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Repeated Flooding: A Worsening Natural Disaster

Flooding is the natural disaster that occurs most often in Thailand. Though the country has experienced many severe natural disasters in the past, they occurred less frequently than today, particularly in the year 2006, when the repeated severe floods deserved to the label of “crisis”. At the same time, repeated dry spells are a recurring problem every dry season.

2006 the Flood Crisis Year

The flood crisis in 2006 can be considered the most severe in the past five years (see Table 1). The adversity began in May when flash floods devastated Uttaradit, Sukhothai, Phrae, Lampang and Nan provinces. Laplae and Mueang district in Uttaradit was the worse hit.

Two months later, a southwest monsoon covered the Andaman Sea and the Gulf of Thailand causing heavy rains and severe floods in 22 provinces in the northern, central and southern regions.

In August, Thailand was also hard hit by torrential rains. A southwest monsoon caused heavy floods which brought widespread destruction to Prachuap Khiri Khan and Chumphon provinces. In the north, a low pressure trough caused torrential rains in Nan province as never experienced before. At the end of August, heavy rains continued in Chiang Mai, Lamphun, Lampang, Prae, Sukhothai and Tak provinces.

In September, a low pressure trough continued to lay over the northern, northeastern and central regions. In addition tropical storm Xangsane moved into Thailand in early October, causing continued torrential rains across all regions of Thailand.

From the end of November 2006 to early January 2007, giant waves and strong winds destroyed many coastal areas in the southern provinces both on the Gulf of Thailand and Andaman sides, including Chumphon, Surat Thani, Nakhon Sri Thammarat, Songkhla, Pattalung, Pattani, Yala, Narathiwat, Satun and Trang provinces. The high waves and strong winds have pushed the shoreline back in many provinces, especially at Laem Ta Loom Puk in Nakhon Sri Thammarat province.

The total area affected by floods was 439 districts in 47 provinces throughout Thailand. As many as 1.42 million households, or 6.17 million people, suffered from the floods. There were a total of 337 deaths. The estimated loss from the floods is 7.707 billion baht.

Sickness Caused by the Floods

The severe floods which inundated many provinces not only destroyed homes, assets, roads, schools, temples, and plantation and fishery areas but also brought physical illness. The longer the period of flooding, the greater the dirtiness and the higher the risk of people getting sick from germs in the water. Diseases from flooding include:

1. Athlete's Foot is a fungal infection of the skin caused by long-term exposure to water which causes the skin to flake and blister. Athlete's foot usually appears between the toes, but can spread to the bottom of the feet and toenails. Therefore, after walking in water, wash your feet clean with soap and wipe it dry. Also, avoid wearing damp shoes and socks.
2. Respiratory Infections such as cold with fever and pneumonia are caused by breathing in viruses from the air. Dampness and cold weather lower the body's immunity so there is greater chance of catching the virus.
3. Conjunctivitis or Pink Eye is inflammation of the eye caused by a virus. Using unclean water to wash your face, using dirty hands or dirty towels to rub your eyes, or contact with a pink eye patient's tears can cause pink eye. Though pink eye is not dangerous, it can cause blurring if the virus enters the cornea. Pink eye can be prevented by hand washing, not using things with the patient, washing your eyes immediately with clean water if dust gets in, not letting flies touch your eyes.
4. Gastrointestinal Infections such as diarrhea, typhoid and food poisoning are caused by eating unclean food or drinking contaminated water. Gastrointestinal infections can be prevented by eating newly cooked food that hasn't been in contact with flies, drinking boiled or bottled water, and washing your hands every time before eating.
5. Infections Through Skin Contact are usually caused by bacteria in soil, mud, pools of water and waterways. The most common is leptospirosis which is caused by contact with water, food, or soil containing urine from infected animals. Symptoms of leptospirosis include high fever, severe headache, muscle aches, red eyes, and/or a rash. If left untreated, it could lead to kidney damage and liver failure and possibly death.
6. Danger from Poisonous Animals such as snakes, centipedes, and scorpions that like to escape the water by entering people's homes.

According to the Ministry of Public Health, from August 27 to December 16, 2006, flood victims that were affected from sickness caused by the floods totaled 757,413 people. The 3 most common ailments were athlete's foot (312,703 cases), rashes (96,436 cases) and cold with fever (87,077 cases). The public health officials were able to control and prevent two communicable diseases that came with the floods, pink eye and diarrhea, so the diseases did not spread in a wide circle.

Prolonged Flooding ...Stress... and Increased Risk of Suicide

In areas with prolonged flooding, besides taking care of flood victims with physical sickness, officials have to monitor people's mental health problems. Dr. Taweessin Visanuyothin, Mental Health Department Spokesman, explained that flood victim's mental health situation can be divided into 3 stages:

Stage 1: Prior to the floods, people worry how high the floods will be and how much damage will be caused to their property. They experience low levels of stress and anxiety and may also experience sleeping problems.

Stage 2: During the floods, the level of stress and anxiety increases. Some people cry, some people gaze into space. There are symptoms of depression. Some people are frustrated with hardship during the floods and become easily irritated. The severity of the mental health problems depend on the situation which is different in different areas.

Stage 3: After the floods, the flood victims express their emotions more because they see loss of lives and property. This may lead to suicide.

The impact on mental health is not severe in the first month because the flood victims are interested in the flood situation that they are presently facing. If the situation has not improved by the second and third month, the flood victims will be more anxious and very stressed. This is the period that the flood victims have to be closely monitored to prevent suicide.

Dr. Prat Boonyawongvirod, Permanent Secretary of the Ministry of Public Health, said that the Ministry of Public Health has prepared a plan to monitor suicide, Post Traumatic Stress Disorder (PTSD), depression and drinking for 3 months. In this period, 95 percent of normal people will be able to adjust to the situation.

The Department of Mental Health which is directly responsible for assisting and rehabilitating the mental health of flood victims has gathered a team of psychiatrists and health volunteers who have passed stress training programs to go with the medical mobile units to help residents in flooded areas. The team will identify flood-affected residents with mental health problems and provide treatment. Those with severe mental health problems will be watched over closely. The Department of Mental Health has also distributed 10,000 stress relief guidebooks to the public, provided training to public health officials and health volunteers in the area so that they can provide initial consultation, and opened the 1323 hotline to provide 24-hour advice for flood victims with mental health problems.

Dr. Seri Hongyok, Deputy Director-General of the Department of Mental Health, said that according to the mental health situation analysis of 17 flood-affected

provinces including Tak, Nan, Angthong, Prachin buri, Nonthaburi, Pichit, Ayutthaya, Uthai Thani, Nakorn Sawan, Chai Nat, Chiang Mai, Chaiyaphum, Sing buri, Lopburi, Loei, Nakhon Pathom and Supanburi up until November 2006, there were a total of 7,942 people with mental health problems. 1,238 people had stress and anxiety problems, with the highest number, 191 cases, in Angthong province followed by 173 cases in Ayutthaya province. There were 671 people who had sleeping problems, apprehension and nightmares, with the highest number, 135 cases, in Ayutthaya province followed by 102 cases in Nakhon Sawan province. There were 72 people who attempted to commit suicide, with the highest number, 15 cases, in Nan province followed by 11 cases in Ayutthaya province. All were registered for treatment and close monitoring until full recovery.

Lessons Learned from the Floods

The Office of the National Economics and Social Development Board surveyed the flood-affected areas in the central region and concluded that one of the causes of the floods was expansion of the communities. Both government and private sector construction obstructed water flow. Therefore, when there was lots of water, the water could not flow conveniently. Also, there were insufficient places to hold water. As a result, areas were inundated quickly; the water level was high; and the period of flooding was longer than in the past. The reason for the long period of flooding was that the water was blocked from entering Bangkok and there were no plans to systematically drain the water from the area. Furthermore, the government's warning used technical language which made it difficult for villagers to understand the severity of the flood conditions. The villagers thought that the floods would be like the previous years so they did not make adequate preparations. In addition, the forecast provided for some areas were very inaccurate, for example, the villagers were informed that the water would rise 20 cm, but the water actually rose 70-80 cm.

The severe floods in 2006 were a serious problem and the rural people suffered greatly. Until December 2006, many provincial areas were still inundated under high water levels. However, people in Bangkok were not much affected because farmers in the central region sacrificed 100,000 rai of farmland to let water in to save Bangkok from being flooded. The area could hold as much as 10-20 million cubic meters of water. The villagers' sacrifice for the city people should be remembered.

Man-made Canal Proposal to Solve Flooding

Solving the flooding problem by increasing the water-holding area like in the past can no longer be used because all areas have been flooded. Improving water drainage is often ineffective because the entire

system has not been developed; it only relocates the flood from one area to another. Therefore, a project to dig a series of canals to solve the water drainage problem has been proposed. The cost for digging canals 1,000 km long will cost approximately 70 billion baht, which is less than the 100 billion baht cost of constructing skytrain routes in Bangkok to ease traffic.

If the man-made canals can drain 2,000 - 3,000 cubic meters per second, the water in the Chaopraya River will fall 2,000 - 3,000 cubic meters per second, reducing the flooding problem a lot. According to the highest statistics, 6,000 cubic meters of water per second at Nakhon Sawan province was recorded at 4,000 cubic meters per second when reaching Bangkok. Therefore, if the eastern ring canal and the western ring canal can drain 2,000 - 3,000 cubic meters per second, the water will not overflow the banks. Besides helping solve the flooding problem nationwide, the canals will also increase the irrigated areas across the country by 150 million rai.

Tackling the Flooding Problem in the Future

As a result of the severe floods in 2006, the Department of Water Resources, the Ministry of Natural Resources and Environment established a short-term plan to deal with the floods. The plan comprised of: determining the areas with flood risk; establishing management methods prior to, during and after the floods, as well as, clearly identified the responsible units from the national to local levels; and establishing flood relief centers to manage and make decisions during emergencies, release warnings, and coordinate with related organizations.

The flood relief master plan for the medium and long-term will include protecting and rehabilitating forests, establishing boundaries for using highlands, rehabilitating water sources, waterways, and wetlands, amending laws related to public streams, taking back waterways that have been trespassed, developing water storage areas, building reservoirs, improving the accuracy of forecasts and warnings, establishing flood insurance systems, developing city flood protection systems, developing a uniformed management structure of the water basin, and revising the national water policy. The Department of Water Resources, which is the Secretary of the National Water Resources Committee, will collaborate with other related agencies to develop the master plan for the Cabinet's approval.

Scientists around the world agreed that climatic changes and global warming are the cause behind more frequent and severe flooding in many countries. The major factor contributing to global warming is industrial activities performed by humans, from burning fossil fuels to changes in plantation methods.

According to the Intergovernmental Panel of Climate Change, one of the impacts from climatic changes on Thailand concerns water, which might be either heavy rainfall causing floods or rain not falling according to season and causing drought. Meanwhile, the World Report on Changes in Asia in the Future which was written 3-4 years ago stated that almost every region in Thailand will have increased rainfall, the number of hot days will increase, and the winter season will be shorter. The worrying issue is climatic volatility which will lead to more frequent and severe flooding.

In formulating the country's development plans and environment management plans, the government sector must consider climatic changes and its impact in the future. At the same time, the people must quickly try to understand the changes ahead in order to prepare for and adjust to the changes. If Thai society ignores global warming today, solving this problem in the future will be much more difficult.

Table 1 : Flooding Situation and Damages
(2002 - 2006)

Year	Population (million people)	Households (million households)	Agricultural area (million rai)	Damages (million baht)
2002	5.08	1.37	10.43	13,385.31
2003	1.87	0.48	1.59	2,050.26
2004	1.79	0.46	1.98	410.86
2005	0.73	0.22	0.89	4,700.10
2006	6.17	1.42	5.97	6,946.82

Source: Disaster Prevention and Mitigation Department,
Ministry of Interior (29 November 2006)

Table 2 : Summary of Flooding in 2006 and Details of Damages

Period	Flooded area	No. of deaths	No. of affected people	Initial value of damages (excluding the residents' homes and property)
May 22 - June 30 ⁽¹⁾	5 provinces: Uttaradit, Sukhothai, Phrae, Lampang and Nan	88 cases	352,016 cases	1,344,833,259 baht
July 1-30 ⁽¹⁾	22 provinces: Chiang Rai, Chiang Mai, Mae Hong Son, Tak, Lampang, Lumpoon, Nakhon Ratchasima, Nakhon Phanom, Udonthani, Roi Et, Chonburi, Rayong, Chanthaburi, Trat, Prachinburi, Phetchaburi, Prachuap Khiri Khan, Chumphon, Satun, Krabi, Trang, Surat Thani	5 cases	48,520 cases	-
August 13-18 ⁽¹⁾	4 provinces: Prachuap Khiri Khan, Chumphon, Ranong, Ubon Ratchathani	-	54,396 cases	93,772,849 baht
August 19-26 ⁽¹⁾	3 provinces: Nan, Chiang Rai, Sukhothai	2 cases	153,574 cases	143,378,478 baht
August 27- December 25 ⁽²⁾	47 provinces: Chiang Rai, Chiang Mai, Mae Hong Son, Lumpun, Lampang, Prae, Phayao, Uttaradit, Petchabun, Phitsanulok, Sukhothai, Tak, Kamphaengphet, Phichit, Nakorn Sawan, Chai Nat, Uthai Thani, Sing buri, Angthong, Ayutthaya, Lop buri, Saraburi, Suphanburi, Pathumthani, Nontaburi, Nakhon Prathom, Nakhon Nayok, Chonburi, Chachoengsao, Prachinburi, Chantaburi, Trat, Chaiyaphum, Khon Kaen, Udon Thani, Nakorn Ratchasima, Sri Sa Ket, Buri ram, Surin, Ubon Ratchathani, Yasothon, Roi Et, Chumphon, Surat Thani, Nakorn Sri Tammarat, Pang Nga, Bangkok	337 cases	5,198,814 cases	7,707,574,527 baht

(-) no data

Sources: 1. Monthly summary of public hazard, May-August 2006. Department of Disaster Prevention and Mitigation of Interior.

2. Cabinet resolution, December 26,2006