

Thailand Country Report 1999

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I. The Nature of Disaster Threats

Thailand lies between latitude 6-12 north and longitude 98-108 east. Its area is 513,115 sq.km. and its population is over 60 million. Thailand's topography is naturally divided into four regions. The North is a mountainous region comprising natural forests, ridges and deep, narrow alluvial valleys. The northern region is subject to floods, landslides, earthquakes and forest fires. The Central Thailand, the basin of the Chao Praya river, is a lush and fertile valley. The central region is subject to floods and earthquakes. The Northeast or the Korat Plateau is an arid region, characterized by a rolling surface and undulating hills. The northeastern region is subject to floods and droughts. The South which is peninsular Thailand is hilly to mountainous, with thick virgin forests. Besides, there are several offshore islands in the region. The southern region is subject to floods, tropical storms, landslides and forest fires.

II . Past Major Disasters in Thailand

1. Natural Disasters

Natural disasters that frequently occur in Thailand include floods, droughts, tropical storms and forest fires. Whereas earthquakes and landslides occur occasionally. Generally, the sudden onset natural disasters cause the most damage to lives and property. The rural area is the most vulnerable to disasters because of infrastructure underdevelopment. Moreover, the rural people that are mostly poor agriculturists are unable to invest in resources for reducing their vulnerability to disasters. Major destructive natural disasters are as follows:

1) Flooding

Flood, the most frequent occurrence disaster in Thailand, occurs during monsoon season of June-September, causing damage to property more than any other kind of disaster. During 1975-1990, floods caused property damage over US \$1,216 million. In 1983, flood occurred in the whole southern region, suffering 14 provinces. This event caused property damage at the estimated cost of US \$360 million. Over 400 persons lost their lives, approximately 11,422 families or 72,814 individuals were homeless, 17,063 houses were demolished, about 1,499,892 livestock died and lost, and around 265,991 hectares of agricultural area were affected.

Bangkok, the capital of Thailand, is sometimes called 'wet city' because prolonged inundation caused by overflowing of the Chao Praya river usually occurs in the rainy season. The most prolonged flood in Bangkok occurred in 1995 for 2 months, causing property damage over US \$400 million.

2) Droughts

Droughts annually occur in the dry season during March-April, and they become much worse than ever before. The problems are exacerbated by water demands for agricultural and industrial purposes due to increase in population and economic development. The root cause of droughts in Thailand is deforestation associated with soil characteristics and dry climate. In 1998 the problems are reinforced by the El Nino phenomenon. As a consequence, droughts affected the whole country at differential levels. The drought-stricken people suffer water shortage, especially water for drinking, cropping and livestock farming. In 1997 droughts occurred in 63 provinces, affecting 24,804 villages, 3,011,601 families or 14,394,322 individuals, and about 414,313 hectares of agricultural area.

3) Tropical storms

Tropical storms associated with floods occur in Thailand during monsoon months of June-November at annual average of 4. The whole country is vulnerable to tropical storms, but the peninsular southern region is the most vulnerable area. Of all tropical storms, the typhoon 'Gay' occurring in 1989 is the most destructive. The typhoon 'Gay' moved inland and crossed the southern region in the area of Chumporn province, causing 602 deaths and property damage at the estimated cost of US \$480 million.

Table 1: The statistic data of the damage (excluding Bangkok) from onset natural disasters during 1978-1995 (floods, storms and landslides)

Year	Property Damage	Deaths
1978	21,066,334	99
1979	3,274,730	—
1980	1,549,085,487	61
1981	314,351,038	73
1982	224,183,917	32
1983	1,104,017,994	57
1984	323,378,409	34
1985	350,359,621	12
1986	628,420,000	36
1987	832,660,000	64
1988	7,540,187,879	374
1989	11,739,595,265	602
1990	6,652,227,121	50
1991	2,620,918,029	43
1992	5,240,583,940	16
1993	2,181,606,542	47
1994	42,950,314	—
1995	11,858,851,634	442

Sources: Civil Defence Secretariat

4) Earthquakes

A few earthquakes occur in Thailand and all of them are moderate magnitude. In April 1983 an earthquake registering 5.9 Richer scale occurred about 200 km. north of Bangkok. In November 1988 a severe earthquake registering 7.3 on the Richer scale occurred in the southern China. Although the epicenter was over 1,000 km. from Bangkok, it rocked high-rise buildings in the city. This is due to Bangkok stands on deep soft alluvial soil which amplified incoming seismic waves.

5) Landslides

Landslides often occur in Thailand as a consequence of heavy rainfall. The most destructive one, triggered by a continuously heavy rainfall, occurred in Nakornsrithammarat province in 1983. A great deal of land was eroded and conveyed by a huge water flow from the top of the high mountain and then slid down to low-lying land, burying the Phibun town located at the foot of that mountain. This incident caused hundreds of deaths and a large amount of property damage. Vast agricultural areas were covered with thick sediment and debris washed.

6) Forest fires

Forest fires in Thailand are generally caused by people who encroach the forest areas and then burn them for cropping. In 1998 the problems are aggravated by the severely dry climate as a consequence of El Nino phenomenon. Many forest areas in the country totally 129,600 acres are on fire beyond the ability to control, inducing the invaluable losses of forest and wildlife.

2. Man-made disasters or technological hazards

Economic and social development in Thailand has rapidly grown for the last four decades because of heavily industrial investment. As a result, various kinds of high-rise buildings, such as office buildings, hotels, apartments and condominiums, industrial factories, etc., are densely constructed in downtown and the suburb of Bangkok and of provinces throughout the country. The development gives rise to high risk of technological hazards. As a consequence, disasters occur more frequently, more severely and more complicatedly than ever before. Major destructive man-made disasters are as follows:

1) Explosion, fire and chemical hazards

In Thailand explosion and fire have frequently occurred with great damage to property and human lives. In September 1990 a trailer full of LPG (Liquid Petroleum Gas) tank overturned in downtown Bangkok, causing 91 persons burned to death. In February 1991 a trailer carrying explosives overturned and exploded in Pang-Nga province, inducing 171 deaths. In March 1991 a chemical fire and explosion occurred in Klong Toey port of Bangkok near the slum, causing an estimated 60,000 persons exposed to toxic chemicals, 642 houses were on fire and 5,000 individuals were homeless. In May 1993 the Kader industrial factory in Nakornpatom province was on fire, causing 188 deaths. In July 1997 the I 6-storey hotel, the Royal Chomtian Resort Pattaya, was on fire, causing 90 deaths.

2) Major accidents

Major accidents are mostly from structural failure (building collapse or pressurized tank burst) and vehicle accidents (plane, car and train crashes, train derailment). In 1993 the Roya Plaza hotel in Nakomrachasima province collapsed because of illegally-added floors without adequate piling, causing 127 deaths and 200 injuries.

Moreover, vehicle accidents have alarmingly increased, affecting economic and social development of the country. In 1993 about 61,339 accidents were recorded, with 8,184 deaths and an estimate loss of 607.7 million bath to the government and non-government budgets. Deaths and injuries in industrial accidents rose a dramatic 38% from 67,912 reported cases in 1989 to 103,296 in 1992. Compensation in 1992 amounted to 617.24 million bath.

Table 2: Relative rank of risks from natural hazards, impact on vulnerabilities and level of their management in Thailand (AIT/UNDP, 1994)

Type of Disasters	Hazard	Vulnerability	Management	Risk
Typhoon and Storm surge	High	High	Moderate	Moderate
Flood	High	Moderate	Moderate	High
Landslide	Moderate	Low	Poor	Moderate
Earthquake	Low	Low	Poor	Moderate
Drought	High	Moderate	Moderate	Moderate
Epidemic	Low	Low	Moderate	Low
Pest	Moderate	Low	Poor	Moderate
Explosion	High	Moderate	Poor	High
Fire	High	Moderate	Moderate	Moderate
Major accident	High	Moderate	Poor	High
Civil Unrest	Low	Low	Poor	Moderate

III. Disaster countermeasures

1. Disaster-related Laws

There are several disaster-related laws and disaster-concerned agencies in Thailand. Different laws are enforced and acted for by different governmental agencies, inducing confusion in unity of command at emergency times. Some important disaster-related laws that are acted for by the Interior Minister are the Civil Defence Act 1979, the Fire Prevention and Control Act 1952, the Building Control Act 1979, etc. Of all the disaster-related laws, the Civil Defence Act 1979 is the most important because it covers all kinds of disasters, prescribes clearly jurisdiction and responsibility of concerned organizations, and also contains systematic process of disaster management.

2. Organizations

Disaster management system, by law, in Thailand is followed to the Civil Defence Act 1979. According to the Act, the governmental agencies which are responsible for disaster management are classified into two types: the strategic body and the functional agencies.

1) The strategic body

The National Civil Defence Committee (NCDC) is the strategic body that has duty to formulate civil defence measures and policies. The NCDC is composed of 17 representatives from multi-ministries concerned, including

- a representative from Defence Ministry,
- a representative from Agriculture and Cooperative Ministry,
- a representative from Public Health Ministry,
- a representative from Communication and Transportation Ministry,
- a representative from Budget Bureau,
- a representative from National Security Council,
- a representative from Bangkok Metropolitan Administration,
- a representative from National Police Office,
- a representative from Meteorological Department,
- not more than five intellectuals nominated by the cabinet,
- Director-General of Local Administration Department being as the secretary of the committee by his position.

The Interior Minister is the committee's chairman and Under-Secretary of State for Interior Ministry is the vice-chairman.

2) The functional agencies

The functional agencies for civil defence are of three categories as follows:

National level

The national civil defence center is established to deal with severe disasters that occur periodically in the Thailand area of responsibility. Almost all of the severe disasters are generally caused by natural phenomena, particularly tropical storms, floods and droughts. The civil defence center at national level is under command and direction of the Interior Minister as the national civil defence director.

Regional level

At present four regional civil defence centers are already established to support manpower, equipment and tools as well as to provide technical assistance and training courses to local agencies. The civil defence centers at regional level are under direction of the regional civil defence directors nominated by the national civil defence director.

Local level

There are five types of civil defence center at local level as follows:

The provincial civil defence centers

There are seventy-five provinces in Thailand, therefore, seventy-five provincial civil defence centers are established to deal with all kinds of disasters that occur in the provincial areas of responsibility. The provincial civil defence centers are under direction of the governors as the provincial civil defence directors.

The district civil defence centers

There are eight hundred and fifty-five districts in the country, and eight hundred and fifty-five district civil defence centers are established to deal with all kinds of disaster that occur in the district areas of responsibility. The district civil defence centers are under direction of the chief district officers as the district civil defence directors.

The Bangkok civil defence centers

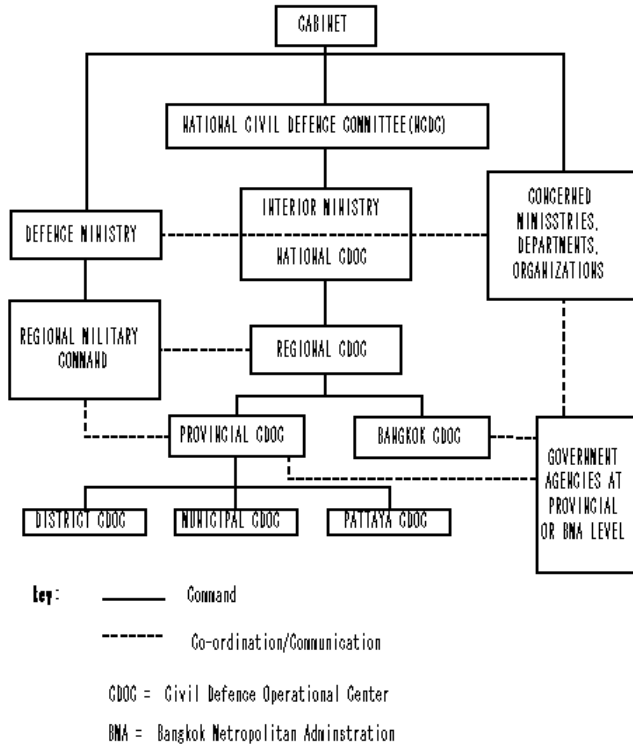
Bangkok, the capital of Thailand, is a special local government. The Bangkok civil defence center is established to deal with all kinds of disaster the occur in the Bangkok area of responsibility. The Bangkok governor is the Bangkok civil defence director. The municipal civil defence centers

There are a hundred and fifty municipalities, and a hundred and fifty municipal civil defence centers are established to deal with all kinds of disaster the occur in the municipal areas of responsibility. The municipal civil defence centers are under direction of the mayors as the municipal civil defence directors.

The Pattaya civil defence centers

Pattaya is a special local government located in Chonburi province. The Pattaya civil defence center is established to deal with all kinds of disaster that occur in the Pattaya area of responsibility. The Pattaya clerk is the Pattaya civil defence director.

Figure 1: Structure of Civil Defence Organizations in Thailand



3. The scope of responsibility in disaster management

The Civil Defence Act 1979 is addressed to three kinds of disaster threats as follows:

- **Public disasters** mean disasters from fires, storms, floods and other disasters from natural and man-made causes that destroy the lives of the people and cause damage to the property of the people, and of the state.
- **Air Threats** mean threats created from air attack.
- **Sabotage** means any action made for the purpose of destruction to the property of the people of the state or public utilities or actions of offensive, deterrence, delay to any operational system including any harmful action towards persons which will create a political, economic and social disturbance and damage to stability of the state as a whole.

4. Disaster management planning

According to the Civil Defence Act 1979, the functional agencies have duty to make their own disaster management plan. The master disaster management plan which is regarded as a national civil defence plan is to be made by the Civil Defence Secretariat. The national civil defence plan is to be reviewed and updated every three year term. The new-made or updated plan must be proposed to the National Civil Defence Committee for approval. The current national civil defence plan which was reviewed and updated in 1998 consists of three parts as follows:

Part I is concerning the principles of disaster management, containing the objectives of the plan, the scope of responsibility, organization, the disaster management processes at pre-disaster stage, during disaster stage and post disaster stage, coordination, and communication at emergency times.

Part II is concerning disaster management processes for eight kinds of public disaster, including flood and storm, fire, earthquake and building collapse, drought, forest fire, hazardous substance and dangerous and chemical transportation.

Part III is concerning disaster management processes of three kinds of national security, including rear area security and damage control, sabotage prevention and control, and protest rally of civil unrest prevention and control.

5. The Planned Disaster Management System

According to the national civil defence plan, the disaster-concerned organizations are categorized into three kinds as follows.

1) Policy Level

The disaster management policy which is followed to the Government policy involves with accidental emergency, natural and man-made disasters, and national security. Three governmental organizations are authorized to formulate disaster management measures and policies which differ from each other as follows.

- The National Safety Committee of Thailand (NSCT) has duty to formulate measures and policies on accidental emergency.
- The National Civil Defence Committee (NCDC) has duty to formulate measures and policies on public disasters.
- The National Security Council (NSC) has duty to formulate measures and policies on national emergency.

2) Policy Implementation Level

The Office of Civil Defence Secretariat (OCDS) is responsible for putting disaster management measures and policies formulated by the above-mentioned policy bodies into implementation. The national civil defence plan is made to be 'Master Plan' for all agencies concerned. This plan contains guidelines for functional agencies to make their own operational plan as well as to deal with disasters at emergency times. However, the OCDS has duty not only to put policies into action, but also to provide equipment and tools, technical assistance and training courses to local agencies as well as to coordinate with the other agencies concerned for disaster relief and rescue operations at emergency times.

3) Operational level

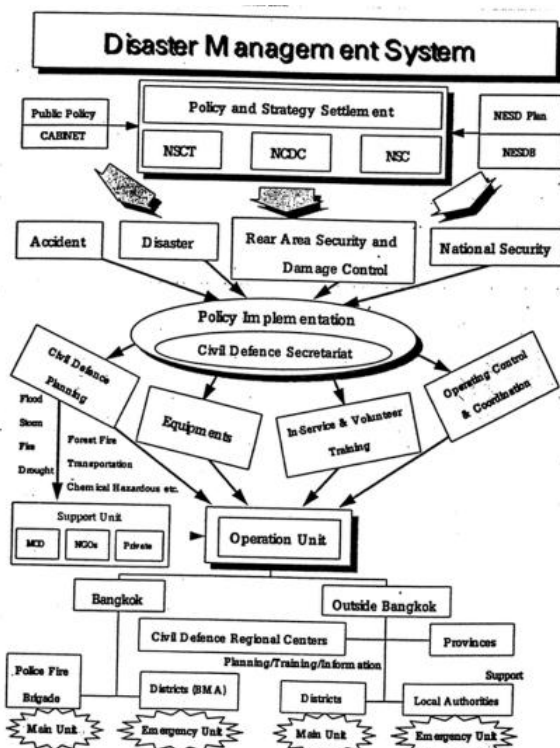
Operational agencies are classified into three types as follows:

- An emergency unit is a small governmental agency which stands by in the area where a disaster is likely to occur. The emergency unit has duty to respond to disasters immediately. District civil defence centers work as emergency units in Bangkok. Municipal civil defence centers, sanitary districts, and Tambon Administrative Organizations work as emergency units in provinces.

- A main unit has duty to respond to disasters that are beyond the ability of the emergency unit to deal with. Police Fire Brigades work as main units in Bangkok and district civil defence centers work as main units in province.

- A supportive unit has duty to support manpower, rescue equipment and tools, and technical assistance according to the request of the emergency or the main units. All governmental agencies concerned, NGOs, regional civil defence centers, and the armed forces work as supportive units in Bangkok. Provincial civil defence centers, NGOs, regional civil defence centers, and the armed forces work as supportive units in provinces.

Figure 2: The planned disaster management system



6. The Process of Disaster management

According to the national civil defence plan, the processes of disaster management that are operated by the functional agencies at all levels are of three stages.

1) Pre-disaster stage

At pre-disaster stage, the functional agencies have duty to deal with disaster mitigation and preparedness measures so as to reduce any disasters and damages that are likely to occur. However, disaster mitigation measures, both structural and non-structural measures, are operated to reduce the probability of the occurrence and the effects of the disasters by many governmental agencies concerned. For instance, the Royal Irrigation Department concerns with flood and drought mitigation, such as the embankment projects, dam or reservoir projects, etc. The Meteorological Department involves with public awareness programmes, particularly early warning of the people to confront with onset disasters, etc. The Agriculture Extension Department concerns with promoting varieties of crops that are less affected by natural hazards, etc. The Local Administration Department deals with knowledge-based programmes, etc.

Preparedness measures which are closer to the onset of impact than mitigation one are aimed at improving the emergency response time if a disaster were to occur. The civil defence directors at all levels are to deal with activities to minimize disaster damage by preparing manpower, rescue equipment and tools, and other rescue facilities for effective response operations at emergency times.

2) During disaster stage

At response stage, Office of Civil Defence Secretariat, Local Administration Department, Interior Ministry, is the government focal point to respond to disasters by providing emergency assistance, reducing the probability of secondary damages and coordinating with all agencies concerned,

particularly armed forces, volunteers and NGOs, for supporting assistance as necessary.

3) Post-disaster stage

After the emergency period is over, Office of Civil Defence Secretariat, together with other agencies concerned, deals with rehabilitation or reconstruction activities to return to normal functioning by providing financial assistance, technical information to the restoration of major services, the rebuilding of damaged and destroyed facilities, crisis or psychological counseling and employment.

IV. Disaster reduction cooperation among Asian countries

Generally, natural disasters that occur in the Asian countries are of similarity. Very often, natural disasters occur across national boundaries, leading to a need for international joint rescue operations, such as forest fires, oil tanker wreck, etc. As a result, there could be a need for Asian countries to exchange views, to share experiences and disaster information, and to promote better understanding of each other's disaster management system. The Royal Thai Government (RTG) realizes that regional cooperation among Asian countries for disaster reduction is of importance and it always delegates the country's representatives to participate in nearly all international conferences. Some international conference are as follows:

- The ASEAN Committee on Social Development
- The Panel on Tropical Cyclones
- The ASEAN Youth Aid Workshop on Disaster Preparedness
- The Typhoon Committee
- The ASEAN Experts Group on Disaster Management
- The ASEAN Regional Forum on Disaster Relief
- The CIRDAP Regional Workshop on Sustainable Development and Disaster Reduction

V. Disaster education

Although varieties of disasters often occur in Thailand, only a few are extremely destructive because Thailand's topography, unlike Bangladesh or the Philippines, is quite safe from catastrophic disasters. Historically, most of Thai people have hardly faced with any calamities. As a consequence, they ignore any disaster prevention measures for protecting their communities. Habitually, they seem to lack culture of safety, tending to do even their daily activities without carefulness. These lead to alarming increase in major accidents, particularly vehicle accidents. However, disaster-related courses operated by the Civil Defence Secretariat, are available to governmental officers and civil defence volunteers. Moreover, many institutes of disaster management, together with disaster-related curriculums, were recently established, serving to the request of both governmental and non-governmental agencies concerned. Some courses are as follows:

- Basic and advanced firemen courses for governmental officers from municipalities and sanitary districts.
- Basic rescue courses for students, the youth, and civil defence volunteers.
- Fire-fighting instructor courses for municipal firemen and sanitary district officers.
- Other disaster-related training courses and seminars.

In addition, the Civil Defence Secretariat always campaigns disaster reduction by non-structural measures, raises awareness of disaster threats, disseminates the knowledge of natural disasters through radios, televisions, newspapers, pamphlets, brochures and booklets and promotes help-self communities for dealing with disasters.

VI. Expectations

It is expected that the meeting will strengthen the joint rescue operations and cooperation among Asian countries. The experts from Asian countries will exchange ideas and share experiences, disaster information, and disaster management system to each other. In addition, the recommendations gained from the meeting will be applied, as a policy framework, to reduce sufferings and losses of people in face of destructive disasters.

APPENDIX

1. GENERAL

During 1 November 1998 - 1 November 1999, many events of heavy rainfalls which were influenced by tropical storms 'CHIP', 'GIL' and 'EVE' occurred in almost all parts of the country, causing floods in the partial areas of 65 provinces (350 districts) over the country. The eastern and southern regions were seriously affected. Chonburi province located in the eastern region is the most seriously disaster-affected province.

2. HUMAN DAMAGE

- Dead and missing 43 persons
- Injured 13 persons
- Evacuated 790 families (4,583 persons)
- Homeless 1402 families (8,132 persons)
- Affected 517,192 families (1,766,901 persons)
- Total - persons

3. MATERIAL DAMAGE IN PHYSICAL TERMS

1) Houses and buildings

- Destroyed 1,402 units (35,050,000 baht)
- Damaged 4,511 units (45,110,000 baht)

2) Farmland

- Farmland 306,023 hectares (475,513,945 baht)

3) Agricultural products

- Crops - tons
- Livestock 1,290,532 heads (42,205,133 baht)
- Fishery pond 17,127 units (148,002,127 baht)
- Fruit plant hectares
- Others

4) Public works facilities

● Road	8,925 sites (762,498,133 baht)
● Bridge	859 sites (183,478,228 baht)
● Culvert	2,849 sites (72,214,963 baht)
● Dyke and dam	781 sites (63,858,143 baht)
● Harbor and port	- sites

5) Public Utilities

● Railway	- sites
● Electric supply	- affected families/sites
● Water supply	- affected families/sites
● Telecommunication	- sites
● School	100 units (9,344,834 baht)
● Buddhist temple	68 units (3,349,700 baht)
● State owned building	41 units (2,264,874 baht)

6) Other

● Others	359 units (38,651,818 baht)
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4 . MATERIAL DAMAGE IN MONETARY TERMS

A. Damage of houses and loss of private property* includes: *houses and buildings for residential use, *household furniture, appliances and possession, *stored good and other assets of farmers and fisherman's households *Other	60,160,000 baht
B. Loss of agricultural production includes: *crops, vegetables, fruits, etc. *livestock *Other: Fisheries	665,721,205 baht
C. Loss of industry	-
D. Loss of public work facilities includes items under III. MATERIAL DAMAGE IN PHYSICAL TERMS *road, bridge, river embankment, etc., irrigation facility *reservoir and dam, harbour and port, and public bridges *rehabilitation cost of farmland at government expense *other	1,102,045,465 baht
E. Loss of public utilities includes items under III. MATERIAL DAMAGE IN PHYSICAL TERMS *railway, electric supply, water supply, telecommunication *other	14,959,408 baht
Total estimated/counted damage cost, sum of item A., B., C., D. and E.	1,882,886,078 baht

- Remark: i. US\$1 = 40 baht
ii. The data do not include the disaster-caused damage in Bangkok