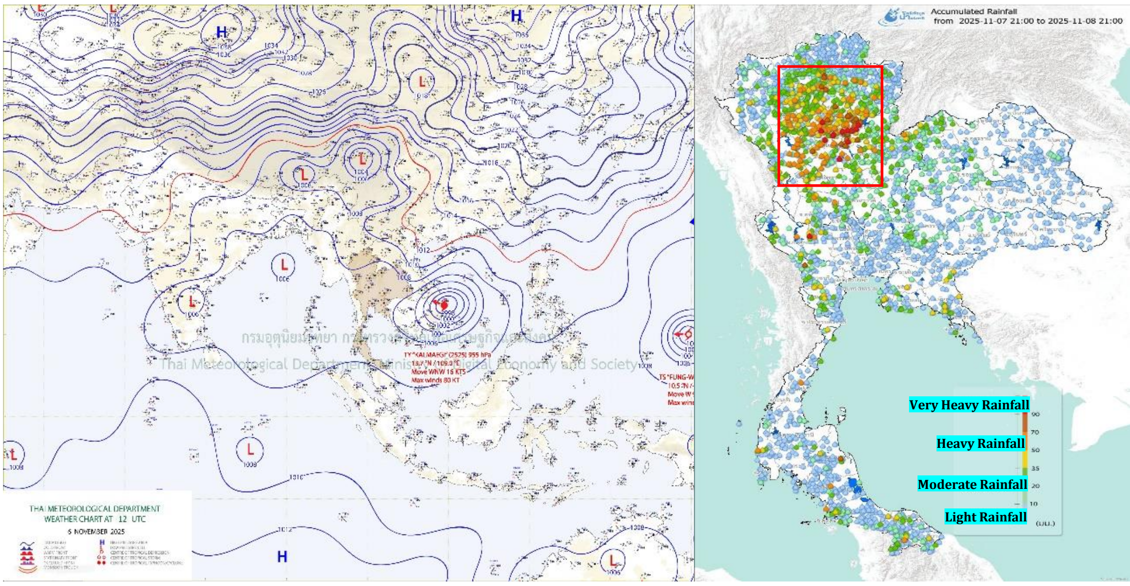


Figure 20: Surface Weather Map and 24 Hr. Accumulated Rainfall on November 7, 2025

The accumulated heavy rainfall in the northern and central regions of Thailand from late July to mid-November caused a large volume of water to flow into the Chao Phraya River Basin in the central region. The peak discharge reached 3,016 cubic meters per second on 11 November 2025, as shown in the graph of average basin rainfall and daily discharge of the Chao Phraya River at Station C.2, Chiraprawat Camp, Mueang Nakhon Sawan District, Nakhon Sawan Province, for comparison with high-flow years of the Chao Phraya River in Thailand.

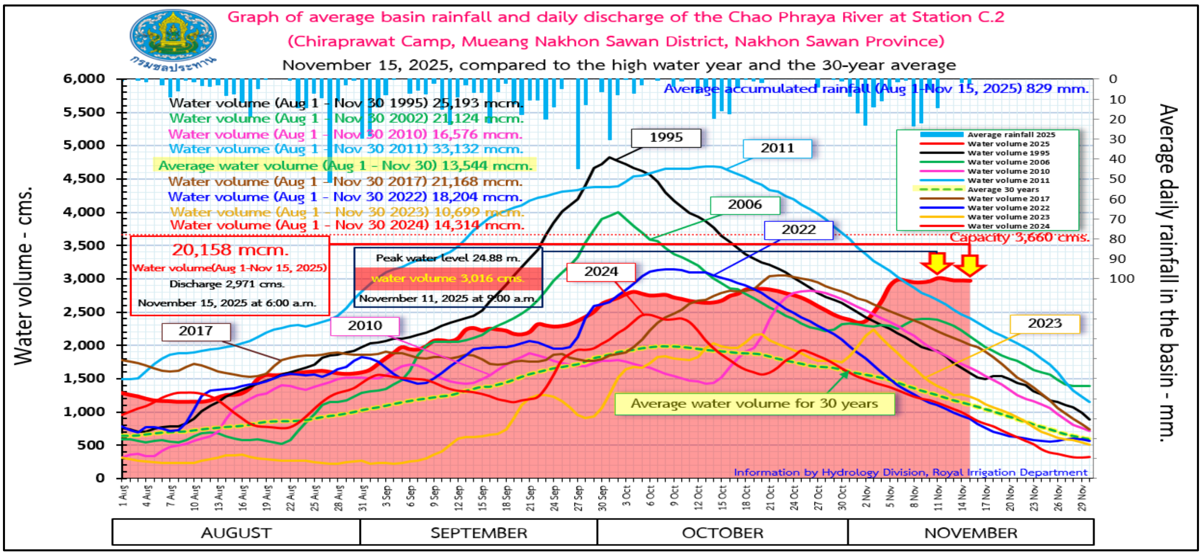
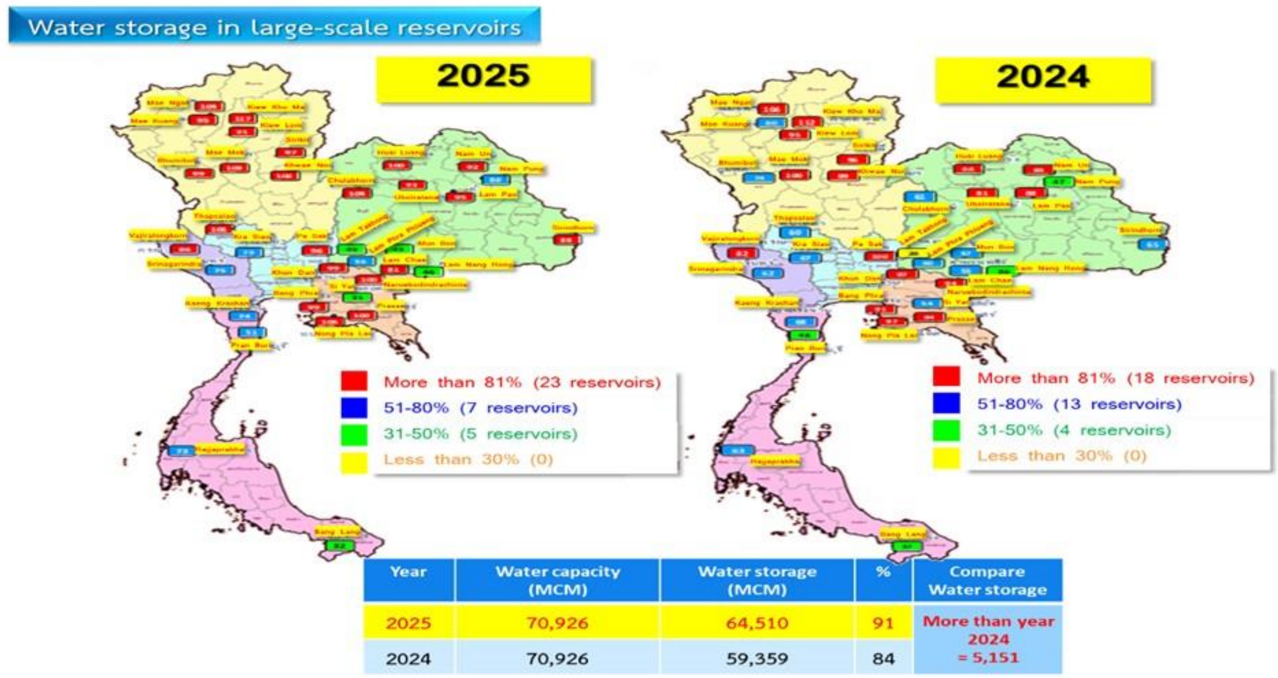


Figure 21: Graph of average basin rainfall and daily discharge of the Chao Phraya River at Station C.2

As November 15, 2025, the total water storage in 35 large-scale reservoirs across Thailand amounts to 64,510 million cubic meters, representing 91% of the total water capacity of 70,926 million cubic meters. The water storage in year 2025 is more than in year 2024 by 5,151 million cubic meters.



Year	Water capacity (MCM)	Water storage (MCM)	%	Compare Water storage
2025	70,926	64,510	91	More than year 2024 = 5,151
2024	70,926	59,359	84	

Figure 22: Water storage in large-scale reservoirs as November 15, 2025

3. Socio-Economic Assessment

Overview of tropical cyclones which had affected/impacted Thailand from 1 November 2024 to 15 November 2025 by Department of Disaster Prevention and Mitigation (DDPM), Thailand.

3.1 Tropical cyclone "KALMAEGI" (2525)

The tropical storm "KALMAEGI" (2525) was the only tropical cyclone to affect Thailand during this period. After forming in the western North Pacific and making landfall in Vietnam, it weakened as it passed through Cambodia and Laos before entering northeastern Thailand on 7 November 2025. The system further degenerated into a low-pressure cell the same day and moved across northern and northeastern Thailand until 8 November 2025.

In the period of 7 - 9 November 2025, DDPM reported that the tropical storm "KALMAEGI" (2525) caused flooding which affected 3,630 households across 27 districts, 62 subdistricts and 264 villages in 17 provinces including Kamphaeng Phet, Chai Nat, Tak, Nakhon Pathom, Nakhon Ratchasima, Nakhon Si Thammarat, Phayao, Phichit, Lampang, Lamphun, Si Sa Ket, Satun, Samut Sakhon, Sing Buri, Sukhothai, Suphan Buri and Uttaradit. There were no injuries, missing persons, or fatalities resulting from the incident.

3.2 Tropical cyclone “WIPHA” (2506)

The tropical storm “WIPHA” (2506) made landfall in southern China before crossing the Gulf of Tonkin and entering Vietnam on 22 July 2025. It weakened while moving across Laos and reached northern Thailand on 23 July 2025 as a low-pressure system, bringing widespread rainfall to northern and northeastern Thailand.

In the period of 21 - 24 July 2025, DDPM reported that the tropical storm “WIPHA” (2506) caused flooding which affected 105,872 households across 79 districts, 396 subdistricts and 3,127 villages in 17 provinces including Kalasin, Chiang Rai, Chiang Mai, Tak, Nakhon Phanom, Nan, Bueng Kan, Prachuap Khiri Khan, Phayao, Phitsanulok, Phrae, Mae Hong Son, Lampang, Loei, Nong Khai, Amnat Charoen and Uttaradit. The incident resulted in 7 fatalities and 1 missing person.

3.3 Tropical cyclone “KAJIKI” (2513)

The tropical storm “KAJIKI” (2513) formed over the upper South China Sea on 23 August 2025, intensified into a typhoon, and made landfall in Vinh, Vietnam on 25 August 2025. It weakened as it moved across Laos and entered northern Thailand during 26 - 27 August 2025 as a low-pressure system before progressing into upper Myanmar. The storm and its remnants brought widespread and heavy to very heavy rainfall across northern and northeastern Thailand.

In the period of 24 - 27 August 2025, DDPM reported that the tropical storm “KAJIKI” (2513) caused flooding which affected 46,232 households across 68 districts, 202 subdistricts and 1,040 villages in 25 provinces including Kanchanaburi, Khon Kaen, Chachoengsao, Chaiyaphum, Chiang Rai, Chiang Mai, Nakhon Nayok, Nakhon Sawan, Nan, Phayao, Phichit, Phitsanulok, Phetchabun, Phrae, Mukdahan, Mae Hong Son, Lampang, Lamphun, Loei, Sakon Nakhon, Nong Khai, Nong Bua Lam Phu, Ang Thong, Amnat Charoen and Uttaradit. The incident resulted in 8 fatalities, 3 missing persons and 4 injured persons.

3.4 Tropical cyclone “NONGFA” (2514)

The tropical storm “NONGFA” (2514) developed over the South China Sea and made landfall in Ha Tinh, Vietnam, on 30 August 2025 before weakening as it moved across Laos and into northeastern Thailand. Its remnants progressed westward across Nakhon Phanom, Nong Khai, Loei, and parts of the lower northern region. The storm brought widespread and heavy to very heavy rainfall to northern and northeastern Thailand, with the most significant impacts in the lower northern and upper northeastern regions.

In the period of 29 - 31 August 2025, DDPM reported that the tropical storm “NONGFA” (2514) caused flooding which affected 58,661 households across 97 districts, 477 subdistricts and 2,790 villages in 22 provinces including Kalasin, Kamphaeng Phet, Khon Kaen, Chiang Mai, Trat, Tak, Phichit, Phitsanulok, Phetchabun, Mukdahan, Roi Et, Ranong, Lampang, Lamphun, Loei, Sakon Nakhon, Sukhothai, Nong Bua Lam Phu, Ang Thong, Amnat Charoen, Udon Thani and Uttaradit. The incident resulted in 2 fatalities.

3.5 Tropical cyclone "TAPAH" (2516)

The tropical storm "TAPAH" (2516) formed over the upper South China Sea on 6 September 2025, intensified into a typhoon, and made landfall in Guangdong, China, on 8 September 2025 before weakening rapidly over southern China. Although the system did not enter Thailand, it strengthened the southwest monsoon over the Andaman Sea, Thailand, and the Gulf of Thailand, bringing widespread and heavy rainfall to the eastern and western coasts of southern Thailand.

In the period of 6 - 8 September 2025, DDPM reported that the tropical storm "TAPAH" (2516) caused flooding which affected 146,255 households across 88 districts, 326 subdistricts and 1,975 villages in 30 provinces including Kalasin, Chanthaburi, Chachoengsao, Chon Buri, Chaiyaphum, Chiang Mai, Nakhon Nayok, Nakhon Pathom, Nakhon Ratchasima, Nakhon Sawan, Nonthaburi, Pathum Thani, Prachin Buri, Phra Nakhon Si Ayutthaya, Phichit, Phitsanulok, Phetchabun, Maha Sarakham, Yasothon, Roi Et, Rayong, Ratchaburi, Lampang, Samut Prakan, Saraburi, Sukhothai, Suphan Buri, Surin, Nong Bua Lam Phu and Ang Thong. The incident resulted in 4 fatalities.

3.6 Tropical cyclone "RAGASA" (2518)

The tropical storm "RAGASA" (2518) made landfall in southern Guangdong, China, on 24 September 2025 before weakening as it moved along the southern China coast and into Vietnam on 25 September 2025. Although the system did not enter Thailand, it enhanced the monsoon trough over the upper northern and upper northeastern regions and strengthened the southwest monsoon over the Andaman Sea and the Gulf of Thailand, resulting in widespread rainfall across northern and northeastern Thailand.

In the period of 23 - 25 September 2025, DDPM reported that the tropical storm "RAGASA" (2518) caused flooding which affected 13,509 households across 62 districts, 153 subdistricts and 736 villages in 30 provinces including Kalasin, Chanthaburi, Chaiyaphum, Chiang Rai, Chiang Mai, Tak, Nakhon Nayok, Nakhon Pathom, Nakhon Ratchasima, Nakhon Sawan, Nan, Buri Ram, Prachin Buri, Phayao, Phichit, Phitsanulok, Maha Sarakham, Mae Hong Son, Yasothon, Roi Et, Ranong, Lampang, Lamphun, Si Sa Ket, Sing Buri, Sukhothai, Surin, Nong Khai, Ang Thong and Amnat Charoen. The incident resulted in 1 fatalities.

3.7 Tropical cyclone "BUALOI" (2520)

The tropical storm "BUALOI" (2520) made landfall in Quang Binh, Vietnam, on 29 September 2025 before weakening rapidly as it moved across Laos and into upper Myanmar. Although the system did not enter Thailand, it intensified the monsoon trough over upper Thailand and strengthened the southwest monsoon over the Andaman Sea and the Gulf of Thailand. This resulted in widespread and abundant rainfall across the northern and northeastern regions, as well as along the west coast of southern Thailand.

In the period of 28 - 30 September 2025, DDPM reported that the tropical storm "BUALOI" (2520) caused flooding which affected 71,087 households across 134 districts, 444 subdistricts and 2,728 villages in 40 provinces including Kalasin, Kamphaeng Phet, Khon Kaen, Chachoengsao, Chai Nat, Chaiyaphum, Chiang Mai, Tak, Nakhon Nayok, Nakhon Ratchasima, Nakhon Sawan, Buri Ram, Pathum Thani, Prachin Buri, Phayao, Phichit, Phitsanulok, Phetchabun, Phrae, Maha Sarakham, Mukdahan, Mae Hong Son, Yasothon, Roi Et, Lampang, Lamphun, Loei, Si Sa Ket, Sakon Nakhon, Satun, Sa Kaeo, Sing Buri, Sukhothai, Surin, Nong Khai, Nong Bua Lam Phu, Ang Thong, Udon Thani, Uttaradit and Uthai Thani. The incident resulted in 12 fatalities and 1 missing person.

II. Summary of Progress in Priorities supporting Key Result Areas

1. Development of Regional Radar Network

Main Text:

The project continues to advance through the enhancement of regional radar integration and improved real-time data sharing among Members. Ongoing efforts focus on refining radar quality control procedures and quantitative precipitation estimation (QPE) techniques to ensure higher data accuracy and consistency across the region. These improvements collectively strengthen the capability for regional tropical cyclone (TC) track monitoring and the detection of severe weather events, thereby supporting more timely and reliable early warning services. (Enhance cross-border radar calibration and real-time data exchange.)

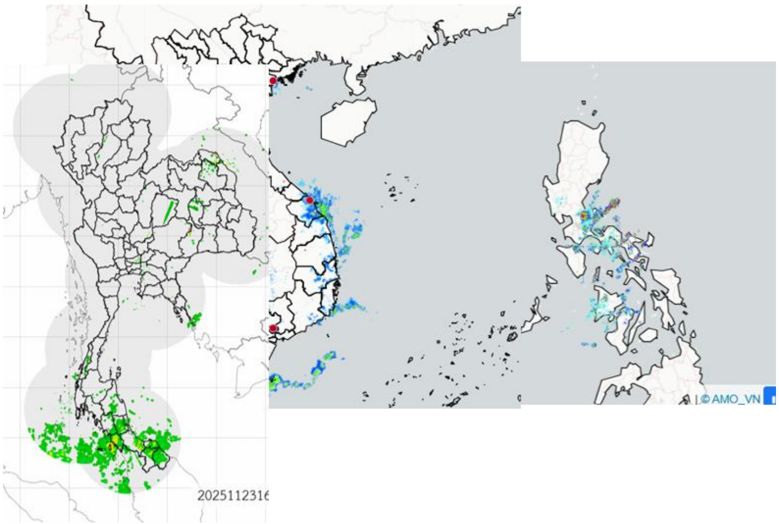


Figure 23. Regional Radar Network

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

Future cooperation on cross-border radar data sharing among Member countries.

Priority Areas Addressed:

Integrated

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.
- Strengthen cross-cutting activities among working groups in the Committee.
- Enhance collaborative activities with other regional/international frameworks/ organizations, including technical cooperation between TC/AP-TCRC and TC/PTC cooperation mechanism.

Meteorology

- Enhance the capacity to monitor and forecast typhoon activities particularly in genesis, intensity and structure change.
- Enhance and provide typhoon forecast guidance based on NWP including ensembles, weather radar and satellite related products, such as QPE/QPF.
- Promote communication among typhoon operational forecast and research communities in Typhoon Committee region.
- Enhance training activities with TRCG, WGH, and WGDRR in accordance with Typhoon Committee forecast competency, knowledge sharing, and exchange of latest development and new techniques.

Hydrology

- Improve typhoon-related flood (including riverine flood, flash flood, urban flood, and coastal flood) monitoring, data collection and archiving, quality control, transmission, processing, and sharing framework.
- Strengthen capacity in effective flood forecasting and impact-based early warning, including hazard mapping and anticipated risk base on methodological and hydrological modelling, and operation system development.
- Increase capacity in utilization of advanced science and technology for typhoon-related flood forecasting, early warning, and management.

DRR

- Enhance Members' disaster risk reduction techniques and management strategies.
- Share experience/knowhow of DRR activities including legal and policy framework, community-based DRR activities, methodology to collect disaster-related information.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed:

Key Pillars of EW4All	Please ✓ the related pillar(s)
Disaster risk knowledge and management	✓
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	

Contact Information:
Member: Thailand
Name of contact for this item: Mr. Peeranat Longsombun
Telephone: +662 399 4012-4
Email: ii.arrm.bb@gmail.com

2. Radar nowcasting based on RaINS/SWIRL

Main Text:

TMD has nominated participants to conduct research under the ESCAP/WMO Typhoon Committee Research Fellowship (TCRF) on collaborative developments of AI/ML nowcasting techniques. The objective is to study and utilize the Com-SWIRLS software for developing data processing, quality control, optical flow, and extrapolation-based nowcasting using Thailand's radar datasets.

In addition, TMD staff participated in the Training Attachment on the Radar Integrated Nowcasting System (RaINS) in Petaling Jaya, Malaysia. The knowledge and techniques gained from these activities will be applied and further enhanced to improve the accuracy of rainfall forecasting, thereby strengthening heavy rainfall warning services and enhancing national early warning capacity in alignment with the EW4All initiative.

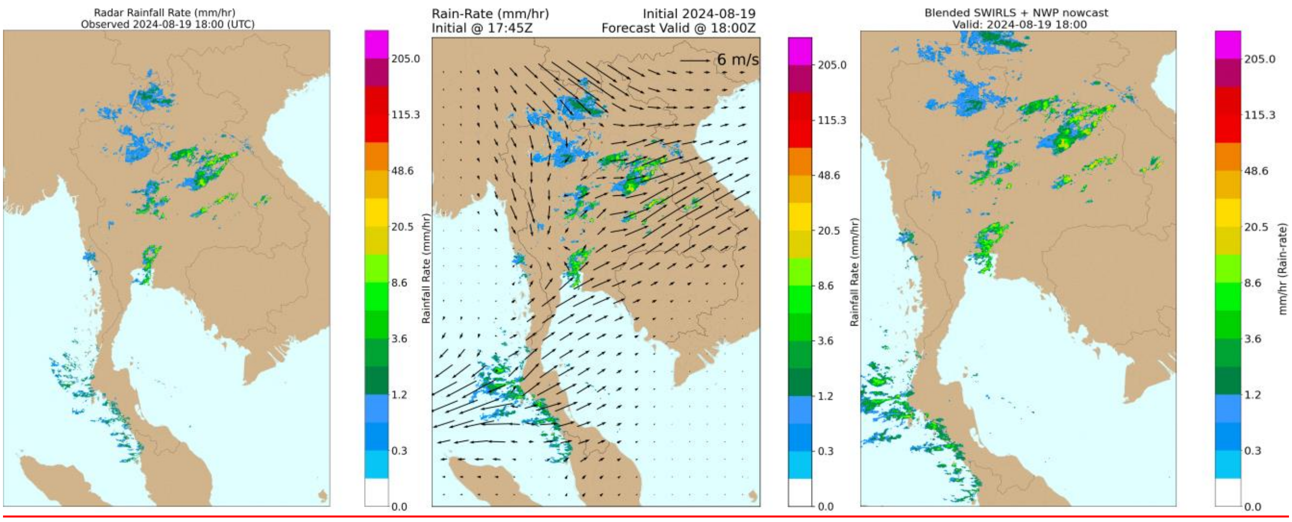


Figure 24. Blending Numerical Weather Prediction (NWP) data with Radar Nowcasting

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

One key challenge concerns the use of software that is subject to the developer's licensing requirements. It is recommended that guidelines or options for software acquisition be proposed for Member countries to ensure sustainable and authorized usage.

Priority Areas Addressed:

Integrated

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.
- Strengthen cross-cutting activities among working groups in the Committee.
- Enhance collaborative activities with other regional/international frameworks/organizations, including technical cooperation between TC/AP-TCRC and TC/PTC cooperation mechanism.

Meteorology

- Enhance the capacity to monitor and forecast typhoon activities particularly in genesis, intensity and structure change.
- Enhance training activities with TRCG, WGH, and WGDRR in accordance with Typhoon Committee forecast competency, knowledge sharing, and exchange of latest development and new techniques.

Hydrology

- Strengthen capacity in effective flood forecasting and impact-based early warning, including hazard mapping and anticipated risk base on methodological and hydrological modelling, and operation system development.
- Increase capacity in utilization of advanced science and technology for typhoon-related flood forecasting, early warning, and management.

DRR

- Share experience/knowhow of DRR activities including legal and policy framework, community-based DRR activities, methodology to collect disaster-related information.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed:

Key Pillars of EW4All	Please ✓the related pillar(s)
Disaster risk knowledge and management	✓
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	

Contact Information:

Member: Thailand
Name of contact for this item: Mr. Jaral Yiemwech
Telephone: +662 399 4012-4
Email: mywebcenter@hotmail.com

Contact Information:
Member: Thailand
Name of contact for this item: Mr. Jaral Yiemwech
Telephone: +662 399 4012-4
Email: mywebcenter@hotmail.com

3. Utilization of FengYun Satellite for High-Frequency TC Observation

Main Text:

The activity promotes the operational use of high-frequency FengYun satellite observations to improve tropical cyclone monitoring. Enhancements to the FengYun satellite QPE product allow for more accurate estimation of typhoon-related rainfall, supporting improved warning services for rainstorm-related disasters. Additionally, organizing workshops on FengYun satellite applications strengthens technical exchange among Members and enhances the interpretation and operational utilization of satellite data for TC analysis.

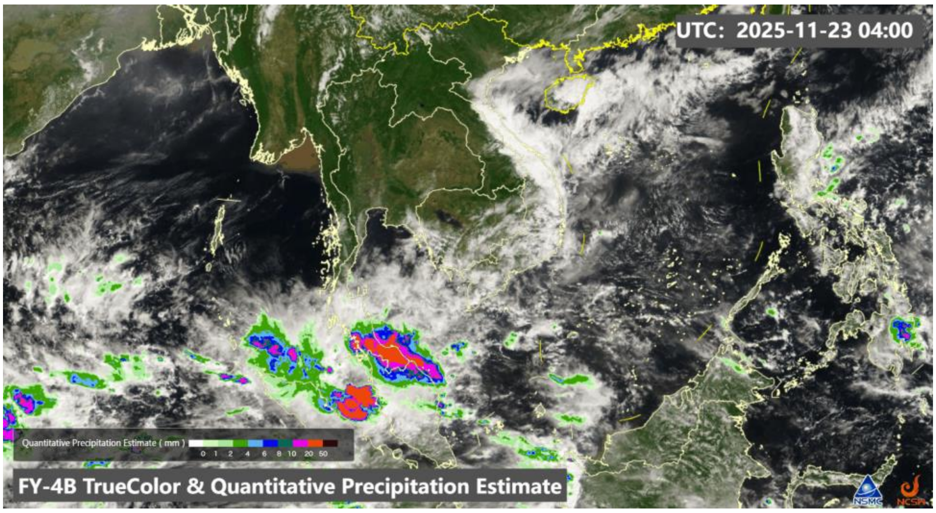


Figure 25. FengYun satellite QPE product

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

Techniques and methods to be used for calibrating the estimation of cloud-based rainfall against the actual rainfall observed on the ground.

Priority Areas Addressed:

<u>Integrated</u>

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.
- Enhance collaborative activities with other regional/international frameworks/organizations, including technical cooperation between TC/AP-

TCRC and TC/PTC cooperation mechanism.
- Strengthen cross-cutting activities among working groups in the Committee.

<u>Meteorology</u>
- Enhance the capacity to monitor and forecast typhoon activities particularly in genesis, intensity and structure change.
- Enhance and provide typhoon forecast guidance based on NWP including ensembles, weather radar and satellite related products, such as QPE/QPF.
- Promote communication among typhoon operational forecast and research communities in the Typhoon Committee region.
- Enhance training activities with TRCG, WGH, and WGDRR in accordance with Typhoon Committee forecast competency, knowledge sharing, and exchange of latest development and new techniques.

<u>Hydrology</u>
- Improve typhoon-related flood (including riverine flood, flash flood, urban flood, and coastal flood) monitoring, data collection and archiving, quality control, transmission, processing, and sharing framework.
- Strengthen capacity in effective flood forecasting and impact-based early warning, including hazard mapping and anticipated risk base on methodological and hydrological modelling, and operation system development.
- Increase capacity in utilization of advanced science and technology for typhoon-related flood forecasting, early warning, and management.

<u>DRR</u>
- Enhance Members' disaster risk reduction techniques and management strategies.
- Promote international cooperation of DRR implementation project.
- Share experience/knowhow of DRR activities including legal and policy framework, community-based DRR activities, methodology to collect disaster-related information.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed:

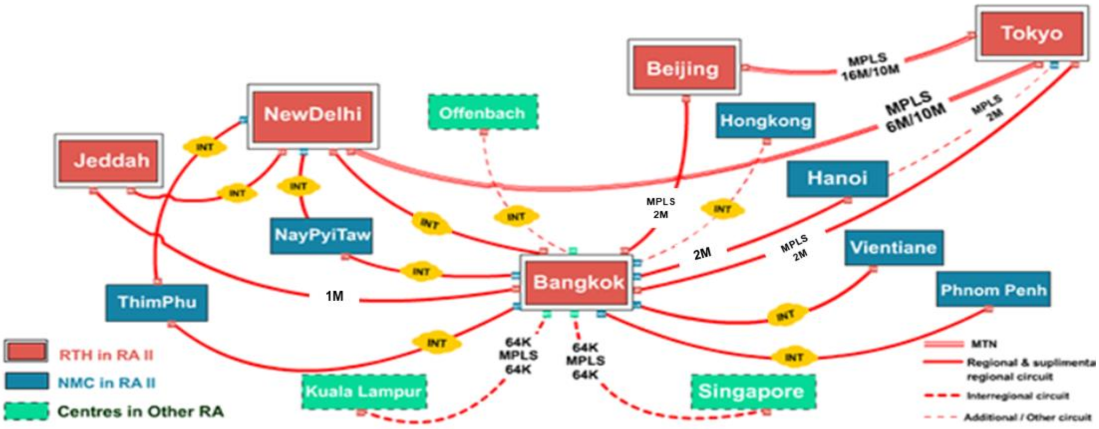
Key Pillars of EW4All	Please ✓ the related pillar(s)
Disaster risk knowledge and management	
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	

Contact Information:
Member: Thailand
Name of contact for this item: Mr. Thaweesak Chantaburi
Telephone: +662 366 9372
Email: thaweesakc@gmail.com

4. Development of GTS and WIS2.0 network

Main Text:

In 2025, TMD upgraded GTS connection by increasing the internet bandwidth from 40/10 Mbps to 80/40 Mbps to improve data exchanging. The updated international network connections are summarized in the table below.



No.	Country	Wan Topology	Protocol	Speed
1	Beijing	Leased Line (MPLS)	FTP	2 Mbps
2	Japan	Leased Line (MPLS)	Socket	2 Mbps
3	Malaysia	Leased Line (MPLS)	Socket	64 Kbps
4	Singapore	Leased Line (MPLS)	Socket	64 Kbps
5	Hongkong	Internet (Public IP)	SFTP	80/40 Mbps
6	Cambodia (AoR)	Internet (VPN/IPsec)	FTP	80/40 Mbps
7	Hanoi (AoR)	Leased Line (IPLC)	FTP	2 Mbps
8	Laos (AoR)	Internet (Public IP)	FTP	80/40 Mbps

Figure 26. International network connections

For WIS2.0, TMD initiated implementation in June 2025 by studying materials on WMO website then installation and configuration were completed in July, and TMD successfully registered as a WIS2.0 node in August.

International collaboration:
TMD continues to collaborate with JMA and CMA to support the implementation of WIS2.0. This cooperation focuses on capacity building and technical support, particularly for operating as a WIS2.0 node.

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

1. Collaboration on WIS 2.0 Implementation: The cooperation between TMD and GISC Tokyo and Beijing on WIS 2.0 provides capacity development for operating as a WIS 2.0 Node.

Priority Areas Addressed:
Integrated

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed:

Key Pillars of EW4All	Please ✓the related pillar(s)
Disaster risk knowledge and management	
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	
Preparedness and response capabilities	

Contact Information:
Member: Thailand
Name of contact for this item: Ms. Natthaporn Lertsamranpinit
Telephone: +662 399 4596
Email: natthaporn.le@gmail.com

5. Application of Numerical Weather Prediction (NWP), Weather Radar, and Satellite to estimate quantitative precipitation forecasting during Typhoon events.

Main text:

During the typhoon event, ONWR conducts monitoring of accumulated heavy rainfall to support water situations surveillance, using Weather Research and Forecasting (WRF) model from the Thai Meteorological Department and Hydro-Informatics Institute (Public Organization) (HII) to assess daily heavy rainfall risk areas and 3-day accumulated forecasts. Additionally, near real-time monitoring of short-duration accumulated heavy rainfall (Nowcast) was monitored to assess potential flash floods and inundation areas, including the radar-based rainfall visualization platforms from radar mosaic of the Department of Royal Rainmaking and Agricultural Aviation and radar composite, as well as satellite-based rainfall estimates provide by the Thai Meteorological Department.

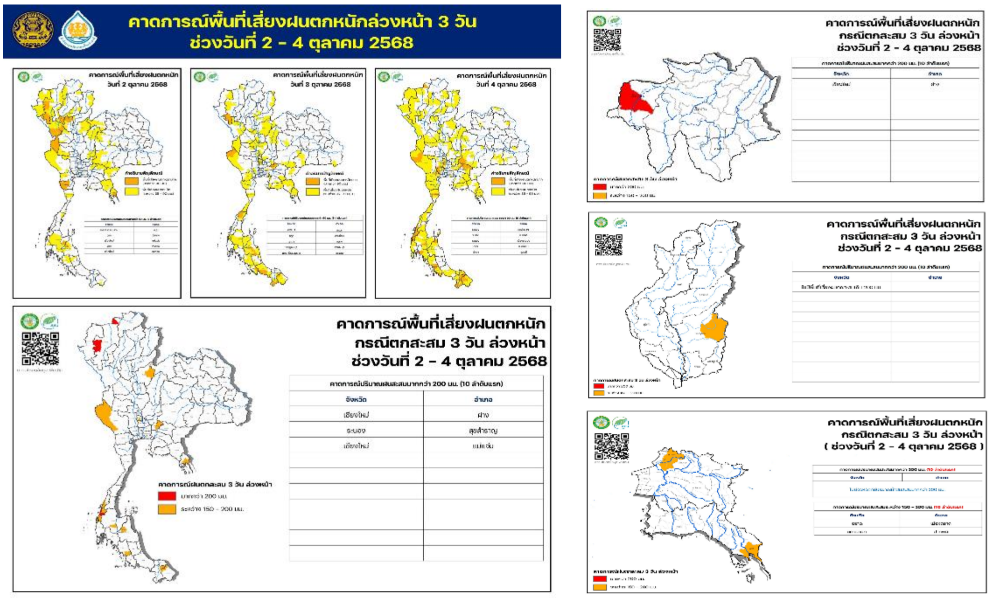


Figure 27: Risk area assessment based on 3-day advance cumulative rainfall.

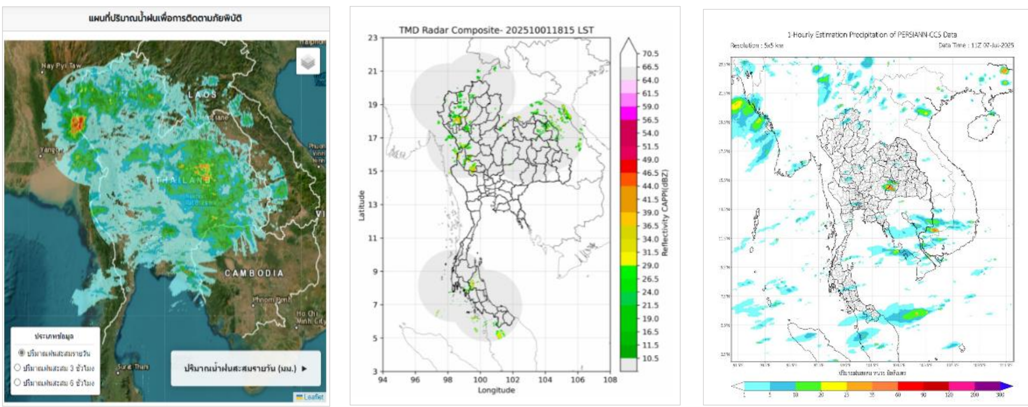


Figure 28: Risk area assessment based on 1-6 hours accumulated rainfall.

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

Thai Meteorological Department shared weather and storm situations. To enhance the agency to have a basic understanding of meteorology, to use in monitoring, evaluating, analyzing, targeting risk areas. Also used to notify related agencies and people in risk areas for advance preparation.

Priority Areas Addressed:

Integrated

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.

Meteorology

- Develop and enhance typhoon analysis and forecast techniques from nowcast to medium-range, and seasonal to long-range prediction.
- Enhance and provide typhoon forecast guidance based on NWP including ensembles, weather radar and satellite related products, such as QPE/QPF.

Hydrology

- Improve typhoon-related flood (including riverine flood, flash flood, urban flood, and coastal flood) monitoring, data collection and archiving, quality control, transmission, processing, and sharing framework.

DRR

- Enhance Members'disaster risk reduction techniques and management strategies.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed:

Key Pillars of EW4All	Please ✓ the related pillar(s)
Disaster risk knowledge and management	✓
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	✓

Contact Information:
Member: Thailand
Name of contact for this item: Ms.Sumalee PHUNGKHAM
Telephone: +662 554 1800
Email: sphungkham2@gmail.com

6. Strengthen the capacity for effective flood forecasting and early warning systems, including predictive disaster and risk mapping by using methodological and hydrological models, and operational systems development.

Main text:

ONWR has coordinated an integrated forecasting effort among relevant agencies to assess water-related risks induced by typhoon influences across the Northern, Northeastern, and Central regions. The assessment focuses on riverbank overflow levels and reservoirs storage conditions at high-risk reservoirs, including Sirikit, Ubonratana, Pa Sak Jolasid, Nam Un, Nam Phung, and Nong Han reservoirs. The assessment also includes forecasted reservoir inflows during the influence of tropical storms “Wipha,” “Kajiki,” and “Bualoi,” as well as forecasting of flooding impacts resulting from controlled reservoir releases.

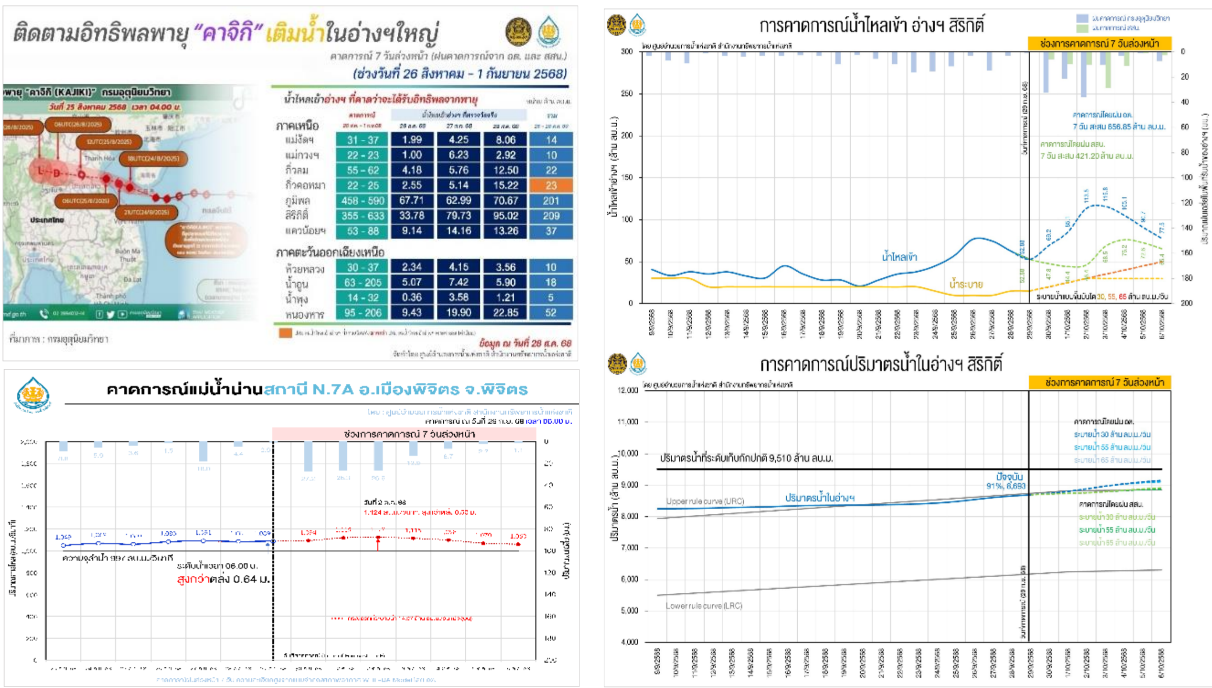


Figure 29: Daily Water Situation by Basin.
(https://nationalthaiwater.onwr.go.th/infographic-basin-situation)

In particular, for the Sirikit Reservoir, forecasted inflow conditions under the influence of the storms required adjustments to the water drainage plan in order to retain water and mitigate downstream flood impacts in Phichit Province.

Figure 30: Daily Water Situation by Basin.
(https://nationalthaiwater.onwr.go.th/infographic-basin-situation)

Furthermore, flood-risk areas have been forecasted in the case of adjusting the Chao Phraya Dam's drainage plan, serving as critical information for issuing warnings in potentially affected areas.

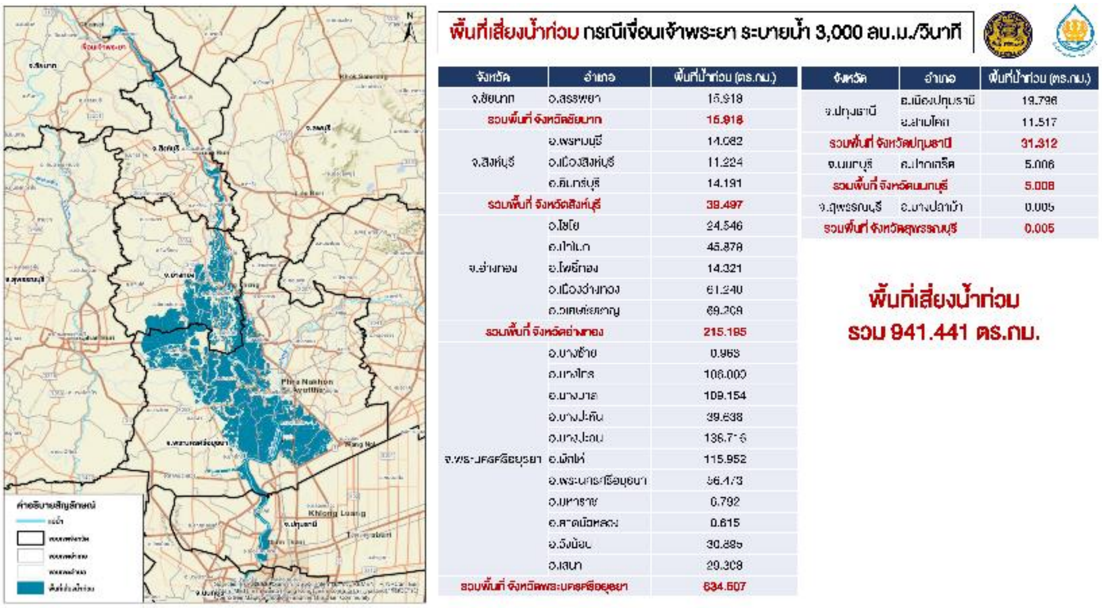


Figure 31: Flood-risk areas forecasted

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

ONWR will advancing data integration and the development of water situation and flood forecasting systems in collaboration with relevant agencies, to cover recurrent risk areas and important urban communities by seeking technical support and applying model such as the Rainfall–Runoff–Inundation (RRI) model to improve risk assessment and decision-making capabilities.

Priority Areas Addressed:

Integrated

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.

Meteorology

- Enhance and provide typhoon forecast guidance based on NWP including ensembles, weather radar and satellite related products, such as QPE/QPF.

Hydrology

- Strengthen capacity in effective flood forecasting and impact-based early warning, including hazard mapping and anticipated risk based on methodological and hydrological modelling, and operation system development.
- Enhance capacity in typhoon-related flood risk management (including land-use management, dam operation, etc.) and integrated water resources management and flood-water utilization.

DRR

- Enhance Members'disaster risk reduction techniques and management strategies.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed:

Key Pillars of EW4All	Please ✓ the related pillar(s)
Disaster risk knowledge and management	✓
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	✓

Contact Information:

Member: Thailand
Name of contact for this item: Ms.Sumalee PHUNGKHAM
Telephone: +662 554 1800
Email: sphungkham2@gmail.com

7. Enhancing capacity for typhoon-related flood risk management.

Main text:

ONWR, in collaboration with relevant agencies such as the Royal Irrigation Department (RID) and the Electricity Generating Authority of Thailand (EGAT), has enhanced flood risk management capacity during the strong southwest monsoon period, which brought in heavy rainfall in several areas in the upper region above the Chao Phraya Dam. This resulted in rising water volumes and water levels in the Chao Phraya River and its tributaries. Under the forecasted influence of Typhoon "Bualoi" expected to bring increased rainfall and greater water inflow into the Chao Phraya Dam, RID adjusted the water discharge plan for upstream reservoirs, namely Ubolratana, Sirikit, and Khwae Noi reservoirs, as well as increasing the discharge rate through the Chao Phraya Dam in Chai Nat Province to 2,200 cubic meters per second, while retaining water upstream and diverting water into irrigation systems on both sides of river according to canal capacities. ONWR also compiled real time data to monitor the water situation across 22 river basins nationwide, including integration of water level forecasts from relevant agencies, and disseminated to related agencies and the public in an easy-to-understand Infographic format for use in preparing for water situations and flood events.

Figure 32: River Basin Management of Chao Praya River Basin.

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

Nil.

Priority Areas Addressed:

Integrated

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.

Meteorology

- Enhance the capacity to monitor and forecast typhoon activities particularly in genesis, intensity and structure change.
- Develop and enhance typhoon analysis and forecast techniques from nowcast to medium-range, and seasonal to long-range prediction.

Hydrology

- Strengthen capacity in effective flood forecasting and impact-based early warning, including hazard mapping and anticipated risk based on methodological and hydrological modelling, and operation system development.
- Enhance capacity in typhoon-related flood risk management (including land-use management, dam operation, etc.) and integrated water resources management and flood-water utilization.

DRR

- Enhance Members'disaster risk reduction techniques and management strategies.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed:

Key Pillars of EW4All	Please ✓ the related pillar(s)
Disaster risk knowledge and management	✓
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	✓

Contact Information:

Member: Thailand

Name of contact for this item: Ms.Sumalee PHUNGKHAM

Telephone: +662 554 1800

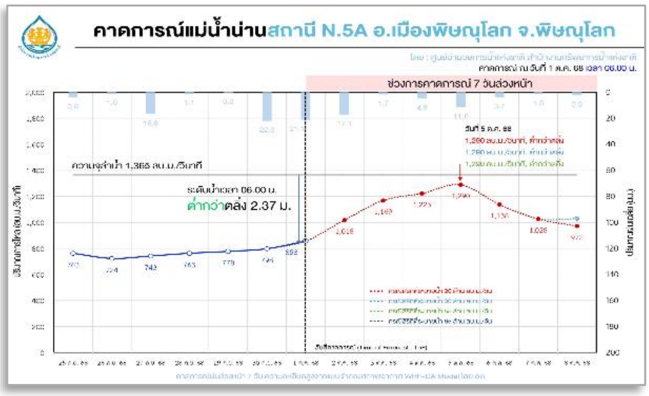
Email: sphungkham2@gmail.com

8. Data sharing on water situations and flooding, including water management resulting from typhoon influences.

Main text:

ONWR has compiled data to monitor the water situation in 22 river basins nationwide, including integrating water level forecasts from relevant agencies, and disseminating this information to related agencies and the public in an easy-to-understand Infographic format to be used in preparing and responding for water situations and flood disasters.

Figure 33: Daily Water Situation by Basin.
(https://nationalthaiwater.onwr.go.th/infographic-basin-situation)



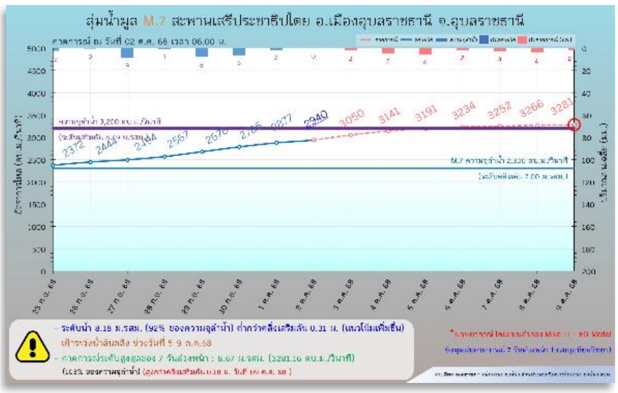


Figure 34: Water level forecasts.

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

ONWR will continue advancing data integration and the development of water situation forecasting systems and flood forecasting systems in collaboration with relevant agencies, aiming to enhance coverage across recurrent flood-prone areas and major urban areas by seeking technical knowledge support and applying the RRI model.

Priority Areas Addressed:

Integrated

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.

Meteorology

- Enhance and provide typhoon forecast guidance based on NWP including ensembles, weather radar and satellite related products, such as QPE/QPF.

Hydrology

- Strengthen capacity in effective flood forecasting and impact-based early warning, including hazard mapping and anticipated risk based on methodological and hydrological modelling, and operation system development.
- Enhance capacity in typhoon-related flood risk management (including land-use management, dam operation, etc.) and integrated water resources management and flood-water utilization.

DRR

- Enhance Members'disaster risk reduction techniques and management strategies.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed:

Key Pillars of EW4All	Please ✓ the related pillar(s)
Disaster risk knowledge and management	✓
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	✓

Contact Information:
Member: Thailand
Name of contact for this item: Ms.Sumalee PHUNGKHAM
Telephone: +662 554 1800
Email: sphungkham2@gmail.com

9. Flood Marks in Chao Phraya River Basin

Main Text:

The Chao Phraya River Basin is the main and most important river basin in Thailand, covering an area of approximately 157,000 square kilometers, or about 30 percent of the country's total area. It consists of four major tributaries the Ping, Wang, Yom, and Nan Rivers which converge at Nakhon Sawan Province, forming the Chao Phraya River. The river then flows through Chai Nat, Sing Buri, Ang Thong, and Phra Nakhon Si Ayutthaya Provinces, before entering Pathum Thani, Nonthaburi, and Bangkok, and finally discharging into the Gulf of Thailand.

The topography of the lower Chao Phraya Basin is characterized by flat lowland plains with very gentle slopes, averaging only 1–3 meters above sea level. This natural feature causes slow drainage, especially during the rainy season when large volumes of water flow from the upper part of the basin.

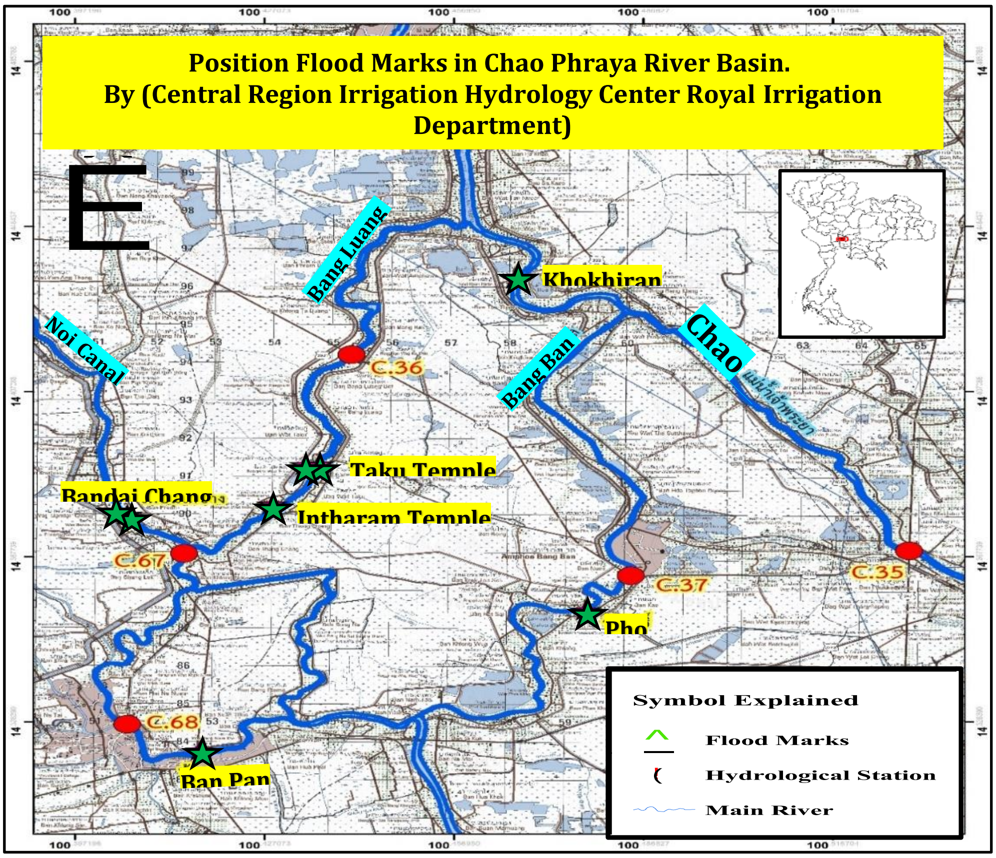


Figure 35: Map showing Flood Marks in Chao Phraya River Basin.

Due to the physical characteristics of the Chao Phraya River Basin, which has a very gentle slope and extensive lowland areas in its lower part, Phra Nakhon Si Ayutthaya Province, located at the confluence of several major rivers namely the Chao Phraya, Pa Sak, and Noi Rivers is considered one of the most flood-prone areas in the central region of Thailand.

The province's topography is largely flat and low-lying, particularly in districts such as Bang Ban, Phak Hai, Sena, and Phra Nakhon Si Ayutthaya, which are situated along the main rivers and their numerous tributary canals. When the water level in the Chao Phraya River rises due to heavy rainfall or runoff from upstream, part of the water overflows the riverbanks and inundates these lowland areas before other provinces, as the terrain lies at a lower elevation than the main river channel and has a very slight slope, causing slow drainage.

Moreover, Ayutthaya naturally serves as a "flood retention area" in the lower Chao Phraya Basin. When water is released from the Bhumibol and Sirikit Dams, or when large volumes of runoff flow from the northern and upper central regions, the water gradually moves downstream through Nakhon Sawan, Chai Nat, and Sing Buri Provinces, before reaching Ayutthaya a key water receiving area and then continues to Pathum Thani, Nonthaburi, and Bangkok on its way to the Gulf of Thailand.

For this reason, whenever the Chao Phraya River carries an above-normal volume of water, Phra Nakhon Si Ayutthaya Province is often the first area to experience flooding, which can persist for several weeks or even months. This is especially true in lowland zones without permanent flood protection structures or those located within the basin's natural floodplain.

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

Reduce flood damage and access real-time water level data.

1. Flood Mark

A strategy was therefore developed to address flood problems by focusing on raising awareness and understanding among residents in flood-prone areas about their local water conditions, both current and historical. The "Flood Mark Water Level Poles" are introduced as a key tool for communicating water level information to the public in a simple, clear, and easily accessible way.

The Flood Mark Water Level Poles serve as visual indicators showing both the highest historical flood levels and the current water levels in each area. This enables local residents to compare, monitor, and assess flood risks by themselves in a timely manner. When they observe that the water level is rising close to the historical flood mark, they can take appropriate precautions and prepare for evacuation if necessary. This approach helps reduce losses to lives and property by promoting understanding and participation among communities through real, visible, and localized information. It enhances the efficiency of flood disaster management in terms of early warning, preparedness, and mitigation of impacts when flood situations occur in the future.

Figure 36: Flood Marks in Chao Phraya River Basin.

Originally, Flood Mark were simply indicators or traces showing the highest water levels reached during past flood events essentially, the visible flood stains left behind. However, they have now been developed and applied as Flood Mark Water Level Poles, serving as statistical markers that allow the public to better understand and access information about both historical flood events and current water conditions in their area.

The Flood Mark Water Level Poles is a symbolic marker installed along rivers, canals, or flood-prone areas within communities or economic zones. It is designed to display the following key information:

- Historical Maximum Level – the highest water level recorded in the past, based on hydrological station data.
- Critical Level (Bank Overflow Threshold) – indicated by color codes:

  Green: Normal – water level is within the normal range.

  Yellow: Caution – water level is rising and should be monitored closely.

  Red: Critical/Flooding – water level has reached the flood stage.
- Current Water Level – the real-time water level observed at the site.

In addition, the Flood Mark Water Level Poles can be used to illustrate the relationship between the volume of water flowing from the upstream area and the water level in the downstream area. A correlation scale between water volume and water level has been established to help the public easily understand how a certain amount of inflow from upstream will affect the rise of water levels in their own area.

Figure 37: Comparison of flood events using the Flood Mark Water Level Poles.

This information helps residents anticipate potential flood situations and prepare appropriately, such as by moving belongings, protecting their homes, or planning for evacuation when water levels show signs of rising.

These poles serve as “on-site warning symbols,” allowing people to visually observe water levels with their own eyes, without relying solely on technical data from government agencies.

A total of 8 Flood Mark Water Level Poles have been installed in the Chao Phraya River Basin, within Phra Nakhon Si Ayutthaya Province, and the initiative will be expanded to other flood-prone areas in the future.

Priority Areas Addressed:
<u>Hydrology</u>

- Improve typhoon-related flood (including riverine flood, flash flood, urban flood, and coastal flood) monitoring, data collection and archiving, quality control, transmission, processing, and sharing framework.
- Enhance capacity in typhoon-related flood risk management (including land-use management, dam operation, etc.) and integrated water resources management and flood-water utilization.
- Strengthen capacity in effective flood forecasting and impact-based early warning, including hazard mapping and anticipated risk based on methodological and hydrological modelling, and operation system development.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed:

Key Pillars of EW4All	Please ✓ the related pillar(s)
Disaster risk knowledge and management	✓
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	
Preparedness and response capabilities	✓

Contact Information:
Member: Thailand
Name of contact for this item: Mrs. Supinda WATTANAKARN
Telephone: +66 89 890 8426
Email: water.rid@gmail.com

10. Expansion of CCTV installation for flood-risk river basins

Main Text:

Under the project to enhance real-time monitoring of water conditions, Thailand expanded the installation of CCTV cameras in flood-prone river basins. In addition to the existing 60 cameras across 9 provinces, the additional 120 cameras were installed in 14 provinces. These cameras enable provincial authorities and the National Disaster Warning Center (NDWC) to closely monitor water levels in upstream, midstream, and downstream areas, thereby improving water management and facilitating timely hazard warnings.

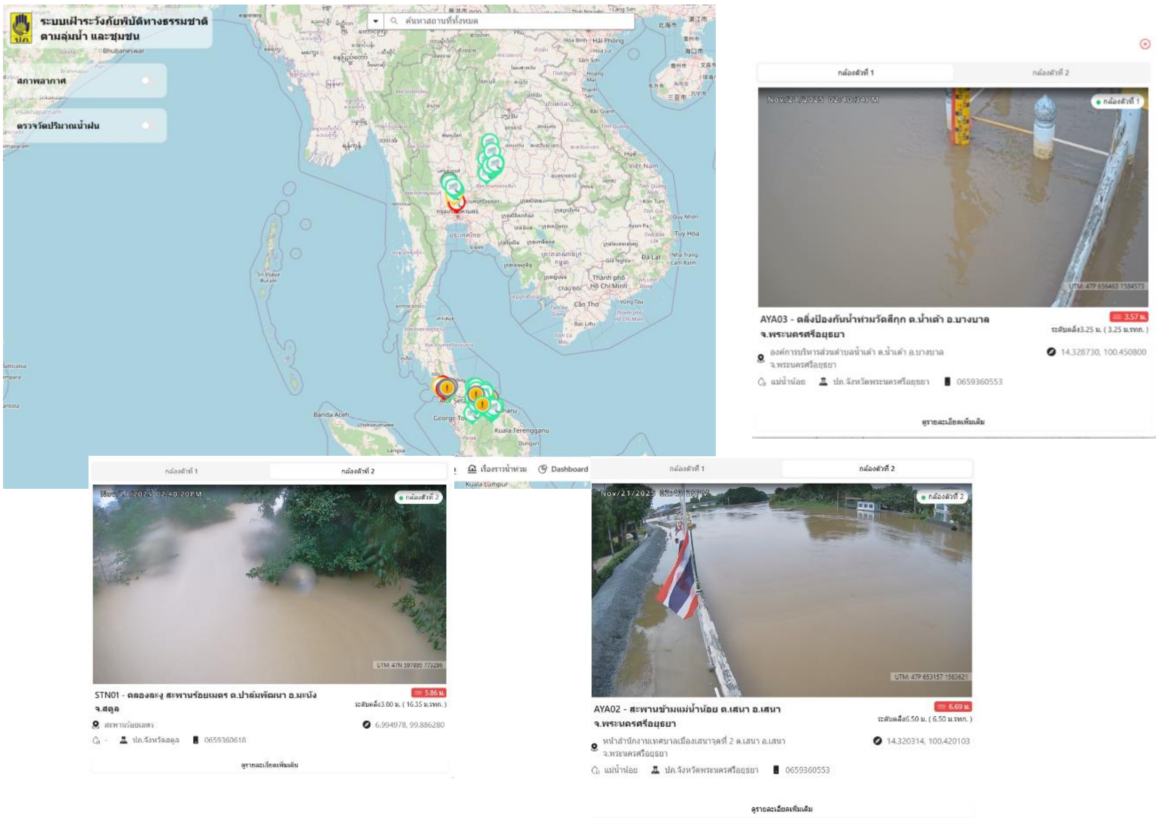


Figure 38: Examples of CCTV cameras in flood-prone river basins

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

1. The existing CCTV system does not yet provide full coverage across all high-risk areas. Additional CCTV installations are therefore required to ensure comprehensive monitoring of all high-risk areas.

2. In some high-risk areas located on mountain peaks or highlands, there is no mobile phone or internet signal available.

Priority Areas Addressed:

Integrated

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.
- Strengthen cross-cutting activities among working groups in the Committee.

Hydrology

- Improve typhoon-related flood (including riverine flood, flash flood, urban flood, and coastal flood) monitoring, data collection and archiving, quality control, transmission, processing, and sharing framework.
- Enhance capacity in typhoon-related flood risk management (including land-use management, dam operation, etc.) and integrated water resources management and flood-water utilization.

DRR

- Enhance Members' disaster risk reduction techniques and management strategies.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed

Key Pillars of EW4All	Please ✓ the related pillar(s)
Disaster risk knowledge and management	✓
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	✓

Contact Information:

Member: Thailand
Name of contact for this item: DDPM Thailand
Telephone: +66 2637 3669
Email: foreign.dpm.th@gmail.com

11. Implementation of the Cell Broadcast System (CBS) to enhance the warning capacity to the public

Main Text:

DDPM has implemented the Cell Broadcast System (CBS) which delivers disaster alerts directly to mobile phones located in at-risk areas without requiring users to download any application. The system provides audible alerts, visual hazard icons, and text messages, ensuring accessibility for persons with visual or hearing impairments.

DDPM, in collaboration with the Ministry of Digital Economy and Society; the National Broadcasting and Telecommunications Commission (NBTC); the Public Relations Department; and all three major mobile network operators including NT, TRUE, and AIS, conducted nationwide testing of the CBS at three alert levels across four regions (North, Northeast, Central and South) and Bangkok.

The CBS is now fully operational. During the 2025 rainy season, a total of 450 flood warning messages were successfully transmitted to mobile phones in at-risk areas via the CBS system.

The CBS serves as a crucial channel for disseminating alerts directly to the public. It enables rapid, comprehensive, and real-time delivery of warning messages, enabling citizens to take appropriate precautions and respond promptly to potential threats. Once such alerts are received, the public is required to adhere strictly to the instructions and guidance provided by the authorities.

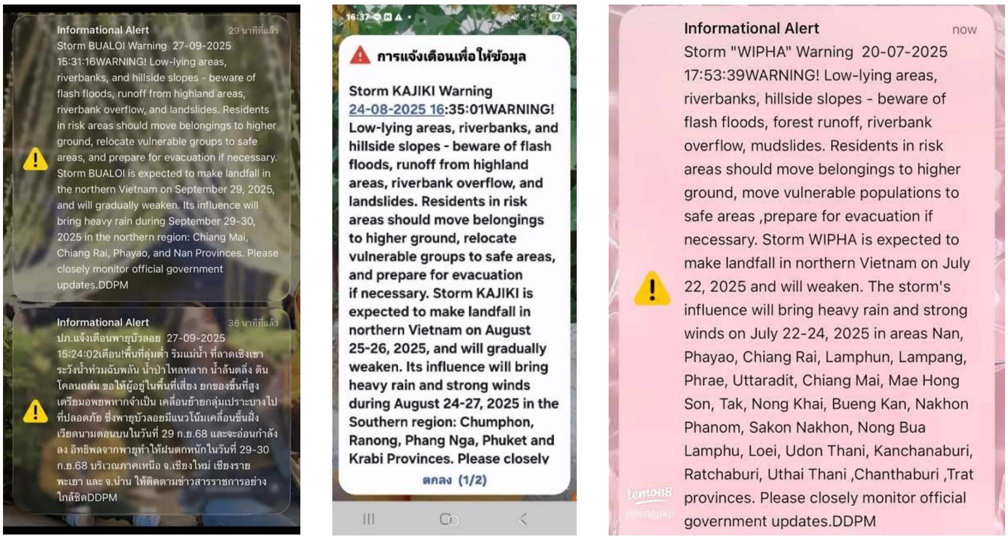


Figure 39: Examples of Warning Messages using the Cell Broadcast System (CBS)

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

At present, the CBS is operated centrally. In the future, the system should be deployed in every province to facilitate faster and more timely dissemination of alerts in response to disasters or emergencies.

Priority Areas Addressed:

Integrated

- Strengthen the cooperation between TRCG, WGM, WGH, and WGDRR to develop impact-based forecasts, decision-support and risk-based warning.
- Strengthen cross-cutting activities among working groups in the Committee.

Meteorology

- Enhance the capacity to monitor and forecast typhoon activities particularly in genesis, intensity and structure change.
- Develop and enhance typhoon analysis and forecast techniques from nowcast to medium-range, and seasonal to long-range prediction.

DRR

- Enhance Members' disaster risk reduction techniques and management strategies.

Key Pillars of UN's Early Warnings for All (EW4All) Initiative Addressed

Key Pillars of EW4All	Please ✓ the related pillar(s)
Disaster risk knowledge and management	✓
Detection, observation, monitoring, analysis, and forecasting	✓
Warning dissemination and communication	✓
Preparedness and response capabilities	✓

Contact Information:

Member: Thailand
Name of contact for this item: DDPM Thailand
Telephone: +66 2637 3669
Email: foreign.dpm.th@gmail.com