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Factors Affecting the Efficiency and Effectiveness of Policy Formation and Management according to Public Policies and the Appropriate Management Model in Response to Disaster: Case Study on Floods in Thailand during 1942-2012[1]

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Abstract

The objectives of this study on were to analyze factors affecting the efficiency and effectiveness of the policy formation and to study the implementation of public policies related to risk reduction and management of disaster. This qualitative research consisted of analysis of documents on floods that occurred in Thailand from 1942 to 2012 and interviews of stakeholders in policy formation and policy implementation who had experience in disaster management from related government and private sectors such as the Ministry of Interior, Department of Disaster Prevention and Mitigation, Royal Irrigation Department, Thai Meteorological Department, Bangkok Metropolitan Administration, including experts on disaster management, representatives from the communities and non-governmental organizations (NGOs). There were 18 key informants in total. The instruments used for collecting data on the qualitative research are recording forms and the semi-structured interview.

The study found that:

1. There were three main factors affecting the policy change, which consisted of technical factors, human performance and organizational performance.

2. The three laws directly related to disaster management (Civil Defense Act 1979, National Civil Defense Plan 2005 and Disaster Prevention and Mitigation Act 2007). The Civil

[1] This article derives from the "Management toward government policy in responsibility to disaster in Thailand: Case studies of floods between 1942 – 2012".

Defense Act 1979 authorized the central government unit to be in charge of all disaster management. The National Civil Defense Plan 2005 was implemented under the Civil Defense Act 1979, while the Disaster Prevention and Mitigation Act 2007 authorized several units at different levels.

3. In this particular case study, the researchers have categorized into three subordinate case studies. From case studies between 1995 and 2006, the response towards disasters during this period was more defensive inclined than offensive, often focused on addressing immediate problems, as well as using infrastructure, such as dams, dikes, reservoirs and ridges to take in water and protect economic areas. As for the people, in 2006 there was clearer management of aids in communities. In 2011, the management of government still has a commanding characteristic, but there were changes in thinking – not only defensive, but preventive and preparative as well.

Keywords: Efficiency and Effectiveness, Policy Formation, Management

Problem Statement

In the past, disaster management in Thailand prioritized rehabilitation rather than prevention. Disaster management was inefficient. An expert of the United Nations stated that the problems of disaster management in Thailand were: poor organizational management and authorization. Moreover, there were no laws, policies and plans directly related to disaster reduction and management, and there was no cooperation among relevant organizations. This resulted in an unclear, chaotic way of work which caused a lot of budgetary waste (Tingsanchali *et al.* 2003:5-6). The study of Piotrowski (2010:110) stated that formal disaster planning, particularly in local governmental jurisdiction, either fails to implement at the time of crisis or proves to be irrelevant to the needs of specific disasters. Such drawbacks to planning can also be applied to multi-national response to crises, wherein multi-jurisdictional factors contribute to poor coordination, conflicts in communication, and a breakdown in command-and-control functions. The result is Government in "inaction" (Piotrowski 2010:109).

A case study of Thailand's tsunami disaster management Moe & Pathranarakul (2006:403) reveals that there were specific problems encountered in each of the phases of project life cycle such as lack of master plan for disaster management in Thailand, lack of activities for proactive approach including prediction and warning for disaster occurrences, no specific responsible units, slow decision making at the national level for emergency relief activities and unclear line of command from the top to provincial level authorities. This is in

accordance with the studies of Tingsanchali *et al.* (2003:2), Wankaew *et al.* (2007:167-168) and Kamolvej (2006:42). The management of interagency emergency operations not only should prepare them to work together, but also to balance command-control and decentralization. These types of interactions should occur not only at the top of the organizations making decisions jointly, but also at lower levels. Crises management is centered at humans, including first responders and decision-makers. Equally important are persons outside these responding organizations, such as civilians, who might help or observe something that is crucial. In fact, civilians are often the actual "first responders" as a result of being caught up in or near the location of a disaster (Janssen, Lee and Bharosa 2010:4).

In response to the above-mentioned problems, the present study needs to analyze factors affecting the efficiency and effectiveness of the policy formation and to study the implementation of public policies related to risk reduction and management of disaster for developing approach in response to floods in the future.

Objectives of the Study

1. To analyze factors affecting the efficiency and effectiveness of the policy formation.

2. To study the implementation of public policies related to risk reduction and management of disaster.

Literature Review

1. Definition of Disaster

According to Black's Law Dictionary, disaster means an event that causes hazards. It usually happens suddenly and causes loss of life, damages or sufferings. Examples of disaster include floods, aircraft crashes and economic collapse (Schnied and Larry 1952:1). This definition is in accordance with The Malaysian National Security Council (MNSC) Directive 20 (cited in Shaluf and Ahmadun 2006:286) and Lindell, Perry and Prater (2007:3) which defines disaster as an incident that occurs suddenly, is difficult in nature, destructive of property or environment and may cause loss of life and disrupts the daily activity of local community, society and economics.

It can be concluded that disaster is an incident that occurs suddenly, impacts many people, causes loss of life and property, disrupts the daily activity of local community, society and economics. Hence, disaster can lead to crisis.

2. Concepts and Theories of Administration and Relationship of Government Bodies

Public administration and public policies in an area that are set up by a government body at one level are regarded as national government mechanism. In this case, it is easy to identify the authorities in charge or the main actors who are responsible for the success or failure of the policy. However, the current situation is different as the policy process is more complicated in terms of the variety of main actors, their roles and relationship. The policies are part of a "policy network" where the government's role changes from administrator to coordinator of the policy network (Luangpraphat 2010:62). The management of water and other resources is carried out in accordance with policies set at various levels of government (Viessman and Welty 1985:51). Basic to the resolution of many water problems is clarification of the roles of federal, state, and local governments in addressing them (Viessman and Welty 1985:53).

These institutional elements are sometimes hard to change because they may involve political sensitivities and may also be tied to local traditions (Viessman and Welty 1985:52-53).

It can be summarized that policy network means the hierarchy or relationship of authorities, which is unstable in an emergency and the impact on which unpredictable. The damages caused by disaster affect more people in larger areas. In some incidents, a state of emergency is announced by more than one authority, which causes confusion among field workers. Therefore, it is necessary to have a network so that all work can be done in a more systematic way, with cooperation of all relevant authorities at the local, provincial, national and international level.

3. Disaster in Thailand

The most severe disaster which raised awareness among Thai people was the tsunami in 2004, which struck 407 villages in 6 Southern provinces of Thailand, Phang Nga, Krabi, Phuket, Ranong, Trang and Satun, killing 5,309 people, 1,240 foreigners, 2,341 unidentified, 3,370 missing (Office of the National Economic and Social Development Board 2011:54). Countries that were the most severely damaged by the tsunami 2004 included Indonesia, Sri Lanka, India and Thailand. In the case of Thailand, the severity of the damage was partly due to lack of information and lack of an effective tsunami warning system.

According to the record, Thailand has experienced various forms of disaster, most of which were floods. Tumthong (2004:8-10) stated in his work about the floods along Chao Phraya River as follows:

A flood in 1942 caused a lot of damage to the areas along Chao Phraya River. The water level at King Rama I Bridge Water Level Sensing Station was 2.25 meters, which was

the highest level of the station, and the water level at Nakhon Sawan Water Level Sensing Station 2 was 1.50 meters higher than that of the year 1995. In 1942, the areas along Chao Phraya River were still covered with forests. There were no dams or specific plans to prevent floods. In 1978, there was heavy rain in the areas along the upper part of Chao Phraya River. The areas along three out of four branches of the Chao Phraya River (Nan, Yom and Ping) were flooded including the Pasak River. There were heavy flood flows at Nakhon Sawan Water Level Sensing Station 2, Chainat Station 13 and Angthong Station, with maximum flow rates of 3,500 cubic meter/second, 3,800 cubic meter/second and 2,900 cubic meter/second, respectively. Heavy rain in the areas along the Chainat-Pasak Canal and the Lop Buri River caused severe floods that lasted several months. Some other provinces, from Chainat to Phra Nakhon Si Ayutthaya, were also flooded but not seriously. However, Bangkok was not affected.

In 1980, heavy rain caused floods in some areas. The flow rates of the Chao Phraya River in Nakhon Sawan and Chainat were 4,400 cubic meters/second and 3,800 cubic meters/second, respectively. There were also severe floods in some provinces along the Chao Phraya River, from Chainat to Phra Nakhon Si Ayutthaya. The flood damaged houses and agricultural areas in Nakhon Sawan, Chainat, Sing Buri, Angthong and to Phra Nakhon Si Ayutthaya.

In 1983, Bangkok was seriously flooded due to heavy rain in the areas along the upper part of the Chao Phraya River from September to November. The water flow rate at Chainat Station was 3,400 cubic meters/second in October and November. Water from the Sakae Krang River flowed to the Chao Phraya River at the rate of 2,300 cubic meters/second. Furthermore, there was a heavy rain (434 millimeters) in the areas along the lower part of the Chao Phraya River in August, causing floods in many parts of Bangkok. The total amount of rain from September to November was 405 millimeters, causing floods in most areas of Bangkok. The water level at King Rama I Bridge Station was 2.04 meters. The floods in 1983 made people aware of the damage caused by them. As a result, plans and projects to prevent floods along the areas on western and eastern parts of the Chao Phraya River were initiated.

In 1995, there was another severe flood covering the areas of 20,000 square meters from the upper part of the Chao Phraya River (especially along the Yom and Nan River) to lower areas of the Central region In this year, Bangkok was not as highly affected by floods as the areas around it. The flood in 1995 was caused by heavy rain and storms from July to September. In the areas along the Nan and Pasak River, there was a heavy rain of 450 and 345 millimeters, respectively. The water flow rates at Nakhon Sawan Station, Chainat Station and Angthong Station were 4,800 4,500 and 2,700 cubic meters/second, respectively. There

were floods in some provinces along the Chao Phraya River, from Chainat to Phra Nakhon Si Ayutthaya. The flood covered most areas in the Central part of Thailand.

In 1996, another flood was caused by heavy rain and the overflow of the river water. Compared with other floods, this one was not so serious. The water flow rate at Nakhon Sawan Station was 3,000 cubic meters/second. Due to heavy rain in western part of the Tha Chin River, the water in Krasiau Dam was released, causing floods in many areas of Suphan Buri.

The flood in 2003 affected 44 provinces, 160 districts, 488 sub-districts and 1,692 villages. 668,362 people from 198,500 households were affected. Nineteen people died. It also caused a lot of damage to the construction. For example, 1,243 roads, 105 bridges, 3 irrigation canals and 84 reservoirs and 3,515 houses were partly damaged, while 558,952 of agricultural areas, 1,162 fish ponds, 6,691 cattle and 8 drain pipes were totally damaged. The total cost of the damage was 137,631,592 baht.

In 2004, there were 12 floods affecting 56 provinces, 361 districts, 27 district branches, 1,675 sub-districts and 8,339 villages. 1,795,701 people were affected.

In 2006, the storm called, “Changsarn” caused heavy rain during August 1 – November 24, 2006, resulting in a flood which damaged 5,607,502 agricultural areas in 47 provinces, and 476,687 farmers were affected (Department of Agricultural Extension, 2006:1 cited in Jirawat 2007:1).

In 2011, a tropical storm called, “Nok Ten” caused one of the most severe floods in Thailand. From July 25 to September 2, the flood damaged 8 provinces (Sukhothai, Phichit, Phitsanulok, Nakhonsawan, Phra Nakhon Si Ayutthaya, Angthong, Chainat and Ubon Ratchathani), 42 districts, 299 sub-districts and 1,832 villages. 362,338 people from 118,963 households were affected (Pollution Control Department 2011:1). The flood continued to damage more areas. As of September 19, there were 26 provinces that had been affected by the flood. These provinces were Sukhothai, Phichit, Phitsanulok, Nakhonsawan, Uthai Thani, Chainat, Sing Buri, Angthong, Phra Nakhon Si Ayutthaya, Lopburi, Saraburi, Suphanburi, Nakhon Pathom, Pathum Thani, Nonthaburi, Ubon Ratchathani, Yasothon, Loei, Khon Kaen, Maha Sarakham, Si Sa Ket, Chachoengsao, Nakhon Nayok, Tak, Sa Kaeo and Prachin Buri (Center for Emergency Management 2011:1).

Disaster in other countries

1. Malaysia

Malaysia had experienced 39 disasters during the period of 1968-2004. Kuala Lumpur, located on a river basin, is the capital of Malaysia, which is surrounded by the Indian

and Pacific Oceans. Due to its hot and humid climate with rain, the city cannot absorb water. Natural flood retention occurs often because water can not be drained quickly enough. Major flooding in the past occured two times, in 1926 and 1971, but after expansion of the city in 1985 there has been flooding almost every year. Damage estimates are worth almost 1 percent of GDP. In 2000, the Malaysian government implemented the Smart Tunnel Project, divided into three classes, namely tier 1 and tier 2, the traffic of cars and taxis during rush hour, and tier 3, a floor drain in cases where there is little flooding. If the water level rises and drains, tunnel tier 1 and tier 2 will be closed for traffic Any change to the drainage tunnel should be done immediately (Tiwtanorm 2012:36).

2. The Netherlands

Most areas of the Netherlands are plains with about a quarter of the country below sea level. The Netherlands has sustained land area by pumping water out of the lakes. To be useful, the Netherlands has built dams, sewers and numerous pumping stations. To prevent approximately half of the country from experiencing heavy flooding, they have the largest engineering building for water management in the world (Apiprachyasakul 2011:268).

Their approach to control flooding areas is to select protected areas, where populations are dense. The dam is made using natural dunes and levees. Dam water storage and doors prevent the flood waves from the sea. An embankment is constructed to prevent flooding of the Rhine Meuse River. While the drainage canals and pumping stations are more complex to maintain the water level in the lower residential and agricultural areas. The Water Control Board is an organization that reports directly to the government to maintain a flood protection system. In each region, a total of 26 nationwide stations play a role in managing the flood protection corridor water levels, water quality and waste water treatment in each region of the country. Currently, disaster prevention will be developed in a large building to reduce the impact of sea and flooding in the future (Apiprachyasakul 2011:270).

Data derived from the literature review are applied in explaining factors of flood management in Thai context in the past seven decades in order to study roles and duties of the authorities and stakeholders, flood management by public sectors and the problems.

Methodology

This research has involved a review of data on floods that occurred in Thailand from 1942 to 2012. It has included the following methods:

1. A literature and context review, including minutes of meetings, newspaper, books/research articles/thesis and other related documents from the

Department of Disaster Prevention and Mitigation, the Royal Irrigation Department and the Thai Meteorological Department and other related organizations.

2. A review of the three laws directly related to disaster management (Civil Defense Act 1979, National Civil Defense Plan 2005 and Disaster Prevention and Mitigation Act 2007).

3. Interviews with 18 key informants to find out the attitudes and general opinions of the stakeholders in order to understand the activities, participation, conditions and relationship of the issues for the development of disaster management by the government in response to the natural disaster focusing on flood.

3.1 Two persons from each office are selected as key informants.

3.1.1 Ministry of Interior

3.1.2 Department of Disaster Prevention and Mitigation

3.1.3 Royal Irrigation Department

3.1.4 Department of Thai Meteorological Department

3.1.5 Bangkok Metropolitan Administration

3.1.6 Professionals on disaster management

3.1.7 Representatives from the community

3.1.8 Representatives from Non-governmental organizations

3.1.9 Representatives from Non-profit organizations

3.2 Criteria in selecting the key informants

3.2.1 Representatives from government offices are selected from the following groups of people: 1) directors, professionals or experts who have 1-3 years of experience in policy making and implementation related to flood management, 2) those who work in the offices that are in charge of disaster management after the government reform in 2002.

3.2.2 Professionals on disaster management offices are selected from the following groups of people: 1) those who have at least three years of experience in disaster management; 2) university academic persons who have conducted research or academic work related to disaster management (focusing on flood management).

3.2.3 Representatives from the community are selected from those with the following qualifications: 1) residing in the areas affected by flood such as Bangrakam District and

Bangchang District in Nakhonpathom; 2) having experience in the community disaster management

3.2.4 Representatives from non-governmental organizations offices are selected from the following groups of people: 1) people who support and rescued those who were affected from flood; 2) people who were affected by flood themselves, for example, Thai Television Station Chanel 3.

3.2.5 Representatives from non-profit organizations are selected from the following groups of people: 1) people who supported and rescued those who were affected from flood; 2) representatives from the organizations that work on the environment such as Ruamkatanyu Foundation, Thai NGOs and Green Peace.

4. A comparison of case studies classified by the incidence of floods before and after the Disaster Prevention and Mitigation Act 2007, number of deaths and area.

Research Instruments

The instruments used for collecting data on the qualitative research are recording the data derived from documentary study and the semi-structured interviews of the professionals and those who are in charge of flood management to collect data on the network of the government, private sector and civil society in response to the natural disaster.

Result of Analysis

1. Analysis on the Policy Formation and Implementation in Response to Disaster in Thailand: Case Study on Flood Management by the Government, Private Sectors and Civil Society Derived from Content Analysis and Data Grouping

Documents in this study were divided into two groups: primary documents and secondary documents. Primary documents consisted of historical documents, laws, announcements, acts, rules and regulations related to disasters and floods occurring in 1942-2012. Secondary documents consisted of printed materials, newspapers, records and statistics of related organizations/offices, textbooks, research, articles and other academic documents.

The study found that these factors or conditions could be divided into three categories: technical factors, human performance and organizational performance, as adapted from Bayrak (2009:95). He proposed that the three factors affected the system's ability to deal with a disaster. These factors are essential to the planning and implementation of the disaster management process, in addition to preparation, protection, response and recovery.

1.1 Management and factors in other periods

In 1942-1992, the government was a key performer in disaster management. In most cases, the management process began immediately after a disaster had occurred. In the rehabilitation process, the government received support from many countries.

These three factors can be described by time as follows:

1. Technical Factors: structural and non-structural measures[2] were not practiced because when there was a flood in 1942, and reservoirs had not yet been constructed (Irrigation Development Institute 2012:2). The implementation of the 34 laws related to disaster management was not done in an integral manner. A lack of unity and justice in resource distribution from the related organizations/offices made matters worse (Tingsanchali *et al.* 2003:6-15; Apiprachyasakul 2011:268).

2. Human Performance: These factors consisted of knowledge, skills, experience, understanding, training and awareness. The government bodies in charge of disaster management consisted of various ministries and departments in the central government and local authorities. The complicated organizational structure of related governmental bodies made it slow to respond to the disaster. Moreover, there were no preventive measures. Much of the time, disaster management was done only after the disaster had occurred (Tingsanchali *et al.* 2003:6-15; Maiklad 2012).

3. Organizational Performance: There was a lack of efficient cooperation between governmental and private sectors, as well as autonomous organizations and civil society in disaster management. There was no specific government authority, under the Office of Civil Defense, coordinating efforts among the organizations (Tingsanchali *et al.* 2003:6-15). The related agency was the Office of Civil Defense.

[2] Structural measures, in the context of social science, refer to a strategy that keeps the citizens *in situ* without needing to evacuate. Examples are construction of dams and dikes to prevent water from entering into citizens' residential areas. Non-structural measures, in social science, refer to a strategy that encourages citizens' adaptation, to raise awareness and prepare the citizens when floods are severe enough to the point of needing evacuation, to inform citizens about adaptation measures, decisions and capacity for development.

From 1993-2002, the government, military and private sectors managed disasters after they had already occurred. Rehabilitation was a part of the response to the disaster. In this process, other countries provided support and aid. The factors are composed as follows:

1. Technical factors consisted of structural measures and non- structural measures.

2. Human performance factors were a lack of skills and experiences in responding to disasters and a lack of awareness about the environmental issues.

3. Organizational performance factors were a lack of a specific governmental body that was in charge of such matters and a complicated management process, which caused confusion among the stakeholders. The related agency was the Office of Civil Defense.

From 2003-2012, the government, private sector, civil society and local authorities changed their strategies regarding disaster management to increase cooperation. In the past, disaster management focused on the response to the disaster and rehabilitation. In the new disaster management process, the focus was on prevention as well as the response to the disaster and rehabilitation. Other countries also emphasized both prevention and rehabilitation. They provided experts and advice for Thai staff to be more prepared for disasters. The factors are composed as follows:

1. Technical factors consisted of structural measures and non-structural measures. The problems in structural measures were related to dikes, water flows and high tide. Non-structural measures consisted of conflict among people (in the area near Rangsit Canal, for example), settlement of people, land use in the affected areas, laws and policies.

2. Human performance factors were knowledge of the people in charge in disaster prevention and preparedness, response to the disaster and rehabilitation and knowledge about the general public in disaster prevention and preparedness.

3. The organizational performance factor was related to the communication channels from the government to the public. However, this problem was solved after government reform in 2002 as the Department of Disaster Prevention and Mitigation, under the Civil Defense Act 1979 and the National Plan on Civil Defense 2002, which authorized setting up preventive measures for the government, private sectors and civil society (Tingsanchali *et al.* 2003:6-15). The related agencies are the Department of Disaster Prevention and Mitigation, Royal Irrigation Department, Department of Water Resource, Department of Public Works and Town & Country Planning, Thai Meteorological Department.

1.2 Related laws

1.2.1 Civil Defense Act 1979

This act was formed because the existing air defense act did not cover all kinds of disasters. Based on the Civil Defense Act 1979, the available resources, i.e. human resources, machines, tools, equipment, buildings and areas, experiences and skills would be integrated and used in an effective way (Thailand Research Fund 2012:4-5).

1.2.2 National Civil Defense Plan 2005

It was implemented under the Civil Defense 1979. According to this Plan, the Civil Defense Secretariat Office would make three-year plans to be guidelines and for the directions and policies for the disaster management. The emphasis was on the disaster prevention, using proactive approaches to reduce the risks and damages. Warning systems were developed at the local levels and the national levels. Main communication systems, supporting communication systems and additional communication systems were well managed as they were equally important in case of an emergency. Disaster management was done in an integral way, with cooperation from the community (National Disaster Prevention and Mitigation Committee 2009:18).

1.2.3 Disaster Prevention and Mitigation Act 2007

This act was formed after the government reform, focusing on the new structure of the disaster management that emphasized on integrated resources management and administration as well as the cooperation among related sectors.

1.3 A comparison of case studies classified by the incidence of floods before and after the Disaster Prevention and Mitigation Act 2007, number of death and area.

Case study of the flood in 1995 under the government of PM Banharn Silpa-acha. The flood in 1995 was caused by heavy rain due to Intertropical Convergence Zone and Southwest monsoon which covered the Chao Phraya River including other storms such as Gary, Helen, Lois and Nina). The water flow of the Chao Phraya River in Nakhon Sawan Province was 4,820 cubic meters/second. At that time, the Bhumibol Irrigation Dam could store all water from Ping River. But due to an excessive amount of water, the Sirikit Irrigation Dam released water into the river. The amount of water released from the Sirikit Irrigation Dam from August to October was 17% of the water in the Chao Phraya River. Water flow at the end of the Chao Phraya Dam was 4,538 cubic meters/second, causing overflow along Chao Phraya River areas from Nakhon Sawan to Bangkok. There was also excessive rain near the Pasak River, causing overflow in the Rama VI Dam. Water flow at the Rama VI Dam was 1,480 cubic meters/second, causing floods from the end of the Dam to Ayutthaya Province (Royal Irrigation Department 2012:29).

Case study of the flood in 2006: At that time, General Surayud Chulanont was the Prime Minister of Thailand. There were floods and mudslides in lower areas of the northern part of Thailand. There was unusually heavy rain in lower areas of the north for about one week in late May 2006, causing mudslides and floods during the night of May 22 to the early morning of May 23, 2006, which caused a lot of damage to life and property, especially in Uttaradit Province. More than 75 people in this province were killed from this disaster. 116 people from 5 provinces affected by the floods and mudslides were missing or dead. Flood management was done with the 3E concept (Engineering, Education and Enforcement) and 4R (Reduction, Readiness, Respond and Recovery). Management structure was clearer. The authorities in charge were assigned to take responsibility according to the government reform in 2002. As lesson learned from the year 1995, the constructional measures (such as the construction of irrigation dams) were used. In 2006, flood management by the community was more recognized and more effective. Examples of flood management projects included the Bangrakam Model at Banrakam Sub-District, Banglen District, Nakhon Pathom Province. This project area is located about 17 kilometers from Banglen District, with the area of 18,750 rai (about 30 square meter). The soil in this area is fertile with water supply all over the year as it is located near Tha-Chin River. Banglen District is divided into two sides, eastern and western. There are nine villages in the eastern part and six villages in western part, with 24 canals in the whole district. The northern part of the district is next to Lam Phya Sub-District and Kong Nok Krathung Sub-District of Banglen District, Nakhon Pathom Province. The southern part of the district is next to Bang Kaew Fah Sub-District and Bang Pra Sub-District of Nakhon Chaisri District, Nakhon Pathom Province. The estern part of the district is next to Narapirom Sub-District and Klong Yong Sub-District of Puttamonthon District, Nakhon Pathom Province. The western part of the district is next to Don Putsa Sub-District and Ban Luang Sub-District of Don Toom District, Nakhon Pathom Province.

The case study of the flood in 2011 found that there were different ways of flood management as follows: 1) flood management by the government; 2) flood management by local authorities; 3) flood management by the communities and 4) flood management among countries.

Other organizations such as local administration organizations, communities, civil society and international organizations also play some roles in the prevention, preparedness, response and recovery. Pakkred City Municipality was a good example of cooperation among local authorities in flood management. Due to the experience of floods in 1995, people in this area learned how to manage the floods in 2011. In order to reduce damages from floods, some areas needed to be used as floodways. The owners of these areas of land understood and contributed their land as flooded areas in order to protect the economically important areas. They knew that if all areas were flooded, there would be no food and necessities for all

of them. People in the community had common goals and everybody followed so they could survive during the floods. Compared with Bangkok, the administration of Nonthaburi Province was more decentralized in terms of flood management. Nonthaburi City Municipality and Pakkred City Municipality were more independent in flood administration and management. For example, they could make quick decisions in negotiating with local people and providing mechanical equipment and technical support in a timely manner (Sirisrisak 2012:5-6).

Since 1995, there have been attempts to prevent floods. In 1995, levees were built in different areas. However, in 2006, these levees were destroyed by floods. New levees were built to protect important areas such as roads, economic areas, crowded communities and government offices. Farmers were asked to plant rice twice a year instead of three times a year in order to prepare the field as flood storage toward the end of the year. The constructions after 2006 were all made to be safe from flood i.e. tall, one-storey houses. Several ways of disaster preparedness were mentioned such as evacuation and food transportation. A Vegetable Seeds Bank was part of the restoration and recovery program after the floods. Under this program, vegetable and plant seeds were advanced for farmers. After harvesting, they can return the seeds to the program. Local technical colleges helped fix damaged houses as part of the restoration programs (Khaosod 2011).

From the above three case studies, it can be concluded that the government managed floods under the Incident Command System (ICS). From the study of flood management in 1995 and 2006, it was found that the government handled the urgent situation case by case. There were no proactive measures to prevent floods. During this time, constructional measures were used such as the construction of irrigation dams, check dams, reservoirs, levees, etc. In 2006, there was more community participation in flood management. As people had experienced floods in 1995, they had lessons of how to manage floods. Flood barriers were built in order to protect important areas of the community. The Bangrakam model is a good example of flood management by the community. People learned how to survive and how to support one another during the flood. In 2011, the government had more proactive measures for flood management such as the prevention and preparedness for floods. There was also more community participation in flood management from people in the areas affected by floods at earlier periods of time. There was cooperation among people in the community as well as local authorities. Nowadays, there is cooperation at the international level to be prepared for disaster at the global level. Concerning support derived from international cooperation, it is mainly in the process of response and recovery.

2. Analysis on Factors Affecting Policy Formation and Management in accordance with Public Policies by the Government, Private Sector and Civil Society in Response to the Disaster in Thailand: Case Study on Floods (Analysis of Data Derived from Key Informants)

The result of the interviews of key informants about policy formation and management in accordance with public policies by the government, private sector and civil society in response to the disaster can be divided into five categories:

Government: Interviewees from the government were divided into two groups. The first group thought that the communities should not take part in water management. In their opinions, water management should be in accordance with the Disaster Prevention and Mitigation Act 2007, and people should follow plans and manuals distributed to them. When asked to compare the current situation with the past, they said that in the past there had been no specific laws or policies on disaster management as stated in an interview:

> "*In the past, the government bodies just did things according to our duties. There were no specific laws for us to follow. However, in 2011, clear policies were issued for us to follow. There were short-term and long-term strategies of disaster management. Short term strategies consisted of increasing and maintaining water pumps and lowering the water level in the dams. Long term strategies were management of the upstream, midstream and downstream of water (with the budget of 3.5 billion baht). In the past, water management was done separately by different government offices. There were several meetings among related bodies but still could not solve the problems because there were many ministries and departments in charge of the issues. So there was no unity. But with this budget 3.5 billion baht, the information center would be set up. In my opinion, the conditions on good water management consist of budget, instruments, good decision making, accurate disaster prediction and single command*."
>
> (Interviewed on August 23, 2013).

The interviewees in this group thought that main problems in flood management were culture, safety of people, and people's awareness of the problems because most

communities did not know their rights. So they were disadvantaged when negotiating with the government sector, as stated in an interview with a government official:

> "*The main problem is communication between the government and the public before, during and after disaster. Sometimes people did not take the warning seriously and did not evacuate. In some cases, people called us and said they wanted to evacuate and needed our support, but when we arrived, they refused to evacuate and asked us to provide food.*"
>
> (Interviewed on September 12, 2013).

The second group of interviewees thought that the communities should participate in water management. In their opinion, water management needed cooperation from all sectors at the national, provincial, local/community levels. People in the communities should be informed so that they are aware of the severity of the disaster, including its affect and how to get support when they experience the disaster as stated in an interview with a government official:

> "*We should prioritize the communities. People should be well informed so that they are aware of the disaster and understand how serious it is. Good communication and understanding are important to avoid conflicts. People should be prepared for the floods. Those who experienced the floods should get support and compensation*."
>
> (Interviewed on August 23, 2013).

In addition, compensation should be given to those who experienced disaster in a systematic and fair practice, not by judgment of the individuals, as stated in an interview with a government official:

> *"There should be laws and regulations that specify roles and duties of stakeholders. The disaster management process should be more systematic and not based on an individual's judgment. Even though the person in charge is not available when the disaster begins, the management process should not be hindered. Water management models should be universal."*
>
> (Interviewed on August 23, 2013).

In such an urgent situation, there must be reliable, complete and consistent information so that stakeholders can judge the situation and make proper steps. The experts on disaster management compared current situations of water management with the past. He said in the past, there was just one government body that was in charge of water management. After the government reform, there were more government bodies with specific roles and responsibilities according to the laws and regulations. However, there is still lack of unity in their work. There was an overlap of work and authority among related authorities and the government sector was not ready for coordinating with other sectors. Most policies on water resources in Thailand focus on water supply rather than flood management. Floods and other disasters are regarded as issues of public welfare. As a result, flood and disaster management are under the Disaster Prevention and Mitigation Act. Under this act, flood management is done in accordance with the administrative regions, which is not effective because flood management should be trans-boundary (Khaosa-ard n.d.:1-3).

For example, there is no mutual plan and practice in evacuation, as stated by an interviewee:

> "*In the past, water management was easy. The Royal Irrigation Department was the only authority in charge. Nowadays, it is more complicated as there are more factories and houses. There are more government bodies in charge of water management but there are still problems related to authority of these bodies. More problems include no evacuation drills and conflicts/politics. It is recommended that the command on disaster management should be "Field Incident Command". The authorities in charge have their own roles and functions. One strategy on water management is the "Adaptation to Climate Change." For example, Tung Nam Cooperatives were set up. We should adapt ourselves to nature. Regarding the information sharing, there are three main problems: 1) The information of each office is not integrated; 2) The information is not shared among the authorities in charge; 3) The available information is not enough for accurate forecast. The authorities in charge do not cooperate well. It should be more systematic*".
>
> (Interviewed on September 11, 2013).

Representatives from the communities said that in the past, the government did not have clear plans on disaster management. There was a lack of unity in flood management. For example, there was no information network, ineffective mass communication and failure in general management. Even though there were a lot of data on floods, they were scattered in different offices. Due to the lack of information network, water mass could not be accurately predicted (Kamolvej 2012 cited in Khaosa-ard 2012:4-8).

Disaster victims did not get support or compensation for their loss. However, some strategies have been planned to reduce the loss and damages caused by floods. For example, floodways will be redirected to protect business areas which are important to the economy. However, this may cause trouble to people living in flooded areas. Other measures include protection of business areas, redirecting floodways and compensation to the victims, as stated by an interviewee:

> "*The government needs to support those who suffer from the floods. The water management system needs to be improved. There should be enough dams and water gates that work properly. The Netherlands is a good example. It has good measures which can meet the needs of people. Hence, the government gets support from people. This is important*".
>
> (Interviewed on October 10, 2013).

Regarding people's ways of life during the floods, it was found that they could adjust themselves to the situations. The government also had more measures to prevent floods such as digging and clearing the canals. The government was more prepared for the floods. Food and necessities were given to people before flooding time. Temporary kitchens were built for cooking and food was distributed to the people who suffered from the floods.

Local communities were the main factors of the efficiency and effectiveness of water management as the government bodies lacked unity and did not cooperate well. Other important factors included information sharing, mutual planning, no barriers that block the waterway, etc. The private sector was faster in response to the floods. The government had a limited budget compared with the number of the victims. Mass media such as Thai PBS also played a key role in distributing information to the public so that the victims could get support. Some examples of the private sector that supported the victims were: PTT, Bangchak Petroleum Public Company Ltd., Thai Health Promotion Foundation. These private organizations gave support in various ways such as giving seeds for farmers and rebuilding or fixing their houses. Problems in flood management were: 1) no practical plans; 2) no

specific authorities to be in charge; 3) no information management system and no database, as stated by an interviewee who was a representative from the communities:

> "*Local authorities such as Sub-District Administrative Organizations (SAO or Or Bor Tor in Thai) informed villagers about the floods, some information like water level, directions of the floods. They also prepared safe places for evacuation and places to stay during the floods including temporary kitchens. We were told how to adjust our lives during the floods*."
>
> (Interviewed on August 19, 2013).

The interview with representatives from the private sector found that there were several kinds of support to those who suffered from the floods. Regarding plans to respond to the floods, it was found that the government had plans to manage the floods. There were several government bodies related to this matter. However, hierarchy was still a problem. Regarding information and data, it was found that the information system and database were more modern so that they could keep up with the situation, but the public might not be well aware of it. In some situations, unclear information caused confusion among people in the communities as well as those who were in charge of disaster management. It was recommended that there be a TV channel reporting news about the floods only, as stated by a representative from private organizations:

> "*The government should set up an information system that reports the flood situation from upstream, midstream to downstream. Information should be available for the public. The government should set up an information center similar to Thai Flood, which is a private information center, to avoid conflicts*"
>
> (Interviewed on November 22, 2013).

Representatives from NGOs thought that communities should play key roles in flood management. Before doing that, thorough study needs to be done in all communities as each of them is unique in terms of the environment and other factors. They need to understand the cultural diversity of the people in different communities. People working with villagers in the communities, including vulnerable groups, have to respect their ways of life. For example, when making donations to Muslim communities, we have to make sure they can use what

help is given. In Muslim communities like Banda Aceh in Indonesia, people there need to pray five times a day to worship Allah. Those who work with the communities need to be aware of these points (Suwanmolee 2009:28-31). As stated by a representative from NGOs,

> "*The government should gather information about the problems in the affected areas and what people in those areas need. For example, the water flow is heavier in some areas. There should be manuals for people in local communities. City planning and structures should be developed. The private sector can give support from time to time. Most information distributed by mass media is distorted. Experts and academics should play more roles to integrate information. The government should have more channels to distribute information to the public as nowadays there are many ways to communicate (like social media). The government should utilize these communication means (to answer the questions like who will use and benefit from the information.)*"
>
> (Interviewed on November 22, 2013).

In order to solve the problem, we need to consider the differences of each area in terms of environment and causes of the floods. Successful measures should contain the following two parts: 1) the roles of people in the community and 2) the network and cooperation with local communities and civil society. The government should be open for public opinions in order to get good cooperation from civil society. During the flood time in 2011, a lot of support came from NGOs and other private organizations. These organizations set up their own network of support and utilized what they had learned from the floods in 2011.

From the interviews with 18 key informants, the researcher had collected and categorized the data and found that the factors affecting the efficiency and effectiveness of policy formation and disaster management according to public policies include inefficient communication between the government and the public. Communication with the public should be done consistently using the same communication system. The information distributed to the public should be reliable. Another problem was lack of main plans for disaster management. In some cases, there were already plans but no implementation. Another main issue cited by the interviewees was that there was no specific authority in charge of this matter. So when the disaster happened, it was chaotic as the related agencies

responded to it in their own ways. There was no unity among related organizations. Besides, hierarchy made the process slow and complicated. Factors related to information include lack of systematic information and database management. Issues about laws and regulations include the absence specific laws related to this matter. In some cases, there were already such laws but no implementation. Transportation was another issue in the time of crisis. Food and necessities were not provided to the victims in a timely manner. Politics and conflicts among different groups also caused troubles in flood management. Other problems were the need of more support from the government and the lack of integration of the plans for disaster management. Problems related to communication were an inefficient communication system, the lack of a standardized way of communication, and non-reliable information. Other problems were insufficiently experienced staff in the time of crisis, land use change, lack of knowledge/information/discipline of people, and distorted information proposed by mass media.

Summary

1. The factors affecting the policy formation and management were three main factors consisted of technical factors, human performance factors and organizational performance factors. Problems related to technical factors consisted of structural measures and non- structural measures. The problems on structural measures were related to dikes, water flows and high tide. Non-structural measures were conflict among people (in the area near Rangsit Canal, for example), settlement of people and use of the land in the affected areas, laws and policies. Problems related to human performance were lack of knowledge, skills and experience. People's knowledge and discipline were factors of efficient management. Problems related to organizational performance included lack of efficient communication channel between the government and the public and lack of unity and cooperation among government bodies. These factors affect the efficiency and effectiveness of the policy formation and management by the government, private sector and civil society. Hierarchy and lack of integration in government work have been problems up to the present.

2. This study revealed that the Civil Defense Act 1979 authorized the central government unit to be in charge of all disaster management. The National Civil Defense Plan 2005 emphasis was implemented under the Civil Defense Act 1979. However, the Disaster Prevention and Mitigation Act 2007 authorized several units at different levels to be in charge of disaster management, from policy formation to policy implementation. Additionally, more participation from local authorities was encouraged.

3. In this particular case study, the researchers have categorized the situation into three case studies: incidence of disasters, the case study of floods: 1) prior to the reformation, the public sector had the structure using 2R ideologies, which are Readiness and Response, from the Department of Disaster Prevention and Mitigation, 2) after the reformation, the public sector uses the ideology of 3E (Engineering, Education, Enforcement) annexed with 4R (Reduction, Readiness, Respond, Recovery) (Tingsanchali *et al.* 2003:6-25), and 3) nowadays uses the ideas of 2P2R (Prevention/ Preparation/ Response/Recovery) within the government led by Ms. Yingluck Shinnawatra.

From the case studies of 1995 and 2006, the response towards disasters in this period inclines to be more of a defense than offense, and often focuses on addressing immediate problems, as well as using infrastructure, such as dams, dikes, reservoirs and ridges, etc. to take in water and protect economic areas. As for the citizens, in 2006, there was a clearer management of aid in communities. This may be because the majority of the citizens have experienced from the past – and thus are using that experience to create prevention guidelines and protect the essential areas of the community. In 2011, the management of government still has a commanding characteristic, but there were changes in thinking – not only defensive, but preventive measures and preparations in addition are needed. Furthermore, people of many areas went through a number of floods; they thus have produced community-operated defense measures and aid provision.

Discussion

The three main factors affecting policy formation and management by the government, private sector and civil society consisted of technical factors, human performance factors and organizational performance factors.

For technical factors, Thailand used a different system from the Netherlands in terms of flood prevention and management (Apiprachyasakul 2011:268). The Netherlands has sustained land area by pumping water out of the lakes. To be useful, the Netherlands has built dams, sewers and numerous pumping stations. To prevent approximately half of the country from experiencing heavy flooding, they have the largest engineering building for water management in the world (Apiprachyasakul 2011:268). But most policies on water resources in Thailand focus on water supply rather than flood management. As learned from lessons in the year 1995, structural measures such as dams were used. Meanwhile, the Netherlands used structural measures for flood management because most areas of the Netherlands are plains. Structural measures should be built, with minimum expense, to prevent floods in the areas at risk. Such construction should be in accordance with the

geographical characteristics and other conditions of the communities and should not affect the environment (or affect the environment as little as possible). Prevention of floods using non-structural measures means people should learn to live with nature by adjusting themselves to nature so that they can be safe. For example, we can learn how to adjust ourselves to live in accordance with the conditions of natural floods (Maiklad 2012).

The human performance factors were comprised of the lack of skills and experience in responding to the disaster and lack of awareness on the environmental issues. The Netherlands and Malaysia prioritized public awareness raising, education and standardization of work. They also prioritized underprivileged groups such as the elderly, children and women (Mulwanda 1991:46; Shaluf and Ahmadun 2006:286; Sabur 2012:37). This is congruent with the study of Tingsanchali *et al.* (2003: 5-6) which stated that disaster management in Thailand had focused on rehabilitation, not the disaster prevention and mitigation. As stated in this study, an expert from the United Nations said that factors affecting disaster management in Thailand consisted of problems in organizational management, laws, complicated administrative lines, hierarchy, lack of policies and plans. These factors caused confusion among stakeholders, resulting in chaotic, costly management process.

Problems of disaster in Thailand are related to organization factors. The insufficient communication system included non-consistent, incomplete communication, unreliable information, and different ways of communication in the country. This result was congruent with the study of Anantanakorn (2005), Moe and Pathranarakul (2006:339), Kamolvej (2006:39), Price (2009:15-16) and Kamolvej (2012) (cited in Khaosa-ard, 2012:4-8). Khaosa-ard (n.d.:1-3) stated that there were several factors affecting policy formation and management by the government in response to the disaster in Thailand such as inconsistent communication and political conflicts. Data management and efficient communication system also played important roles in disaster management as they were necessary in identifying the risks and the damages that may be caused by the disaster.

From the above information, it can be seen that main content of disaster management is written in other laws, public policies, and the National Economic and Social Development Plan. Roles of relevant organizations and the disaster management previously done by the government are in accordance with the study of Mulwanda (1999:43); Atmanand (2003:293-294) which stated that in order to make disaster management efficient, laws need to be developed and public awareness should be raised. In the past, the government work in Thailand was slow. However, after the issuance of the Disaster Prevention and Mitigation Act in 2007, there was a clearer structure of work. Roles and duties of the organizations in charge are clearly defined. People in the communities are given highest priorities as they are victims of the disaster. This is in accordance with the study of Patterson et al (2010:127); Newport and Jawahar (2003:33); Jahangiri *et al*. (2011:83-84); Said *et al.* (2011:89-92) which

stated the communities should have more participation in risk management, starting from the prevention, preparedness, response and restoration. Decentralization should be promoted (Rhodes and Marsh 1992:1-26); Price 2009:14). In crisis, local governments should have authority to make decisions (Kamolvej 2006:39). In this way, there shall be more balance of power, more participation and more cooperation (Brinkerhoff 2002:325-326). The organizational administration should be improved so that water management can be done in an integral way. The authority in charge should be able to make prompt decisions during crisis and can make a single command to avoid confusion. Several mechanisms can be established for disaster management at the national level and provincial level. Roles and duties of each office must be clearly defined. Good cooperation among organizations and civil society shall be encouraged. All stakeholders should participate in disaster management activities such as the meetings and drills (Department of Disaster Prevention and Mitigation 2012:6).

Suggestions

1. A database should be developed to be used as a standard. Information sharing among stakeholders should be encouraged in order to set up plans for disaster prevention and mitigation and to reduce the gap between policy formation and policy implementation.

2. There should be a TV program that broadcasts information on different types of disaster to educate people and to raise public awareness on the risks of disaster. All stakeholders should cooperate with one another in risk analysis and risk reduction.

3. Structures and roles of the Department of Disaster Prevention and Mitigation as well as other authorities should be reviewed. Taking the deficiencies of the old disaster management system as a lesson, we should be able to identify best practice for the future disaster management model, with cooperation from all stakeholders from the government, private sectors and civil society.

4. All agencies responsible for water management should exchange information, be it forecasting information, GIS information, mathematical models, satellite photos and natural resource information in order to check its reliability and for the benefits of bringing the information for analysis, forecast and water management plan.

5. There should be capacity and knowledge development, and exchange of experiences between policy-makers, those who follow the policies, stakeholders and other communities; in order to inform them of the faults, the weaknesses, the strengths of the procedures concerning water management.

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