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**Vulnerability and Resilience of the Bang Luang Community
to Flooding from the Chao Phraya River**

by

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Being a Thesis

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ABSTRACT

Flooding is a natural phenomenon and in the past Thai people have adapted to flood events. However over the years land degradation, deforestation and bad urban practices have exacerbated the impact of flood disasters. This study of flood management in Thailand shows how human activities and interventions have impacted on the river basin system. This research focuses on the vulnerability to flood hazard of the people living or working near the Chao Phraya River. The case study is of the community living or working in the proximity of Wat Bang Luang (Bang Luang Temple) of the Pathum Thani Province, Thailand.

This research explores the capacity of communities to live with or cope with floods. Their adaptations to changes in flood regimes will depend on several factors: political (especially when Thailand has a long history of preoccupation with engineering and technological solutions as the main approach to disaster response), economic, ecological (human modification to flood plains), social (kin-based networks) and cultural factors.

The data collected from the target community showed a power struggle between Thai culture and the dominant hazard management paradigm. This research put a human face on natural disaster and looked at the issue of flooding from the experiences of ordinary people. The findings showed that some members of the community are resilient while others are passive and are more vulnerable to floods. However, it is important not to label any individual or group as either vulnerable or resilient as people can be both at the same time and policy makers need to build on the strengths, rather than focus on the weaknesses and on offering emergency relief.

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THAI GLOSSARY

Amphoe	a district
Klong	a canal or waterway
Rai	a farm, field or plantation; unit of area equal to 1,600 square metres
Tambon	a sub-district
Wat	a temple

Chapter 1 Introduction

Introduction

Flooding is a natural phenomenon, and the people of the klong¹ Bang Luang (located in Amphoe Muang) of the Pathum Thani Province in Thailand (see Figures 1 and 2) have experienced it almost every year with varying levels of severity. This research focuses on the vulnerability and the level of resilience among the members of the Bang Luang community who live near the Chao Phraya River in Pathum Thani Province (see Figures 2 to 4). They have survived floods but their homes and livelihoods are affected for many months of each year. The community has been largely ignored, marginalised and excluded from the planning process and emergency responses. The vulnerability approach established by Wisner, Blaikie, Cannon and Davis (2004) will be used to examine the effect that the annual flooding of the Chao Phraya River has had on the community. The work on flooding carried out by Burton, Kates and White (1978 and 1993) will be applied to the data collected to evaluate the range of the community's responses to flood. The research will concentrate on how the community has responded to the floods in the past and in 2006.

¹ The term *klong(s)* can be translated as the term "canal(s)" in English, however a klong can be a naturally occurring waterway or one enhanced or constructed by humans.



Map No. 3953 Rev. 1 UNITED NATIONS
January 2004

Department of Peacekeeping Operations
Cartographic Section

Figure 1 Map of Thailand

Source: Department of Peacekeeping Operations, Cartographic Section of the United Nations (January, 2004).

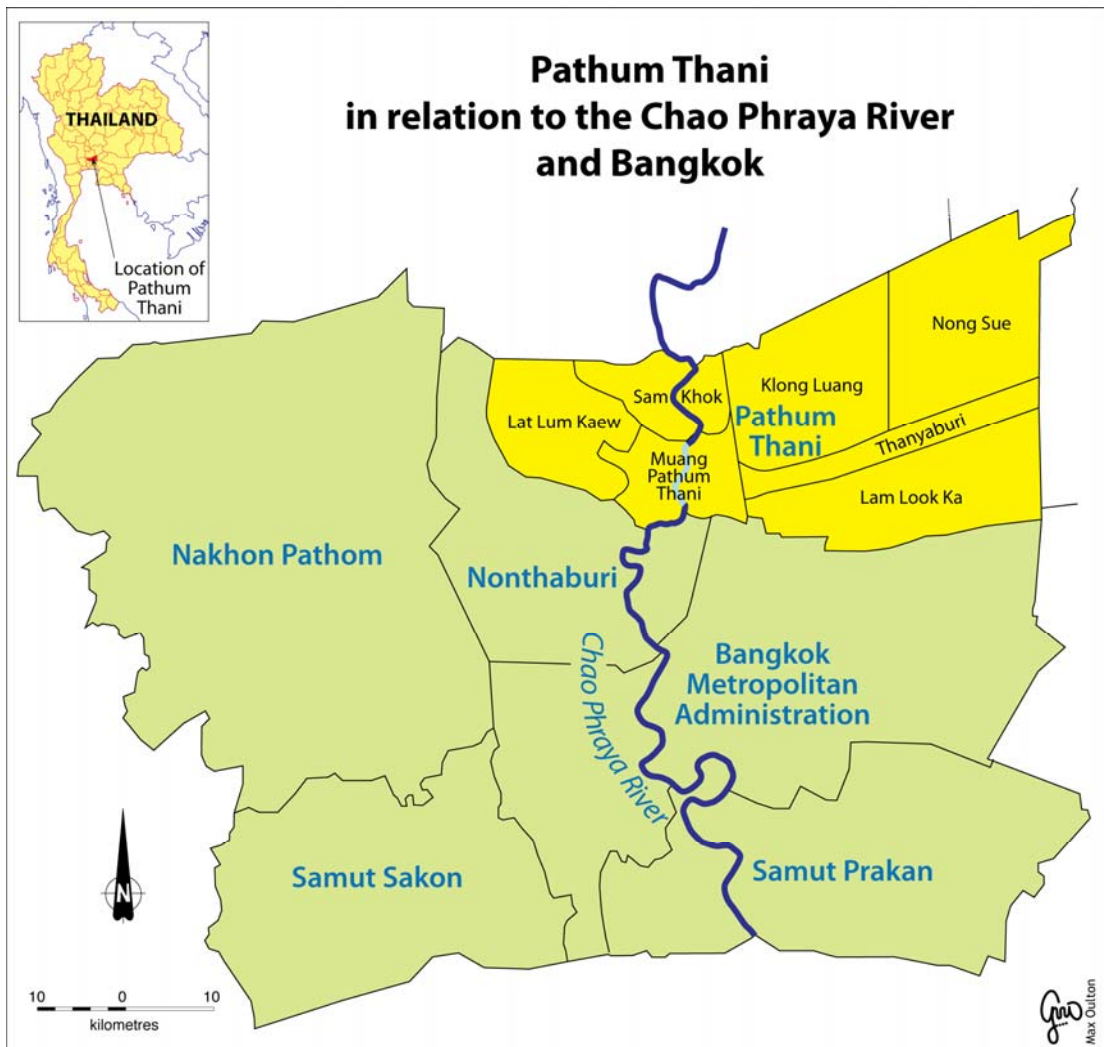


Figure 2 Map of Pathum Thani

Note: Highlighted in yellow are seven districts of Pathum Thani in relation to Bangkok and Chao Phraya River

Source Max Oulton

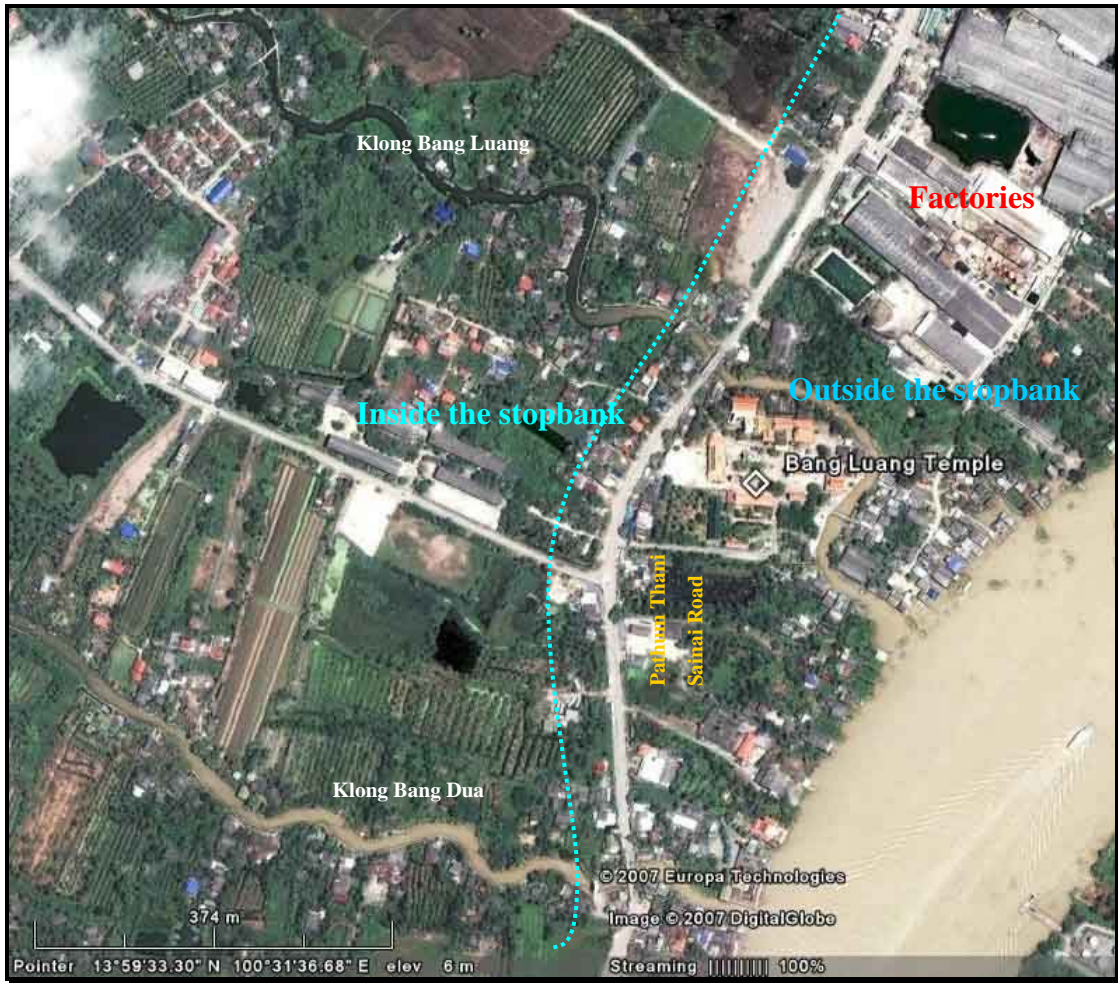


Figure 3 Bang Luang Community
Source: Google Earth Satellite Image (12/2/2007)

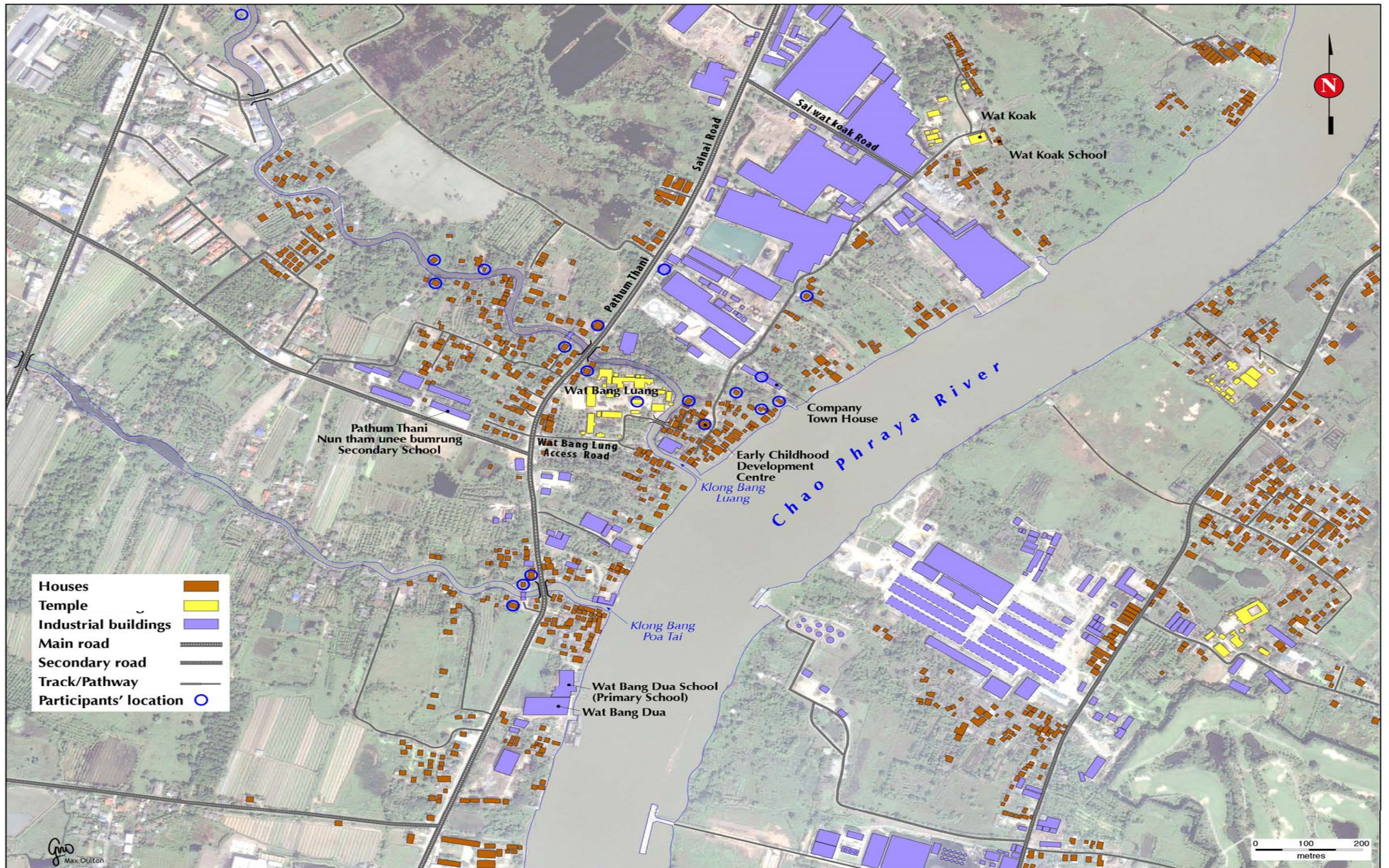


Figure 4 Map of Bang Luang community showing buildings and locations of interviews
 Source: Max Oulton

Thesis Aims and Objectives

This research proposes to deal specifically with the impact of flooding at a community level in the Thai context. A community-based approach has been adopted and too often top-down approaches to hazard responses have been the norm. These dominant paradigms have often ignored the realities and concerns of the communities involved. Different people have different ways of responding to the effects of flooding and in this study I wish to explore the ways a small rural-turned-industrialised community has adapted to flood events. The Klong Bang Luang community in Pathum Thani experiences flooding almost annually, reflecting its location on a low-lying alluvial flat on the banks of the Chao Phraya River. The community has survived various floods of varying severity.

The history of Klong Bang Luang can be traced back 300 years to when agriculture dominated the area. At the present time the area is dominated by various factories and the landscape has been transformed from rice paddies and orchards into factories, commercial units and housing developments. Pathum Thani, with its prime location and close proximity to Bangkok, has been opened up and transformed into an industrialised landscape. The people who live in the area have also changed from land owners to people renting the land from absentee landlords. The social fabric of the community also changed when several factories were established, attracting the migration of new labour from other areas.

The impact of flooding on the area has also changed. As more people have migrated to the area and the land has become more densely populated, the flood hazards have increased. As the land along canals and rivers has become more populated various measures such as stopbanks and watergates have been installed with the intention of reducing the impact of flooding. Yet, by the time various forms of “protection” were installed and operating, many members of the community located outside the structures along the Chao Phraya River had been subjected to prolonged periods of severe flooding. Details of the history and background information on the area will be discussed in Chapter Two.

The focus of this study will be the socio-economic impact of the flood using the Klong Bang Luang community as a case study. The purpose of this thesis is to examine the notion of vulnerability with regard to the target community. The underlying causes of the community's vulnerability will be examined and used to determine why each different individual or group is more or less vulnerable than others. The purpose of the analysis is to provide a clearer and wider understanding of the underlying causes of human vulnerability in the local setting and to direct more attention to those groups which may have been overlooked.

Key Research Questions

The following research questions that I seek to answer within the framework of this study are:

1. What is the range of impact caused by floods and how has the community coped with floods?
2. What is the range of response to the flood(s) in Thailand? (including emergency response and long term recovery.) Is it mainly a proactive or reactive approach?
3. What have been the option(s) taken in the Bang Luang Community and what option(s) have been neglected and why? What are the factors that cause some communities in Thailand to be vulnerable to floods?
4. Has the community's characteristics and its geographical location contributed to greater vulnerability of the community or have these factors contributed to their resilience to floods?

In short, the main question is how do the structure and characteristics of the Klong Bang Luang community and the Thai political and social systems determine the way in which a hazard is likely to affect the local community groups.

Context

The context of this research revolves around the relationship between environments and social, economic and political systems which contribute to varying levels of people's vulnerability within society. The differences in socio-economic and political characteristics shape people's livelihoods and produce unequal access to opportunities and unequal exposure to risk, hence the varying level of vulnerability among the population (Cannon, 1994 and Varley, 1994). This research will examine the notion of vulnerability with respect to the riverside community of Klong Bang Luang.

Social and political aspects of flood disaster management in Thailand

The study of flood management in Thailand shows how human activities and interventions have impacted on the river basin system and in turn how changes in the river system have impacted on society. The political element of flood management and mitigation is powerful, as can be seen in varying levels of vulnerability to flood risk among different groups of the population. The outskirts of urban areas are often being sacrificed to flooding through systems of dykes and floodgates in order to protect the central business district or industrial areas. Cases of political conflicts within and among institutions have also resulted in inefficiency and increased vulnerability among the marginalized communities that are most affected (Shook, 1997). Even though floods are triggered by nature, they are also entrenched in a social and political context where they show their effects. Floods affect areas where people, who are subjected to different economic, social and cultural constraints, settle. The impact of floods on society will depend on the effectiveness of flood management and mitigation (Weichselgartner, 2005).

Outline of Chapters

This research seeks to bring to light the experiences of a community that has been affected by flooding in a Thai context, and how its members have responded to the changes. The substantive findings of this research are presented in seven chapters.

Chapter One has outlined the rationale for and aims of the thesis. Chapter Two begins by outlining some background information on the flooding issue in Thailand. This chapter also gives a brief history and the geography and socio-economic characteristics of the case study area.

In Chapter Three the relevant natural disaster research literature is reviewed to develop a conceptual framework for the research. Various theoretical perspectives will be explored and the major works on vulnerability established by Wisner et al. (2004) and the research on flooding carried out by Burton, Kates and White (1978 and 1993) will be discussed. Chapter Four discusses various research methods that I undertook to gather data, and my own self-awareness throughout the entire process.

Chapter Five contains a description of findings related to the research participants' experiences and their opinions on flooding issues. Chapter Six gives a comprehensive analysis of the data collected in relation to theoretical frameworks introduced in Chapter Three. The conclusions are summarised in Chapter Seven. Returning to the research questions, there is a brief review of findings and some reflections on further avenues for research on the impact of flooding on Thai communities.

Chapter 2 Background Information

Introduction

Thailand is located in Southeast Asia, bordering the Andaman Sea and the Gulf of Thailand (see Figures 1 and 2). It is nearly the size of France and has a population of over 64 million (National Statistical Office, Thailand, 2004). Its climate is tropical and characterised by monsoon seasons which run from July to November, hence the annual flooding along the floodplain areas. The centre of the country is predominantly covered by the flat Chao Phraya River Valley. The flooding conditions are economically advantageous for rice production in Thailand. Thai people have adapted to this floodplain system by utilising the fertile land for rice cultivation and using the waterways and rivers for transport (Ross, 2000).

Thailand has been ruled by kings since the 13th century. The country officially became a constitutional monarchy in 1932. However it has a high degree of political instability with frequent military coups. Thus, in practice the government is dominated by the military and the elite bureaucracy. The government structure is highly hierarchical and bureaucratic with a heavy influence from a past of monarchy rule and military regimes (Aphornsuvan, 2001). Thailand is divided into 76 provinces. The Ministry of the Interior appoints a governor for all but one province—the metropolis of greater Bangkok, where the governor is elected. Each province is divided into smaller districts and sub-districts and is governed by the local government (Aphornsuvan, 2001). Historically, Thailand was an agricultural country, but that has changed in recent years. The country has embraced rapid economic development and become an industrialised country, exporting products such as rice, textiles, rubber, automobiles and appliances overseas. Rice is still the most important export crop with most of the available arable land used for rice production. The exploding economic growth in the metropolitan area of Bangkok has also led to rapid development of its surrounding areas which were previously dominated by rice cultivation. Factories and other forms of economic development have dramatically changed village society and integrated it with the outside world. The country has also experienced cycles of economic boom and bust. In 1997 the

economy collapsed after years of economic boom, prompting a wider Asian financial crisis. The country has recovered slowly since this time. Emerging as a newly industrialised nation, Thailand's traditional bureaucratic system is struggling to cope with the rapidly developing capitalist economy. Government policy makers have been struggling to keep up with this pace of change, resulting in changes in the make up of the traditional society as a result (Molle & Srijantr, 2003). These swift changes both in the economy and structure of society have also increased the risk of economic and social damage due to natural disasters (Shook, 1997).

Thailand and Flooding

Flooding is a natural phenomenon and in the past Thai people have adapted to the hydrological systems in their localities. However, years of land degradation, deforestation and poor urban practices have exacerbated the impact of flood events. Statistics of recent flood occurrences (Table 1) have shown that a substantial number of flood events occurred in recent years and although numbers of deaths were relatively low, the financial losses can be substantial.

Table 1 Flood situation in Thailand from 1996 to 2006

Year	No. of Occurrences	No. of affected provinces	No. of deaths	No. of injuries	Loss (million baht)
1996	N/A	74	158	21	7,160.68
1997	N/A	64	98	427	3,842.22
1998	12	65	8	3	1,706.03
1999	9	69	53	-	1,381.64
2000	12	N/A	120	-	1,032.93
2001	14	N/A	N/A	N/A	3,666.3
2002	N/A	72	216	N/A	13,385.31
2003	17	66	53	10	2,066.08
2004	6	48	27	8	4,700.10
2005	2	19	76	40	8,720.00*
2006	3	34	280	NA	1,397.60* ²

Source: Adapted from the Thailand Country Report 2006, from the Civil Defence Division, Department of Local Administration, Ministry of the Interior and the Civil Defence Secretariat (2006)

* EM-DAT: The OFDA/CRED International Disaster Database (12 Dec, 2007)

² The data from EM-DAT is different from figures reported by the Ministry of Interior which indicate the loss for the year 2006 to be 17 billion baht. One might assume that a different criterion has been used.

The statistics of natural disasters' occurrence and the value of assets loss show fluctuations in the number of deaths, number of injuries and financial losses (see Table 1). The increase in financial losses to flood is related to the increase in settlement and investment along the flood prone areas (Civil Defence Division, Ministry of Interior, 2006; the Civil Defence Secretariat, 2006). The data from Table 1 is not as up to date due to limited and restricted access to the official government statistics.

This research explores the capacity of communities to live or cope with floods. Their adaptation to changes in flood regimes will depend on several factors: political (i.e. the capacity of state), economic (financial resources), ecological (human modification to the flood plain), social (i.e. insurance and kin-based networks) and cultural factors.

The 2006 Flood Event

In 2006, flood events occurred in more than 46 of Thailand's provinces (Interior Ministry, 2006). The first bout of flooding began on the 20th of August and the last ended on the 13th of December, 2006, covering a period of 116 days. With the start of the monsoon season, followed by Typhoon Xangsane in October, people who lived near the river banks were being inundated by the rising water of the Chao Phraya River. Thus, the result was more than 450,000 people suffered from flood related diseases. The flood also caused damage to nearly 4,000 roads, 300 bridges, nearly 30,000 shrimp and fish farms, 262,000 hectares of farm land and nearly 1,000 temples and schools (Interior Ministry, 2006). According to the Bank of Thailand, the economic damage caused by the floods was estimated to be around 17 billion baht (about 460 million US dollars) as of October 2006 (Interior Ministry, 2006).

Pathum Thani and Flooding

This research focuses on the vulnerability of the people living or working near the Chao Phraya River to flood hazards. It includes a case study of the Klong Bang Luang Community, Amphoe (district) Muang of the Pathum Thani Province. The scoping process of this research occurred in November 2006 when the flooding was

happening. The community consists of low income earners with minimum wage incomes from working in the surrounding industrial facilities.

In Pathum Thani, flooding occurred in Muang, Sam Kok, Klong Luang, Tanyaburi, Lamlukka and Lardlumkaew districts (see Figure 2). The main damage was to public shelters and agricultural land. Before the flood, the Civil Defence Secretariat Office, Department of Disaster Prevention and Mitigation had issued a precaution warning of disaster-possible location to Disaster Prevention and Mitigation Regional Centres to be ready to prevent damage from flash floods, storms and mudslides. As a result, authorities stood by through 24 hours (during the critical period of flooding which lasted three months) to coordinate with districts, sub districts and local administrative authorities in case of emergency (Disaster Report, Thai Government website, 2006).

History of settlement

The Pathum Thani province dates back to the Ayudhaya period around 1650 (PAO, 2007; Srisawalak-Nabangchang and Wonghanchao, 2000). The province comprises of seven districts, 60 tambons (sub-districts) and 529 villages. Present settlements originated from small communities along the banks of the Chao Phraya River and along the waterways. Muang district, in which the Bang Luang community is situated, is located in the middle of the province and straddles the Chao Phraya River. The communities discussed in this thesis include those located in the proximity of Wat Bang Luang which is found in three tambons- Bann Chang, Bang Luang and Bang Dua (PAO, 2007).

Changes in Land Use

Pathum Thani province is located on the low alluvial flats of the Chao Phraya River, which also flows through Bangkok, the capital city of Thailand (refer to Figures 1-3). Due to the geography of the area flooding occurs annually during the monsoon season and the water level of the Chao Phraya River can increase by around 50 centimeters (Pathum Thani Administration Office, 2007). Pathum Thani has several natural waterway networks and they are a major influence on land use patterns in

Pathum Thani especially in the expansion of paddy land. The fertility of the land attracted many new settlers. In the past the agricultural policy which had been significantly influenced by the “growth oriented” concept (introduced in the last 30 years) has shaped the land use patterns in Pathum Thani. The market mechanism combined with limited control of land use has resulted in the allocation of land to the highest bidder. This was the root cause for the continued decline of agricultural land in Pathum Thani as industrial land use increased, especially in the area that adjoins Bangkok (Srisawalak-Nabangchang & Wonghanchao, 2000).

From the beginning of the 1980s onwards, another major type of land use emerged where rice producing land was modified into orchard farms (Srisawalak-Nabangchang & Wonghanchao, 2000). The expansion of the non-agricultural users has been at the expense of the loss of agricultural land and has had great impact on farmers (Srisawalak-Nabangchang & Wonghanchao, 2000). However the economic crisis in 1997³ slowed down the dynamics of the land market in Pathum Thani.

Over recent decades, industrialization, urbanization and globalization have led to very different land use patterns, economic structures and livelihood bases which have resulted in a sharp increase in people’s susceptibility to floods. Thailand’s development has concentrated on promoting industry as a replacement to agriculture. The unrestrained monocentric growth of the Bangkok Metropolitan area has created numerous problems in surrounding provinces such as Pathum Thani. This has included pressure on inadequate infrastructure and services, pollution, degradation of natural resources and poor quality of life. The exploding growth has put extremely high demands on the natural environment particularly in the low-lying areas (Jarupongsakul & Kaida, 2000). The very rapid growth of Bangkok has also caused great social and economic impacts on the neighbouring provinces. According to

³ The Asian Financial Crisis started in Thailand with the financial collapse of the Thai baht caused by the decision of the Thai government to float the currency. At the time Thailand had acquired a burden of foreign debt that made the country effectively bankrupt even before the collapse of its currency. This crisis had spread to most of the South East Asian countries, many of which are still recovering from the impacts.

Chunnasit, Pages and Duangngam (2000), if farmers cannot sell their land off to developers, they have to invest in new technology and equipment to achieve a higher level of productivity in order to compete in the global market economy.

The changes in land use have contributed to changes in living conditions and types of jobs available to the community. These changes in some ways have affected the type of dwelling, mode of transport, local knowledge about the environment and preparation and adaptation to floods. In many cases the wages earned from working in shifts at the factories are not as high as people once hoped and the jobs are not as permanent. The levels of saving are much smaller than expected per household and this may have a direct impact on the coping ability of households in the preparation for, and during the recovery from, flooding.

One of the reasons for the current situation of flooding, especially in some areas of Pathum Thani is the topography of the area itself. Pathum Thani is a low lying area covering both sides of the Chao Phraya River. As noted above, the area was once used as rice paddies and is now developed into orchards, housing development and industrial areas. Pathum Thani is subject to urbanization caused by the very rapid growth of Bangkok City which has spread beyond Bangkok's administrative boundaries to the surrounding provinces. This rapid urbanization has had a big impact on the neighbouring provinces: increasing population density, more economic activity and growing industrialization which have contributed to growing pressure on natural resources such as water and land. Hence, some people are now living and working in low lying areas which were previously reserved for rice production, see Figures 5 and 6. Some waterways have been turned into streets and roads to enable access to the land near the river (Chunnasit, Pages & Duangngam, 2000).

These waterways are used for transportation and irrigation as well as drainage during the rainy season. The rice paddies hold access water during floods but these lands were sold off and developed into industrial sites. A large area of agricultural land has been converted for residential, commercial and industrial use.



Figure 5 Flooded street

Source: Author

The original land owners are often moved to live between the river bank and the new industrial site. These industrial sites are often on higher ground and use the surrounding land for drainage which contributes significantly to the problems of flooded villages and stagnant water during the monsoon season (Srisawalak-Nabangchang & Wonghanchao, 2000).

In Bangkok and the surrounding provinces, the application of engineering and technological solutions has led to even greater issues. These include creating a false sense of security and diverting flood paths elsewhere impacting on other communities. Pathum Thani and other provinces surrounding Bangkok are used for drainage or as a sponge to absorb excess water from flooding and to protect the Bangkok Metropolitan area from rising flood waters. The 2006 flood disaster reflects issues with the planning of land use and zoning of the areas where industrial and commercial spaces have replaced agricultural land. The current situation reflects changes in society, lifestyle and livelihood. Most of the people have no spending or saving power to prepare for disasters such as floods or droughts.



Figure 6 The local people use boats as means of transport

Source: Author

Local knowledge of adaptation and flood preparation practices has slowly disappeared with the older generation. There is an urgent need to educate the local community and to preserve the local knowledge of the older generation for times of emergency.

Conclusion

In this Chapter, I set out the background information of flooding in Thailand. The focus was on the event of the 2006 flood which was described in term of its impact on Pathum Thani province. The area of Bang Luang, which is located in Pathum Thani, has undergone many changes from an agricultural landscape to an industrialized one. The changes in land use have also led to changes in the way of life of its people. It also affects the ways the community copes with floods. In the following chapters theoretical perspectives on natural disasters will be discussed and will be applied to the research findings in the context of a small community in Thailand.

Chapter 3 Theory

Introduction

Natural hazard theories provide the essential principles for discussing the importance of vulnerability at the community level in relation to flood management. Key concerns of this thesis include a critique of the dominant paradigm of using a technocratic view of hazard management and the need to pay attention more to the social side of natural hazards guided by vulnerability theory established by Wisner et al. (2004).

This section will outline the theory which explains the conditions that underpin the vulnerability experienced by the Bang Luang Community during annual floods. The main concept of vulnerability used in this research is based on the work of Blaikie et al. (1994) and Wisner et al. (2004)⁴ who use the concept of vulnerability to understand what causes natural disasters and how to reduce the impacts. Overall Wisner et al. (2004) focus on the ways in which social systems operate to generate disasters by making people vulnerable.

Paradigms of Hazard

The three main approaches to natural hazard theory in the social sciences are currently identified as the dominant approach, the behavioural approach, and the structural approach (Smith, 1992). I will focus on the approach that underpins hazard management in Thailand and the move towards a balanced view of hazard management. In the dominant technocratic view the blame was assumed to lie with nature hence it appeared logical that the control, monitoring and prediction of natural events would provide an effective solution. The dominant paradigm described by Hewitt (1983, p. 6) has been paraphrased as follows:

⁴ Blaikie et al. (1994) published the first edition of the book “At Risk” where the Progression to Vulnerability Model was introduced while Wisner et al. (2004) published the second edition, the authors and the main theory remain the same but the content is more up to date in the second edition.

1. A dependence on field monitoring and scientific explanation of geophysical processes. The most important goal in relation to hazards is to predict extreme events.
2. An emphasis on physical and managerial control aiming to physically rearrange human activities in accordance with the objectives, geophysical patterns and probabilities. The aim is to contain nature through environmental engineering works which include zoning, building codes and 'fail-safe' structures such as flood embankment.
3. Another important area is the formulation of disaster plans and emergency measures. Action is most commonly put in the hand of military-style organizations as it underpins the notion of state reimposing order on a devastated community.

Hillhorst (2003) stated that the domain of international science and disaster management is dominated by a hazard-centred paradigm. This paradigm is embedded in a capitalist discourse where nature and society are seen as separate and in which nature is seen as a commodity that can be utilized and controlled through expert knowledge and modern administration (Escobar, 1999). Disaster management is predominantly focused on the physical processes considered to underlie disaster and is geared to developing technology for monitoring and predicting these processes. The aim is to contain nature through engineering works such as flood embankments or dams. The policies of disaster governance are often derived from the domain of disaster science and management. In some disaster events the disaster management is regulated by specialized bureaucracies and military operations while others are left to be regulated by local government or for people to cope for themselves. Where technocratic measures fail, post-disaster response is often organized along military lines and often involves military personnel (Hillhorst, 2003).

Behavioural Approach

The behavioural approach looks at ways people can avoid disasters by modifying behaviour. Burton, Kates and White (1978) used a systems perspective to explain how humans responded to hazards and focused on the interactions of humans with their environment as well as the natural events that occurred within that environment. This system approach tended to dominate much of the early natural hazards research. Their work on natural hazards mainly focused on the floods occurring in the United States at the time. The human ecology approach to natural hazards identifies the following ranges of responses: modify the event, modify human use, and modify losses: the traditional responses such as building flood embankments and funding relief concentrated on modification of the event and losses. This is illustrated in Figure 7 which shows the different foci of the two approaches (Burton et al., 1978).

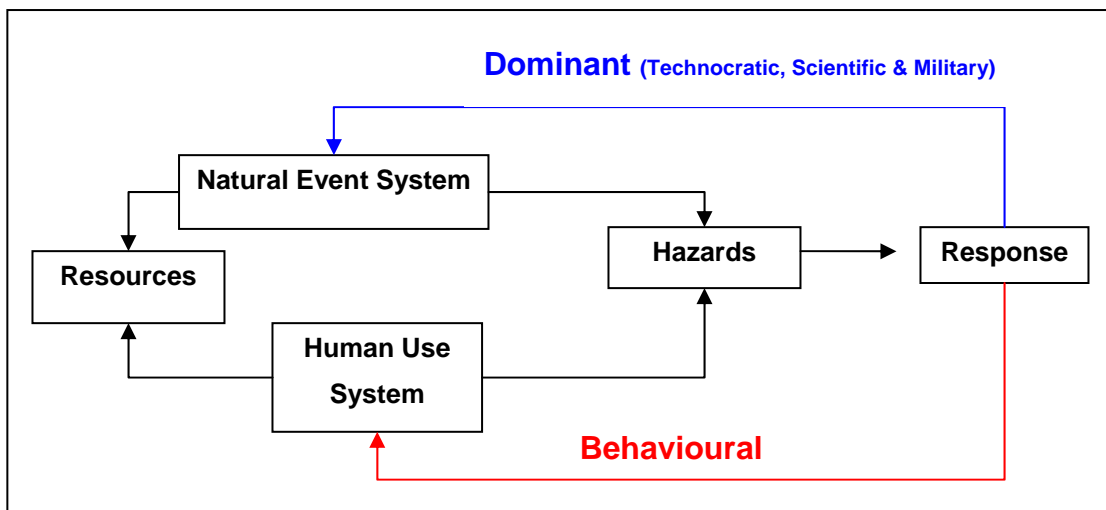


Figure 7 Interaction of People, Hazards and their Environment

Source: After Burton et al., 1978, p. 32

The focus of the technocratic (dominant) paradigm was on modifying the natural events systems whereas the behavioural approach sought to modify the human use system. This was a considerable advance upon the dominant paradigm bringing attention to the role people play in creating hazards. Accordingly, modifying human behaviour, particularly locational decision making would reduce hazards. Burton, Kates and White's early work in the 1970s failed to provide a "social theory capable of addressing social process..." (Watts, 1983, p. 240). In their work in 1986, they

acknowledged the critique of their work (Hewitt, 1983; Torry 1979; O'Keefe & Wisner, 1975 and Watts, 1983). By the late 1970s hazards research was progressing toward a more political economic outlook which was trying to contest some of the forms of environmental determinism inherent in conventional hazards research (Blaikie et al., 1994).

Burton et al. (1978 & 1993) summarized decades of research and practice on flood management and derived lessons on individual perceptions on risk. The collective research showed that all types of natural hazard and all social and political upheaval have vastly different impacts on different groups in society. A population's vulnerability is based on where its members live/work, their use of the natural resources and the resources they have to cope with (Burton et al., 1978 & 1993). The human ecology point of view argues that the discourse of hazard management is too focused on engineering approaches and has failed to connect with the political and structural causes of vulnerability. Human ecologists tried to explain why the marginalized and the poor people have been most at risk from natural hazards (Blaikie et al., 1994; Hewitt, 1983; and Watts, 1983). Hewitt (1997) and Blaikie et al. (1994) stated that poorer and more deprived people tend to live or work in riskier areas, putting themselves at risk from flooding, diseases and other stressors.

The behavioural view has been criticized because of its over-exaggeration of the role of individuals, either as decision-maker or as victim (Smith, 1992). From a political economic perspective, the notion of individual choice is highly problematic as social, political and economic structures constrain an individual's ability to locate wherever they wish for example. Hewitt (1983, p. 8) argues that "the 'natural science-technological fix' approach to hazards is..., a socio-cultural construct reflecting a distinct, institution-centred and ethnocentric view of man [sic] and nature". He went on to challenge the effectiveness as well as the truth of the dominant view.

Political Economy Approach

The study of the human-environment system within the structuralist view aims at identifying the ways in which political and economic structures determine or

constrain individual adjustment to the environment (Smith, 1992). Disasters are defined as “the interface between an extreme physical event and a vulnerable population” (Susman et al., 1983, p. 264), where a population’s vulnerability is related to the degree to which the population can anticipate, cope with, resist and recover from the impact of a natural hazard (Blaikie et al., 1994). By the 1990s geographers were increasingly aware of the “human factor” in natural hazards research and the need to avoid using an environmental deterministic perspective (Blaikie et al., 1994). Today hazard research has evolved to include and be complemented by vulnerability studies which emphasise the way in which communities are exposed to hazards, rather than the character or nature of the physical hazards themselves (Hewitt, 1997).

Vulnerability Theory and its Evolution

In a seminal article in *Nature*, O’Keefe, Westgate and Wisner (1976) argue that disasters are more a consequence of socio-economic activities than natural factors. They state, “Disaster marks the interface between an extreme physical phenomenon and a vulnerable human population” and “precautionary planning must commence with the removal of concepts of naturalness from natural disasters” (O’Keefe, Westgate and Wisner, 1976, p. 566-567). The vulnerability approaches to hazards base themselves on the notion that disasters were in fact not ‘natural’ but were human induced (Blaikie et al., 1994, p. 11). Vulnerability studies have often been referred to in natural hazards or natural disaster as they play a vital role in explaining why individuals and communities respond to natural disasters in certain ways. Some scholars define vulnerability as “the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard” (Wisner et al., 2004, p. 11). Cannon (1994, p. 19) states that “vulnerability is a characteristic of individuals and groups of people who inhabit a given natural, social and economic space, within which they are differentiated according to their varying position in society into more or less vulnerable individuals or groups”. Cannon (1994) acknowledges the processes that shape people’s circumstances and that social, political and economic processes contribute significantly to people’s degrees of vulnerability. Vulnerability to natural

disasters does not exist in isolation from the political economy of resource use and power relations among different groups of people in a society (Adger, 2006; Pelling, 2003).

Precursor research traditions on vulnerability to environmental changes include theories of vulnerability as entitlement failure (Adger, 2006). Entitlements-based explanations of vulnerability focus on the social realm of institutions, well-being and on social status, class, gender and ethnicity as important factors (Adger, 2006; Sen, 1984).

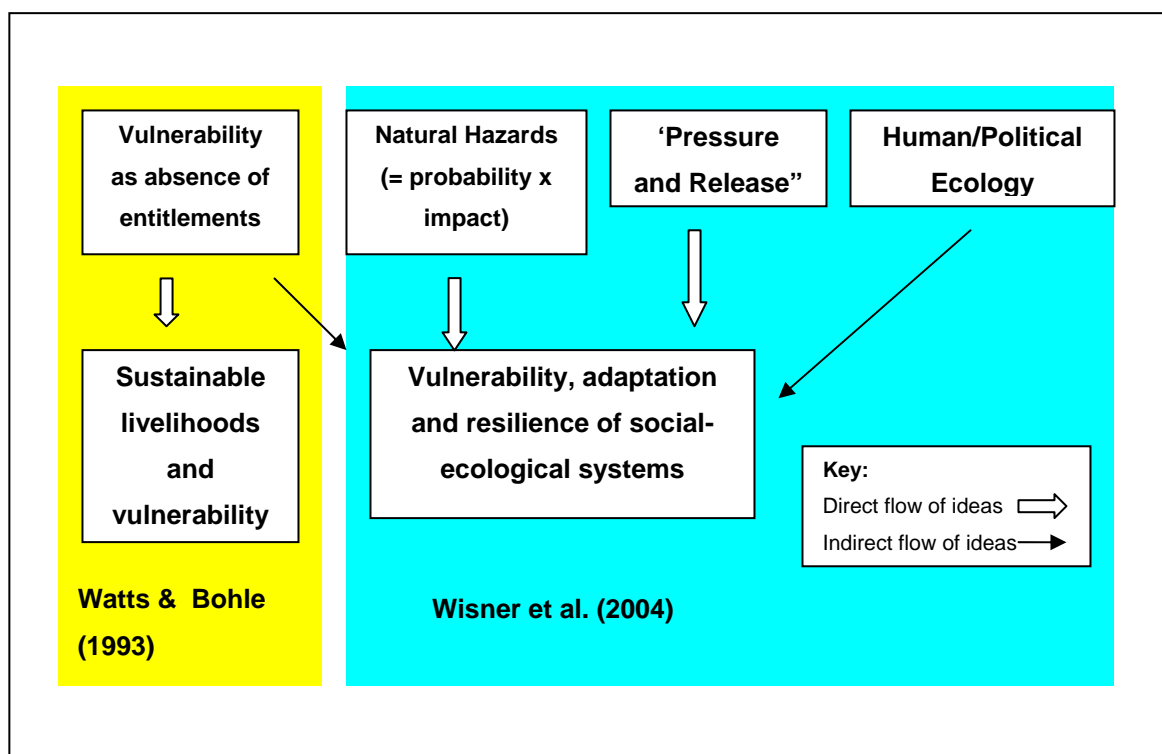


Figure 8 Traditions in vulnerability research and their evolution

Source: Adapted from Adger, 2006, Figure 1, p 271

Entitlement Theory

Entitlement theory (Sen, 1981) deals with two related approaches to hunger. The first deals with food security and a coping strategy model (Watts and Bohle, 1993). The second is concerned with social welfare and social security theories. Where the state cannot adequately provide a welfare system, it is usually left up to local social institutions or the moral economy (Scott, 1976) to provide some form of assistance

for the people (Watts and Bohle, 1993). Figure 8 portrays two traditions of hazard research (Adger, 2006) as being successfully bridged by Wisner et al. (2004) using the 'Pressure and Release' model. They argued that the physical hazards represent one pressure and further pressures come from the cumulative progression of vulnerability, from root causes through to local geography and social differentiation (Blaikie et al., 1994). Vulnerability is a dynamic process or phenomenon that is often in a continuous state of change: both the biophysical and social process that shape local conditions and the ability to cope, are themselves dynamic (Adger, 2006; O'Brien et al., 2005). Measurement of vulnerability is therefore a reflection of social processes as well as material outcomes within systems. Accordingly vulnerability is difficult to quantify (Adger, 2006).

Disasters are better viewed as the actualization of social vulnerability (Lewis, 1999; Hillhorst & Bankoff, 2003). Vulnerability is a more accurate understanding of the processes and impacts of underdevelopment rather than poverty and it is a more precise measurement of individual's exposure to risk from disaster (Cannon, 1994; Hillhorst & Bankoff, 2003). In order to understand the concept of vulnerability it requires taking into account people's experiences and perceptions. Vulnerability provides a conceptual link in improving the understanding of the relationship between disasters, development and people. History can also reveal that vulnerability may progress over time, as societies and destructive agents are mutually constructed and embedded in social and natural systems. Vulnerability is about people, their knowledge and perceptions. Vulnerability is a dynamic process embedded in complex social relations and processes. Vulnerability changes through time depending on the social, economic and political contexts which will consequently affect the probability of loss. If societal vulnerability increases, the loss due to disasters increases. On the other hand, enhancing a community's resilience would reduce vulnerability (Dixit, 2003; Hillhorst & Bankoff, 2003).

The Progression of Vulnerability

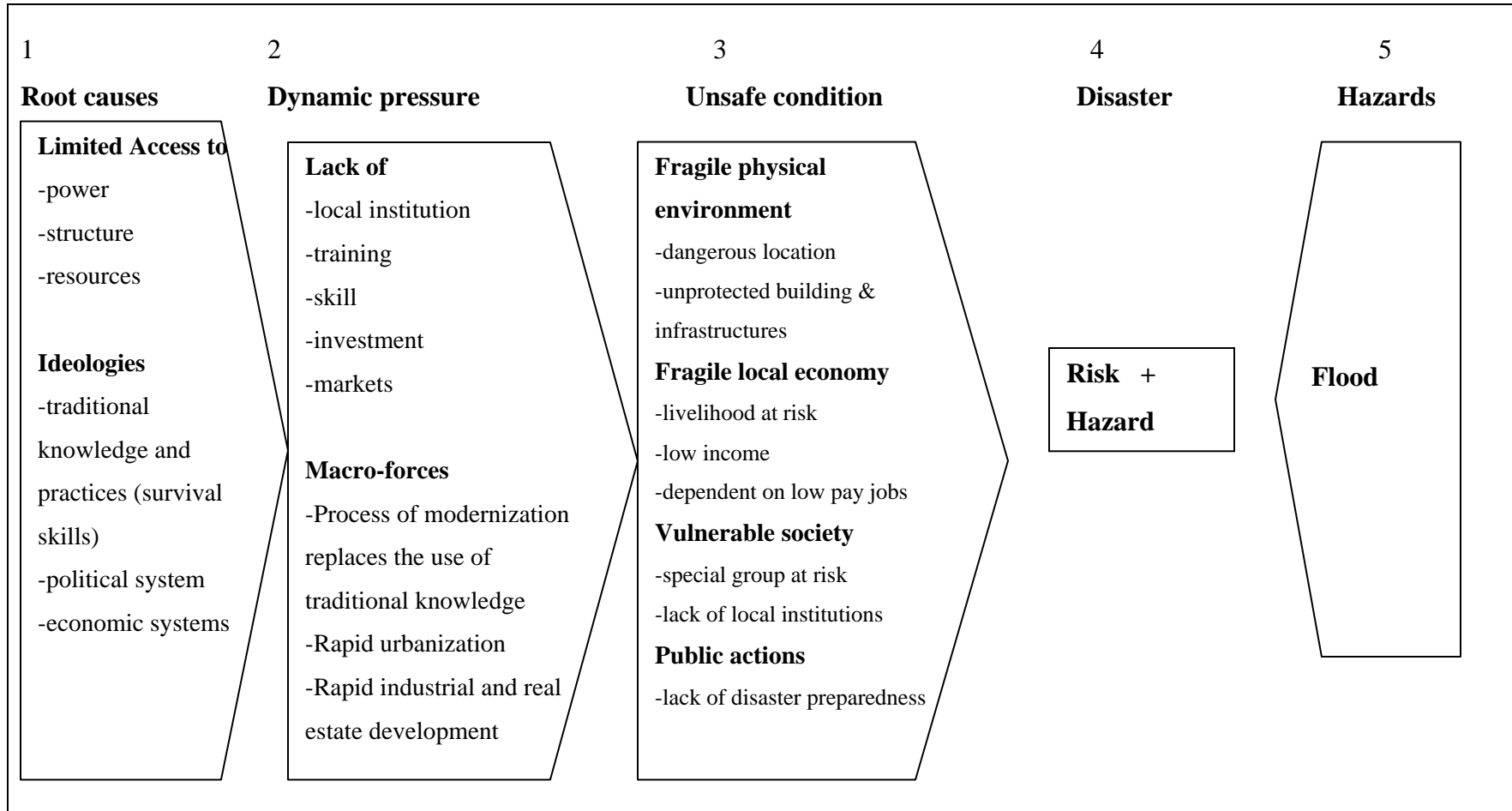


Figure 9 The Progression of Vulnerability

Source: Adapted from Blaikie et al. (1994) p.23 Figure 2.1

The Progression of vulnerability Model

Blaikie et al. (1994) established a “Pressure and Release” model (see Figure 9) in which risk is presented as the result of the combination of some conditions of vulnerability and of some threats. The model shows the progression of vulnerability from the root causes through dynamic pressures to unsafe conditions which lead to disaster. Blaikie et al. (1994) argue that some individuals or groups are more prone to damage, loss and suffering than others. Key characteristics of these variations in impacts include age, class, gender, ethnicity and disability. Other pressures also make them more vulnerable including lack of education, lack of training, low paid jobs, lack of savings, rapid development of industrial areas and urbanization, substance abuse and some levels of poverty (Blaikie et al., 1994). Vulnerability can be understood by identifying the social pressures and relationships from personal to national and global levels. The model uses the term ‘root cause’ for the global pressures which include social, political and economic factors. For the intermediate level, the term ‘dynamic pressure’ was used to include factors such as population growth, urban development, population pressure and environmental degradation. The term, ‘unsafe conditions’ was used when referring to the local pressures which can include social fragility, potential to harm and poverty. Prevention or mitigation measures are conceived as ways of releasing the pressure (Wisner et al., 2004).

The Underlying Causes

The underlying causes⁵ that give rise to vulnerability are economic, demographic and political processes. These affect the allocation and distribution of resources, among different groups of people. Underlying causes reflect the exercise and distribution of power in a society. Firstly, people who only have access to resources and livelihoods which are insecure tend to be more vulnerable. They are likely to be a low priority for government interventions planned to deal with hazard mitigation. People who are

⁵ I prefer to use the term underlying causes rather than root causes. This acknowledges the possibility of greater complexity of vulnerability causation than a singular root cause or explanation.

economically marginal and politically marginal are more likely to stop trusting their own methods for self-protection and to lose confidence in their own abilities and their local knowledge (Wisner et al., 2004).

Wisner et al. (2004) identify ideologies of political and economic systems as they affect the allocation and distribution of resources in a society. They identify these ideologies as the root causes of disasters. The concept of limited access to power is also supported by Pelling (2003) who examines how power makes certain social groups within an area more disaster prone than others. Social equity principles can also be used in examining the level of freedom which allows people to have equal access to resources. Process equity is the underlying social, economic, political or institutional causes of these uneven distributions. Environmental or social justice is required to rectify these inequalities (Cutter, 2006). Aspects of the underlying dimensions of social vulnerability include personal wealth, age, economic dependence, housing tenancy, occupation and infrastructure. These aspects are discussed in detail in Table 2.

Dynamic Pressures

Dynamic pressures are processes and activities that ‘translate’ the effects of underlying causes both temporally and spatially, into unsafe conditions. Dynamic pressures include rapid urbanization, current political conflict or industry promotion. By taking into account these dynamic pressures, micro-mapping of unsafe conditions affecting households differentially (e.g. those lacking essential access to material and resources), can be identified (Wisner et al, 2004).

Development in Disaster-prone Places

The division between disaster response on one hand and development on the other, has long tarnished the efficiency of efforts to prevent damage prior to disasters or to strengthen post-disaster actions in order to reduce vulnerability in the future (Lewis, 1999). Lewis (1999) states that a disaster is a social event, therefore actions to reduce vulnerability and the subsequent impacts of disaster must include social, economic,

and political contexts. Solutions may lie in changes to public policy and in interventions aimed at changing aspects of the social structure (Lewis, 1999).

Table 2 Aspects of the underlying dimensions of social vulnerability

Aspects of the Underlying Dimensions of Social Vulnerability	
Personal wealth	A person's or household wealth can be measured by his/her income per capita, percentage of household earning, house values and rents (Cutter, 2006). However Thai people may define the term personal wealth differently to the definitions from various textbooks.
Age	The two demographic groups most affected by disasters are children and the elderly. Children and the elderly are usually dependent on an adult (income earner) of the household. The make-up of the household can affect their vulnerability to disaster (Cutter, 2006). This is particularly important to note, as in Thai culture, a household usually consists of more than one generation with grand-children living with their parents and grandparents.
Single-sector economic dependence	A singular reliance on one economic sector and also single crops for income generation may create a form of economic vulnerability. During hard times such as war or a natural disaster, industry may take longer to recover. Any changes in weather conditions can increase the probability of hazards such as flooding or drought (Cutter, 2006). This is one of the reasons in the Pathum Thani for its shift from the agricultural sector to an industries dependent economy.
Housing stock and tenancy	The combination of home ownership and rental accommodation combine to produce social vulnerability. The displacement of affected populations from damaged dwellings is another factor to be considered. The issue of reconstruction and the cost involved is another issue which will add to the pressure of the household's period of recovery (Cutter, 2006).
Occupation	The literature suggests that lower wage occupations such as factory workers or service industries are more vulnerable (Cutter, 2006). Another indirect impact is that lower wage earners tend to pay less tax which can impact on a region's spending. The lower wage earners also find it difficult to have savings for emergency events.
Infrastructure dependence	The city's economic vitality and revenue-generating capacity will depend on efficient and high standard of infrastructure which includes transportation and communications (Cutter, 2006). The standard of infrastructure will affect the city's ability to cope or manage in the event of disaster and also the length of time needed to recover. This is reflected in the priority given to the road networks which were kept dry during flood.

Source: Cutter (2006)

Most of the severe impacts caused by a natural disaster may be prevented or reduced prior to the event happening and the focus should be on the social and political contexts and not just on engineering fixes and compensation being offered in the post-disaster setting. It is better to prevent people from becoming vulnerable, rather than aiming to mitigate the effects on them of the natural hazards to which they were susceptible (Lewis, 1999). Political unrest in Thailand following the coup-de-tat in 2006 also led to uncertainty among government officials. The confusing hierarchical

arrangement of the local government structure can delay progress in day-to-day management of the community which can be disastrous during natural hazard events.

Unsafe Conditions

Unsafe conditions are the specific forms in which the vulnerability of a population is expressed in time and space in relation to a hazard (see Figures 9 and 10). For example, vulnerable people who live in hazardous locations and are not able to afford safe buildings have a fragile economy, which is dependent on one specific industry, lack effective protection by the state, or have minimal food entitlements or entitlements that are prone to rapid and severe disruption. Adverse agrarian trends and livelihood diversifications resulting from globalization as in many parts of the world are causing livelihoods to be no longer sustainable and unable to be supported by natural resource-based activities (primarily agriculture). These changes in the economy demand changes in the type of land-use and the livelihood of the population. Unsafe conditions also include a pattern of access to tangible resources such as cash, shelter, food stock or agricultural equipment, and intangible resources, such as network support, knowledge regarding survival and sources of assistance, morale and the ability to function in a crisis (Wisner et al., 2004).

Degradation of natural resources such as destruction of wetland, forest and water resources also create unsafe conditions (Wisner et al., 2004). One example is the removal of swamp and wetland for housing which exacerbates the impact of flooding as there is nowhere else for the excess water to drain or there is nothing left to provide a natural barrier to flash floods. The destruction of forest also reduces the ability of the soil and vegetation to hold and absorb excess water within the catchments, resulting in increased runoff which may contribute to flooding. Global environmental changes such as climate change and sea level rise can also create unsafe conditions especially in low lying areas such as Bangkok and the surrounding provinces in which parts of the city are now below sea level. This means that the impact of flooding will be greatly increased in the low-lying areas especially with the combination of subsidence which is the result of decades of groundwater overdrawn (Manuta et al., 2006; Ross, 2000).

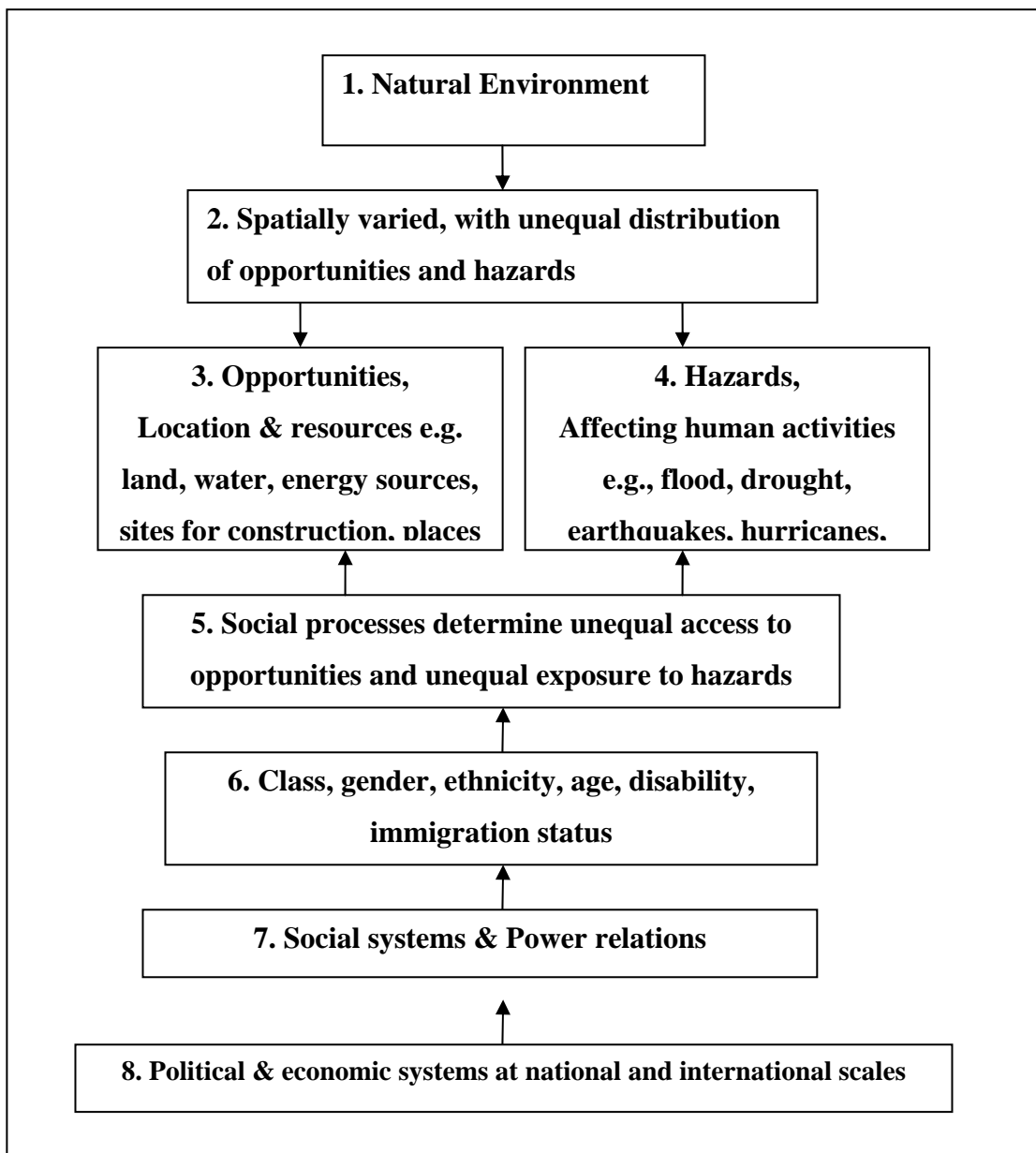


Figure 10 The Social Causation of Disasters

Source: Adapted from Wisner et al. (2004) Figure 1.1, p. 8

Wisner *et al.* (2004) have further developed the access model (see Figure 11) to show how unsafe conditions arise in relation to the economic and political processes which allocate resources, assets and income in society. This access model explains complex sets of social and environmental events and long term processes that are associated with a disaster (Wisner *et al.*, 2004). The access model focuses on the way unsafe conditions arise in relation to the economic and political processes that allocate and distribute assets, income and resources in society. It shows how social systems create the conditions in which hazards have a different impact on various societies and

different groups within society. Access to resources varies among individuals and groups and can affect the potential losses and rates of recovery (Wisner *et al*, 2004). The access model explains many specific mechanisms that turn flood hazards into a disaster. These mechanisms include the location of homes (and their proneness to inundation) and the structure and type of dwellings and workplaces and their resistance to floods. These mechanisms are a function of household income, social limitation on land use availability or cost of materials and the location of livelihood activities (Wisner *et al.*, 2004).

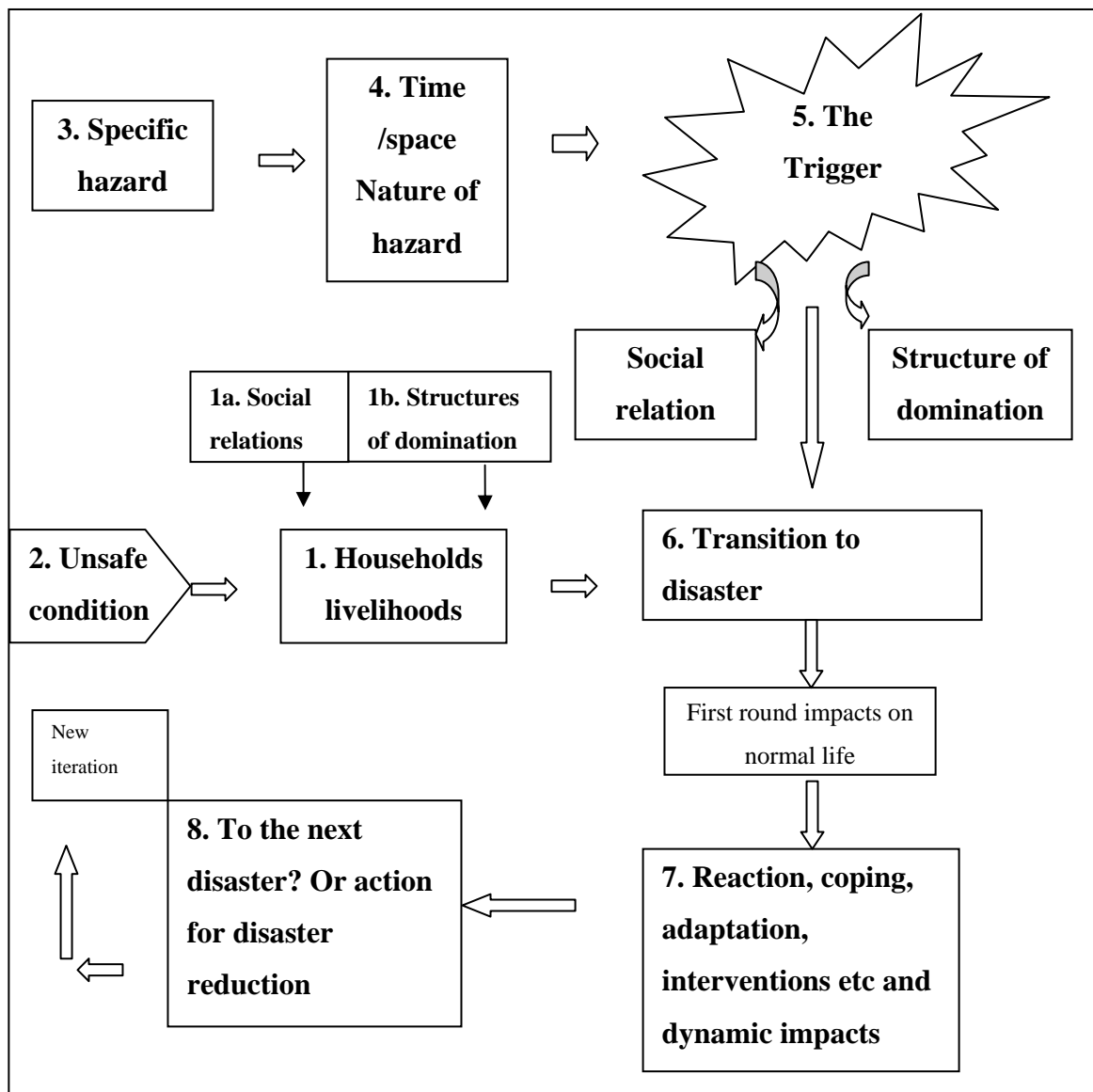


Figure 11 The Access Model Outline

Source: Adapted from Wisner *et al.* (2004), Figure 3.1, p. 89

Patterns of wealth and power can act as major determinants of the levels of vulnerability across a range of people. The household's social relations and power structure can create unsafe conditions to hazards. Access involves the ability to use resources to secure livelihoods in pre-disaster times and the ability to adapt to new and threatening situations. Structures of domination refer to politics of relations among people at different levels (Wisner *et al.*, 2004). A series of extreme events can make livelihood activities extremely fragile for certain social groups. Vulnerability of a social community can be understood as the reduced capacity to adapt or adjust to a set of environmental circumstances. In developing countries, social, political, economic, cultural and educational aspects are often the cause of physical vulnerability. According to Susman *et al.* (1983), vulnerability is the degree to which the different social classes are differentially at risk. From this definition, vulnerability is created according to the political, social and economic conditions of the population. The conditions that create underdevelopment (e.g., social discrimination, corruption, exploitation and capitalism) have made the poorest communities more vulnerable to disasters and have forced the deterioration and degradation of their own environments (Susman *et al.*, 1983).

Socially Constructed vulnerability?

Other scholars have stated that vulnerability is socially constructed and is the result of economic, political and social processes. Hence it is essential to model vulnerability by taking into account social factors such as the fragility of the family and the collective economy, lack of access to property, the presence of ethnic and political discrimination, pollution and illiteracy (Cardona, 2003; Wisner *et al.*, 2004). When faced with hazards the risk could be different depending on the capacity of each group to absorb the impact. Vulnerability sometimes may be associated with certain social circumstances such as poverty or lack of development but they are not the same as vulnerability. Poverty can be considered a factor in creating vulnerability but it is not vulnerability in itself (Cardona, 2003).

Some scholars in disaster research argue that disasters are socio-cultural constructions (discursive rather than material social construction). Oliver-Smith (2003) argues that

disasters belong to that class of phenomena which are neither purely natural, nor cultural and are situated between opposing epistemologies: between the natural and social sciences. Vulnerability is political in nature as the material wealth and distribution of vulnerability is the product of political processes. The labelling of vulnerable people is also a political act as the labelling of vulnerability creates subjects that can be addressed by top-down disaster management practices (Hillhorst & Bankoff, 2003).

Hewitt (1997) argues that disasters were not primarily the result of geographical processes but are also related to social, political and economic processes. In developing countries, factors such as poverty, war, corruption and uncontrollable urbanization and other related social processes accounted for people and societies' vulnerability to disaster. It is better to understand disasters in term of the interaction between hazard and vulnerability, as expressed by Blaikie et al. (1994) and Wisner et al. (2004) in the formula of Risk = Hazard + Vulnerability. This paradigm emphasizes the mutuality of hazard and vulnerability to disaster caused by complex interaction between natural environment and society. People are not just vulnerable to hazards but hazards are increasingly the result of human activity (Hillhorst, 2003; Wisner et al., 2004). Hazards such as floods have become more frequent and more devastating due to environmental degradation and as a result of human-induced climate change (Hillhorst, 2003). This understanding can be considered as a measure of the impact that society has on the environment (Oliver-Smith, 1999). However, the impacts of such events have increased much more rapidly with more and more people becoming vulnerable to them.

In the Thailand context there is no equivalent term for the word vulnerability. SE-ED's Thai-English Dictionary (Thiengburanatham, 2001) defines the term vulnerable in Thai as weak which is not the meaning or even the concept used in this thesis. As there is no Thai terminology for the term vulnerable or vulnerability, the question of whether the concept actually exists in Thai has been raised, suggesting the term vulnerable is socially imposed on Thai people by Western social scientists.

Resilience

Cannon (1994) divides vulnerability into three aspects: livelihood resilience, self protection and social protection. He defines livelihood resilience as the capacity of an individual or group to resist the impact of hazard. Similar to that of Cannon is Pelling's (2003, p. 48) definition of resilience to natural hazards as "the ability of an actor to cope with or adapt to hazard stress". Pelling (2003) views resilience as the preparatory actions which humans undertake in the knowledge of a potential hazard and the adaptation and adjustment behaviour that occurs after experiencing a hazard, irrespective of whether the behaviour is deliberately or unintentionally carried out. He believes that both formal and informal insurance devices are likely to enhance resilience as the economic costs will be able to be spread effectively among members of society over time.

Adger (2003, p. 201) defines social resilience as "a measure of the enforced exposure to critical stress, or hazard, combined with the restricted capacity to cope". He recognizes the significance of social and ecological applications of resilience as having important implications for sustainable development and resource use. The main idea is that a resilient community will be able to withstand the devastating impacts of a natural hazard and recover from it by adapting or adjusting its circumstances in order to continue surviving. A resilient community is therefore a notion which is wished upon all communities affected by natural hazards and is quite an emancipating and liberating concept as it does not designate communities to the role of passive and submissive recipients of calamities.

Progression of Safety

We can apply the model 'Progression of Safety' developed by Wisner et al. (2004) to understand how a particular community can be resilient to natural hazards and how the community copes with the disaster both before, during and after the event (see Figure 12).

The Progression of Safety

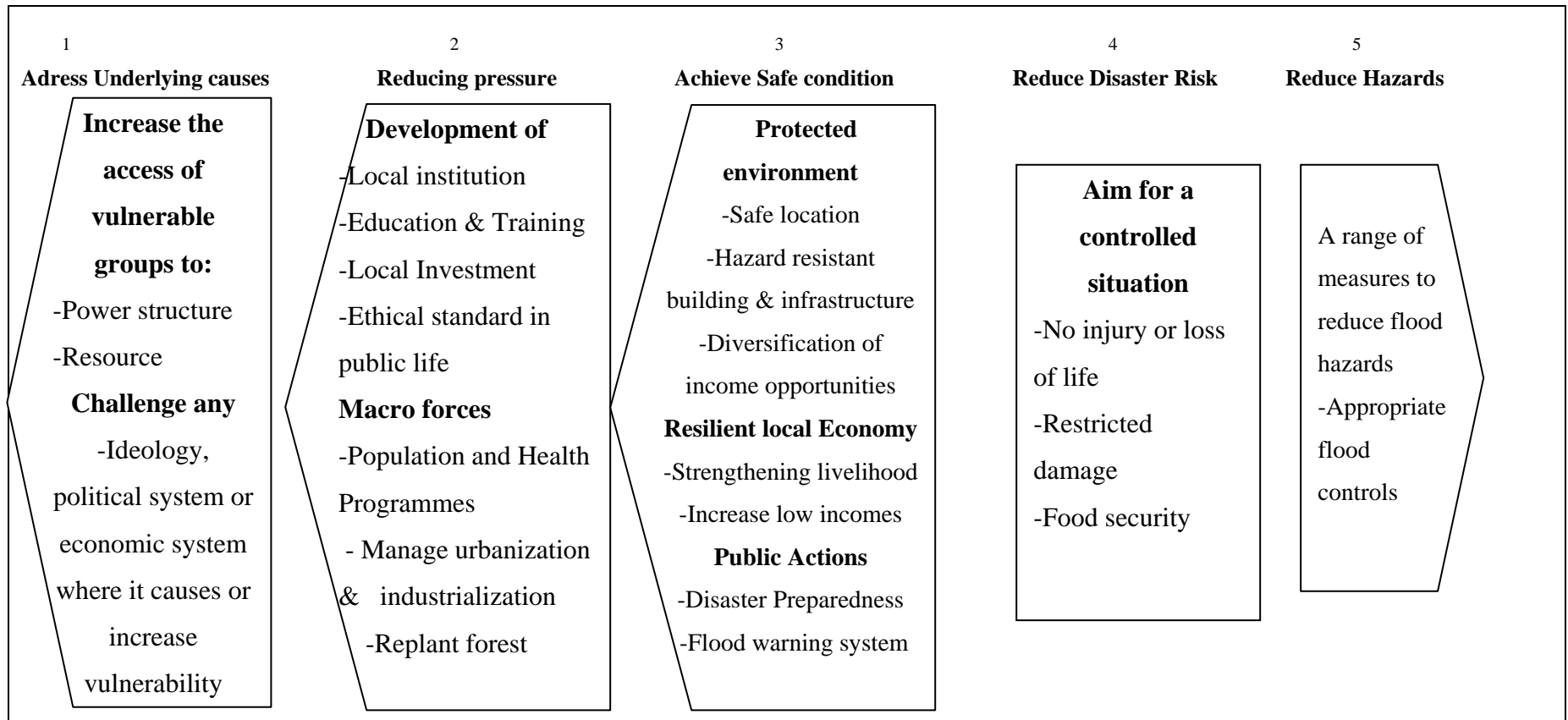


Figure 12 The Progression of Safety to flooding of the Bang Luang Community, Pathum Thani, Thailand.
Source: Adapted from Wisner et al. (2004) Figure 9.4, p. 344

The Progression of Safety Model begins by addressing the underlying causes which include increasing the access of vulnerable groups to power structures (such as being able to voice their concerns to the government officials) and resources (such as materials to reinforce their homes or food storage for emergency) (Wisner et al., 2004).

The second step is to reduce pressure by developing efficient local institutions, education, training, local investment and ethical standards. Another part of this step is to develop population and health programmes, and manage urbanization and industrialization. A community can increase resilience to natural hazards by achieving safe conditions through protecting the environment either by living or working in a safe location, building hazard resistant buildings and infrastructure, diversifying income opportunities and having a resilient economy, and lastly the community can increase its resilience by having effective public actions which include disaster preparedness and coordinated flood warning systems (Wisner et al., 2004). Overall a community can reduce disaster risk by aiming for a controlled situation with no injury or loss of life and restricted damage. A range of measures can be put in place to reduce flood hazards which can include appropriate flood controls both in forms of structural (engineering work) and social (food security, community network) elements.

Experience of Disasters: Individuals and Community

Disasters often defy geographical, social and cultural boundaries. Various aspects of a disaster imprint themselves on every aspect of peoples' lives. Adding to the complexity, disasters are often different from one another and create very specific needs on each individual of the community. The core of disaster experience is the dynamic interplay of individual and community experiences. The impacts on individuals reveal themselves within the parameters of other people's suffering. Loss and gain, breakdown and recovery are individual and collective struggles. The reality of an individual's experience of disaster cannot be understood without consideration of the collective reality at all levels: environmental, psychological, social, political

and cultural. Community reactions can better or worsen individual reactions; individual reactions become shared reactions and define the collective reactions of a coping community.

Natural disasters affect great numbers of people simultaneously, many of whom are members of one another's support networks and are mutually dependent on one another's coping efforts (Kaniasty & Norris, 1999). Literature on disaster response rarely acknowledges the individual experience of disaster but often groups them into a unit or into a 'community'. Even though some members of the community live in the same area and experience the same disaster they came from different backgrounds with different characteristics and experiences on how to cope with a natural disaster. Later on in the Findings chapter, the individual's experience of flooding will reflect the unique and differing circumstances of each individual member of a community.

Conclusion

In this chapter I discussed some of the main approaches to natural hazard theory with a critique of the dominant hazard paradigm which focused on scientific explanation of geophysical processes with the aim to control and contain "nature" through engineering work and the formulation of disaster plans commonly carried out by military-style organizations. The use of flood control works such as floodgates and dams, are some of the examples of modification of the natural events system to reduce human losses as mentioned in the work of Burton, Kates and White (1978 and 1993). The concept of vulnerability has been introduced, based on the notion that disasters were in fact not "natural" but were human induced (Blaikier et al., 1994 and Wisner et al., 2004). The Progression of Vulnerability Model introduced the underlying causes which include limited access to power and resources, the dynamic pressures which include lack of local institution, training, modernization, urbanization and industrialization which all contribute to unsafe conditions under which disasters occur. These underlying causes and dynamic pressures all contribute to varying levels of vulnerability to disasters among a population. I intend to use this vulnerability study approach in explaining the event that occurred in the Bang Luang community following the floods in 2006. This will be discussed in the Chapter Six.

Chapter 4 Methodology

Introduction

The research was conducted on the community situated in the proximity of Wat Bang Luang (Bang Luang Temple) which includes parts of Tambon Bang Luang, Tambon Bann Chang and Tambon Bang Dua of Pathum Thani province in Thailand. This chapter discusses the various methods used in obtaining the information to guide this study and outlines the issues experienced when utilizing these different methods. It is also a reflection upon my own position as a researcher and the various constraints experienced while undertaking this research.

Semi-structured interviews and focus groups were used as my main methods of acquiring data as qualitative rather than quantitative information was required and both of these methods were informal and conversational, allowing for open-ended responses (Longhurst 2003). My initial intention was to collect data from those who live in the Naa Wat Bang Luang community but as my interviews progressed I found that there are two groups of people who have been affected by flooding and to gain a wider perspective I needed to include people from both of these groups. Hence, the geographical focus of my interviews was extended to include people from these two categories. The total number of participants was increased to 22, with the majority living within the boundaries of Tambon Bang Luang, Tambon Bann Chang and Tambon Bang Dua. The participants include villagers, people who live or work in the area, a manager of a local factory where many of the residents were employed, the Mayor of Tambon Bang Luang, a local school teacher, a staff member from the Early Childhood Development Centre (one of the government buildings which were half submerged under the flood waters), and the abbot of the Bang Luang Temple.

The research focused on the community's experience of flooding and the impacts it has had on their lifestyles and livelihoods. The key research questions focused on various factors that caused some communities in Thailand to be vulnerable to floods, using Tambon Bang Luang as a case study. I generally only interviewed people who had lived or worked in this low lying area near the Chao Phraya River and those who

had experienced various floods throughout their lives while living or working in the area. The qualitative nature of my interviews did not allow me to randomly select my research participants. I selected the participants from those I met while walking along the bank of Klong Bang Luang (not all were willing to be interviewed or involved) and those who live at the back of Wat Bang Luang - and later, by word of mouth, more participants were found (a snowballing technique).

Subjectivity in my Research

My recruitment of research participants had significant implications for my own positionality and subjectivity as a researcher. Valentine (1997, p 113), in Longhurst (2003, p10), makes the important point that “when you are thinking about who you want to interview it is important to reflect on who you are and how your own identity will shape the interactions that you have with others” by being reflexive and recognizing one’s own positionality in relation to one’s own research participants.

My research participants perceived me as playing out different roles and I recognize that this may have affected the way they participated in my research. My father established a paper manufacturing plant in Pathum Thani in the early 1970s. The company employed around 70-100 workers all of whom lived in the area. Many of the participants used to work in the factory and some have been working there since the early 1970s. Furthermore, my position as an educated person from an overseas university may have allowed me to be seen in a totally different light from the local people and this may have worked for or against me during the interviews. According to Dowling (2000) my personal characteristics and social position as the researcher would affect the way my research participants received me, the way I perceive my research participants and the ways we interacted.

Choosing my Field Site

I chose Klong Bang Luang as my research field site because I am familiar with the area and remember the place before it became developed into an industrial area. I also experienced the flooding situation in Tambon Bang Luang first hand during my

summer break in November 2006. I chose this district as field site as it is relevant to my research on factors that cause some communities in Thailand to be vulnerable to floods. The area experiences flooding almost every year; the differences lie in the severity and length of time the flood will last. The community is not too large and is ideal for data collection for Master's Thesis research where time is restricted. I wanted to do research in my own country and in a familiar place so that I could give back to the community and not just take information from the people. I was fortunate that the community's experience of flooding was still fresh in their minds as it had been affected badly by a three months long flood in 2006 and many more floods prior to that. Much of the evidence of flood damage was still present and available for me to observe. I hope that this research may produce additional questions which may fuel further research in this area.

Semi-structured Interviews

The semi-structured interviews were used to gather primary data or personal stories or experiences of the community affected by flood(s). The topic to be explored is people's vulnerabilities and their coping capacities in relation to flood disasters, especially members of the communities living or working near the Chao Phraya River. The research focused on lower income earners as their experiences to flood disaster may be different from those of the larger population or those who live in the larger city of Bangkok. People's responses to and preparation for flood hazards have changed due to changes in land use. The interviews gathered specific and in-depth information about the community's history and its exposure to flood events as well as vulnerability to flood disasters. .

The advantages of interviews are that they take a conversational, fluid form and each interview varies according to the interests, experiences and views of the interviewees. Interviewing is sensitive and people-oriented which allows interviewees to build up their own accounts of their experiences in their own words. Interviews enable a wider discussion than a questionnaire and are more flexible. Interviews allow participants to raise issues that the researcher may not have anticipated and the material generated is rich, detailed and multi-layered. This approach relies on words and meanings rather

than statistics. The aim is to understand how individual people experience and make sense of their own lives and does not claim to be representative. The focus is on considering the meaning people attribute to their lives and the processes which operate in particular social contexts (Valentine, 2005; Bryman, 2001).

Focus Groups

I also used focus groups as another method of collecting data for my research. The one-on-one interview was not suitable for some circumstances especially when the participants felt awkward or nervous. Hence I arranged participants into small groups of two to four people. There are various challenges to the researcher when using focus groups as a method for data collection. The challenges include the logistics of accessing participants, the influence of gate keepers, group dynamics, balance between encouraging spontaneity and adhering to the research project and the difficulty of ensuring confidentiality (Barbour & Schostak, 2005). The focus group arrangement worked out extremely well as those who have similar backgrounds and characteristics chose to be in the same focus groups. The atmosphere of the focus group meetings was more relaxed and conversational as the participants knew each other very well. The logistics of getting the participants together worked out smoothly as they work in the same shifts and were from the same factory.

I had asked the ‘gatekeepers’, who were the human resource managers of each company, for their workers’ contribution to my research project and most seemed reluctant at first, especially knowing my topic. This may have affected the data gained from the workers and I do not know if the ‘gatekeepers’ had exerted some influence or power on the participants before the interviews commenced. The group dynamics also had some impacts on how the participants contributed to the discussion but from my observations no one in any of the focus groups were intimidated or reluctant to contribute as they knew each other so well and felt some kind of comfort of having someone from the “same side” present during the interview. The power relations between the researcher and the interviewees shifted during the focus group meeting and having more numbers on the participants’ side seemed to ease the nervousness of the participants.

In some meetings it was difficult to keep a balance between encouraging spontaneity and adhering to the research topic. The reasons for extended meetings were various interruptions such as phone calls, work or family commitments, power cuts, and the coming and going of other people. The location of the meetings, which were conducted in public spaces, such as in garden and the lunch areas, posed a dilemma for me between trying to ensure the participants' confidentiality and also finding the location and time that suited all participants.

Constraints in Gathering Data

I intended to use a voice recorder for all of my interviews to save time as well as to enable me to record accurately exactly what was said during each interview. However most of the interviewees felt awkward and self-conscious about having their voices recorded on tape. The first few interviews progressed very slowly and the situation only improved when I switched back to note-taking. The constraint of note taking is that I could not record every single word or take notice of every facial expression or the participants' reaction to the question or topic being discussed. However the most important thing is to put the interviewee at ease and let the conversation flow. I still had to keep prompting them with questions, comments, keywords or photographs taken from the 2006 flood to keep the interviews moving and stay on the topic.

Photographs taken during the scoping process in November 2006 were used as prompts to remind the interviewees of what had happened during the previous year's flood. Many things like the type of dwelling and the issue of toilets overflowing during floods were picked up during the interview using these photographs. The Mayor of Tambon Bang Luang kindly provided me with photographs which were taken to show the damage to properties in the area. These photographs were then sent to the Ministry of Interior for compensation claims. I also took photographs of the current situation which were used to compare during and after conditions in the area.

The constraint of the focus groups is that it is very difficult to take notes when several people are talking at the same time and it can be difficult to steer the conversation to

the topic I wanted to discuss as the participants can get carried away on other topics and it can be rude to interrupt them.

The interview questions were first written in English then translated into Thai together with the Consent Form and information sheets. The interviews were conducted in Thai, in their own dialects, for the convenience of the participants. Translated transcripts of the interviews were produced upon return to Waikato University. It was a lot of work translating all the data collected into English again. I took extra care when translating the interviews into English so as not to lose the essence of the participants' views.

Red Tape

I had intended to access primary documents from various government departments in Thailand. However most of these documents were restricted or unavailable to the public. Cases of red tape also occurred when contacting various government departments. For example the official maps of district boundaries and household information are restricted to government use only. Various government reports on flood impacts at the community level were restricted. However some information can be accessed on official departmental websites. The information from the local administrative office was not available on the internet as it does not have its own webpage. Some of the figures on rehabilitation programmes and relief funding spent on some regions are available on the government websites. I also visited Chulalongkorn University in Bangkok to access various articles, conference papers and books published on the topic of flooding in the Pathum Thani area.

Research, using secondary documents, was undertaken to complement the primary data and help theorize and validate the data I had collected in the field. The secondary data were collected from various literature reviews of news articles, journals, books, theses, government reports, conference papers and internet websites. Each source portrays different levels of vulnerability faced by the community depending on the target audience and the purpose of the article. The materials collected focused on the concept of vulnerability, and dynamic pressures (social, political and economic impacts). The weakness of a desktop study is that it can only be as good as the

documents on which the researcher works. The use of secondary data may lack depth as no primary data was collected and it is difficult to answer 'why' questions when the primary source of data is not there. However a desktop study provides a comprehensive result in a short amount of time (rapid search). It is suitable for a limited budget project as there are no travelling costs (i.e. for interviews) involved. It provides an overview on the topic and can be unobtrusive and able to generate information about groups that are difficult to access (Bryman, 2001 and Clifford & Valentine, 2003).

The Issue of Informed Consent

There are issues with informed consent, in obtaining the signature of participants, in the Thai context in which I undertook my research. The community is very much an oral based society and I was concerned that the task of getting the interviewees to sign consent forms would be highly inappropriate. To gain a written consent may cause undue suspicion and anxiety among the potential participants. Researchers may be viewed as potential threats either from the government or the private sector who want to evict them from their land. I overcame this issue by recruiting a liaison person who is well known and well respected in the community to both introduce me to the local people and to be present during the interviews. Due to this cultural sensitivity the participants were given two choices for giving their consents - either as a signature on the Consent Form or as a verbal agreement recorded on a tape, saying who they are and that they agree to the conditions that have been explained to them and which are set out in the Consent Form (see Appendices Three and Four).

The participants were given a copy of the information sheet (see Appendix Two) which outlined the topic and the purpose of this research and the contact details of the researcher, the ethics committee and the supervisor, as well as a copy of the consent form signed by the researcher, the participant (either in the signature form or tape recorded verbal agreement, and the liaison person (only if his/her presence was requested during the interview). The participants were given a choice as to whether or not they wished the liaison person to be present during the interview. When the liaison person's presence was requested during the interview, then the liaison person also signed a separate Consent Form.

From the onset I had made my research intention clear to each of the potential participants. Before embarking on my interviews I reiterated participants' rights, which included anonymity (they could choose to be anonymous or not), confidentiality, and the right to withdraw at any time from the research. In the end all of the interviewees chose to give their signatures on the Consent Forms as most were nervous or too self-conscious with the voice recorder.

Gifts were prepared and given to participants as a mark of respect and to follow a Thai protocol that a guest should not come for a visit empty handed. I cannot go into the community and ask questions without giving anything back in return. I acknowledge that these small offerings may have affected how the participants responded to my questions. However the quality of data tended to depend more on the participant's interest on the flooding issue.

Research Participants

I collected my primary data from the total of 22 people from Bang Luang community in Pathum Thani, 14 of which gave information in several focus group settings. More than half of the interviews and all of the focus groups took place at the participants' workplaces. Each interview lasted for about an hour with a few exceeding that time. I decided to choose my research participants according to their experience of flooding and the locations and elevations of their houses which were located in the low lying area along the canals or near the Chao Phraya River. After the first few interviews I found out that there are two distinct groups of people who have been differently affected by flooding. One group is those who have their homes located on the inside of the stopbank and the other are those whose homes were located between the stopbank and the river. These two groups of people experienced different impacts from the flood and conflict often arose from the opening and shutting of the water gates.

The research participants who were interviewed ranged in age from 32 to 67, ten were male and 12 were female (see Table 3 for summary). Most of the participants work as

shift workers at nearby factories and have small savings, and their main mode of transport is bicycle or motorcycle during dry periods and boat during floods. The length of time the participants have been living or working in the area ranges from four to 67 years. Most of the participants were affected by flood(s) in some ways with the majority affected directly with damaged houses and disrupted everyday activities. Most of the participants' coping mechanisms included self-reliance followed by assistance from family, employer and government.

As most of the participants work at various factories in shifts, I conducted the focus group meetings during their lunch break in the afternoon. I did this because that was the only time they were available to be interviewed as most of the participants have commitments after their normal working hours and during weekends. The focus groups also elicited more response from each participant than a one-on-one semi-structured interview. Semi-structured interviews were conducted with a general manager of the factory, the Mayor of Tambon Bang Luang, the abbot of Bang Luang Temple (interviewed at the temple before lunchtime), a teacher from a local school (interviewed at the school during the students' lunchtime), a staff member at the Early Childhood Development Centre (interviewed at the Centre during business hours) and a few of the factory workers, who preferred a more private setting were interviewed separately.

The questions I posed to the people, involved them discussing with me their experiences and opinions of flood impact and its management. Some of the interviews were emotional ones as they recalled some of their stressful experiences with previous floods and the problems they had faced. Other participants reflected on their experiences of flooding almost with detachment as if trying to make the issue less significant. They considered flooding as part of everyday life and there were other more pressing issues to worry about. One of their worries included the prospect of unemployment, as during the time of the interviews there were a few large factories laying off workers due to the impact from the strengthening of Baht against the US dollar. This had caused many factories, which rely on exports, to declare bankruptcy.

Table 3 Participants' characteristics

Name (pseudonym)	Age (Year)	Gender Male/Female	Employment Status	Mode of Transport	Household Structure	Type of Dwelling	Length of time living in the area (year)	Location: Inside/Outside the water gate	Level of impacts received from flooding	Level of Assistance
1. Suthichai	47	M	Production supervisor	Walk, bike	Widow with a dependent child	Single-storey concrete building	20 years	Outside 100m from the river	Flooded home during high tide (during flooding), flooded access road	Self reliance, some help from employer, none from the govt.
2.Sommai	35	M	Shift Supervisor	Walk, bike	Married with 2 young children	Single-storey concrete building	9 years	Outside 100 m. from the river	Flooded home during high tide, cracked floor, flooded access road	Self-reliance, some help from employer
3.Supot	40	F	Shift worker	Walk, bike	Married with one grown up child	Single-storey concrete building	11 years	Outside 100 m. from the river	Overflowing toilet, Cannot bath, do the washing, flooded access road, very stressful	Assistance from employer
4. Sakorn	67	F	Housewife/ Retired	Walk	Married with one working-age son	Single-storey wooden house	67 years	Outside 5 m. from the river	Completely flooded to the roof, full evacuation	Live with relatives
5. Orashorn	32	F	Quality Controller at Timber factory	Walk, bike	2 Friends	Rental property 5 stories brick house	4 years	Outside 250 m. from the river	Home unaffected by flood, flooded accessed road	Did not ask for any assistance
6. Prasert	42	M	Shift worker	Walk, bike	Married with 2 children & live with an older brother	Single raised storey with timber upstairs and concrete basement	40 years	Inside Beside Bang Luang Canal	Flooded basement (less impact if floodgate was closed)	Self reliance
7. Suthus	54	M	Drive Motorcycle Taxi	Walk, bike	Married with one son and daughter in-law	2 stories timber home (recent addition 2 nd floor	8 years	Inside Beside Bang Luang Canal	Flooded basement, difficulty with washing	Self reliance

Name	Age (year)	Gender Male/Female	Employment Status	Mode of Transport	Household Structure	Type of Dwelling	Length of time living/ working in the area (year)	Location: Inside/Outside the water gate	Level of impacts received from flooding	Level of Assistance
8. Krish	63	M	Carpenter/ Retired but still does shift work	Walk, bike	Married, live with independent children and grandchildren, Total 7 people	2 stories	>30 years	Outside Beside Bang Luang Canal and 180 m. from the river	Flooded basement, and accessed road, damaged to electrical appliances, travel by boat	Self reliance, received small compensation from the government
9. Luan	58	M	Builder/ shift worker	Walk, bike	Married	Single-storey timber building	37 years	Inside stopbank Along Klong Bang Luang	Flooded basement, Difficulty with commuting to work	Self reliance but wants more community support
10. Soodchai	47	F	Production Line Supervisor	Walk	Lives with an elderly mother, a sister, niece and nephew A total of 5 people	Single-storey timber building	47 years	Outside Near Wat Bang Luang beside the main road	Flooded house every year, sleep on raised floor, threat from poisonous animals like snakes, risk of electrocution	No Assistance provided
11. Sumreung	42	M	Workers at a tyre factory	Walk, motorcycle taxi	Lives with elderly parents (own the house), wife and a son	Single storey Raised upstairs built from timber and concrete basement	>40 years	Inside 1 km. from Wat Bang Luang	Flooded basement, no flood if the gate was closed, smelly stagnant water, dead trees, flooded fish pond, hard commuting to work	Assistance from employer
12. Thipawan	43	F	Worker at a soap factory	Walk	Lives with a husband and a brother	Single raised storey, wooden floor and concrete front steps	43 years	Outside Low lying area	Flooded access road	Ask family or relative for help
13. Kannikar	38	F	Supervisor Sorting paper Section	Walk, bike	Total of 6 people mainly older relatives and children	Single raised storey, timber upstairs & concrete basement.	5 years	Inside Along Bang Luang Canal	Difficulty preparing food and doing the washing, raised power points to avoid electrocutions.	Self-reliance, Assistance from govt.

Name	Age (year)	Gender Male/Female	Employment Status	Mode of Transport	Household Structure	Type of Dwelling	Length of time living/ working in the area (year)	Location: Inside/Outside the water gate	Level of impacts received from flooding	Level of Assistance
14. Washaree	53	F	Stock manager at a paper factory	Drive	Total of 9 people-relatives, in-law and their children	2 stories brick house	50 years	Outside Beside watergate	Flooded basement and access road, dead trees	Self reliance, built concrete wall embankment along canal, sandbag from Local Administrati-ve Office
15. Pratheung	50	F	Chemical mixer at a paper factory	Walk, bike, boat	Total of 8 people- an elderly mother, 2 brothers and in-law, and their children and a husband	2 Stories houses with timber upstairs and concrete basement	50 years	Inside 100 m. from Bang Luang Canal	Flooded access road, clean water scarcity, smelly stagnant water, skin condition from using the river water, stress	Self reliance, adaptation with raised floor, Assistance from Local Administrati-ve Office
16. Sriprapa	54	F	Sale manager at paper factory	Drive	Lives with a husband	Single storey with raised basement for car park	54 years	Inside Right beside the watergate	Flooded basement, smelly stagnant water	Did not ask for assistance
17. Boonteang	42	F	Unemploye-d	Walk, bike	Live with an older brother's family, total of 5 people, Have 3 dependent children (1 with multiple disabilities),	Single storey timber home with raised basement	10 years	Outside 100 m. from the river	Flooded home, cannot sleep (live in the basement which will be completely submerged during floods) Stress of caring for disabled son during flooding	Cannot do anything much as the house is on a very low-lying area, received reparation from the government & Red Cross
18. Nippapaan	44	F	Teacher at an Early Childhood Development Centre (govt own)	Walk, drive	A school with young children	A single storey concrete building	>10 years	Outside 100 m. from the river	Centre was flooded for 3 months and had to closed, used sandbags but water reached the window level, poisonous animals, Dengue fever ou	Local Govt. Office helped with clean up, rebuilding, and fumigating to prevent mosquitoes breeding

Name	Age (year)	Gender Male/Female	Employment Status	Mode of Transport	Household Structure	Type of Dwelling	Length of time living/ working in the area (year)	Location: Inside/Outside the water gate	Level of impacts received from flooding	Level of Assistance
19. Pra Mahatavorn Thirachito	N/A	M	A Buddhist abbot (Bang Luang Temple)	Walk	Around 20 monks	Groups of brick buildings, some single storey some more than 2 stories with raised basement	>20 years	Outside 200m. from the river and right beside Bang Luang Canal	Flooded ground level, flooded access road, Dengue Fever, threats from poisonous animals, disruption with morning alms ritual	Sandbags provided by the Local Administrative Office Govt. assistance & community help with the clean up and renovation
20. Oukrit	N/A	M	A primary school teacher (Bang Dua School)	Walk	Lives with a wife and an elderly mother (suffered from stroke)	School building: 2 stories buildings built from timber and concrete	50 years	Outside Extremely low lying, Located next to an empty swamp field	Flooded the first floor of classroom, access road & surrounding area, school remained closed for 3 months, Stress & Dengue Fever	Government assistance and reparation, Help from NGOs help, and other schools with clean up
21. Piyathida	43	F	General manager at the paper factory	Walk, drive	Lives with husband and 2 teenage sons	Single storey concrete building	10 years	Outside Next to the main road and 500 m. from the river	Home unaffected by flood, main road not flooded, But responsible for the maintenance of company home which was flooded at the back of the factory (closer to the river)	Factory does not qualified for compensation, Self reliance, -Sandbags, -Concrete wall at the company homes, Water pump
22. Mayor Ramathana Vichitkarn	N/A	M	Mayor of Tambon Bang Luang Bann Chang)	Drive	N/A	N/A	>30 years	N/A	Responsible for the district's well-being Carried out flood response	N/A

I enlisted the help of my sister and brother in-law on many occasions to circulate the news of my research around the community and to see if people would be interested in participating. My initial intention of walking along the pathway and introducing myself to the residents during the day did not seem to work as most houses were empty while the owners were away at work and by the evening it is too dark and unsafe to walk into the area. I am fortunate enough to have family members who could help me with networking and introduce me to various members of the community such as the mayor, the abbot and the local school teacher. The presence of others during the interviews and focus groups may have affected the way the interviewees answered my questions. Most of the participants were eager and willing to be interviewed by me and some felt pleased that I was interested in their stories and opinions.

I used a preset schedule of questions and before each interview I would outline, to my research participants, the types of questions that I would be asking (refer to Appendix Five). After the first five interviews I examined the patterns in their answers and arranged them into groups to find common factors or shared characteristics so that I could make changes and improve my list of questions and prepare for what to expect during the future interviews. Some of the focus groups generated more in-depth and detailed information than others. However as the interviews progressed the community had a rather good idea of what kind of questions I was asking and their answers often seemed very similar to responses from previous interviews as they had had the opportunity to prepare themselves. I gave the list of questions to many of the participants who were busy and could not participate in a solid one hour interview so they could remember what we were discussing in future interview meetings.

The participants' responses to my questions may have been influenced by my age, gender, education and their relationship with me or my family and my lack of familiarity with the local practices, etiquettes and protocols. I acknowledge that it is possible that the participants may have perceived me through a number of different roles which included being a close relative, a young female and an overseas educated person. The responses from the research participants were possibly influenced by my

presence and the power relations that were happening during the meetings. I acknowledge that as a researcher I am in a privileged position as the collected data is to be used for my own goals. I also acknowledge that even though I am a Thai doing research in Thailand; I am still utilizing a western perspective in my research and analysis and critiquing the data using this type of perspective.

Analysing the Data

I encountered a few difficulties when attempting to translate Thai phrases or words into English. In some cases direct translation from Thai words into English distorted the original meanings of the phrases. In other cases I could not find the right words in English to capture the true essence of the Thai words. This issue with translation also occurred when I translated the English version of the questions into Thai. The word “vulnerable”, which is one of the most important keywords in my thesis is very difficult to translate and convey its comprehensive meaning into Thai word(s). The direct translation of the English word “vulnerable” into Thai is “weak” which is not the exact meaning I use in this thesis is. In most cases I used English words which were as close as possible in meaning to the Thai words. Some of the special or technical phrases or words were difficult to translate as a standard dictionary does not give a detailed explanation. I am fortunate enough to have two of my family members working in the academic world and they assisted me in the translation of many specific phrases or words.

The transcribing of interviews for my analysis was a massive undertaking. I spent weeks organizing my hand written notes of the interviews into some sort of classification of topics ready for translation. I realized that I should have asked another person to assist me in note taking during the interviews and focus groups so that I could make some detailed notes or explanations on some incidents or specific words or phrases while they were still fresh in my mind.

Conclusion

I utilised semi-structured interviews and focus groups as main methods of acquiring data from the Bang Luang community. The issues of access to participants, informed consent, protocol and etiquette played vital roles in the data collection methods and the quality of data gathered. This is a qualitative research project which aims for in-depth and detailed data from personal stories and experiences and does not intend to be representative of a Thai community as a whole.

Chapter 5 Findings

Introduction

This chapter provides background information on the Bang Luang community and focuses on two elements: the community's response to flooding and the government response to flooding and national flood management.

Bang Luang Community: Description of the Landscape

Bang Luang Community is located along the Klong⁶ Bang Luang on the west side of the Chao Phraya River (see Figures 2 to 4) The main landmark of the area is Bang Luang Temple which has a long history of more than 300 years, tracing back to the Ayutthaya⁷ period (PAO, 2007 and Srisawalak-Nabangchang & Wonghanchao, 2000). The community falls within the boundary of three tambons⁸ - Bang Luang, Bann Chang and Bang Dua all of which are parts of Amphoe⁹ Muang. The general topography of the area is low-lying alluvial flood plains of the Chao Phraya River. The community was historically agricultural with rice cultivation as the main source of income and a small number of orchards. At the present time the community's economy relies heavily on income from people working at various factories located in the district. The province's close vicinity to Bangkok led to changes in socio-economic conditions. The labour force in the city area becomes more expensive and this has led to cheap labour migrating into the area, attracted to the relatively high wages (in comparison to wage earned from agricultural sector) offered at the nearby industries. It has also upscled the cost of living in the Pathum Thani area (Chunnasit, Pages & Duangngam, 2000).

⁶ The term "klong(s)" can be translated into the term "canal(s)" in English but a klong can be a naturally occurring waterway or enhanced or constructed by humans while the term "canal" only applies to waterways artificially constructed by humans.

⁷ The kingdom of Ayutthaya (Thai: อยุตฺยราช) was a Thai kingdom that existed from 1350 to 1767. The seat of the kingdom of Ayutthaya is located 85 kilometres north of Bangkok (PAO, 2007 and Srisawalak-Nabangchang & Wonghanchao, 2000)

⁸ Tambon(s) is the term used in Thailand when referring to a sub-district

⁹ Amphoe is the term used in Thailand when referring to a district.

The community has been living with floods as part of their lives for hundreds of years. People have adjusted their lives to suit the flood conditions and used them to their advantage by timing their rice cultivation to coincide with the annual flooding (Chunnasit, Pages & Duangngam, 2000). Their houses were adapted to sit on raised poles so that flood waters could not reach the living and sleeping areas and the basements could be used for storage or as meeting areas. However as the area along the banks of the Chao Phraya River and along various klongs have become more densely populated, the need to ‘contain’ the water or ‘protect’ the community from flood hazards has emerged and increased. Surface flooding is a normal occurrence in the low-lying parts after heavy rainfall during the monsoon season and as the water level in the river increases the water level in the klongs also rises.

The previous ‘big flood’ that the community speaks of (leaving the 2006 flood to be mentioned later) was in 1995 where the majority of Pathum Thani province was submerged under flood waters for a full month and even the main road in the province (Pathum Thani-Sainai Road) which is located a few kilometers from the river was flooded. The 1995 flood disrupted communication and transportation between Pathum Thani and Bangkok and people had to use flat-bottomed boats as their main transport device instead of cars or bicycles. During that flood large trucks could still use the main road but to access the streets or houses near the river people needed to use rafts or boats (Pra Mahatavorn, Washaree and Sriprapa).

The notion of ‘containing’ the flood along the Chao Phraya River was born many years ago and in Pathum Thani stopbanks and watergates were constructed after the flood event of 1995 (2538 B.E.¹⁰). The rise in the river level and the increased rainfall led to the klong, which flows through the middle of the community, overflowing its banks and flooding the houses and land around it. The result was the complete inundation of the whole district as the land area, upon which the community is located is a floodplain and is very low-lying (some parts are below the mean water level of the Chao Phraya River). The residents ended up having to row boats or rafts through the district to commute to work or to school (Piyathida, Krish).

¹⁰ Buddhist Era (B.E.) is the Thai calendar which started 543 years before the start of the western calendar. The year 1995 is 2538 B.E., the year 2008 is 2551 B.E.)

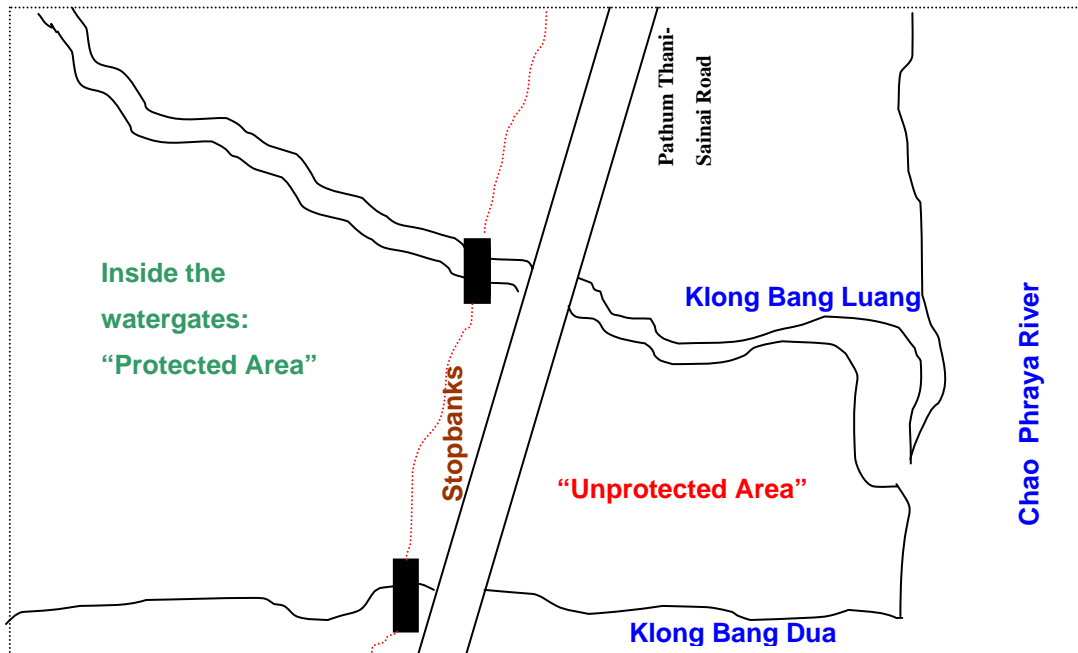


Figure 13 A sketch of the stopbank boundary showing the “protected” and “unprotected” areas (not drawn to scale).

Source: Author

The Flood of 2006 and its Impacts on the Bang Luang Community

During the 2006 flood the area along the banks of the Chao Phraya River in the Pathum Thani province became submerged for almost three months starting from late August to early November. The flood began in the northern parts of Thailand (where all the tributaries are located) and flowed through the Chao Phraya River passing several dams which were filled to their maximum capacity down to the Gulf of Thailand, flooding each city along the way.

Physical Impacts

The land along the banks of Pathum Thani’s canal networks which criss-cross the landscape also become flooded. The main road (Pathum Thani Sainai) acted as an embankment as it was raised a few metres following previous floods. The houses and buildings located in the low-lying area also become flooded and submerged under flood water for a long period of time. Threats from poisonous animals such as snakes became real and people wadding in gumboots had to take particular care when

placing their feet. In some areas the flood waters even reached the height of electricity transformers making electrocution a part of the flood hazard.

The opening and closing of the water gates

One issue that occurred during the flooding is the conflict between those who live outside the stopbank, near the Chao Phraya River, and those who live inside their protection. The data collected from the interviews and focus groups showed the complex nature of the situation and how the flood impacted upon people in different ways. One group experienced prolonged and high levels of flood water (mostly up to the window ledge level) and a small degree of subsidence. The other group experienced moderate levels of flood water and problems of smell and as outbreak of dengue fever from the polluted and stagnant water. I found that the factor that separates these two groups was the location of their houses in relation to the stopbank and water gates.

Those who live inside the stopbank received the protection from rising water as the water gate (controlled by the Royal Irrigation Department) stopped the water from going into the inland area. However conflicts often arose as to when the gate should be opened or closed as the responsibility lay with the Royal Irrigation Department and the monitoring of the local water level may be limited (the office is in Bangkok and the officers communicate by phone). The closing and opening of the watergate may be too hasty and the residents who live further inland would experience shortages of water especially if they rely on it for consumption (see Figure 14). When the gate was closed for longer than three days, issues with stagnant water followed. Such issues included the smell from polluted water and rotten garbage and organic matter present in the flood water and an outbreak of dengue fever (Interviews: Sriprapa, Tippawan, and Sumreuang). On the other hand, people on the other side of the stopbank experienced even greater levels of inundation than would be the case if floodwaters could freely flow away from the river.



Figure 14 Inside the watergate
Source: Author

Questions were raised about who should control the monitoring and the opening-closing of watergates/floodgates

The local people want to take the responsibility of monitoring the opening and closing of the watergates (as they live on site) rather than leave it to the staff of the Royal Irrigation Department. Community members stated that they can monitor the situation closely while balancing the needs and well being of those who live inside and outside the stopbank. This may be a good way for the local people to have some input into local community flood management. However it can lead to conflict or fights between the two groups of residents as the decision may favour one group over the other hence the decision from the Royal Irrigation Department may be the best (most neutral party).

Those who live outside the stopbank experienced a prolonged flooding period of three months and high levels of flooding as the water has nowhere else to spread to as the construction and installation of watergates stopped the water from spreading to the inland area which used to be empty fields and floodplain but is now occupied by houses and industrial buildings. These groups of people received more financial

assistance from the government as the level of damage is much greater and more severe than those who have the protection of the stopbank.

Washaree, whose house is located a few metres outside the Watergate, said that she had to construct a personal stop bank which consists of a 1.30 metres concrete wall to stop the excess water going into her property. After the 2006 flood Washaree had to increase the height of her concrete wall by the height of two bricks just to be better prepared for future floods (see Figure 15).



Figure 15 Concrete wall built by the homeowner (Washaree),
Note: The lighter colour showing the water mark and the increased height of the wall.

Source: Author

Sakorn's house is located on the bank of the Chao Phraya River (outside the stopbank) and she had experienced various floods over the years. In 2006 her home was flooded up to the roof and she had to evacuate and live elsewhere with other family members during the worst period of flooding.

During the high tide, the water will reach the access road going to my house. I have lived here for as long as I can remember [she is 67 years old] and the flooding seems to get worse with every completion of the stopbanks and watergates. I face the flood year in, year out; there was no assistance or

compensation from the government until last year [2006]. The Tambon official came to take some photographs and we got some money this year to repair the damage caused by the flood but it was not enough to cover the complete cost of repair as my whole house was flooded. As I live right on the bank of the river sandbags were useless to me. At the time I was worried that my house will fall down from the waves caused by river traffic [boats and ships]. I asked the local government for a boat but received nothing. I suppose they (the government) cannot do anything much as I live outside the stopbank but at least I got some compensation this year for the flood damage. (Interview: Sakorn)

Reason for stopbank construction

The stopbank was constructed after the big flood of 1995 which submerged the whole of Pathum Thani under one metre of water. The watergate was later constructed after the 1995 flood to keep the water away from the community living along the canal. The mayor of Tambon Bang Luang (Mr. Ramathana Vichitkarn predicted that this year (2007) the flood will be more severe than previous floods as many of the watergates constructed along the Chao Phraya River are nearly finished and the flood water will have no where else to go. When the larger dams upriver reach their maximum holding capacity they have to be closed and the excess water flows down the river and spreads to the low lying flood plains. However the people who live nearer to the junction of the klong and the river will suffer the most, and as various stopbanks and water gates have been constructed to shut off the excess flood water from flowing further away from the river, the water will have no where else to go and will rush down the klong and flood the land along the river.

Type of dwelling

The majority of the dwellings in the proximity of Bang Luang Temple are raised on posts with large spaces below for storage (see Figure 16). Some houses are one level buildings constructed from timber or concrete. The houses with only one level tend to suffer the most during flooding as there is no second storey to move furniture to or to evacuate upstairs to sleep when the flood waters rise above the height of the beds. Some residents will build raised wooden planks across the room so they escape the rising flood water. In the worst case, Sakorn (the elderly lady whose house is located right alongside the Chao Phraya River) had to keep raising the plank until her nose

touched the ceiling when she slept and finally she had to evacuate when the water reached the roof of her home. Those who live in a one level house are not as fortunate but earlier in the flood they could prevent the water from seeping inside their houses by laying sandbags outside their doorsteps. However, the sandbags can only do so much when the water pressure is strong and the levels keep rising.



Figure 16 Two level homes on posts

Source: Author

Some of the residents confessed their worries and fears that the flood may rise higher during the night and sweep them away or drown them during their sleep. Some of the participants had to lie awake at night and monitor the level of flood water in the river or in the canal so they could evacuate if the water reached their homes (Interview: Sommai).

Almost all of the participants related stories of overflowing toilets during the floods. As the water pressure underground increased, toilets could not be flushed and sewage could overflow inside the houses. It is noted that the majority of toilets used by the participants were the squat toilet with no mechanised flushing system but which rely on a scoop of water to flush. Those who constructed their toilets higher than the water level (bear in mind that many of these houses were located lower than the water level)

experienced less difficulty with overflowing toilets. The factory workers could also go and use the toilet facilities provided at the factories as the toilets were constructed on a raised foundation up to a meter high to prevent the pressure build up during flooding.

Health Issues

There were no major water-borne diseases such as Cholera or Typhoid spreading in the area during the flooding. The residents were particularly cautious with water consumption as they would treat and/or boil the water before being consuming it. Other health concerns included cases of athlete's foot and other skin conditions caused by being in contact with polluted water (Interview: Sommai). The community members were also concerned about threats from poisonous animals such as snakes and centipedes which tend to escape the flood water to live inside people's houses (Interview: Kannikar). Dengue fever is another major concern for the local residents and the local health sector, as it usually spreads during the rainy season and can be quite hard to control during flooding where stagnant water lies everywhere. Dengue fever is spread by Tiger mosquitoes (*Aedes albopictus*) which transmit the disease from one person to another (Ministry of Public Health, 2007). The local administration office counteracted this threat by fumigating the area and putting bait into stagnant water to prevent the mosquitoes from breeding. Posters and pamphlets were put up, both to warn people of the outbreak, advertising them to be vigilant regarding any suspected cases - and secondly, to educate the community about how the disease can be spread and what can be done to stop it.

Social Impacts

Flooded work places, school closure: disrupted routines

Oukrit, the local school teacher, said that the school had to be closed for three months as the whole of the school ground was submerged under one and a half metres of flood water. People commuted to work by boats or rafts starting from their door steps. Sandbags were prepared and laid to form an embankment along the main road, pathways and in front of houses. Bamboo or timber planks were used to raise the level of living quarters and furniture was stored on higher ground. Most of the

residents' lives were disrupted by the flood but many had accepted that the conditions came with living along the river and had learned to live with it.



Figure 17 Flooded local school

Source: Author

Some residents were more severely affected by the flood than others depending on the level of flood water around their homes. The following account came from Boontang (42 years old female) who lives at the basement of her brother's house and suffered severely from the flood. She and her three children had to evacuate to her relative's house as the whole basement was submerged under water during the worst period of flooding.

I live with my brother and my three children. Last year's flood was horrible as the road was submerged under water but it improved during the low tide. The entry to my home was flooded so badly that I needed to use a boat for transport. I live in the basement so there is no escape from rising floodwater. I am currently looking for a job and don't have any savings so I cannot afford to live anywhere else...finding food for my children was difficult especially during the flood and job opportunities were hard to find. I usually help with dishwashing at the Bang Luang Temple and the monks don't mind me taking the leftover food back home. One of my sons has multiple disabilities and is in a wheelchair. [This may be one of the reasons that she could not hold down any permanent job as she has to care for her disabled son]. When the flooding was so severe all of the schools [see Figure 17 above] in the area were closed and I had to stay home to

take care of my children. During the flood my daily activities changed. My washing had to be done upstairs, food preparation was difficult, bathing was another issue and I had to use water stored in the pot for washing up (Interview: Boontiang).

The local childcare centre also had to be closed for over three months (see Figure 18 below). This closure significantly affected families with young children as they are of an age that needs adult supervision at all time and this can be difficult with working parents (Interview: Nippapaan).

During the 2006 flood the water came up to window height but things were put back to normal when the water receded and the Tambon Administration Office came to repair damages caused by the flood (see the Photo showing the same building during and after the flood). The new site for the centre was chosen so that a larger building can be built on a safer area outside the flood hazard zone but the building will not be completed until later. During the closure staff are still on the payroll but they can be transferred to work on other government departments until the centre can be opened again (Interview: Nippapaan).



Figure 18 Flooded Early Childhood Development Centre (November 2006), and after clean up and rehabilitation (May 2007)

Source: Author

Issue with morning alms ritual conducted by monks

Wat Bang Luang (Wat is the Thai word for temple) has a morning alms ritual which is when the monk(s) go among the Buddhist households to be given food. In Buddhism, alms or almsgiving is the respect given by a lay Buddhist to a Buddhist monk. In the past, the morning alms rituals were conducted along the klong network and along the Chao Phraya River where monks would row a boat to visit each household. But this practice has changed since the big flood of 1995 when the monks adapted to walking along the streets. The current walking option however can sometimes be disrupted during flooding periods. There is a story of a monk who had fallen off a timber plank as he could not see the end of the path due to the rising water level and the murkiness of the flood water. This is just one of the hazards posed by rising water during flooding period (Interview: Pra Mahatavorn).

Economic Impacts

The economic activities of the area were not devastated by the flood but the small shops and local eateries did suffer badly as most were partly inundated by water and the traffic of people coming and going to their services was greatly reduced. During the scoping period in November the atmosphere of the whole street (which runs parallel to the Chao Phraya River) of the Naa Wat Bang Luang Community was completely quiet with a few people wading through knee-high water and others were in a flat-bottomed boat or a raft. The woman who owned a local eating place called out to me that everything was closed as her first floor was flooded (see Figure 19 below).

Most of the factories were not affected by the flood as their foundations were usually at least one metre higher than that of the surrounding houses. The workers still wanted to work as usual but this may have been with great difficulty if their travel paths were flooded.



Figure 19 Local eating place submerged under water

Source: Author

The paper factory, which is located near the Chao Phraya River, did suffer from flood damage to workers' flats. Piyathida, who is the manager of the paper factory, remarked that

The factory itself was not affected by flood but the company homes for the workers at the back [100 metres from the river] were badly affected. We used to be quite high compared to other areas but after the road level was raised we are now located at the same elevation. At the back of the factory (at the workers' homes) the sandbags had helped to a certain degree and the pump was turned on to pump out the water but the water still seeped inside through the concrete floor. There is nothing much we can do as the land over there is very low and quite close to the river and the houses are only one storey flats. We are constructing a new dam [an embankment wall] for this year's flood [2007] as it was predicted to be worse than previous ones. (Interview: Piyathida)

The main road (Pathum Thani-Sainai) was protected by a low embankment built from clay to protect the main transport route of the district. It seems rather ironic to see the

road remain dry but the surrounding houses flooded. One can assume the rationale being that the arterial route is quite important for transporting goods and services in and out of the area. The Mayor of Tambon Bang Luang observed that

We were very busy during the flooding period and water can rise pretty quickly. We could not pack sandbags fast enough for the road and had to form mounds of dirt to create an embankment wall to protect the road This is just to ensure that the road won't be flooded like it was in the year 2538 B.E. [1995], and we can ensure that the people can still travel in and out of the area. (Interview: Mayor Ramathana Vichitkarn)

The smaller streets and alleyways were, however, flooded but people still commuted to work as usual as can be seen in Figure 20 below where the local motorcycle taxi is doing his round. The flat-bottomed boats were used in the areas with deeper water.



Figure 20 Going to work
Source: Author

Ranges of Response Strategies/Coping mechanisms

Self-reliance

In the first few interviews participants indicated that they did not ask for help or assistance with the impacts from flooding which affected their lives. Most of the local

people tended to rely on themselves and most said help yourself before asking for others to help you. Most of the local people never expected the government to provide any assistance, citing that they live too far away from any government organizations or there are others who are less fortunate and needed more help. Most of the people from Tambon Bang Luang said that it is better to rely on yourself and do not expect or wait for government assistance or NGOs to provide help. Personal responsibility and preparation are the most important things during emergency circumstances according to Supot, Sommai and Suthichai.

I detected some sense of a community network at work which included the local meetings at the temple where various groups discussed issues that concerned them. The temple is the centre of the community; it is where people come together to offer help and encouragement to each other. The monks provide a stable influence over the community especially in times of need. A few of the local people are proactive about flood management while others adjust or adapt to the flood when it arrives. Those who were proactive organized sandbag packing and laid the bags in front of buildings and along footpaths to create raised walkways in the areas where the flood water would not be as high. The municipal office sent people, timber and concrete materials to build temporary bridges and raised walkways in the extremely low-lying areas and for paths which have frequent traffic such as those between the community's main streets to the smaller ones where most houses are located. The residents who have relatives or kinship relationships with others can count on them to help each other in the time of emergency, which is one example of the strength of these Thai people. However, the financial state of each household must be taken into consideration as some families have no savings and low incomes and it is too much of a burden on them to support or help their friends or relatives.

Some of the older houses were constructed from timber and the newer ones from concrete so there will be less rotting when the posts are submerged under water during flood. Some residents had raised their bathrooms and toilets to the second floor to reduce the water pressure causing toilets to overflow during flooding. There has also been a shift from one level concrete buildings to the traditional two story building built on raised posts.

Some of the houses do not have access to treated clean water from the pipeline provided by the town and have to rely on the water from the canal or river for everyday use such as washing and cleaning. They collect rainwater and river water in tank(s) or in large terracotta pots. The water is then treated with aluminium sulphate crystals and left to settle, ready to be used for washing and cleaning (Interview: Soodchai). The water for drinking and preparing food often came from bottled waters purchased from the local supermarket or from boiling the treated water. These terracotta pots and water tanks are essential for many households' survival during drought or flood seasons. The residents who live further from the river and inside the watergate sometimes had to rely heavily on stored water for consumption when the watergate was closed too early and the water in the klong had started to dry up or become clogged with debris and rubbish (Interviews: Thippawan and Pratheung).

Some people own flat-bottomed boats or rafts which they used for commuting to work during the flood (Interview: Pratheung). The ownership of a boat or raft tends to depend on where the participant lives and the elevation of their houses, the availability of raised walkways for access, and financial factors. Participants that do not own a boat but need to commute during flood use the boat services which are available in some klongs.

During the flooding many of the residents of Bang Luang, Bang Dua and Bann Chang expressed their concerns and frustrations over the difficulty in accessing their own homes due to the rising flood level. The flood also affected the way they commuted to work and to schools. Some residents who could afford to build their own footpaths (Interviews: Luan and Soodchai) usually raised the level of the path depending on the floodwater level as can be seen below in Figure 21



Figure 21 Varying levels of walkway (timber and concrete) for different flood levels

Source: Author

In the 22 interviews there were some conflicting answers about the role of government assistance to the local community. Some residents received assistance from the local administrative office either in forms of money or material goods such as sandbags and relief packages. Other residents, however, experienced the event differently as they stated that they received little or no assistance from the government.

I don't have a social security [refers to health insurance] as you need to be employed to have one, as the employer will be responsible for any medical payment. Sometimes the charity people will come to give out relief packs which usually have some dry food but you have to be at the right place and at the right time to get these packs. Mostly the temple is my refuge and I can always find some food there for my children. (Interview: Boontang)

The local administrative office had constructed temporary raised footpaths and foot bridges for the residents to have access from their homes to the main roads and these paths and bridges would be taken down into storage for the next flood. Sandbags were packed (see Figure 22) and filled in preparation for the flood and the residents could get access to sand and sacks made available by the local administrative office

(Interview: Suthus). Volunteers were called to help with packing the sandbags and forming a wall or pathways along the streets.



Figure 22 Sandbags preparation

Source: Author

Many of the residents including the Mayor of Tambon Bang Luang, predicted that the next flood will be worse than the last as many of the stopbanks and watergates further up along the Chao Phraya River have been completed. However the Mayor did not comment on whether he agreed with the stopbanks and watergates construction or not, as in some ways it only protects certain groups of people and makes the flood impact worse for others.

Attitude to Flooding

Most of the people in the community do not agonize over flooding as they had grown up with it and had learned to adjust their lives accordingly. There is less anger and more acceptance of the flood and the residents do not blame anyone for their predicament and tended to rely on themselves before asking for any assistance. Most Thai people do not like to voice their burdens or worries in public; some may feel that they might lose face and become embarrassed by the difficulties they experienced. The belief of karma in Buddhism also means that people should not complain of their

fate but learn to be respectful to others and the environment. It was very difficult to get the residents to open up and talk about the hardship they faced. All of them considered that they coped with the flood like every other day-to-day event (see Figure 23 below).



Figure 23 A local woman doing her washing
Source: Author

The ones who suffered the most tended to be the elderly who became trapped in their homes during floods and had to depend on their adult children or neighbours for basic necessities such as clean water, dry food or assistance to transport them to local health care. Oukrit (a local school teacher) remarked that his elderly mother, who also suffered from a stroke, had to endure the onerous process of being moved from her son's flooded house to her daughter's house which remained dry. They predicted that the 2006 flood was not serious and they had not moved her until it was almost too late. She had to be carried into a boat at the front door and went on many trips in and out of boats as the system of canals are not connected and are separated by streets. It was a tiring and probably dangerous trip for her. Boonteang's dilemma is another example of the social impacts from flood. Her account and attitude to flooding is stated below.

I was so stressed and extremely anxious. There are no words to describe it really. I have nowhere to live during the worst period of flood and my disabled son is difficult to care for as he is in a wheelchair. When the road was flooded he could not go anywhere and we were stuck at home, he would become angry and throw tantrums. But this [flooding] happened every year and you have to learn to live with it. Before the flood arrived the local government issued the flood warning over the radio and people were filling up sandbags to protect their homes. I did not ask anyone for help but after the water receded the Tambon Administration and the Red Cross came to offer assistance. (Interview: Boonteang)

People have lived in this stretch of water for hundreds of years. Some abuse the natural resources [pollution and expansion of towns and city] and we have had to live with the consequences. We live on a floodplain and floods are part of natural processes in this area. You have to learn to live with it. People have been using floods to their advantages for years, for example to irrigate the rice paddies and orchards. (Interview: Piyathida)

Most of the residents' sentiment is that they take ownership of the problem of flooding and each takes the responsibility to manage it so that they can still live and survive in the area as did their ancestors. They cannot be selfish and turn their back on the problem or leave it to the government to take care of the management. Self-reliance is the key to survival and they can be resilient to flooding by knowing their weaknesses and strengthening the community to deal with the issue. As one of the participants stated:

We have to start from personal responsibility of flood management then up to the provincial level and to the national level. All of us "own" the problem and should take responsibility for it. The problem [flooding] probably started from logging up in the north leading to balding mountains which act as our catchment area and we end up with flash floods along the Chao Phraya River as there is nothing to absorb excess water and there is no space for it to drain to as we all populate the fertile floodplain. We should not wait until the flood arrives to deal with the issue as it will be too late. (Interview: Suthichai)

Knowledge and experience of the area and previous floods

Most of the participants have lived in the area ever since they can remember. For those interviewees who had just moved into the Wat Bang Luang, I did not ask them much about the history of the area, but rather, focused on their experiences and the

impacts they received from the flood(s). The long-time residents reflected that their experiences with floods were part of their everyday life and had become used to the impacts that were caused by floods. Many of them had made adjustments to their homes (e.g., built houses on poles and raised the elevation of their toilets) and changed their modes of travel from walking or cycling to using rafts or boats (see Figure 24 below).



Figure 24 Mode of transport during floods

Source: Author

They also adapted their lifestyle to suit the flood conditions. The local people would find alternative food sources such as watercress and fish from the river instead of buying food from the market, or use something that needed less preparation so as to minimise use of precious water during cooking. However a person needs to have local knowledge about what kind of plant is safe for consumption and what kinds of animals are poisonous and should be avoided during the rising flood waters. The older residents remarked that they never expected help from outsiders like some of the newcomers who waited for relief packs from various organizations to be delivered to their homes.

Flood Management of Tambon Bang Luang Administration

Flood monitoring and communication

The Municipal Office and Tambon Administrative Office communicated with various flood management organisations, including the Royal Irrigation Department, Civil Defence Secretariat and Department of Disaster Prevention and Mitigation via a radio network. The radio communication centre operated 24 hours and monitored the water level of each dam, river and canal and reported back to each area with the potential risk of being flooded when the water level at a particular dam reached the maximum level. The 2006 flood which affected many provinces along the Chao Phraya River was partly caused by a prolonged period of rainfall and an early monsoon season which put high pressure on the carrying capacity of each dam.

The core monitoring centre reported the water level flood warnings were announced to the community via the Municipal Office and Tambon Administrative Office. The mayor of each tambon (sub-district) carried out flood response actions such as the reinforcing of watergates to withstand the increased volume of flood water, the laying of sandbags at various crucial transport routes and at the homes of the villagers. The construction of raised pathways and bridges and the formation of sandbag embankments were carried out by groups of volunteers who came from the community itself (Interviews: Krish, Mayor Ramathana, and Piyathida).

Defence Volunteer Group

The Defence Volunteer Group consists of villagers, workers at various factories and staff from the Tambon Administrative Office. This group of volunteers was trained to assist the Fire Department. They learned how to treat basic injuries using first aid training, how to scale a building, how to operate water pumps, and how to manage traffic flows in case of large events and during an emergency. The recruitment process started from the community level. Letters were sent to each manager of various workplaces asking for volunteers to be trained to help with various emergencies such as national disasters, fire accidents, drowning, snake bites and so on. Before and during the flood event volunteers and local people from villages would built temporary dams and embankments using local materials such as clay or

sandbags to protect the streets and buildings, especially those located along the klongs or river. However there was little that could be done to help protect the houses which were located along the banks of Chao Phraya River as the water rose up to two metres in some places and full evacuation was required. The weakest point or lowest point of the Bang Luang community was along the Chao Phraya River and the area near Bang Dua School where the ground level is already quite low and flanked by swamps.

Walkways and bridges were built from timber and concrete so people could gain access to their homes and commute to work or school. The hardest hit areas were those along the Chao Phraya River which were submerged under flood water ranging from a mere 20 centimetres to two metres. In Bang Luang District there were 174 households affected and they were given compensation in the form of money three months after the damage survey was lodged to the Ministry of Interior. A total of around 180,000 sandbags were given away, paid from the Municipal budget. The budget for materials used for flood mitigation in Bang Luang district totalled around three millions baht, including the cost of building materials such as timber, concrete and sandbags (Interview: Mayor Ramathana).

Damage survey

During the flood the mayor sent out a team of staff to survey the damage in the affected area and to take photographs of the damaged houses and buildings. These photographs were used during the claims process. The report included detailed information on the damages surveyed and details of the losses in term of financial value. The photographs were evidence of the damages caused by the flood and the approval of compensation claims was quickly received by the district with maximum compensation of no more than 30,000 baht per household. The average payout was around 20,000 baht which would go towards the cost of rehabilitation and repairs. The payout was a lump sum which is much higher than any payout or compensation received previously by the local community from the government. The local people remembered receiving around 2,000 bath for damages from previous floods but that payout was given to every household with no requirement of claim report or evidence of damages (Interviews: Piyathida, Sakorn, and Krish).

Assistance and Compensation

Donations and assistance came from various organizations, both governmental and private. Assistance arrived in the form of monetary aid, materials and labour. Each foundation and charity organized a roster so that they could help the community on alternate days of the week so there was no overlapping or repetition and this arrangement also spread out the relief assistance so as not to concentrate it in only one particular area (Interview: Mayor Ramathana).

Concern and stress

During the flood people were worried and concerned over their safety and the survival of their livelihood. The level of anxiety tends to vary among each different households with different characteristics and composition. Households with small dependent children or elderly were the most anxious over the day-to-day activities during flooding. The chores of washing, cleaning, preparing for food and commuting to work could be troublesome during flooding. As the local mayor admits, flood problems are severe and ongoing. The presence of watergates and stopbanks is only a temporary measure and in the case of supradesign events (events that exceed the protective capacity of that structure) the structures may fail disastrously.

The warning and preparation can only be as good as the people carrying it out. Some people who did not believe the warning from the radio usually suffered the most as they did not prepare for the scale of flooding that often arrived soon after the warning was issued. It is difficult to predict precisely how high or how fast the flood level will rise and sometimes the flood is more severe than previously thought, due to heavy rain or dam failure. Most of the riverside community have their own ways of predicting flood advancement. “Markers” are houses that are located on the lowest point of a community. If the water reaches the windows of the “marker” then severe flooding will follow and people will quickly move their furniture to higher ground or prepare for full evacuation (Interviews: Sakorn, and Soodchai).

During flooding, water pumped to the outside of the gate slowly seeped back inside again. People shovelled sand into sandbags in pouring rain when the sandbag barriers

(which were laid during the day) started to be swept away. This was very stressful for the local people and the administrative staff. When the water remained for more than a month people started to feel discouraged with the work involved in flood management and mitigation as all temporary walkways, sandbag barriers and bridges have to be taken down after flood water recedes and stored for the next flood.

Acceptance and future floods

Most of the residents of Bang Luang community have accepted the situation and conditions arising from flood hazards since they live along or near to the river. There is nothing much a person can do to change or resist the flood hazards other than learning to live with it by minimising the damage and / or maximizing the advantages floods bring to the community. Most of the residents were concerned about their livelihood and safety during the flood but there are other more pressing problems to sort out when the flood event was behind them. Some of the local concerns are just like those of many communities around the world and include concerns over crime rates, unemployment, poverty, outbreaks of diseases and the general health and wellbeing of their family members (Interviews and focus groups: Sakorn, Boontang, Piyathida, and Sudthichai).

Most of the villagers have become used to the situations and conditions caused by flood hazards. Small children were taught how to row a boat, how to swim and how to recognize poisonous snakes. Each household has a supply of timber or wooden scraps which they can utilise to build walkways or to raise the floor of their homes. Those who can afford less just simply raise their sleeping quarters (Interview: Sakorn). The concrete wall built by Washaree to stop the flood waters getting inside her home is another example of the local response to the flood hazards caused by the stopbank. The watergate in this instance separates those who live inside and those who live outside the stopbank. Those who live inside the stopbank suffered less and received less assistance and compensation while those who live outside the stopbank suffered from flood hazards longer (around three months in 2006) and usually received a larger sum of compensation.

Summary of 2006 Government's Flood Assistance

The National Civil Defence Secretariat, Department of Disaster Prevention and Mitigation monitor flash flood situations and coordinate with the Royal Irrigation Department, The Royal Thai Army and concerned agencies to prevent, mitigate and assist flood victims. There were 47 provinces affected by floods including Pathum Thani. The information as of November 13th 2006 reported six out of seven districts in the Pathum Thani province had continued to be affected by flooding with 46,420 families and 120,682 individual people affected. The average water level ranged from a few centimetres to one metre. Pathum Thani authorities and related agencies have coordinated to enhance sandbag walls along the Chao Phraya River to prevent water overflow and relief bags were given to flood victims (Department of Disaster Prevention and Mitigation, 2006). The Royal Irrigation Department provided water pumps to the affected areas. The department also established relief centres so that affected farmers could report their losses of damaged farmland, livestock and fisheries. The impacts were assessed using data from satellite photographs together with maps from the Land Development Department. The Department of Disaster Prevention and Mitigation mobilized mechanical instruments such as flat bottomed boats, drinking water, temporary platform tents, relief bags, funeral payments, dry rice, rubber boots, loin cloths and Thai sarongs to the affected households (Department of Disaster Prevention and Mitigation, 2006).

Conclusion

Parts of the Klong Bang Luang community have provided an excellent example of a resilient community. However in some areas the location and the proximity to the Chao Phraya River contributed to some residents being more vulnerable to flood hazards than those people who live within the protected area inside the stopbank. Despite this, many used their initiative and adjusted their lifestyle to suit the conditions as can be seen in the types of dwelling and modes of transport. The construction and installation of stopbanks and watergates may have caused some conflict among the residents. There was a general sense of dissatisfaction and anger from the riverside residents and those whose houses fell short of the stopbank protection. The issues that are now faced by the community cannot be ignored but

history has shown that in spite of their struggles, the community has never given up and stopped trying to improve their living conditions.

Their resilience is evident in the fact that despite the many problems they faced, the people have tend to accept their “fate” which is positive as they learn to live in “harmony” with the conditions and adjust or adapt accordingly. The problems of water, mode of transport, access to pathway, and damaged to housing can all be repaired and the villagers will always find innovative ways to reduce the hardship they faced. The stopbank construction is an issue that the government engineers may have overlooked in their need to protect the inland area from flooding. This technocratic and engineering approach was evident in the flood management in Thailand and it illustrates the apparent weaknesses of such an approach in dealing with the effects of a natural hazard. The notion of being able to ‘contain’ the impact of hazards as in stopbank and floodgate construction is a legacy from the dominant hazard research paradigm as critiqued by Hewitt (1984). All protective works have their limits and fail to prevent damages when supradesign events take place. With the increased investment in housing and the industrial sector in the floodplain area, losses may be considerably greater than if the stopbank was not constructed at all. Erickson (1986) discusses this process in relation to the creation of urban flood disasters in New Zealand.

Chapter 6 Discussion

Introduction

This chapter is a discussion of the case study of Bang Luang community's vulnerability to floods and how the vulnerability theories that have been outlined in Chapter Three are applicable to the findings. This chapter focuses on the particular situations of the Bang Luang Community and how different processes have more or less contributed to their vulnerability and how they have shown resilience and persistence during the floods. By drawing on Wisner et al.'s (2004) progression of vulnerability model I will attempt to explain the different factors that have contributed to the Bang Luang community's vulnerability to floods (see Figure 25). By applying the work of Wisner et al. (2004) I will demonstrate how the underlying causes of the community's vulnerability can be understood. The progression to the vulnerability model was used to assist in the explanation of vulnerability to natural hazards that has arisen in various places, especially in developing countries. The vulnerability study empowered people to learn and understand the underlying causes, to their vulnerability to hazards, that were related to their social, economic and political structures and not just the physical hazard itself as implied by the dominant hazard research paradigm.

This vulnerability study guided by the work of Wisner et al. (2004) subverts the notions of technocratic and scientific solutions present in the dominant western hazard paradigm. The latter part of this chapter will be a critique of past and present flood management in Thailand and the role of institutions and the state, in flood disaster management. The vulnerability case study of the Bang Luang Community assisted in the understanding of flood issues at the grass roots level and guided attention deeper into the personal experiences and stories of the people affected by floods, rather than just relying on the quantitative accounts of financial losses or numbers of injuries caused by the floods as cited by various reports and media.

The Progression of Vulnerability of Bang Luang community to Flood Hazards

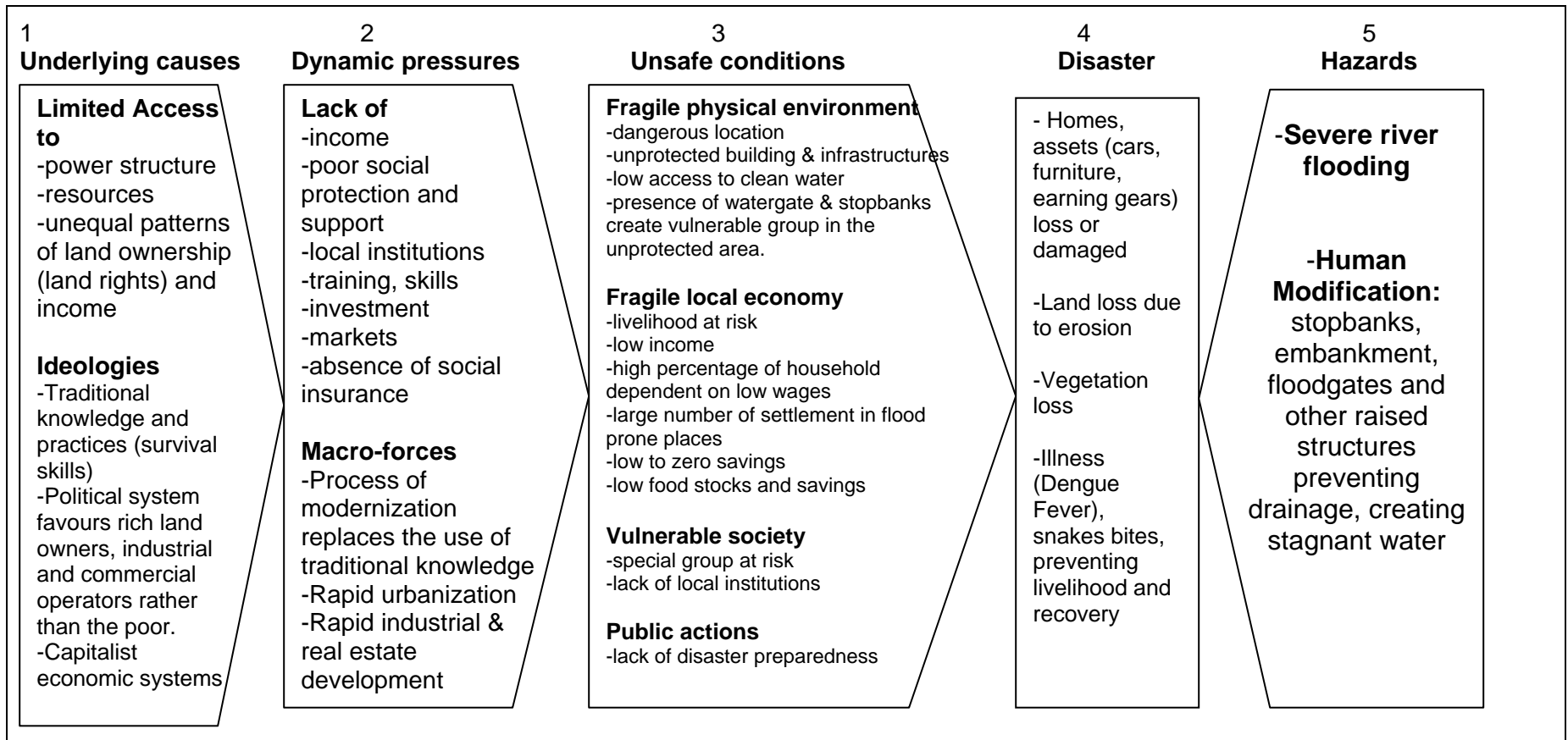


Figure 25 Progression of vulnerability to flooding of the Bang Luang community, Pathum Thani, Thailand.

Source: Adapted from Wisner et al. (2004) p. 234 Figure 6.3

Bang Luang Community - A Vulnerable Community?

The Underlying Causes: Origins of the Problem

In the past the floodplain area of Pathum Thani was used as agricultural land mainly to support rice cultivation and orchards. The farmers maximized the nutrient levels and the abundance of water to grow crops. However the current land uses which include manufacturing industries and commercial and residential development, have encroached into flood-prone areas exposing people, services and properties to flood risk and potential loss. The actual population at risk to flood hazard depends on the size of the flood event, land use and levels of “protection” (Ericksen, 1986).

The flood problems of many places originate from decisions made over a long period of time. It was logical in the past to locate beside a river because water transport was important (Ericksen, 1986). Some people chose to locate near a river so they could make use of fertile soil and irrigation for crops cultivation (Hung & Yasuoka, 2000). In the past the vulnerability of the people of Bang Luang community was a result of the timing and the size of flood events and the extent to which each flood event affected the rice harvest. The flood plains were not as densely populated and the risk to the population was quite low compared to the present day.

For the last 30 years one of the key reasons for locating near a river and in flood-prone areas is water supply for industrial purposes. However, it is the impact of urbanization and industrialization, which has spread from the Bangkok Metropolitan area outward to cheaper available land, and the well-developed transport network available that has enabled this. As cities expand, prime agricultural lands such as flood plains were transformed from rice paddies to land for housing, roads and industry. High economic growth and the increase in employment opportunities also caused a large influx of labour immigration into Pathum Thani (Hung & Yasuoka, 2000). At present the provinces surrounding Bangkok City are full of housing projects and factories. The new occupation for the traditional agricultural families has become employment in industrial factories (Jarupongsakul & Kaida, 2000).

The economic structure of the province has changed dramatically during recent decades due to the relocation of industries from Bangkok City (Hung and Yasuoka, 2000). A considerable number of young workers were hired in the growing industrial sector. However most of the shift work only provides a minimum wage and hence some groups of the community have limited access to resources and power due to unequal patterns of income and also land ownership, as many rent their accommodation. The increasing building development and a well-developed road network have added additional pressure from Bangkok on the Pathum Thani province. Rapid land use changes and the influx of labour migrants in the area have given rise to serious problems such as inefficiency of land utilization, inadequate facilities and infrastructure, traffic congestion, pollution and other environmental problems such as surface flooding (Vibulsresth, 1992).

In summary the structure of the society has changed and with it, the flood hazard to its population and expanding industries has grown (see Figure 25). The characteristics of each community member also contributed to varying levels of vulnerability to flooding as summarized in Table 3 below. The capitalised economy also favours the more affluent groups and has made the low income earners more vulnerable to disaster events as they have limited to non-existent savings which can be utilized in flood prevention, modification and rehabilitation.

Dynamic Pressures

Lack of Income and social support

A large portion of the Bang Luang Community relies on low wage income earners who work in shifts at the nearby factories. Low incomes and a lack of savings can increase the household's vulnerability to flood hazards as they have fewer financial assets or savings to rely on to improve resilience of their home prior to and during an emergency and for the recovery period after flood waters have receded and clean up has begun. There is a limited amount of social protection or support provided by the government and the welfare benefit is very low and may not cover the emergency costs created by flood events. The community does provide some social support for

the residents who require assistance. Neighbours, relatives and friends come together and help each other in forms of labour or small gift offerings such as food or materials.

Table 3 Factors or characteristics of research participants that may contribute to the varying level of their vulnerability/resilience to floods

Factors and characteristics of research participants that may contribute to the varying level of their vulnerability/resilience to flood hazards	Examples
Home location: Inside/outside the protection of the stopbank	Inside stopbank protection: experienced lower level (0-30cm.) of flooding, stagnant water Outside the stopbank near the river bank: prolonged periods of extremely high level of flood waters
Type of dwelling	Traditional two story houses survive better during flood
Employment Status/ Income and Saving	Employment and level of income affect the ability of the person to prepare for or recovery from flood impacts
Household Structure	The number of dependent children and adults per household will affect the ability and the way that household cope with flood
Age	The elderly suffered more from the flood due to worries and stress over the day-to-day living difficulties during the event
Length of time living/working in the area (Knowledge and Experience)	The experience and knowledge of previous floods affect the level of preparation to flood hazards
Mode of Transport	The level of difficulties of transport experienced during flood
Vehicle Ownership (Type of vehicle)	Owning a raft or boat assists in the mobilization of people to get on with their lives during flood
Level of Assistance from the community	Community networks and kinship assistance provide a vital part in the community's resilience to flood hazards
Level of Assistance from the government and other organizations	The government and external organizations can provide some degree of assistance during flood BUT reliance on external help can increase the community's vulnerability to floods

Source: Author

Macro-forces

The shift from an agricultural based community to an industrialized society has changed the power structure of the community from individual land owners to absentee landlords and to corporate management of the area. The use of traditional

knowledge and practices has slowly disappeared. One of the distinct examples of this is the style of housing which has changed from two story dwellings raised on posts to modern single story concrete buildings. The subsistence agricultural community with the safety measure of crops stored in preparation for flood or drought has also vanished. People are now reliant on going to the markets to buy food rather than growing their own vegetables or raising small animals on their premises for their own consumption. The community has fewer resources to depend on at times of emergency. The power structure in society has also changed from a network community to increased power in the hands of corporate companies who now own the majority of the land area.

Urbanisation is another major factor in the development of vulnerability, especially for low-income families residing within squatter settlements as they are living in very closely-built structures which can disturb natural land drainage patterns and water courses. This also applies to the factories and industries which have built up in the area and replaced the agricultural land with impermeable surfaces which exacerbate run off rates in the event of flooding.

In the case of Bang Luang community, dynamic pressures include the encouragement of industries and manufacturing factories to replace the agricultural landscape such as rice paddies and orchards which acted as natural buffers and sponges in the event of floods. These changes in land use and activities translate the effects of underlying causes into unsafe conditions for the people of the Bang Luang community.

Unsafe Conditions

Unsafe conditions include a pattern of limited access to tangible resources such as cash, shelter, food stocks, or agricultural equipment and intangible resources such as support networks, knowledge regarding survival and sources of assistance, morale and the ability to function in a crisis (Wisner et al., 2004).

Adverse agrarian trends and livelihood diversification are the result of globalization as in many parts of the world it is becoming obvious that sustainable livelihoods

cannot be supported by natural resource-based activities (primarily agriculture). These changes in the economy lead to changes in the type of land-use and the livelihood of the population. In Pathum Thani this can be seen in replacement of agricultural land with industries as the majority of farmers cannot compete with the increasing costs of fertilizer and equipment, making rice cultivation an expensive and high maintenance occupation. As factories began to be established in the area, the residential units have had to move into more flood prone locations. Factories were located on higher ground or safer land to protect the expensive machinery, equipment and the finished products from being damaged by flood water and to be closer to the main transport route.

The removal of swamp and wetland for housing and industrial development has exacerbated the impact of flooding as there is nowhere else for the excess water to drain or nothing left to provide a natural barrier against flash floods. The destruction of forests in the northern part of Thailand has reduced the ability of the soil and vegetation to hold and absorb excess water within the catchments and reduce run off. This may contribute to increased duration and levels of flooding. Global environmental changes such as climate change and a rise in sea level can also create unsafe conditions especially in low lying areas such as Bangkok and the surrounding provinces where parts of the city are now below sea level. This means that the impact of flooding will be greatly increased - especially in combination with subsidence which is the result of decades of groundwater overdrawn (Manuta et al., 2006; Ross, 2000; Dutta & Tingsanchali, 2003).

“Protected” Population and “Protected” Areas

As discussed in the previous chapter, the frantic flood protection efforts with sandbags on top of stop banks prevented some houses and the road network from being flooded. The sandbags provided by the local government were placed along the main roads and streets keeping the main transport route from being flooded. However that caused houses in the low lying area along the road to remain flooded for a longer period of time as there was nowhere else for the water to flow. The issue of the residents’ ability to get hold of, or purchase sandbags, is also important as

some households cannot afford to buy sandbags and their houses and surrounding vegetable gardens remained flooded. In the worst cases the water level has gone higher than the windows.

This indicates that a household's vulnerability to the flood hazard is significantly dependent on its access to resources such as food, materials, money and power (as in the power to be included in the disaster management beyond the household scale). The area "protected" from the flood hazard tends to be the transport network and industrial area where the owners have invested money and labour in raising the foundations of the buildings to keep their products and machinery dry. The low lying residential areas were then used as a drainage basin. The residents, some of whom were the original owners of the land on which industry is now located, were literally caught in the middle - in some cases with water level reaching their roof (refer to Figure 26 below).

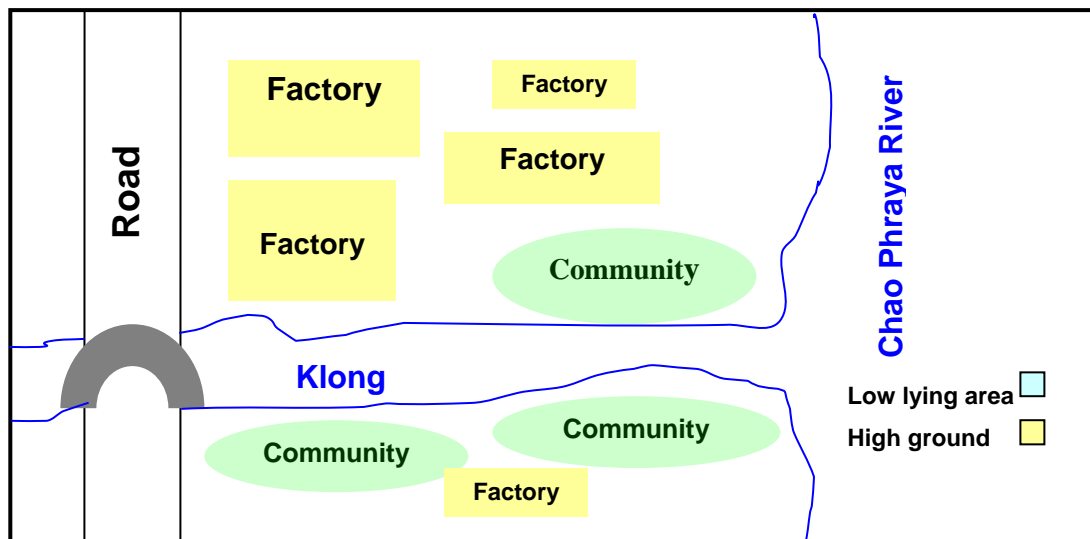


Figure 26 A sketch diagram of communities located in the low lying area surrounded by industries.

Note: not drawn to scale (see Figures 2 and 3 for detailed map of area)

Source: Author

The worst affected people are those who live on the banks of the Chao Phraya River as there is nowhere for them to escape the rising flood waters and the use of sandbags or stopbanks was not applicable and cannot offer protection to the inhabitants. The current from river traffic has also caused some erosion on the land and affects the

stability of some buildings. The least protected areas are those belonging to the most vulnerable to flood who live on the river banks and who cannot neither escape from floods, nor afford to strengthen their homes as they do not have the money or resources to fall back on at times of emergency.

The presence of stopbanks and watergates dictates who is made more or less vulnerable to flood hazards. Those who live or work in the 'protected' area are less vulnerable to flooding compared to those who live or work outside the protection of stopbanks and subsequently experience a higher level of flooding. However those who had the protection of stopbanks still had to contend with prolonged period of stagnant water which can give off unpleasant smells of decomposing rubbish and organic matter which arrives with the flood waters.

Governance Implications of Vulnerability

One of the challenges posed by the study of vulnerability is the governance solutions to environmental change. Vulnerable people and places are often excluded from decision-making processes and from access to power and resources (Pelling, 2003; Adger, 2006). Policy interventions to reduce vulnerability need to be able to identify vulnerabilities within social-ecological systems, to recognize the mechanisms which cause vulnerability in the first place, and to address marginalization as a cause of social vulnerability (Adger, 2006). Vulnerability occurs at multiple levels hence policy interventions need to address the multi-level nature of vulnerability. At the local level, adaptations to environmental risks often reduce the vulnerability of those who are able to mobilize resources rather than the most vulnerable. Integrating the principle of equity is vital to identify who is the most vulnerable (Adger, 2006; Cutter, 2006). Resources required to reduce vulnerability at times of emergency are largely low on the priority list in social institutions. Policies and strategies which reduce vulnerability and promote resilience, often change the status quo for institutions and are frequently resisted (Adger, 2006).

Critique of Flood Management in Thailand: Thailand's preoccupation with the engineering approach to flood management

Thailand has had a long history of preoccupation with engineering and technological solutions as the main approach to disaster response. The study of flood management in Thailand shows how human activities and interventions impacted the river basin system and in turn how changes in the river system impacted on society. The engineering solutions often shifted the flood risks to somewhere else and created new patterns of flood regimes in areas that rarely experienced flooding previously, hence creating a false sense of security in areas deemed to be “protected” (Ross, 2000; Dutta & Tingsanchali, 2003).

Before the introduction of engineering works in the nineteenth century, Thailand's adjustments to flood were for communities to avoid more hazardous flood plains and for the people to adapt their livelihoods to the flood regime. People used a variety of techniques such as raised house construction, careful choice of crop variety and emergency action before, during and after floods. Dykes and flood gates can also create varying levels of vulnerability among the community and may disadvantage certain areas. Engineering works have given many areas additional protection while others were exposed to longer water-logging and more disastrous overflow. Dykes and flood gates divert floodwater from central Bangkok onto open spaces to the east and west of the city to act as floodways. These disadvantages increase the vulnerability of those living or working in these areas. The decline in the number of klongs and the increased built-up areas and urban encroachment onto flood plains, means that less open space is available to absorb water and more water is forced to go through reduced canals. Studies have shown that building on floodways has increased the risk of flooding to homes and industries (Ross, 2000; Dutta & Tingsanchali, 2003).

The Role of Institutions and the State in Flood Disaster Management in Thailand

The capacity of communities to live or cope with floods and adapt to changes in flood regimes will depend on several factors: political, economic, ecological, social and

cultural. Dysfunctional institutional arrangements may increase vulnerabilities to flood disasters. The economic factors include the level of financial resources the community or state has, to cope with natural disasters. Ecological factors include the extent of riparian vegetation and the extent of human modification of flood plains. Social and cultural factors are also vital. The insurance mechanism and kin-based networks are important in recovery (Manuta et al., 2006).

The imbalance between disaster response and development has long hindered the efficiency of efforts to prevent damage prior to disasters (Lewis, 1999). The push for economic growth in the global context has pressured the Thai government to allow the expansion of the industrial sector into hazard prone areas. The community's vulnerability to disaster can be reduced by developing a local strategy based on recognition of the full range of factors that contribute to vulnerability which include social, economic and political aspects.

In the recent history of Thailand, urban planning and legal loopholes have been exploited to allow houses and industries to develop along flood plains which interfere with the flood plains ecological role as passages for flood water. The surrounding areas of the Chao Phraya River are flooded annually as they receive the water diverted from Bangkok by dykes, canals and other engineering works (Ross, 2000). Several agencies have been involved with flood-related disaster management. The Thai state is administered through a highly centralized bureaucracy. The interrelationship between various institutions can be complementary or conflicting (refer to Table 4) (Lebel et al., 2005). In 2002 there was a major shake up in the organisation of the government, resulting in many departments being combined to increase efficiency and reduce overlapping in duties and responsibility of each department.

However there is no encompassing law or legislation that covers flood mitigation, control, rehabilitation or recovery. The relevant laws and policies can be grouped into three categories. First is flood control and mitigation. Flood control and mitigation are the main components of water resource infrastructure development in Thailand. The government has invested large amounts of money in flood control especially

around the Greater Bangkok Metropolitan Area and other urban and industrial enclaves (Manuta et al., 2006).

Table 4 Roles and responsibilities for disaster management after the October 2002 reforms

<i>Department</i>	<i>Ministry</i>	<i>Responsibility</i>
Disaster Prevention and Mitigation	Interior	Coordinate flood prevention and mitigation plans from different agencies.
Water Resources	Environment and Natural Resources	Policy advice on national water policy; plans, coordinate, monitor flood mitigation and national water resource management.
All departments	Social Development & Human Security	Carry out rehabilitation and social and economic recovery.
Meteorological	Information & Communication Technology	Forecast and early warning systems
Irrigation	Agriculture and Cooperatives	Water provisions, storage, maintenance and allocation
Public Works and Town and Country Planning	Interior	Infrastructure rehabilitation and provide development planning guidelines

Source: DDPM 2004; DWR 2005

Second is land and water use control. Development criteria for watershed and urban development were issued by the Department of Land Development, the Department of Public Works and Department of Town and Country Planning. The aims of the criteria are to reduce flash floods and soil erosion on steep slopes. The criteria include the restriction of urban development on flood-prone areas, on steep slopes and coastal areas, which are prone to flooding. However the guidelines are not being followed (ESCAP, 1999). Land subsidence resulting from overdraw of groundwater is a major issue, especially in the Bangkok area as it has resulted in deeper flooding and longer periods of water logging. This has resulted in the introduction of the Groundwater Act 1977 which provided a guideline for stricter control of groundwater uses from 1983-2000. The water level has improved within the Bangkok area but not its outskirts due to housing and industrial development (ESCAP, 1999). Lastly, there is relief and compensation. The Treasury Act 2003 sets out the rules for allocation of disaster relief assistance and funds are budgeted by the Prime Minister's office and several ministries.

Disaster Management System

The disaster management system in Thailand is based on the Civil Defence Act of 1979 and the Civil Defence Plan 2002. After the Bureaucratic Reform Act 2002 was passed, the Department of Disaster Prevention and Mitigation (DDPM) was established under the Ministry of Interior, which was made responsible for disaster management of the country. Thailand urgently needs to reform disaster management systems and mechanisms as suggested by the Thailand Country World Conference on Disaster Reduction (WCDR) Report 2006. The recommendations in the report showed that Thailand's disaster management has acknowledged that it has to shift from technocratic and institutional responses to a more community based approach with an emphasis on public participation. It also needs to move beyond scientific or engineering fixes and provide a more proactive response by the means of both structural and non-structural measures to reduce risk. An important point to note is the focus on unity in management - which is vital if the country is going to move beyond the cobweb of hierarchical arrangements and poor communication and coordination among the responsible departments.

The current disaster management system is still fragmented, highly hierarchical and patriarchal. Poor coordination is one of the main issues among departments and organizations responsible for managing water resources and flood control works. There are many departments responsible for similar tasks and duplications and repetition of tasks occurs (Manuta et al., 2006; Lebel et al., 2005). Problems lie in bureaucratic norms of organisation; administering and rule making that have institutionalized incapacities, ensuring effective disaster management will be difficult to achieve (Manuta et al, 2006).

Disaster management in Thailand has shown a great number of contradictions. On one hand Thai culture is based on Buddhism and animism and is centred on living in harmony with nature - and water is an important part of Thai people's lives as can be seen in various traditions and ceremonies involving water such as Songkran¹¹ and

¹¹ Songkran is a Thai New Year occurs in April where people celebrate by splashing water as it is believed to bring good luck in the coming year.

Loy Krathong¹². However, since the country has become more modernised, the government has adopted a dominant paradigm of disaster management which focuses on engineering work, scientific monitoring and military involvement during the emergency response and rehabilitation. The present system of flood management is still underpinned with the need to modify the environment by constructing dams, dykes and embankments to contain and control nature. At the grassroots level some communities still prefer a more traditional Buddhist and animist approach by being careful not to interfere with the natural environment. However in the urban areas people tend to support the notion of “containing and controlling” the natural environment which in some cases have failed miserably as can be seen in the case of overflowing dams, flooding along streets and main roads of Bangkok after a heavy rain as there is nowhere for the water to flow to as drains are clogged with rubbish and networks of klongs, which used to criss-cross the landscape of Thailand, have been filled in to build streets and roads.

The government management of natural disaster fits into three categories of adjustments for reducing flood losses as identified by Burton, Kates and White (1978). This is summarized below in Figure 27. Thailand’s flood management focuses on modifying flood cause and effects. Many of the measures for modifying loss-potential are weakly adopted though there are policies and legislations to cater for these needs.

Thailand is still heavily influenced by the dominant hazard management paradigm. It focuses on modifying flood causes and effects by watershed and catchment control (responsible by the Royal Irrigation Department), with heavy reliance on flood control structures such as stopbanking, building flood walls, watergates and reservoirs to ‘contain’ flood water. Much of the flood management was on public relief and compensation. The use of zoning and building codes were largely ignored with more attention paid to flood forecasting and monitoring (see Figure 27).

¹² Loy Krathong is a festival celebrated annually in Thailand and carried out by people decorating floats and releasing them in a river or klong on a full moon in November. The purpose is to honour the Lord Buddha.

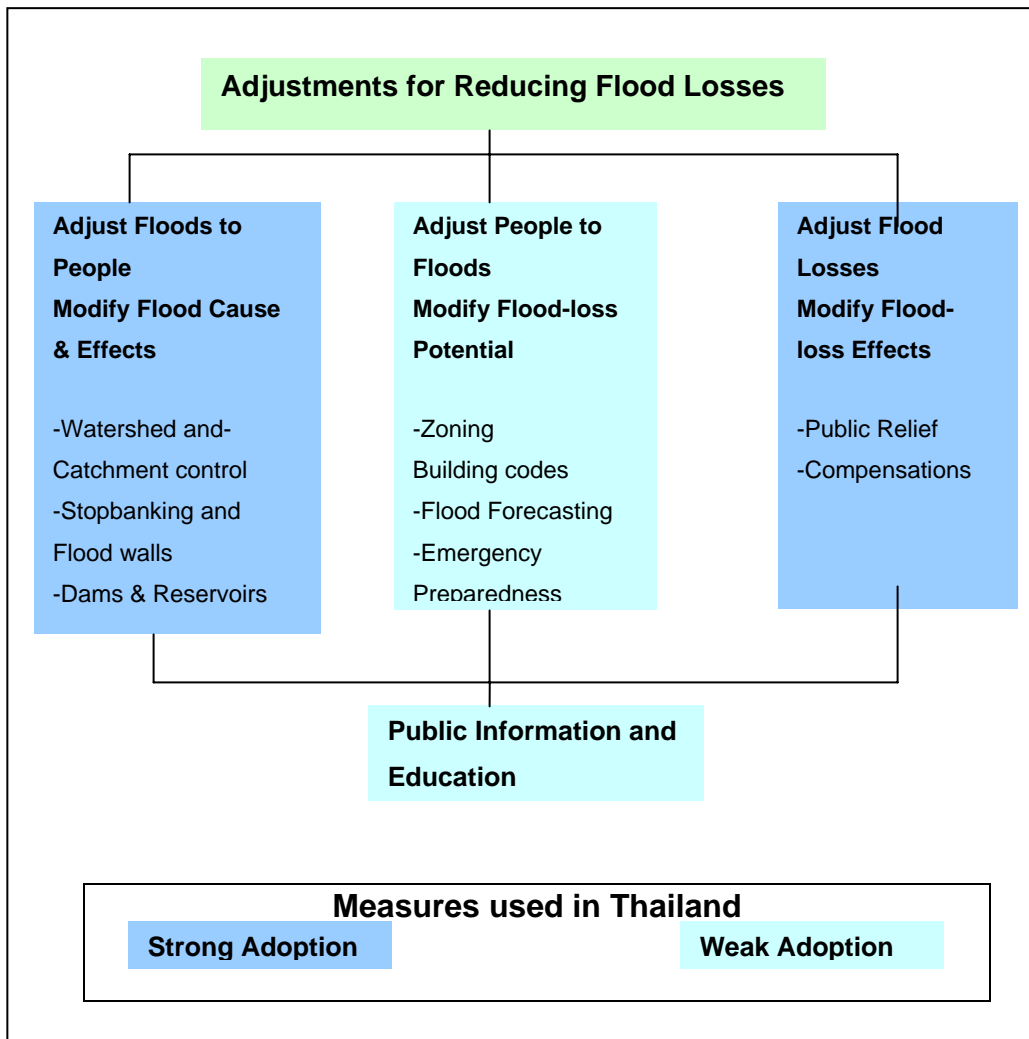


Figure 27 Chart of Flood Adjustments and the extent adopted in Thailand
Source: Adapted from Ericksen (1986), Figure 12.1 p. 240

The work by Wisner et al. (2004) can be applied to the political ecology that is present in the Thai communities and assists in understanding how communities become vulnerable to natural hazards through social, economic and political processes. The case study has revealed that the community has experienced different types and degrees of vulnerability depending on their age, class, disability, and gender.

There are various elements and factors that have contributed to Bang Luang community's vulnerability to floods (see Figures 25 and 28). Elements of the Thai political economy that contribute to Bang Luang community's vulnerability to floods began with the force of globalisation which drives the capitalist economy,

encouraging a traditional agricultural town to become industrialised and the types of land use of the area to change from rice paddies and orchards into factories. This change also sped up the urbanisation of the area with labour forces migrating from other areas, attracted by job opportunities. The economy is fragile and relies on low incomes paid to shift workers at the local factories, allowing for low to zero savings.

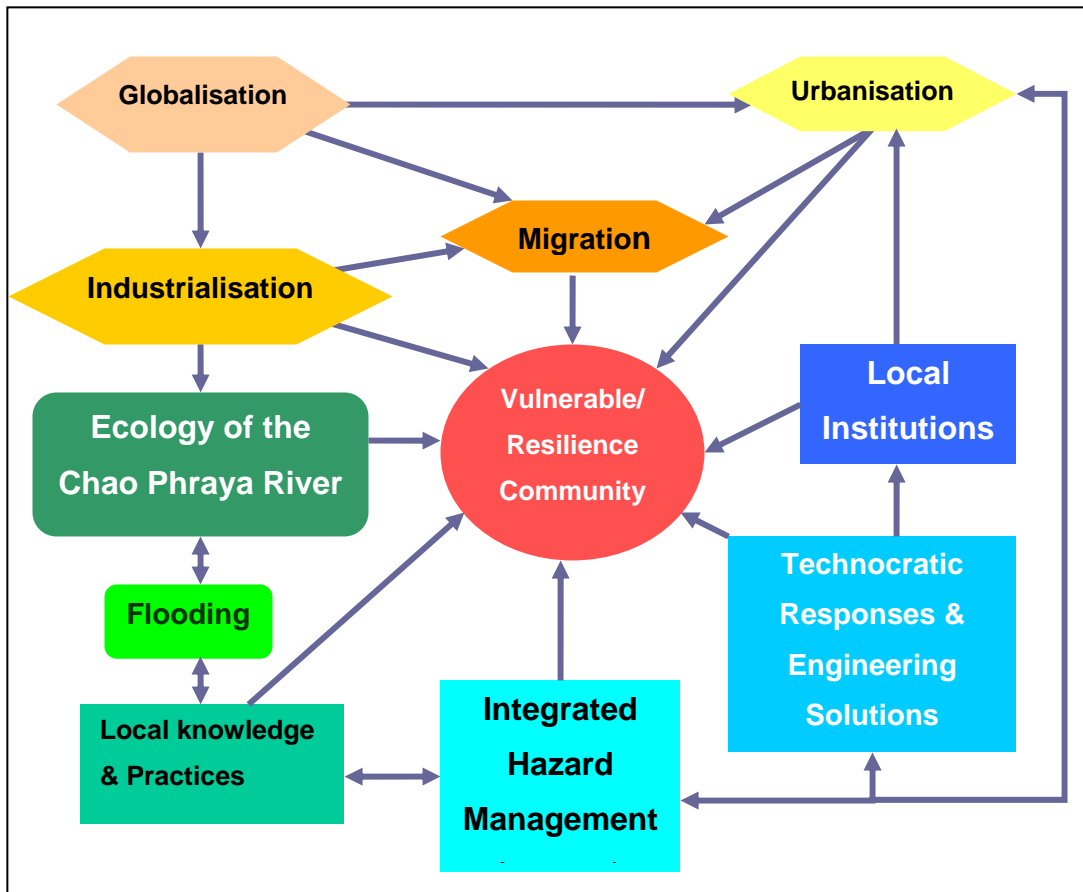


Figure 28 A flow chart showing factors that contribute to Bang Luang community's vulnerability and resiliency to flood hazards

Source: Author

In Figure 25, the progression toward vulnerability of the Bang Luang community to flood hazards began with the underlying causes which include limited access to power structure and resources and the shift away from traditional knowledge and practices. The dynamic pressures on the community include low income, lack of social protection and support from the macro-forces of globalization, industrialization and urbanisation. These elements were shown in Figure 28 as a flow chart showing

relationship between various factors that contributed to the Bang Luang community's vulnerability and resiliency to flood hazards.

Firstly, the ecology of the Chao Phraya River and surrounding flood plains is more suitable for agricultural activities and problems arose when the area became more populated and land was filled with concrete and hard structures which increase the rates of run off during heavy rain in the monsoon season. Both local and national institutions encouraged this economic growth which contributes to the Gross Domestic Product of Thailand. The community has become more vulnerable as more people populated the flood prone area and less priority was given to urban planning and building regulations in the face of economic development. Technocratic responses and engineering solutions all combined to make the situation worse and traditional knowledge and practices were ignored (see Figure 28).

Resilient Community

Vulnerability of people in risk-prone areas must be addressed by enhancing resilience. The progression to safety is summarised in Figure 29 below. The approach to disaster management must be pluralistic (Dixit, 2003). As flood events are regular phenomena in the region, coping with disasters should not be treated as a question of relief aid after the event has occurred. The risk of potential disasters should be anticipated in a proactive approach (Dixit, 2003). In the past, flood disaster mitigation involved large commitments of financial resources that could otherwise be spent on development efforts. Disaster preparedness should involve social institutions that range from community level, local governments to government and non-governmental agents at the national levels (Dixit, 2003). Elements of the progression to safety are discussed in the following section.

The Progression of Safety

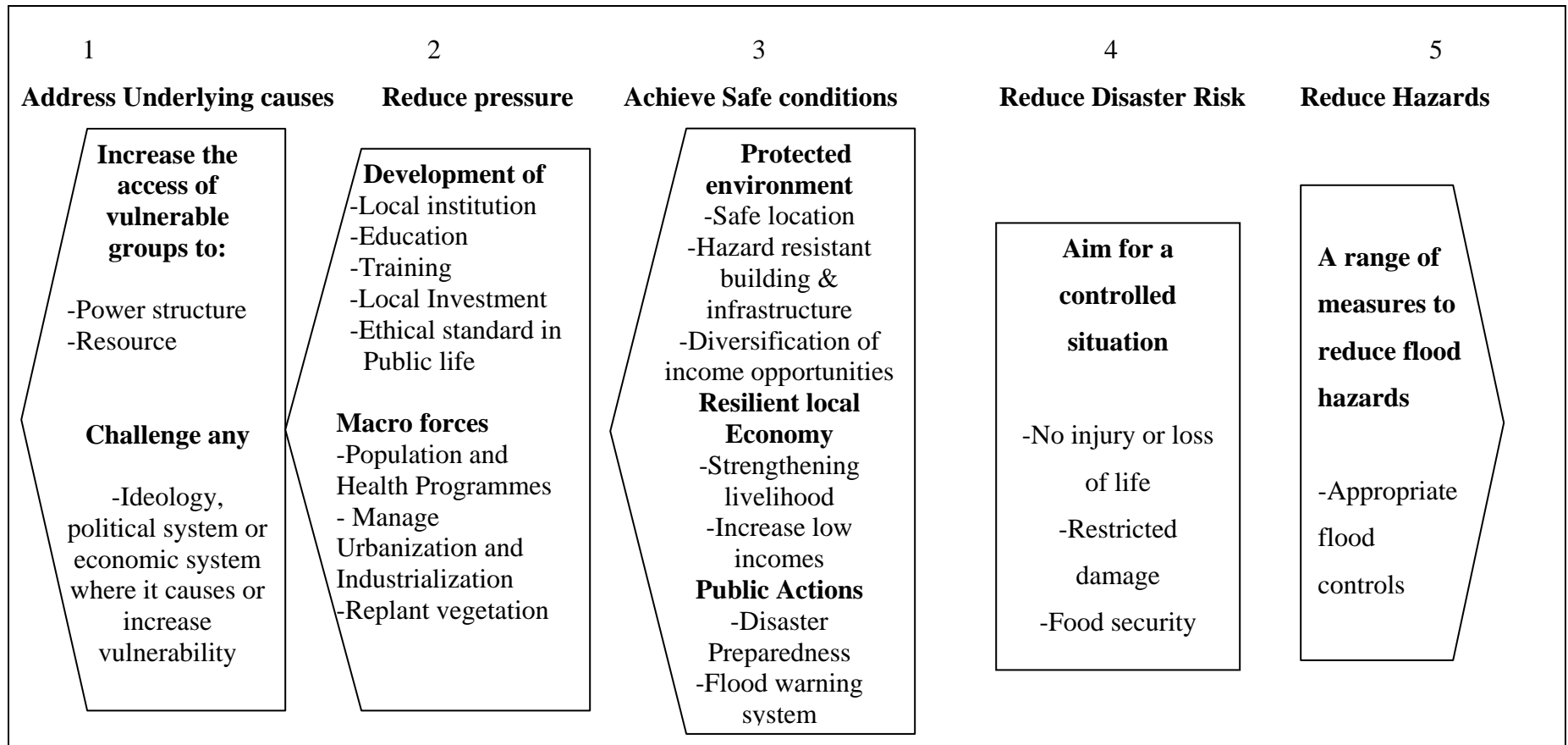


Figure 29 The Progression of Safety to flooding of the Bang Luang community, Pathum Thani, Thailand.

Source: Adapted from Wisner et al. (2004) Figure 9.4, p. 344

Address Underlying Causes: Increased access to power structure and resources

The progression to safety from flood hazards, begins with the underlying causes being addressed. This involves an increase in access to power structure and resources starting from the personal level to the local government level (decentralising the central government power).

As one of the local administrative staff, Mayor Ramathana has first hand experience of the flood issues and is approachable. At the present time people have the power to speak out on any issues they are concerned with and they have the power to carry out flood prevention and mitigation programmes at a personal and community level without having to wait for government initiatives.

One of the reasons for the formation of Tambon (sub-district) Administrative Organisation (TAO) is to decentralize the state power which was the core of the 1997 Constitution. The Ministry of Interior is transferring power from various levels to deal with new responsibilities. The Tambon Administrative Organisation is an elected body with each village electing two persons on to the Council, which, in turn, elects its own chairperson. The purpose of the TAO is to strengthen community based organizations in order to facilitate improved community involvement in planning and implementation. The TAO is responsible for implementing the government's development activities and running the day to day public service functions at the Tambon level such as education, health, waster management, infrastructures, and natural hazards management. This has transferred the "power" from the centralized state bureaucracy with a top-down approach to a "people organization" approach (Buch-Hansen, 2001).

However the power relation between individuals and groups within the Bang Luang community is still partly hierarchical and is controlled by the top-down relationship shown in Figure 30 below. The workers and other recent residents remain on the bottom rung of the power relations ladder as they cannot choose where to live or work since that is decided by where employment opportunities lie. Moreover, they can only live where they can afford which tends to be in hazard prone areas. The

factory owners and land developers still have some power to negotiate land purchase from the long term residents. The over arching power still comes from the top which is the national government. The Interior Ministry oversees the working of all the lower levels of government sectors. For example the budget for compensation had to be approved by the Interior Ministry following reports lodged by the sub-district offices.

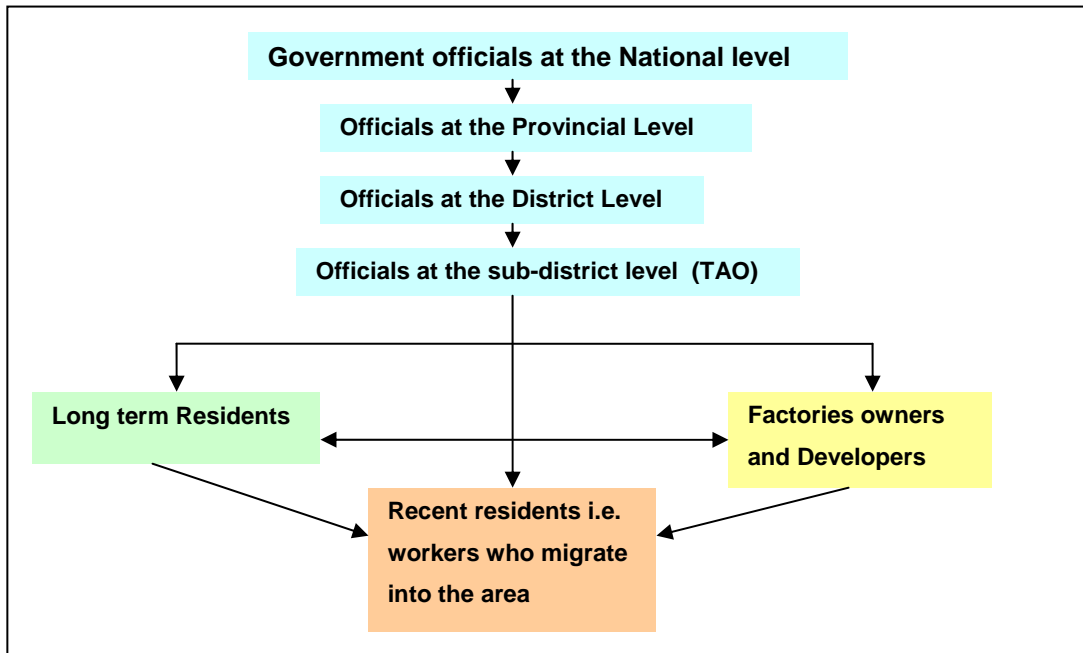


Figure 30 A flow chart showing the power relation in the Bang Luang community

Source: Author

Challenge Ideologies that contribute to the community’s vulnerability toward flooding

Some of the more proactive local people have become more involved in local politics and oversee the community networks strengthened during the emergency. Lebel (2006) has produced a framework for assessing institutionalized capacities and practices with regard to flood-related disaster. This framework can be used as a tool to monitor the effectiveness of government organizations when dealing with flooding (see Table 5 below).

Table 5 Framework for assessing institutionalised capacities and practices with regard to flood-related disaster.

Functions	Phase of Disaster Cycle (Timing)			
	Mitigation (well before)	Preparedness (before)	Emergency (during)	Rehabilitation (After)
Deliberation What should be done?	How were decisions made? Whose knowledge was considered and represented?	Was the public consulted about disaster preparedness?	How were decisions made? Who should be protected first?	How were decision made in rehabilitation?
Coordination Who is responsible?	What policies, strategies and legislation were in placed to reduce risks?	How were responsibilities divided among authorities and public?	How were specific policies on emergency operation implemented? Who was in charge?	Were resources mobilized adequate? How was rehabilitation integrated into community or national development?
Implementa-tion How was it done?	What measures were undertaken to reduce likelihood of severe flood?	Were public authorities well prepared? Was the public well-informed?	How were rescue and evacuation performed? Were special efforts made to assist socially vulnerable group?	Did the groups who most needed public assistance get it? Who benefits from reconstruction projects? Was insurance available and used? Was compensation process equitable and transparent?
Evaluation How effective?	How effective?	How adequate?	How is the quality?	How effective?

Source: Lebel (2006)

This framework is a tool to critique and challenge the interplay of the institutions which define what and who will be at risk and shapes the way flood disasters are defined, perceived and acted upon (Lebel, 2006). Upon reflecting on the event of 2006 there is a misplaced emphasis on emergency relief, especially on the distribution of relief packs, and an incorrect assumption that disaster management is a technical problem that calls for experts' opinions and excludes the interests of the most socially vulnerable groups. There is an over-emphasis on structural measures such as stopbanks and flood gates, which have been revealed to be more about re-distributing risks in time and place rather than reducing them. There is evidence of failure to integrate flood disaster actions into normal development planning in flood prone areas.

Reducing Pressure: Development of local Institution, education, training, local investment, ethical standard, manage urbanization and industrialization.

Moral Economy in Thailand

In Thailand moral economies have an enormous impact on the daily lives of the majority of the people. In rural or semi-rural areas where there is little access to formal social welfare networks, moral economies provide the support needed in times of crisis. For example, family members or kin or even neighbours will lend a helping hand in the form of labour or food offerings. This is in line with the Thai ethos of being kind and generous (benevolence and caring for each other as taught in the Buddhist teachings) and can often take place at multiple levels. Buddhist communities are already familiar with alms giving and the belief in karma.

A Buddhist temple is a peaceful meeting place where everybody can hold a meeting or go to seek assistance. One of the participants who always had great difficulty providing food for herself and her children during the flood, often offered her help with the washing up of dishes after the monks had finished their daily meal. She could then take the leftover food back home for her family. During the cleaning up period 'sister' schools (often the secondary schools with grownup students) would assist the primary schools which had been badly affected by the flood. These actions also lifted the morale among the school community. Even during times of birthing, wedding and funerals, a large component of such gatherings is to exchange gifts and well wishes (Interviews: Piyathida and Oukrit).

Mutual exchange is therefore a crucial element of Thai culture and its moral economy and to not return a gesture is seen as being extremely impolite and ignorant.

Buddhist economies also challenge the mainstream neo-liberal economic practices and the capitalist economy. Buddhist economy is based on a different logic from mainstream western economics as it emphasizes moderate or wise consumption

leading to wellbeing (Phra Thamapidok, referred to in Phongpaichit and Baker, 2000, p. 197)¹³.

The local community is renowned for its resourcefulness particularly during difficult times. They used the materials found in the local area to strengthening their homes against flood hazards instead of relying on budgets given by the government which they used to buy materials not easily obtainable within the local area. During any emergency, local knowledge and resources were utilised, such as local plants as food sources and local materials.

Education and Training

The community has established a Defence Volunteer Group with staff training for emergency situations and preparation for natural hazard events. The residents, and not just the volunteers, were educated on how to manage flood hazards such as threats from being electrocuted or bitten by poisonous animals. Health programmes, social security, and health insurance were supported by employers. The community has replanted species of trees and shrubs which can tolerate prolonged periods of water submersion, such as banyan trees at the temple grounds, to replace the dying trees. This planting provides another layer of vegetation which can absorb the excess flood water and reduce the river bank erosion by providing a buffer zone to reduce the impact on the nearby houses from wave action caused by river traffic.

Achieve Safe Conditions: Protected Environment, Resilient local Economy and Public Actions

People have built hazard resistant structures and embraced of traditional style dwellings on two levels with posts - and also raised the toilets to avoid overflowing of sewage. Diversification of incomes also occurred as many of factory shift workers also earn extra income by working on various jobs such as providing motorcycle taxi services to the local people. Some have extra income from opening local “dairies” or

¹³ It should be noted that not every one follows these teaching despite being Buddhist. A person’s religion doesn’t always reflect his/her behaviour.

local eateries to cater for the local workers from nearby factories. Households with single income earners were encouraged to take up part time employment in addition to existing job(s), to support the family, and strengthening livelihoods and increase low incomes.

Public actions have been addressed and disaster preparedness and flood warnings have been put in place and most of the local residents know what to do during flooding as it happens anyway every year. However education programmes can be introduced into the school so that the new generation can learn of the flood hazards and ways in which they can cope and live with flood conditions.

Flood disasters will always occur especially in the event of climate change which increases the low-lying communities' vulnerability to storm surge, erosion and sea level rises. There is a need to reduce social vulnerability and increase disaster resilience with improvements in the social conditions and in strengthening communities' capacities to cope in emergency situations (Cutter, 2006).

Communities need to build housing and infrastructure in harmony with nature and the government and bureaucracy need to pay more attention to disaster management at the community level and plan accordingly. This may include a long term goal of enforcing stricter zoning rules and being fairer to the community. This process of changing the status quo is difficult to achieve as it involves changes to the political and social fabric of the Thai bureaucratic system. Disaster impacts always hit the less fortunate and more deprived communities the hardest. The government, decision makers and planners need to be aware of these differences in vulnerability in disaster management (Cutter, 2006).

Reduce Hazards: Integrated Flood Management

Appropriate flood controls have been discussed at the national level as reflected in the recommendations in the Thailand Country WCDR Report 2006, which suggests a significant shift from technocratic to a more community based approach with acknowledgment of local knowledge and practices. The use of structural flood controls such as dykes and floodgates will always be important in flood management

in Thailand as the organizations that are responsible for disaster management are still very much underpinned by the scientific paradigm (see Figure 27).

My case study of Bang Luang community revealed that people have accepted their circumstances and the situation during the period of flooding and have been adjusting and adapting their livelihoods and lifestyles to accommodate it. The factors that may contribute to the community's vulnerability or resiliency to flood hazards are shown in Figure 28 followed by the progression to safety from flood hazards of Bang Luang community in Figure 29. In some ways the findings effectively showed that the actions of these people are in fact what made the community resilient to flood, as they have shown their ability to resist and live with the impacts of flood hazards. The residents demonstrated their continued perseverance in the face of flood hazards and their ongoing dedication to maintaining their spaces. They have developed some capacity to cope with floods by carefully selecting a combination of strategies including the use of traditional knowledge and practices combined with the modern flood warning system to help them survive during floods. The notion of resilient communities needs to be examined in more detail which will involve advancing beyond merely offering definitions and descriptions of what constitutes a resilient community.

Conclusion

The importance of vulnerability studies at the community level should be noted. The focus on personal stories and experiences can provide insights into flood management and issues faced by lay people during their day-to-day activities, as can be seen in the case of Bang Luang Community. Community studies can help the government to pay more attention to the underlying causes of people's vulnerability to flood hazards and that the response and management of flood hazards can be more proactive and involve the local community.

The individual elements discussed in the Findings chapter (such as impact of stopbanking, and style of dwelling) all play important parts in dictating who is more or less vulnerable to flood hazards. An individual person can be both vulnerable and

resilient at the same time depending on various factors such as personal wealth and knowledge and experiences of flooding. The vulnerability study of the Bang Luang Community can be understood by applying the work of Wisner et al. (2004) on progression towards vulnerability in terms of underlying causes, dynamic pressure and unsafe conditions. This was summarized in Figure 25 and 28. The model took into account the social, economic and political processes and the individual's characteristics when considering what caused that person or that particular group to be vulnerable to disaster.

It should be noted that we should not label people as either 'vulnerable' or 'resilient' groups as individually, they can be both. Individual people may be vulnerable to one thing but resilient to others and this may change through time. Policy makers need to focus on the strength of the individual and of the community and build on that foundation rather than focus on their weaknesses and offering emergency relief. The hardship faced by some members of the Bang Luang community did not reflect their vulnerability but rather their resilience in the face of difficult times. It should take into account the differences in cultural expectations in terms of standard of living and material wealth. In the western society most of the research participants would be considered deprived but in the context of Thailand each individual is seen as thriving and carrying on with their daily lives.

I was critical of the State (government) management of flooding as it relies too heavily on institutional, technocratic responses and scientific and engineering solutions and this is backed up by relief when these systems failed. The State responses to disaster management, especially flooding, are in conflict with the Thai culture and way of life. As a Buddhist country with a hint of animism, people have learned to respect nature and to live with it in harmony. Instead government responses to flood management were underlined with a strong sense of trying to control and contain nature with the dominant scientific paradigm of hazard management focusing on engineering, and an authoritative approach. However a shift toward a more integrative approach with a focus on community level is slowly developing. There are some limitations of my research. The findings and results acquired from interviews and focus groups are just a glimpse of the everyday life of

the people in a small community of Bang Luang. Their stories and experiences provide a case study for my research on vulnerability in the community context of Thailand. The limitations of this research are that I did not attempt to encompass the result or findings to the country context as a whole. It is a qualitative research and did not intend to be statistically valid or as a representation of any other community on the issue of vulnerability to flood.

Chapter 7 Conclusions

Disasters, Land Use Changes and Vulnerability

The people of the Bang Luang Community have undergone considerable change from an agricultural community to part of an industrialized society. In some ways this change has made the community more vulnerable to flood hazards. Globalisation, industrialization, urbanization and migration all have contributed to greater vulnerability to natural disasters. The population has been gradually increasing populated in a more hazard prone area. Low incomes and a hierarchical and bureaucratic system means that some groups of people are more marginalized and have limited access to resources and power. The focus on the engineering and institutionalized approach has contributed to a large gap between the grassroots community and the government officials who carry out the policy and management of disaster responses.

In the physical sense their location and proximity to the river and floodplain has rendered them vulnerable to flood to some degree, but to label the community as vulnerable is doing them an injustice as they have been dealing and living with the floods for hundreds of years. In the past, floods often came with a blessing, as water is vital for the community's agricultural livelihoods. At the present time floods tend to create more problems than benefits. From the interviews, the participants showed that their vulnerability and their resilience to flood can decrease or increase over time depending on personal characteristics, family circumstances and other factors such as the government flood management system, and the relationship between the local people and the local government. Personal characteristics that can cause people of Bang Luang community to be vulnerable to flood include age, gender, employment, income, savings number of dependent children/adults, type of dwelling, elevation of dwelling and location of dwelling in relation to watergates.

The emphasis on the promotion of industries, manufacturing and service industries has led to flaws in government policy on urban planning and management of natural disasters. The focus tends to be on the economic development of the area rather than

the wellbeing of its people. Engineered structural adjustments such as dams, embankments and floodgates have been put in place to deal with natural disasters but with them came a set of problems.

From the findings, the main question that the community wants answered, is how can those people who live outside the watergate near the Chao Phraya River be assisted - especially those whose houses are located in extremely low lying areas. It will require the cooperation of experts with a science background, social scientists, government officials and the grassroots community members to come together and offer their knowledge and expertise to find an integrated solution. The deeper issue is not of the flooding itself but the social, economic and political aspects of the community. If a community has strong social, economic and political bases it can withstand any disasters.

Resilient Community

Under the surface of chaos and conflict, the people of the Bang Luang community have shown how they can become resilient to the impacts of flooding. Their attitude to flood is remarkable and their coping and adaptation showed their depth of local knowledge in preparation for floods. Their attitude to the flood issues also showed their ownership of the problem and their sense of independence by relying on themselves first, to help the other less fortunate community members, with only a small degree of expectation for outside help. The moral economy is still very much in practice and has not disappeared in the face of modernity and an industrialized landscape. The sense of community is still strong which is difficult to find in the modern and industrialized landscape.

Experience of Disasters: Individuals and Community

This research has showed that the core of disaster experience is the dynamic interplay of individual and community experiences. The reality of individual's experience of disaster cannot be understood without consideration of the collective reality at all levels: environmental, psychological, social, political and cultural. Community

reactions can be better or worse than individual reactions (Kaniasty & Norris, 1999). As I have stated in the earlier chapters, Literature on disaster response rarely acknowledges the individual experience of disaster but often grouped them into a collective unit such as a 'community'. However, it is also important to put a human face on the disaster event when studying the impact of disaster instead of just the collective experiences of the whole group. As the results have shown, even though some members of the community lived in the same area and experienced the same disaster, they came from a different background with different characteristics and experiences on how to cope with a natural disaster.

From the Grassroots Level

My research questions involved grassroots approaches and how they can contribute to the management of natural disasters as a whole. Most of the engineering structural adjustments such as flood embankments and watergates were constructed with the input of the government. However, the extent of the environmental effects and the flow-on impacts on the community caused by these structural adjustments are not inconsiderable. The embankment has reduced the impacts from flooding for parts of the community for now, but one needs to plan for future events. The engineering work in some ways has made some members of the community complacent about the impacts from future floods. Many villagers have gone back to relying on traditional housing styles to escape the rising flood water and to use rafts or boats as their main mode of transport. People have learned to adjust and make changes to their lives in many small ways to cope with floods and these become evident from the interviews and exchanges between the residents. Personal experiences, stories and opinions can provide an important picture of what is really happening to the people during floods.

The response from the community level and from the government level can provide some insight into the day-to-day management of floods and lessons can be learned from any mistakes made by both the local people and institutions.

These experiences and stories can be used to bridge the gap between the science and social science sides of the natural hazard management and to treat people with respect, rather than view them as just as a component in a hazard model. A top-down,

centralized approach may not be as effective in helping the flooding problems people are facing today. What might actually be needed is integration between the two; partly community-based and partly bureaucratic, in ways such that each approach balances out the weaknesses of the other.

Conclusion

The primary aim of this thesis which was to explore vulnerability from a community level and to consider the different processes that had contributed to the vulnerability of a Thai community. The first chapter outlined the main research questions and in later chapters, these questions have been discussed and examined. The processes of development and land use changes and their continual progress have contributed to increasing the vulnerability of the Bang Luang Community. Both of the physical and social processes have led to this community becoming more vulnerable. The adaptations and adjustments may reduce the impacts of flooding but they are not always effective. However, the accepting and fighting back attitude of this small community will always support and encourage them in the face of future disasters.

The Bang Luang Community is not an isolated or unique case and one can learn from their circumstances and apply the knowledge elsewhere. It has showed that personal experiences of ordinary people during a disaster can shed some light on ways of survival in the face of social, economic and political changes. The Bang Luang community did not resist any change but remained flexible and adaptive under the strain. It is possible that a community can have both resilient and vulnerable elements and the answer to the future events is to increase its resilience and reduce vulnerability. While the community of Bang Luang may seem passive, this study has shown them to be a resourceful and an active community adapting to a broad range of changes over its history and likely to do so in the future. The study also revealed many contradictions and the struggle between Thai culture and tradition and the dominant paradigm of hazard management.

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Appendices

Appendix One: Ethical Consideration

An ethics application to conduct research was submitted to the Ethics Committee and was approved after a revised application was submitted. Every research which involves human subjects needs ethical approval before the project can commence.

Justification to do this research:

This research will be conducted in fulfillment of a Master of Social Science in Geography. It will investigate the factors that cause some communities in Thailand to be vulnerable to floods and explore the capacity of communities to live with or cope with floods. The communities' adaptations to changes in flood regimes will depend on several factors: political (i.e. the capacity of the state), economic (financial resources), ecological (human modification to flood plains), social (e.g. insurance and kin-based networks) and cultural factors. I focused on a community living along the Chao Phraya River in Pathum Thani Province of Thailand and will use the findings from the community as my case study. This research focused on the vulnerability to flood hazard of the people living or working near the Chao Phraya River. The case study is of the Naa Wat Bang Luang Community, Tambon Bann Chang of the Pathum Thani Province, Thailand.

The data were collected from the community and villages which are clustered in the same area along the Chao Phraya River. The scoping process of this research occurred in November 2006 when a flood was occurring. The area in question was submerged under one to two metres of flood water for a period of two months (depending on the elevation of that particular piece of land) which is longer than usual. The community consists of low incomes earners with minimum wage incomes from working on surrounding industrial sites. The community is located in front of Bang Luang Temple with a number of schools and factories in the area. The data collected from the target community shed some light on what is happening to the people, their vulnerability and capacity to cope with the flood hazards, especially the low income group who live and work near the river.

My positionality as a Thai person has prompted my interest in exploring the factors that cause some communities in Thailand to be vulnerable to floods. This research examined different ways of understanding vulnerability which may assist in hazard reduction and mitigation at the local level and may result in directing assistance to those who have been previously ignored.

Objectives:

The purpose of this research is to find out more about the vulnerability and level of resilience of the people living along the Chao Phraya River in the Pathum Thani Province in response to floods, which occur almost annually. The research aims to explore ways of understanding vulnerability which may be used to assist in the planning process or in hazard mitigation and reduction. This research has two main elements. One is the use of a literature review for which there is no ethical approval required. The second is qualitative interviews, which this application is in regard to. In order to do this, the following questions must be addressed:

- What are the factors that cause some communities in Thailand to be vulnerable to floods?
- What is the range of impacts the flood(s) have on the Naa Wat Bang Luang Community?
- What does the term “vulnerability” mean and how is it applied in the context of Thailand?
- Are some people in Thailand more vulnerable than others and are some groups ignored and given little help from various organizations and the government. If so, why?
- What is the range of attitudes people (e.g. local people, government officials, and relief organizations) have on the flooding and how do these contribute to the current status of the Naa Wat Bang Luang community.
- What is the range of responses to floods in Thailand? These are the broad categories of flood response:
 - a) Reducing loss potential through land use zoning

b) Modifying the natural environment (e.g. dykes, irrigation waterways and floodgates).

c) Modifying the human system (e.g. land use, building style changes)

-What have been the options taken in Tambon Bann Chang and what option(s) have been neglected and why?

-In short, the main question is how do the structures of Naa Wat Bang Luang community and the Thai political and social systems determine the ways in which a hazard is likely to affect the community?

Method(s) of information collection and analysis:

Information is collected using a literature review, semi-structured interviews and focus groups. The semi-structured interviews were conducted in Tambon Bann Chang of the Pathum Thani province with the focus on the Naa Wat Bang Luang Community and involved 22 participants. Each interview was conducted by the researcher. During the interviews information on the history of the area and how the changing land use has impacted on the community in response to flood hazards were collected. Partial transcripts were made of the interviews, that is, only the key information and some useful passages were transcribed and then analysed in conjunction with the theoretical context.

Procedure for recruiting participants and obtaining informed consent:

Participants were recruited via the snowballing method, by contacting the “gatekeeper” and by the researcher identifying houses in low lying areas. The snowballing approach is when the researcher uses one contact to help with recruitment of another contact, who, in turn, can put the researcher in touch with someone else (Valentine, 2005). The advantage of this technique is that it helps the researcher to gain the interviewees’ trust. The “gatekeepers” (mainly include the head of household, and human resource managers) of the area were contacted by the researcher to inform of the purpose of this research and asked for permission to interview. The potential informants were given information sheets and a consent form detailing the aim of the research, the issues to be discussed, an estimation of how long the interview is likely to take and the rights of the participant to refuse to participate or to withhold or withdraw at any time. The time and place to hold

interviews were discussed with potential informants, subject to safety and convenience of both parties. The interviews were recorded by note taking.

The target participants mainly came from Naa Wat Bang Luang Community and those who live nearby along the Chao Phraya River or canals and were affected by flood(s). The researcher identified the potential participants from those who live in the low lying areas. There is no appropriate map available of the area so a sketch map of the community interviewed was done during the interview when the interviewee's house was identified.

The potential participants were approached by the researcher and were then explained the purpose of the research. This enabled the researcher to build rapport with the potential participants. When the potential participants agree to participate, an appointment for an interview was arranged and oral consent or signature was given before any interviews began. There were issues with informed consent in obtaining the signature of participants. Thai people do not like to sign forms or documents as it makes them feel obligated or responsible in some way. To gain a written consent is not appropriate and may cause undue suspicion and anxiety to the potential participant. Researcher may be viewed as potential threats either from the government or the private sector who want to evict them from their land. Due to this cultural sensitivity the participants had choices to give their consents either as a signature on the Consent Form or as verbal agreement recorded on a tape, saying who they are and that they agree to the conditions that have been explained to them and which are set out in the Consent Form. This tape recording was on a different tape from that used to record the interview itself, to reassure the participants of their confidentiality.

The participants were given a copy of the information sheet which outlines the topic and the purpose of this research and the contact details of the researcher, the ethics committee and the supervisor. It also contained a copy of the consent form signed by the researcher, the participant (either in the signature form or tape recorded the verbal agreement), and the liaison (only if his/her presence is requested during the interview). The participants were given a choice whether they wished the liaison

person to be present during the interview or not. This decision can be made without the liaison person knowing, by indicating on the Consent Form Sheet (the liaison will receive another separate sheet of paper to sign so this decision will not be made known to the liaison person), or by talking to the researcher during the absence of the liaison person (e.g., during the arrangement of the coming interview session). When the liaison person's presence was requested during the interview then the liaison person would sign their agreements on the separate Consent Form.

Procedures in which participants were involved:

The scale of the qualitative research was relatively small. The researcher intended to interview ten to fifteen participants currently living in the community along the Chao Phraya River. However the total number of interviews had increased to 22. Participants were involved in semi-structured interviews which were recorded in writing as the use of tape recorder had caused some reluctance among the participants. Photographs of the participants and their homes were taken to assist in compiling and analyzing data (only upon permission). The questions used in these interviews were open-ended and the interviews were conducted in Thai. The length of time for the interview ranged from 30 minutes to one hour or more depending on each participant's information. The place for the interview was decided upon agreement between the participant and the researcher.

ETHICAL AND LEGAL ISSUES

a) Access to participants: Potential participants were contacted face to face by the researcher as phone calls, emails or letter options are not appropriate and some of the potential participants did not have a telephone connection. The face to face introduction to, and conversation with, the potential participant also sped up the process of recruitment and the researcher had the chance to explain the purpose and the procedure involved in the research. Potential participants were personally invited to participate only if they were willing and available. When they agreed a verbal consent was obtained before any interview took place.

b) Informed consent: Participants were informed of their rights and oral consents were obtained before any interview began. As stated earlier there are issues with

informed consent in obtaining the signature of the participant. Members of Thai society do not like to sign forms or documents as it makes them feel obligated or responsible in some way. The appropriate practice is to obtain the consent face to face - orally as some participants may not be able to read or write and most are afraid of signing away their rights or even property. The participants gave their consents either as a signature on the Consent Form or as a verbal agreement. The researcher had recruited a well-known person from the community who acted as a liaison person. This person was informed of the procedures and regulations set out by the University of Waikato's Human Research Ethics Regulations 2005 and abided by the regulations and personal ethics. The participants can request the absence of this person during the interview, but in most cases the participant appreciated the presence of the liaison person. When the presence of the liaison person is requested during the interview this person gave a signature on the separate Consent Form stating that he/she will act ethically and to keep the content and the anonymity of the participants confidential and conduct his/herself as a neutral party in this project.

Participants were informed of their right to decline to participate. Participants were made aware of the form in which the findings will be published, provided with all information relevant to the decision to participate and rights to withdraw any information they have provided up to two weeks after the interview and they have right of access to any data that may have been collected from or about them. Participants were given an information sheet with the researcher's contact details so arrangement can be made in the event that the participants wish to receive information or to withdraw or withhold any part of the information given. The participants have the right to withdraw from the project up until two weeks after the interview. The participants were given an option to be provided with stamped envelopes (pre-paid) with the University postal address in case the participants desired to request any further clarification on the research project after the researcher has already departed for New Zealand.

c) Potential risk to participants: Participants' real names were not used in the research and will be kept confidential unless permitted by the participant. This included strict limitations on access to tapes and transcripts and the use of pseudonyms in the report.

Photographs identifying any individuals will not be used in the thesis or any other subsequent publication unless permitted by the participant.

d) Publication of findings: The findings were in the Master of Social Science thesis and may be published in appropriate journals. A brief summary of the research was prepared in Thai and participants were informed that they may obtain it if they wish by pre-interview arrangement or by contacting the researcher using the contact details provided in the information sheet.

g) Intention to pay participants: The participants were paid to participate in this research. However depending on circumstances and Thai etiquette, a small gift like a bag of rice or dry food were given to the participants before the interviews as an indicator of respect.

h) Any other ethical or legal issue: Participants were given the information sheet printed in Thai. In the case that the participant is illiterate the researcher had explained the information verbally. The researcher was accompanied by a person who knows the area and this person will be present during the interview and assist with translating dialect or explaining any culture or traditions of the area. This person had abided by the rules and regulations set out in the University of Waikato's "Human Research Ethics Regulations 2005" and did not imposed his or her view on the participant's input or influence what the participants say. In some cases this person had left during the interview to provide some privacy to the participant if requested. The researcher had complied with any legislation that applies in that country (Thailand) with respect to privacy and storage of personal information.



Appendix Two: Information Sheet

“Factors that cause some communities in Thailand to be vulnerable to floods, a case study of Naa Wat Bang Luang Community’s vulnerability to floods”

Researcher: Thanahathai Senavattagul (Thai Mobile:0851181007, Email: ts68@waikato.ac.nz)

Supervisor: Associate Professor John Campbell (64 7 8384466 ext 8089, Email: jrc@waikato.ac.nz)

My name is Thanahathai Senavattagul, I am a Master of Social Science student currently conducting research on the vulnerability of the Pathum Thani community to the flood hazard. The aim of this research is to assess the cause of vulnerability of the community to flood hazard.

What does it mean to be a participant in this research?

As part of my research I wish to conduct semi-structured interviews and a detailed investigation of the flood impacts and disaster management in Pathum Thani. The interview will consist of a list of questions or themes to be explored and may take up to one hour. The project will consist of ten to fifteen interviews. The time and place for the interview can be arranged by you and me. A copy of questions is attached to this information sheet. The overall question is “What are the factors that cause some communities in Thailand to be vulnerable to floods?” The interviews will be tape-recorded.

What are your rights as a participant in this interview?

Your experience and opinions are valuable for my research. I would be most grateful if you could participate in the semi-structured interview. You may decline to answer any particular question, and to withdraw from the project up until two weeks after the interview. All the materials from the interview will be kept in confidence and only I and my supervisor will have access to the tapes and transcripts. Your name will be kept confidential and pseudonyms will be given. The information collected will be stored in note form, on tape and in electronic form. The data will be destroyed two

years after the completion of the thesis. A brief summary of the research in Thai will be prepared and available to you upon request.

What will the information be used for?

The findings will be analysed and published in a Master of Social Science Thesis. Upon completion of my thesis, a copy will be available in the University of Waikato Library for access. The information may be published as an article in an appropriate academic journal.

If you want to be involved?

If you want to be involved, you can give verbal consent after you have read the consent form and agree to participate. However, if you change your mind and decide not to be involved, please contact me at Thai Mobile: 085 118 1007, Email: ts68@waikato.ac.nz. For further clarification regarding any part of this research, you may contact my supervisor, Associate Professor John Campbell on 64 7 868 4466 extension 8089.

This research project has been approved by the Human Research Ethics Committee of the Faculty of Arts and Social Sciences. Any questions about the ethical conduct of this research may be sent to the Secretary of the Committee, Charlotte Church, Email: charl@waikato.ac.nz, postal address, Faculty of Arts and Social Sciences, University of Waikato, Private Bag 3105, Hamilton 3240.

Yours truly,

Thanahathai Senavattanagul

Research participant's detail

Identified Name _____

Date _____

Time _____

Place _____

Appendix Three: Consent Form 1

“Factors that cause some communities in Thailand to be vulnerable to floods”

Thanahathai Senavattanakul (Thai: 085 118 1007, Email: ts68@waikato.ac.nz)

Supervisor: A. Prof. John Campbell (64 7 838 4466 extension 8089)

-I am undertaking a research project for my Master of Social Science Thesis. The aim of the project is to investigate factors that cause some communities in Thailand to be vulnerable to floods.

- I would like to interview you about your experiences of floods in Thailand.

-The interview will take approximately an hour.

-When I am not using the data for writing my report, the tapes and transcripts will be stored in a locked cupboard in my University Office. They will be destroyed two years after the completion of my thesis.

-If material from the report is published in an academic article, care will be taken to ensure that your anonymity will be preserved.

-A brief summary of the research will be prepared in Thai and you may obtain it if you wish by the arrangement with me now for the document to be sent to you or by contacting me using the contact details given above.

-If you agree to take part in this interview, you have the following rights:

You can refuse to answer any particular question, and to terminate the interview.

You may withdraw from the research up to two weeks after the interview. If you choose to withdraw, your tape-recorded material will not be used in any publications.

To ask any further questions about the interview or research project that occurs to you, either during the interview or at any other time.

To provide information on the understanding that it is confidential to the interviewer and the supervisor.

To remain anonymous – anything that might identify you will not be included in the research report.

To make any complaints you have about the interview or the research project, you can contact my supervisor, A. Prof. John Campbell (64 7 838 4466 extension 8089) or contact the FASS Research Ethics Committee, the Secretary of the Committee, Charlotte Church, Email: charl@waikato.ac.nz, postal address, Faculty of Arts and Social Sciences, University of Waikato, Private Bag 3105, Hamilton 3240.

“I wish the liaison person to be absent during the interview” Circle **YES NO** (In the case that the liaison person’s presence during the interview is agreed on, the liaison person’s signature will be given on a separate sheet of Consent Form stating “I agree to act ethically and to keep the content and the anonymity of the participants confidential and conduct myself as a neutral party in this project.”)

“I wish to remain anonymous” Circle **YES NO** – to be confirmed at the end of the interview

“I consent to be interviewed for this research on the above conditions”

Interviewee (verbal consent) _____ **Date** _____

“I agree to abide by the above conditions”

Interviewer _____ **Date** _____



Appendix Four: Consent Form 2

“Factors that cause some communities in Thailand to be vulnerable to floods”

Thanahathai Senavattanagul (Thai: 085 118 1007, Email: ts68@waikato.ac.nz)

Supervisor: A. Prof. John Campbell (64 7 838 4466 extension 8089)

-I am undertaking a research project for my Master of Social Science Thesis. The aim of the project is to investigate factors that cause some communities in Thailand to be vulnerable to floods.

- I would like to interview you about your experiences of floods in Thailand.

- The interview will take approximately an hour.

-When I am not using the data for writing my report, the tapes and transcripts will be stored in a locked cupboard in my University Office. They will be destroyed two years after the completion of my thesis.

-If material from the report is published in an academic article, care will be taken to ensure that your anonymity will be preserved.

- A brief summary of the research will be prepared in Thai and you may obtain it if you wish by the arrangement with me now for the document to be sent to you or by contacting me using the contact details given above.

- If you agree to take part in this interview, you have the following rights:

To refuse to answer any particular question, and to terminate the interview. You may withdraw from the research up to two weeks after the interview. If you choose to withdraw, your tape-recorded material will not be used in any publications.

To ask any further questions about the interview or research project that occur to you, either during the interview or at any other time.

To provide information on the understanding that it is confidential to the interviewer and the supervisor.

To remain anonymous – anything that might identify you will not be included in the research report.

To make any complaints you have about the interview or the research project, you can contact my supervisor, A. Prof. John Campbell (64 7 838 4466 extension 8089) or contact the FASS Research Ethics Committee, the Secretary of the Committee, Charlotte Church, Email: charl@waikato.ac.nz, postal address, Faculty of Arts and Social Sciences, University of Waikato, Private Bag 3105, Hamilton 3240.

“I agree to abide by the above conditions”

Interviewer _____ **Date** _____

“I agree act ethically and to keep the content and the anonymity of the participants confidential and conduct myself as a neutral party in this project.”

Liaison person _____ **Date** _____

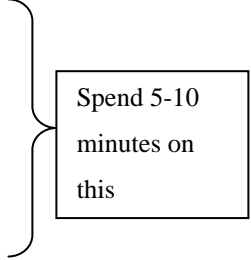
Interview Schedules: Semi-structured Interview

These guiding interview questions are designed to gain information on the 2006 flood and its impacts on the *Naa Wat Bang Luang Community*. The questions will focus on how the community has been made vulnerable to flood disasters through time and the changes in the coping capacity of the community in relation to flood events.

Information will come from the participants' opinions, personal stories or experiences. Information on the characteristics (i.e. age, gender and occupation) of the participant will also be recorded for comparison.

Reminder:

- Give the participant the information sheet and gain the oral consent
- Record the participant's name (code), date, time and place
- Introduction of the research, purpose, background information, issues to be discussed or explore, approximate time spent on the interview.
- Provide a break after 30 minutes or as decided by the participant and the researcher.
- Remind the participant of his or her rights during the interview and after the interview has been completed and point out the contact details of the researcher.
- Thank the participant



Spend 5-10 minutes on this

Probes: "What do you mean...?"

"Tell me more about..."

"Can you give me an example of...?"

"How did you feel about...?"

Checks: "When you say... do you mean...?"

Prompts: a nod, "Yes?", "And then..."

Appendix Five: Topic Questions

If possible take a **photograph** of the participant and the **place** of interview to help with organizing the data and use as reminders while analyzing data.

Participant Name: _____ Place of the interview: _____

Record time: Start _____ Finish _____ Total time spent on the interview _____

Characteristics

1. Gender
2. Age
3. Occupation

These characteristics are vital in the discussion about class, spending power and inequality and how these characteristics can affect the vulnerability or the coping capacity of the participant to disaster. The information on the type of dwelling (i.e. is it a traditional wooden house with raised basement or concrete single storey) is also important in determining the factor which can affect the level of vulnerability of the participant to flood hazard.

4. Type of dwelling. Is it a permanent concrete house or a permanent shack with corrugated iron roof, a temporary shack, or a wooden house? How many storeys? Have you altered or made any changes to your house recently? Have you made any adjustment to your housing style in response to flooding?

Location

5. Where do you live? or Do you live in this house?
6. Where do you work?
7. Do you have to travel far to work and what is your mode of transport (i.e. bicycle, bus, walk, or car)?
8. How long have you been working and /or living in this area?

Household Characteristics

9. How many people are there in your household? Can you tell me about your household?
10. Do you own the house you are now living in? If no, do any of your family members own it? If no, has any of your family or yourself ever owned the house/land in the area before? If yes, what happened to make your circumstances changed? If no, are you renting the property or are you staying with friends/relatives?
11. Do you own the assets (i.e. furniture, bike, and car) in the house? If no, who owns them?
12. What is your occupation? How long have you been working in your current job? If you are now retired what is your previous occupation? How do you earn your living? Do you work full time or part time? Is it a regular paying job? Does it pay enough for you to cover your living costs?
13. Do you have any savings? For example in case of emergency.
14. How many people in your household have a regular paying job? Do they contribute to the household expenses?
15. Do you mortgage your house?
16. Have you ever borrowed money from the bank or obtained a loan from anyone?
17. In the case of emergency who do you turn to for help?

18. Do you have a high school qualification or higher? What about other people living in your household? Do you wish to gain a higher qualification? If yes, what and when? Is it because of family or job commitment, saving or limited time?
19. What is your current health condition? Are you healthy or do you suffer from anything that may cause you some difficulties in everyday living or working?
20. Can you get access for help or assistance from the community or your local government? Is it difficult? Does it take long to get the response?

History of the area

21. What is the main type of land use in this area? For example is it mainly residential or industrial or mixture of residential and commercial and so on.
22. Do you know any history of the area, such as the previous land use or land owner, what this area used to be like? How has it changed?
23. Have your relatives been living in the area for some time? If it is possible may I ask for an interview with your relative/parents who are from an older generation and may be able to provide me with the history of the area? (Only ask if applicable and arrange the interview later).
24. If you moved to the area from some place else, where do you come from and how long ago was it? Have you ever experienced flood hazards before (in the previous settlement and in this current settlement)? Can you tell me about some of the floods you have experienced?

Impacts from the 2006 flood

25. Were you affected by the flood from the Chao Phraya River or the canal networks? Did you suffer any losses from the 2006 flood?
26. What happened to you and your family? Did the flood affect your job, livelihood, social or economic status?
27. What happened before, during and after the flood? Did you have any warning about the heavy rain or about the flash flood?
28. How did you cope and what did you do?
29. Have you changed or adjusted your everyday routine in case of future floods? For example washing, cooking, transport mode, child care, work routine.

Assistance required?

30. Are you worried or stressed about the issue of flooding?
31. Did you get any help and who was it from? Did you require any assistance before/ during/ after/ the flood? If so did anybody provide some assistance to you? Was there enough assistance provided to you?

Comparison between the 2006 flood and other floods

32. Why do you think the flood happened? How was the 2006 flood in comparison with previous ones? Was the 2006 flood similar in length and severity or was it different? What are the differences?

Flood management from personal to national level

33. What have you done in preparation for flooding, during floods and after floods? Do you feel you are more susceptible to flood hazards in any way when compared yourself to other households or other communities or even other provinces? If so, in your opinion what are the reasons for this?
34. What has been done by the community in preparation for flooding, during floods and after floods as in emergency response and long term recovery plan?
35. What has been done by the local government in preparation for flooding, during floods and after floods as in emergency response and long term recovery plan?
36. From what you saw or experienced what has been done by the national government in preparation for flooding, during floods and after floods as in emergency response and long term recovery plan?

Improvements to Flood Management?

37. What could be done to improve the situation? What improvements do you suggest that can be done to alleviate or reduce the impact or the risk of flood hazards?
38. Do you agree or disagree with the method of disaster management applied by local and national government? And, what could be improved on?

Disaster Management Policy

39. Do you know the local and national government disaster management policy? If so do you agree or disagree with it and on what points? If you did not know about the policy do you think the information should be made available or easily accessible to the general public?

Your opinion on the solution(s)

40. In your opinion what are the solution(s) to the issue (at the personal level, the community level, the local government and the national level?)
41. Further comments/questions

Thank you for participating in this interview