A STUDY ON EFFORTS IN BUILDING RESILIENT COMMUNITY TOWARDS FLOOD IN PASIR PUTEH, KELANTAN

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BACHELOR DEGREE IN OCCUPATIONAL SAFETY AND HEALTH (HONS.)

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SITI NOR AISHAH BINTI YUSOFF

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ABSTRACT

Malaysia is one of the well- known country that commonly contribute to the natural disaster which is flood. Due to the flood, there are great devastation has occurred as community loss their homes and also other infrastructures. The huge impacts due to flood indicates that the urgent need to increase community's resilience as during flood of 2014, villagers do not have much experience in protecting themselves from such disasters and for that reason, it is quite likely they suffer quite a lot. Since the villagers were fully unprepared to face the flood, they panicked in witnessing the rising water levels. They did not store food nor did they arrange any other primary aid to meet the immediate needs. Furthermore, their miseries were compounded when relief and other support were delayed due to high levels of water. Their miseries continued even after the floods had subsided as they had very limited options to start life anew. The objectives of this study are to recognize the influencing factors of community to be more resilient towards flood in Pasir Puteh, Kelantan; to identify NGO efforts to build resilient community towards flood in Pasir Puteh, Kelantan; and to determine community in Pasir Puteh, Kelantan participation in mitigation, preparedness, response, and recovery activities to build resilient community towards flood respectively. Mixed methods of collecting and analyzing data using both quantitative and qualitative approaches were used. They provided a comprehensive way of gathering information from households and non-governmental organization (NGO). The data were analyzed and the results assessed through the lens of the overarching concept of community resilience that encompasses six types of resilience. This new approach provided a holistic perspective in exploring factors that influence the building of community resilience. Findings from this study revealed evidence that a number of factors that were gradually increasing their level of resilience. In order to achieve preparedness, response, recovery and also community resilience, the various types of resilience needed to be reinforced. Other than that, findings from this study showed evidence that NGO's effort gave significant contributions in building resilience community as there were many assistance given to community and also their brilliant planning for long-term assistance. It was found that social networking and a combination of local knowledge with that of experts, through community participation in decision making, were crucial in reinforcing community resilience. Based on the research findings, disaster resilience was everyone's business and was a shared responsibility among communities, the private sector, and government. Community leaders and government officials face decisions every day that may pit short-term interests against longer-term goals. Increasing resilience to disasters will require decisions and actions that are informed and forward-looking. Although disasters will continue to occur, actions that move the nation from a reactive to a proactive approach will reduce many of the societal and economic burdens and impacts that disasters cause. Building the nation's resilience was a long-term process, one that will be socially and politically challenging, but the reward for our efforts will be a safer, healthier, more secure, and more prosperous nation.

ABSTRAK

Malaysia adalah salah sebuah negara yang terkenal dengan bencana alam iaitu banjir. Rentetan daripada banjir, kemusnahan yang besar telah berlaku apabila masyarakat kehilangan rumah dan infrastruktur lain. Kesan yang besar akibat banjir menunjukkan bahawa satu keperluan untuk meningkatkan daya tahan masyarakat ketika banjir pada tahun 2014, dimana penduduk kampung tidak mempunyai banyak pengalaman dalam melindungi diri mereka daripada bencana tersebut dan kerana itu, mereka telah menderita. Oleh kerana penduduk tidak bersedia menghadapi banjir, mereka panik melihat paras air yang semakin meningkat. Mereka tidak menyimpan makanan dan tidak mengatur apa-apa bantuan utama yang lain untuk memenuhi keperluan segera. Tambahan pula, kesengsaraan mereka semakin teruk apabila bantuan dan sokongan lain ditangguhkan kerana paras air yang tinggi. Objektif kajian ini adalah mengenali faktor-faktor yang mempengaruhi komuniti agar lebih berdaya tahan terhadap banjir di Pasir Puteh, Kelantan; untuk mengenal pasti usaha NGO untuk membina masyarakat yang berdaya tahan terhadap banjir di Pasir Puteh, Kelantan; dan untuk menentukan aktiviti komuniti dalam mitigasi, kesiapsiagaan, tindak balas, dan pemulihan untuk membina masyarakat yang berdaya tahan terhadap banjir. Kaedah campuran mengumpul dan menganalisis data telah menggunakan pendekatan kuantitatif dan kualitatif. Dua kaedah ini menyediakan cara komprehensif untuk mengumpulkan maklumat isi rumah dan organisasi bukan kerajaan (NGO). Data dianalisis dan hasilnya dinilai melalui konsep menyeluruh ketahanan masyarakat yang merangkumi enam jenis. Pendekatan baru ini memberikan perspektif holistik dalam meneroka faktor-faktor yang mempengaruhi pembinaan ketahanan masyarakat. Penemuan dari kajian ini mendedahkan bukti bahawa beberapa faktor yang meningkatkan tahap daya tahan mereka. Untuk mencapai kesiapsiagaan, tindak balas, pemulihan dan juga ketahanan masyarakat, pelbagai jenis ketahanan perlu diperkukuhkan. Selain daripada itu, penemuan dari kajian ini menunjukkan bukti bahawa usaha NGO memberi sumbangan besar dalam membina masyarakat berdaya tahan kerana terdapat banyak bantuan yang diberikan dalam bentuk jangka pendek dan panjang. Rangkaian sosial dan gabungan pengetahuan tempatan dengan pakar-pakar melalui penyertaan masyarakat dalam membuat keputusan adalah penting dalam mempertingkatkan ketahanan masyarakat. Berdasarkan penemuan penyelidikan, daya tahan bencana adalah tanggungjawab setiap orang yang merangkumi komuniti, sektor swasta dan kerajaan. Meningkatkan daya tahan terhadap bencana memerlukan keputusan dan tindakan yang dimaklumkan dan berpandangan ke hadapan. Walaupun bencana akan terus berlaku, tindakan yang menggerakkan negara dari reaktif kepada pendekatan proaktif akan mengurangkan banyak bebanan dan kesan sosial dan ekonomi yang menyebabkan bencana. Membina daya tahan negara adalah proses jangka panjang yang akan menjadi cabaran sosial dan politik, tetapi ganjaran daripada usaha ini akan menjadikan negara lebih selamat, sihat, lebih selamat, dan lebih makmur.

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LIST OF ABBREVIATIONS

BBNGO	Bantuan Bencana NGO
CBSM	Community-Based Social Marketing
DRR	Disaster Risk Reduction
NGO	Non-Governmental Organization
PPRR	Prevention Preparedness Response and Recovery
UNISDR	United Nations International Strategy for Disaster Reduction

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter present the study background, state problem statement, research questions, research objective, conceptual framework, scope of study, significance of study, and lastly operational definition which is related to study.

1.2 Study Background

Malaysia is one of the well- known country that commonly contribute to the natural disaster which is flood. In the year of 2014, the enormous flood hit Malaysia from 15th of December 2014 to 3rd of January 2015 and it is nominated by means of the worst flood in decades (Malaysian Insider, 2014). Due to the flood, there are great devastation has occurred as community loss their homes and also other infrastructures. East Coast State which are Kelantan, Terengganu, and Pahang can be describe as the most affected states hit by flood (thesundaily.my, 2014). The huge impacts due to flood indicates that the urgent need to increase community's resilience.

In recent years, the concept of 'resilience' is the capacity of human and physical systems to cope with and respond to extreme events, has become an increasingly prominent issue that complements the 'sustainability' agenda. Indeed the concept has largely supplanted the concept of 'resistance' with its focus on pre-disaster mitigation (Tierney and Bruneau,

2007). The recent focus on resilience marks a shift from *resistance* strategies focused solely on the anticipation of risk and the mitigation of vulnerability to more inclusive strategies that integrate both *resistance* (prevent, protect) and *resilience* (respond, recover) in the face of disasters.

In achieving the goal towards resilience community, it requires a new culture of disaster resilience in which each individual and every community takes responsibility for resilience to natural disaster which is flood. Improved disaster resilience will result from decisions made at all levels of government, non-government organization, and communities.

1.3 Problem Statement

The findings obtained in case of flood from previous researchers have begun to express a negative view of flood relief policies in Malaysia, as expressed by Leigh and Low that the flood relief operation by Malaysian government is reactive because government will only act after the disaster occurred and did not see a policy as the preparation for the future (Chan & Parker, 1996; Chan, 2012).

Although Malaysia has implemented various policies for all the stage, but the policies implemented are identified by previous researchers, there are still some problems and issues for the stage during and post-disaster in terms of the implementation of the assistance and rehabilitation projects for the victims (Chan, 2012; Said,Abdul Gapor, Samian, & Abd Aziz, 2013; Zaiton, Mohd Bahrin, & Zaharah, 2013) which has affected the victims quality of life, and suggested that an evaluation of that policy should be implemented (Roosli, 2010).

Following the Malaysian disastrous flood in 1971, several positive strategies and initiatives were streamlined to deal with flood occurrence. Even though there were existing flood mitigation approaches initiated, the approaches were still unable to cope with the flood problems that struck several areas, mainly on the east coast in December 2014. Complexity of flood disasters in terms of their diversity, frequency, magnitude and other uncertainties require re-evaluation and strengthening of the strategies to counter future floods.

In addition, during flood of 2014, villagers do not have much experience in protecting themselves from such disasters and for that reason, it is quite likely they suffer quite a lot. Since the villagers were fully unprepared to face the flood, they panicked in witnessing the rising water levels. They did not store food nor did they arrange any other primary aid to meet the immediate needs. Furthermore, their miseries were compounded when relief and other support were delayed due to high levels of water. Their miseries continued even after the floods had subsided as they had very limited options to start life anew (Mediterranean Journal of Social Sciences, 2016).

Thus, a study on efforts in building resilient community towards flood will be conducted in Pasir Puteh, Kelantan in order to know how government, non-government organization, and community can better anticipate, mitigate, prepare for and cope with the occurrence of present and future hazard events.

1.4 Research Questions

This study is conducted to answer the research questions as follow:

I. What are the factors influencing community to be more resilient towards flood in Pasir Puteh, Kelantan?

II. How Malaysia Government and NGO make efforts to build resilient community towards flood in Pasir Puteh, Kelantan?

III. Is it community take part in mitigation, preparedness, response, and recovery activities in order to build resilient community towards flood?

1.5 Research Objectives

The objectives of this research are:

I. To determine the influencing factors of community to be more resilient towards flood in Pasir Puteh, Kelantan;

II. To identify NGO efforts to build resilient community towards flood in Pasir Puteh, Kelantan; and

III. To determine community in Pasir Puteh, Kelantan participation in mitigation, preparedness, response, and recovery activities to build resilient community towards flood.

1.6 Scope of Study

A study on efforts in building resilient community towards flood was conducted in Pasir Puteh, Kelantan in order to recognize the influencing factors of community to be more resilient towards flood by using questionnaire. This study was also concerning on identifying NGO efforts to build resilient community towards flood in Pasir Puteh, Kelantan by using the semi-structured interview method. Other than that, this study also focuses on determining community participation in mitigation, preparedness, response, and recovery activities to build resilient community towards flood in Pasir Puteh, Kelantan which also used questionnaire method so that many information can be get from the community itself and the level of resilience among them can be determined. A study on efforts in building resilient community towards flood were evaluated to know whether the research objectives are being met so that further recommendation can be made in the future.

1.7 Significance of Study

The significant of the study on community resilient is because of the vulnerability of natural occurrence cannot be predicted and the ability to accommodate change without catastrophic failure in times of disaster is critical. Other than that, people and property fare better when everything is in resilient state in case of disasters struck. The consequences from resilience are fewer buildings collapse, fewer power outages occur, fewer businesses are put at risk, and fewer deaths and injuries occur.

Heavy rain and severe flooding in December 2014 caused Malaysia to become victim of such occurrence which created enormous vulnerabilities to the people in the country. This study conceptualizes such socioeconomic vulnerabilities due to this severe flooding and thus identifies the stress that emerged within the people during and after the calamity. The study specifically locates the socio-economic problems and constraints to ascertain as to how these people responded to such catastrophes. From this perspective, this study explores and discovers the indigenous resilient strategies that the local people had adopted to face such problems.

Based on this, a community resilient strategy is adopted in this study which will be a new dimension to conceptualize flooding in Malaysia. An exploration of these resilient issues relating to the problems of flood-affected people is essential as this dimension of floods has remained unexplored until now. The lack of studies and a gap of such dimension have remained important rationale for this research.

1.8 Conceptual Definitions

Hazard: A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. (UNISDR, 2009)

Natural hazard: Natural process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. (UNISDR, 2009)

Mitigation: The lessening or limitation of the adverse impacts of hazards and related disasters. (UNISDR, 2009)

Prevention: The outright avoidance of adverse impacts of hazards and related disasters. (UNISDR, 2009)

Preparedness: The knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions. (UNISDR, 2009)

Response: The provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected. (UNISDR, 2009)

Recovery: The restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors. (UNISDR, 2009)

Resilience: The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions. (UNISDR, 2009)

Disaster: A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources. (UNISDR, 2009)

Adaptation: The adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. (UNISDR, 2009)

Vulnerability: The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard. (UNISDR, 2009)

Capacity: The combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals. (UNISDR, 2009).

Coping capacity: The ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters. (UNISDR, 2009).

Disaster risk reduction: The concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events. (UNISDR, 2009).

1.9 Conceptual Framework

The Figure 1.1 shows the conceptual framework that has been proposed in order to see the flow throughout this study.

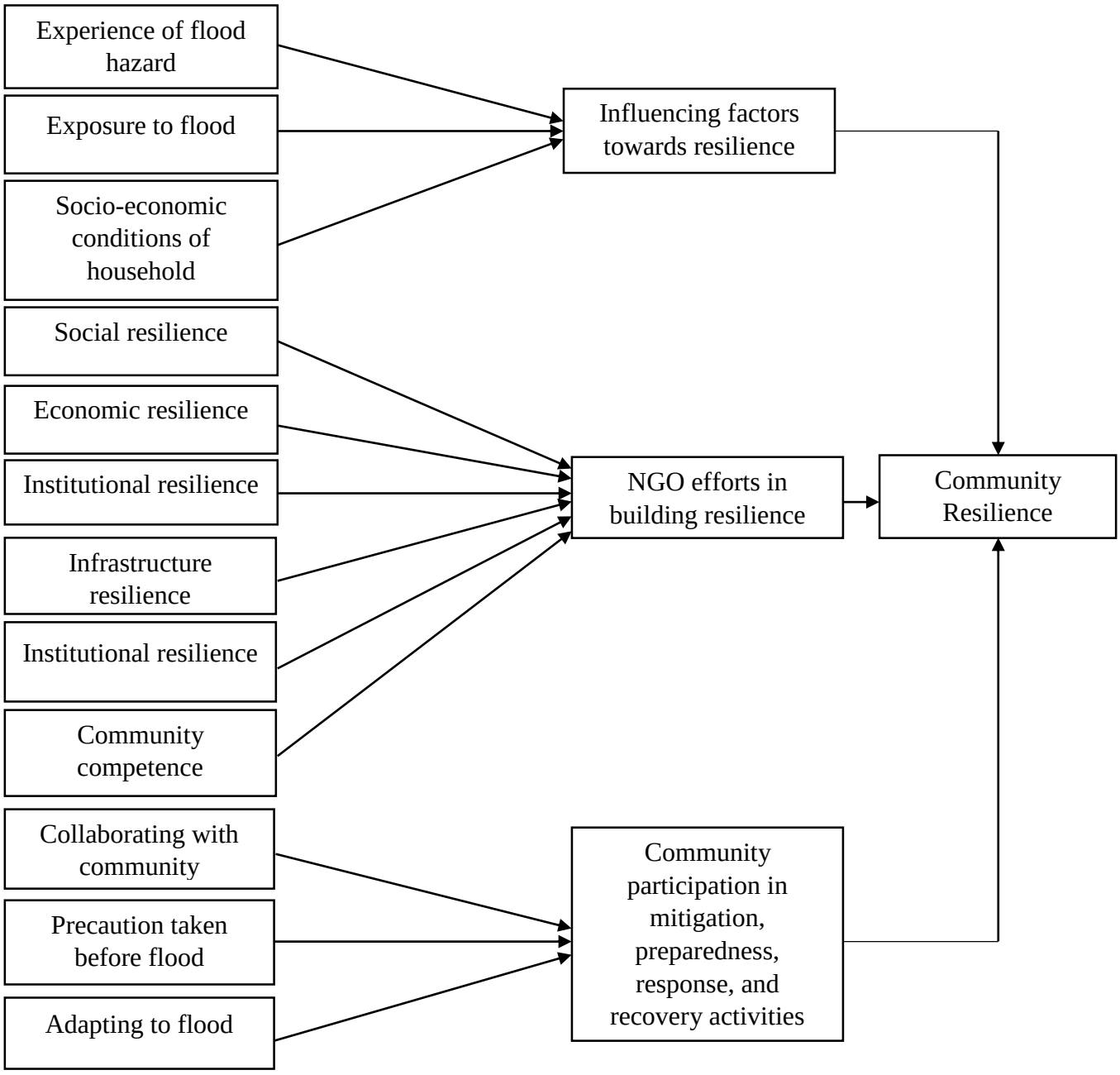

Figure 1.1: Conceptual Framework

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The chapter presents a literature review of the key concepts related to the subject of the study. Academic and scientific journals, and books are the main sources in which the concepts that serve as a theoretical background to the study are being referred.

2.2 Concept of Resilience

Resilience is the capacity of a system, community or society to cope with, adapt, or "bounce back" by resisting or changing in order to reach and maintain an acceptable level of functioning and structure in the light of a hazard stress or shock (Mallak, 1998; Wildavsky, 1991; Comfort, 1999; Holling et al., 1995; Paton, Smith, and Violanti, 2000; Kendra and Wachtendorf, 2003; Pelling, 2003; UNISDR, 2005). The term resilience is often used in the same manner as the notion of "bouncing back" that reflects its Latin root *"resiliere"* which means "to jump back" (Klein et al., 2003; Paton & Johnston, 2006). There is an agreement in the literature that the concept of resilience initiates from the field of ecology, three decades ago. Holling (1973) is frequently cited as probably the first to both use and define the concept of resilience in the field of ecology after publishing his article entitled "*Resilience and Stability of the Ecological Systems"*. Holling (1973) defined the term resilience for an ecosystem as the measure of the ability of an ecosystem to absorb changes and still persist. He also compared the concept of resilience with the notion of stability which he defined as

the ability of a system to return to its equilibrium after a temporary disturbance. That is, the more rapidly the system returns to its equilibrium, the more stable it is. He concluded that resilience and stability are two important properties of an ecological system. Therefore, in this context, a system can be very resilient but still fluctuate greatly; that is low stability. Two decades later, Holling revisited his definition, and redefined the concept of resilience as a buffer capacity or the ability of a system to absorb perturbation, or the magnitude of the disturbance that can be absorbed before a system changes its structure by changing the variables (Holling et al., 1995).

Some authors include *the notion of adaptation* in their definitions. When the notion of adaptation is featured in the definition of resilience, especially with respect to a system, it becomes more of a process oriented, which has important implications to policies (Manyena, 2006). This means that a social system can reorganize itself to maintain essential structure and process within a coping and/ or adaptation process. Thus the notion of adaptation is desirable because it increases capacity for learning and coping.

Some authors link the concept of disaster resilience to *the concept of sustainability,* which refers to a long term survival at a non-decreasing quality of life. The major feature of sustainability is that it highly depends on natural resources (Smith, Simard, and Sharpe, 2001). The notion of suitability is then desirable because it facilitates more sustainable use of community resources.

In some cases resilience is also understood as *the opposite of vulnerability.* This means that where social vulnerability is high the level of resilience tends to be low, and vice versa. As Klein et al. (2003) noted, the problem of defining resilience in this fashion is that it lends itself into the circular reasoning that a community is vulnerable because it is not resilient and it is not resilient because it is vulnerable. Conceptualizing resilience in this way may not be desirable because it does not add much to our understanding.

The abundance of definitions of disaster resilience and the fact that this concept is shared by many disciplines makes it difficult to have a common definition. Therefore, it is important to set a working definition that will form a basis for discussion in this paper. However, this does not mean that the definitions suggested in the literature are wrong. In this paper the concept of community disaster resilience is referred to as the capacity or ability of a community to anticipate, prepare for, respond to, and recover quickly from impacts of disaster. This means that it is not only the measure of how quickly the community can recover from the disaster impacts, but also the ability to learn, cope with or adapt to hazards. Thus, resilient communities should be organized in such a way that the effects of a disaster are minimal and the recovery process is quick.

2.3 Community Resilience

The notion of community is difficult to define owing to the complexity of its meanings (Norris et al., 2008); its dynamic nature, with individuals of different socio-economic backgrounds moving in an out for different reasons; and the influence of external linkages with political and global networks within which the community thrives (Twigg, 2009). Cutter et al. (2008) viewed communities as *'the totality of social system interactions within a defined geographic space having different levels of vulnerability and resilience that could result in recovery disparities' (p.599)*.

Communities are bounded by a network of cultural, economic, political, social, environmental, and geographical conditions in which people live (McEntire, 2001; Pelling and Uitto, 2001; Wisner, et al., 2006; Buckle et al., 2001). As such, these factors are considered to be drivers of community resilience. Community resilience is therefore a multi-faceted concept that has several components that are themselves networked (Bosher et al., 2009). This definition makes it difficult to measure and quantify community resilience. According to Cutter et al. (2008), community resilience can be evaluated by the use of indicators that relate to the type of resilience (social, economic, environmental, infrastructure, and community competence). It is generally accepted that the integration of more dimensions, such as psychological aspects (Whittle et al., 2012), culture, environment, and health, among

the list of indicators can positively contribute to raising the level of measured resilience (Schelfaut et al., 2011) and can help identify the types of resilience that need to be reinforced during the recovery process. A weakness in one component of resilience will have a negative effect on the other components, hence reducing the overall resilience of the community.

Schelfaut et al. (2011) applied the concept of resilience to study the impacts of floods on communities in Europe. They used quantitative data from three case studies and structured interviews with key institutions and residents to evaluate community resilience. The study emphasized the importance of the local knowledge of residents in flood risk management. Ferdinand et al. (2012) assessed the levels of vulnerability and resilience of four Windward Island communities in the Caribbean. This assessment was based on a questionnaire survey at the household level, on semi-structured interviews, and on information obtained from the key stakeholders involved in community development and disaster management. The study used both qualitative and quantitative approaches to assess the social and community competence aspects of community resilience.

Lopez-Marrero and Tschakert (2011) carried out participatory activities in Puerto Rico that encouraged the social learning of affected communities by using the technique of 'mapping out' the causes of flood in their area. The findings suggest that enhancing community resilience required on-going support, building on existing knowledge, and collaboration between the community members and institutions engaged in integrated flood management. Participatory activities therefore involved the integration of local knowledge into flood DRR (Mavhura et al., 2013). In the current study, a qualitative method of analysis is used in addition to a quantitative method. The indicators are social, economic, institutional, psychological, and community competence.

2.4 Factors of Community Resilience towards Flood

2.4.1 Vulnerability

The concept of vulnerability has its roots in geography and natural hazard research, but the term is used in a variety of other research contexts (Füssel, 2007) and in various disciplines. Consequently, the definition of vulnerability has become blurred (Adger, 2006) with no universally accepted definition (Cutter, 2006). In the context of hazard, the concept of vulnerability was traditionally used to denote the degree of exposure and the fragility of the exposed elements. The concept gained prominence with the advent of an increasing number of hazards affecting a greater number of people (Westgate and O'Keefe, 1976).

Other than that, vulnerability is a set of prevailing or consequential conditions, which adversely affect people's ability to prevent, mitigate, prepare for and respond to hazardous events. These long-term factors affect a household or community's ability to absorb losses after disaster and to recover from the damage. Vulnerabilities precede disasters; contribute to their severity, impede disaster response, and may continue to exist long after a disaster has stuck. According to Anderson and Woodrow (1990), vulnerabilities can be categorized into three areas which are:

I. Physical/ material vulnerability. For example, poor people who have few physical and material resources usually suffer more from disasters than rich people. People who are poor often live on marginal lands; they don't have any savings or insurance; they are in poor health. These factors make them more vulnerable to disasters and mean that they have harder time surviving and recovering from calamity than people who are better off economically.

II. Social/ organizational vulnerability. People who have been marginalized in social, economic or political terms are vulnerable to suffering from disasters whereas groups, which are well organized and have high commitment to their members, suffer less during disasters.

Weakness in social and organizational areas may also cause disasters. For example, deep divisions can lead to conflict and war. Conflict over resources due to poverty can also lead to violence. A second area of vulnerability then, is the social and organizational aspect of a community.

III. Attitudinal/ motivational vulnerability. People who have low confidence in their ability to affect change or who have "loss heart" and feel defeated by events they cannot control, are harder heat by disasters than those who have a sense of their ability to bring the changes they desire. Thus, the third area of vulnerability is the attitudinal and motivational aspect.

2.4.2 Exposure to Hazards

Several factors are responsible for exposing people to risk. These include land use for construction and infrastructure and the expansion of urban areas to accommodate incoming people in search of a better livelihood (Wisner et al., 2006). Furthermore, many activities (e.g. deforestation and urbanization) that humans undertake may modify the fragile surroundings in which they live and trigger events that become a threat, resulting in increased risk and vulnerability for them (Wisner et al., 2006). In both industrialized and developing countries, when a disaster strikes, the impact is felt differently by groups of people with varying levels of preparedness, resilience, and capacity to recover. Similarly, even within the same locality, vulnerability may vary from one socio-economic group to another (Werritty et al., 2007a). People with progressively lower capacities to anticipate, cope with, resist, and recover from disaster have progressively higher vulnerabilities (Schroeder and Yocum, 2006). In developing countries, however, it is often the poor people who are the most exposed to hazards due to improper land use, low assets, and marginalization (Wisner et al., 2006).

2.4.3 People are Aware of the Risks of Disaster

Illusions of invulnerability often inhibit planning for a natural hazard. In other words, people, especially those who have never been in a disaster, have a tendency to underestimate their risk from natural hazards (Greening and Dollinger 1992). The insured (often underinsured) may believe that they have a safety net and rationalize away the need to plan further regarding the threat of future impact. The uninsured, many of whom live in poverty, may be unable to plan beyond day-to-day living and/or may live in a continuous state of disaster.

2.5 Malaysia Government and NGO Efforts in Building Resilient Community

The top-down approach is a common method applied in hazard risk reduction management. It involves reducing vulnerability and managing risk (Ingledon, 1999) by applying *structural* and *non-structural* measures. Structural measures in relation to hydrometeorological hazards include engineering work, such as the building of waterways, levees, and wind-resistant buildings. Strategies involving structural measures for adaptation to sea-level rise through the construction of seawalls and levees have proved to be inefficient and have led to more disasters (Kates et al., 2006). Non-structural measures include early warning systems, emergency relief operations, insurance cover, education, capacity building, and awareness raising (UN/ISDR, 2005). Risk assessment and early warning systems are essential investments that protect and save many lives and livelihoods, and much property, contributing to the sustainability of development. In addition, these are far more cost-effective as they involve strengthening coping mechanisms rather than relying primarily on post-disaster response and recovery.

According to Hamid, Roslan, and Dul (2015) in Strategic Framework towards Flood Resilience in Malaysia, the Malaysian Government has and will continue to take action, to provide the badly needed help and restoration services for damaged facilities. Currently, several steps that have been taken by the Government include:

I. Rebuilding communities through partnerships with the local universities, NGOs and faith-based organization;

II. Repairing and strengthening infrastructures including restoring energy, water and communication infrastructures;

III. Rebuilding the local economy and protecting workers;

IV. Restoring the environments and parks including removing debris;

V. Providing health care, social services, food and education including medicines and education materials;

VI. Preventing waste, fraud and abuse;

VII. Providing immediate recovery and relief which includes providing immediate housing, health and other essential services; and

VIII. Better preparedness for future storms and floods.

2.6 Community Participation in Mitigation, Preparedness, Response, and Recovery Activities

A report by UN/ISDR (2005) stated that disasters cannot be prevented but that the risks associated with them could be mitigated or reduced by developing suitable coping and adaptation strategies or resilience. In line with the findings of the report, the UN/ISDR adopted in 2005 the *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters* (UN/ISDR, 2005). The framework was expected to encourage nations to involve communities in recovery within the context of DRR management (UN/ISDR, 2005). It is used operationally by several governments in recovery following disasters. For example, this approach is being applied in Australia to build or strengthen community resilience. The shift is from a previous top-down approach to risk

reduction (Haque and Etkin, 2005) to a more innovative approach where recovery is seen not '*simply as the replacement of what has been destroyed and rehabilitation of those affected*' but seen as '*the coordinated process of supporting affected communities in the reconstruction of the built environment and the restoration of emotional, social, economic, built and natural environment wellbeing'* (Carey, 2011, p.17). This approach should lead to reducing vulnerability, building more robust resilience, and ensuring a faster and fuller recovery.

Other than that, a central reason for focusing on resilience at the community level is because most disasters are local and affect communities differently. Communities are unique and have their own local needs, experiences, resources, and ideas about prevention of, protection against, response to, and recovery from disasters. Furthermore, Schelfaut et al. (2011) suggested that community participation in flood mitigation plays an important role in promoting resilience but has not been widely practiced as it has been considered to be an unimportant activity by institutions where a top-down approach to flood management is still prevalent. The bottom-up approach takes into account the community's perspective, lay knowledge, andstakeholders' views at all levels in building community resilience.

Lay knowledge is sometimes known as '*indigenous knowledge'* or '*traditional knowledge'* and is also described as '*common knowledge'* or '*local knowledge',* which has been acquired by local people and handed down from one generation to the next (Mavhura et al., 2013). It was found that local knowledge played an important role as *'tangible evidence*' (Scammell et al., 2009; McEwen and Jones, 2012) in coping strategies and in building community resilience to floods in Zimbabwe (Mavhura et al., 2013). Mercer et al. (2007) stated that local knowledge was often excluded in decision-making processes and suggested the need to integrate lay knowledge with the expert knowledge of the development agencies of governments, which rely mostly on scientific evidence (Scammell et al., 2009) in disaster risk management. Similarly, Cottrell (2005) emphasized the importance of complementing experts' knowledge with lay knowledge, but the role of all stakeholders in the recovery process should also be acknowledged as a crucial element in community resilience building (Lopez-Marrero and Tschakert, 2011).

According to bottom-up theory developed, it aims to encourage a process of public participation in every aspect of policy formation and evaluation. This theory was developed by Hanf, Hjern and Porter in 1978, which emphasizes the involvement of local, regional and central planning, financing and implementation of government programs and non-governmental. Bottom-up approach is used to assess and develop policies that come from the efforts of the subordinate, the individual or of the people's problems itself (Howlett, Ramesh, & Perl, 2003).

In fact, this approach starts from the grassroots to support the implementation of the policy and strategy because without the support of the executive, operational implementation of the policy would be inefficient (Nevill, 2004). Quarantelli (1991) has also suggested that policy makers should seek the views of the executive and the community to analyse and make plans for disaster relief in the future in line with the philosophy of designing for people not to the government. Most governments still do not take cognizance of the people views of assistance provided, whether successful or not policies are implemented (Hofmann, Roberts, Shoham, & Harvey, 2004).

Roosli and O'Brien (2011), in a study related to the flooding in Malaysia policies has stated that the policies were formed in Malaysia for flood disaster management is based on the top-down theory is failed to meet the demands of the victims. Even Chan (2012) in studies on flood risk management was also argued that using the top-down theory, which developed and implemented the policy does not become effective because the government will only act after a disaster occurs without preparing in advance to take the perception of the community related policy really necessary. This is because the policy is established based on top-down theory is not effective and should be changed to a bottom-up theory to get a perception of the victim itself about policy implementation and implications of the disaster to them.

According to this theory, the detailed information regarding the needs of victims can be obtained from the grassroots based on the perceptions and complaints from the victims themselves. In addition, it can be assumed that making a decision to carry out the distribution

of disaster relief and post-disaster stage will be more effective and comprehensive approach is bottom-up.

2.7 New Approach to Community Flood Education

Using evidence-based research, a new approach to community flood education is promoted below that is viewed as potentially more appropriate and effective than most previous education programs. The new approach involves changes to the following aspects of community flood education:

2.7.1 The participation of the learners

2.7.2 Links with the 'flood cycle'

2.7.3 Evaluation of flood education programs

2.7.4 Links with other flood mitigation and resilience-building plans and methods

2.7.1 The Participation of the Learners

The traditional approach is based on the premise that raising individual awareness will lead to preparedness and response behaviors. According to Paton et al. (2003), 'It is frequently assumed that providing the public with information on hazards and their mitigation will encourage preparation. This assumption is unfounded.' Several researchers, such as Boura (1998), have demonstrated that there is not a strong and causal link between receiving information and acting appropriately for hazards.

A more participatory approach to community flood and other hazard education is now being promoted. According to Paton (2006b), 'Participation in identifying shared problems and collaborating with others to develop and implement solutions to resolve them engenders

the development of competencies (e.g. self-efficacy, action coping, community competence) that enhance community resilience to adversity.'

In a national review of natural hazard community education, awareness and engagement programs for the Australian Government, Elsworth et. al. (2009) promote active community participation as part of their model for effective programs. They stress programs 'would be greatly improved if they involved active community participation during their development and implementation. Levels of community participation of this kind that move towards wide consultation, collaborative development of activities and programs and democratic forms of policy-related decision-making require conscious design, considerable effort in implementation and on-going evaluation'.

In this more participatory approach, emergency management agencies act more as facilitators to communities rather than directing change in a top-down manner. They also can help the community build capacity (e.g. networks, leadership, competencies) for preparedness, response and recovery.

Based on this preferred participatory approach, there are implications for the type of community education resources produced by emergency management agencies. The research favors those education resources that help people actively develop their own plans for flooding rather than ones that simply provide awareness information. These education resources should be tools for the engagement of people, families, businesses and communities in deciding on their own way to prepare for, respond to and recover from a flood.

Another approach to community education and behavior change that is relatively recent is Community-based Social Marketing (CBSM). Developed by Canadian psychologist Dr Doug McKenzie-Mohr, CBSM is 'an attractive alternative to information intensive campaigns. In contrast to conventional approaches, community-based social marketing has been shown to be very effective at bringing about behavior change. Its effectiveness is due to its pragmatic approach. This approach involves: identifying barriers to a sustainable

behavior, designing a strategy that utilizes behavior change tools, piloting the strategy with a small segment of a community, and finally, evaluating the impact of the program once it has been implemented across a community' (CBSM web page: www.cbsm.com). The approach has been largely untried with community flood education.

As noted above, community resilience not only includes preparedness but also systems and competencies required by people and communities to coordinate and utilize these behaviors. Capacity building (e.g. building leadership, networks, partnerships) and skill training (e.g. of staff, volunteers) are important mechanisms in developing these non-behavioral aspects of community resilience and each have their own set of leading practices.

2.7.2 Links with the 'flood cycle'

As for other floodplain management and emergency management activities, community flood education should link to the pre-flood/flood/post-flood cycle that governs the PPRR model. Related to the 'flood cycle,' there are four functions of flood education in building flood resilient communities which are:

I. Preparedness conversion. Helping people, organizations and communities learn how to commence and maintain preparations for flooding;

II. Mitigation behaviors. Learning what to do before, during and after a flood;

III. Adaptive capability. Learning how to change and maintain social systems and build community competencies (e.g. skills, leadership) to minimize the impacts of flooding; and

IV. Post-flood learnings. Learning how to improve 1, 2 & 3 above (i.e. preparedness levels, mitigation behaviors and adaptive capabilities) after a flood event

Pre-flood or ‘preparedness’ education should aim to help people, organizations (e.g. businesses) and their communities commence and maintain preparations for flooding and to build competencies and systems to adapt to flood events. ‘Preparedness conversion’ is a prerequisite - especially in communities where preparedness levels are low for individuals, organizations and communities to commence preparedness planning and then to learn appropriate mitigation behaviors and how to improve their competencies and systems (‘adaptive capability’) to resist and recover from flooding. The education for ‘mitigation behaviors’ should occur prior to and immediately after a flood – but also could occur during a flood, if floodwaters rose slowly.

During the restoration after a flood, education has another important role in helping individuals, organizations and communities learn from their flood experiences (e.g. the effectiveness of mitigation behaviors and adaptive capability) and use these learnings for improvements in future flood events.

2.7.3 Evaluation of Flood Education Programs

Evaluation of flood education programs. Evaluation is a practical management tool for understanding and improving the performance of projects/programs, and demonstrating the impact of these projects/programs. According to Stevens, Gilbert and Elsworth (2008), ‘systematic monitoring and evaluation of community education, awareness and engagement programs for natural hazards is the exception rather than the rule. Some agencies have good systems for monitoring activities and the dissemination of information; however research into outcomes in terms of effectiveness of the information in changing attitudes, patterns of thinking, and behaviors is fairly scarce’.

There could be a variety of reasons for this relative lack of evaluation including time constraints, staff confidence in conducting evaluations and perceptions of the importance of evaluation e.g. the view that evaluation is an afterthought. It should be noted that evaluation is a well-established field and there are numerous program evaluation frameworks that can be adapted for community flood education. A few attempts have been made to design

evaluation frameworks for community flood education programs. Dufty (2008b) developed a framework for evaluating community flood education programs based on an evaluation technique known as the 'program logic model'.

Social research (e.g. surveys, focus groups) is an important tool in collecting community data (e.g. awareness, preparedness, response) that can inform an evaluation framework. Although relatively scant at this stage, there are some evaluations in flood and other hazard community education that can provide learnings to help identify leading education practice.

2.7.4 Links with Other Flood Mitigation and Resilience-Building Plans and Methods

Many flood education programs have been developed and implemented in isolation of floodplain and emergency management plans. Community flood education should be integrated with leading practices in floodplain management and emergency planning as it is part of building resilience through these processes. For example, community flood education plans should be part of local flood plans. An understanding of flood risk and community vulnerability in relation to this risk should be factors in the design of appropriate local flood education activities.

Gissing, Keys and Opper (2010) stress that 'community education is an essential part of any flood warning system as there is a positive linkage between community preparedness and warning systems. Well prepared communities respond better to emergency warnings and improve the effectiveness of these systems.' They add that 'community education is particularly vital in flash flood environments, where flooding may occur quickly without official warnings being received by affected communities, requiring community members to respond appropriately to environmental signals alone. Education is critical in ensuring that the community is able to recognize environmental signals and respond appropriately.

Some researchers (e.g. Finnis, 2004) support a cross-hazard approach to community education where appropriate. This would mean that flood education would be part of general hazard education programs if there is a complex hazards cape (i.e. range of hazard risks). The benefits of this approach include:

I. Economies of scale for managers from integrating education programs across hazards;

II. Reinforcement of preparedness behaviors where there are similar behaviors required across hazards;

III. Use of single community preparedness groups for all hazards; and

IV. Building other community capacity (e.g. competencies, leadership) across hazards.

2.8 Enhancing Disaster Preparedness for Effective Response and to "Build Back Better" in Recovery, Rehabilitation and Reconstruction

According to Sendai Framework for Disaster Risk Reduction 2015-2030, the steady growth of disaster risk including the increase of people and assets exposure combined with the lessons learned from past disasters indicates the need to further strengthen disaster preparedness for response, take action in anticipation of events, integrate disaster risk reduction in response preparedness and that ensure capacities are in place for effective response and recovery at all levels. Empowering women and persons with disabilities to publicly lead and promote gender equitable and universally accessible response, recovery rehabilitation and reconstruction approaches are key. Disasters have demonstrated that the recovery, rehabilitation and reconstruction phase, which needs to be prepared ahead of the disaster, is a critical opportunity to build back better, including through integrating disaster risk reduction into development measures, making nations and communities resilient to disasters.

2.8.1 National and Local Levels

To achieve this, it is important to:

I. Prepare or review and periodically update disaster preparedness and contingency policies, plans and programs with the involvement of the relevant institutions, considering climate change scenarios and their impact on disaster risk, and facilitating, as appropriate, the participation of all sectors and relevant stakeholders;

II. Invest in, develop, maintain and strengthen people-centered multi-hazard, multisectoral forecasting and early warning systems, disaster risk and emergency communications mechanisms, social technologies and hazard-monitoring telecommunications systems. Develop such systems through a participatory process. Tailor them to the needs of users, including social and cultural requirements, in particular gender. Promote the application of simple and low-cost early warning equipment and facilities and broaden release channels for natural disaster early warning information;

III. Establish community centers for the promotion of public awareness and the stockpiling of necessary materials to implement rescue and relief activities;

IV. Ensure the continuity of operations and planning, including social and economic recovery, and the provision of basic services in the post-disaster phase;

V. Promote regular disaster preparedness, response and recovery exercises, including evacuation drills, training and the establishment of area-based support systems, with a view to ensuring rapid and effective response to disasters and related displacement, including access to safe shelter, essential food and non-food relief supplies, as appropriate to local needs; and

VI. Promote the incorporation of disaster risk management into post-disaster recovery and rehabilitation processes, facilitate the link between relief, rehabilitation, and development. Use opportunities during the recovery phase to develop capacities that reduce disaster risk in the short, medium and long term, including through the development of measures such as land use planning, structural standards improvement and the sharing of expertise, knowledge, post-disaster reviews and lessons learned. Integrate post-disaster reconstruction into the economic and social sustainable development of affected areas. This should also apply to temporary settlements for persons displaced by disaster.

Therefore, there has to be a broader and a more people-centered preventive approach to disaster risk. Disaster risk reduction practices need to be multi-hazard and multisectoral based, inclusive and accessible in order to be efficient and effective. While recognizing their leading, regulatory and coordination role, Governments should engage with relevant stakeholders, including women, children and youth, persons with disabilities, poor people, migrants, indigenous peoples, volunteers, the community of practitioners and older persons in the design and implementation of policies, plans and standards. There is a need for the public and private sectors and civil society organizations, as well as academia and scientific and research institutions, to work more closely together and to create opportunities for collaboration, and for businesses to integrate disaster risk into their management practices.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers on methodology in research design, study population, sampling size, sampling strategy, sampling method, data collective technique, validity and reliability, data analysis, research ethics, and summary.

3.2 Research Design

The research design applied in this study was descriptive study which also referred as cross-sectional study. In a cross-sectional study, the researcher measured the outcome and the exposures in the study participants at the same time or in other words, it was a type of observational study that analyzes data collected from a population, or a representative subset, at a specific point in time. This study was being done according to the Gantt chart that has been attached in Appendix A.

3.2.1 Quantitative

The quantitative approach was helpful in studying statistically the characteristics of the people and in analyzing spatial issues, providing information on '*who*' and '*where*' the people at risk. A quantitative approach was employed to explore the perceptions of households on community vulnerability and resilience towards flood hazards.

In this study, questionnaire has been used to recognize the influencing factors of the community to be more resilient towards flood. Other that, questionnaire was being used to identify the community participation in mitigation, preparedness, response, and recovery activities.

3.2.2 Qualitative

Qualitative approach to research relied more on language and description and the interpretation of the meaning of the findings. Davies (2007) considered that people explain and shape the world in the light of their own experiences, attitudes, and beliefs .This phenomenological approach took into account the perspectives and lived experiences of an individual in an everyday world.

In this study, semi-structured interviews data was employed to capture information or to find out their specific responsibilities with regard to resilience building measures. Therefore, a qualitative methods enabled the researcher to gain insight into the social world and to study its complexities and restraints through the use of different tools such as interviews, notes, photographs, and audio/video recordings.

3.3 Research Area

The research area in this study was conducted in Pasir Puteh, Kelantan which has an area of 433.8 square kilometers (167.2 square miles). There were ten administrative territory in Kelantan and Pasir Puteh was one of them whereas the other nine known as Kota Baharu, Pasir Mas, Tumpat, Pasir Puteh, Bachok, Kuala Krai, Machang, Tanah Merah, Jeli and Gua Musang. Pasir Puteh is a city that exists between the two rivers, namely Rassau River and Semerak River. Pasir Puteh consisted of eight districts, namely Padang Pak Amat, Bukit Abal, Bukit Awang, Bukit Jawa, Gong Datuk, rafting, Limbongan and Semarak. The district that involved in this study was in Selising as it was the most affected district hit by flood.

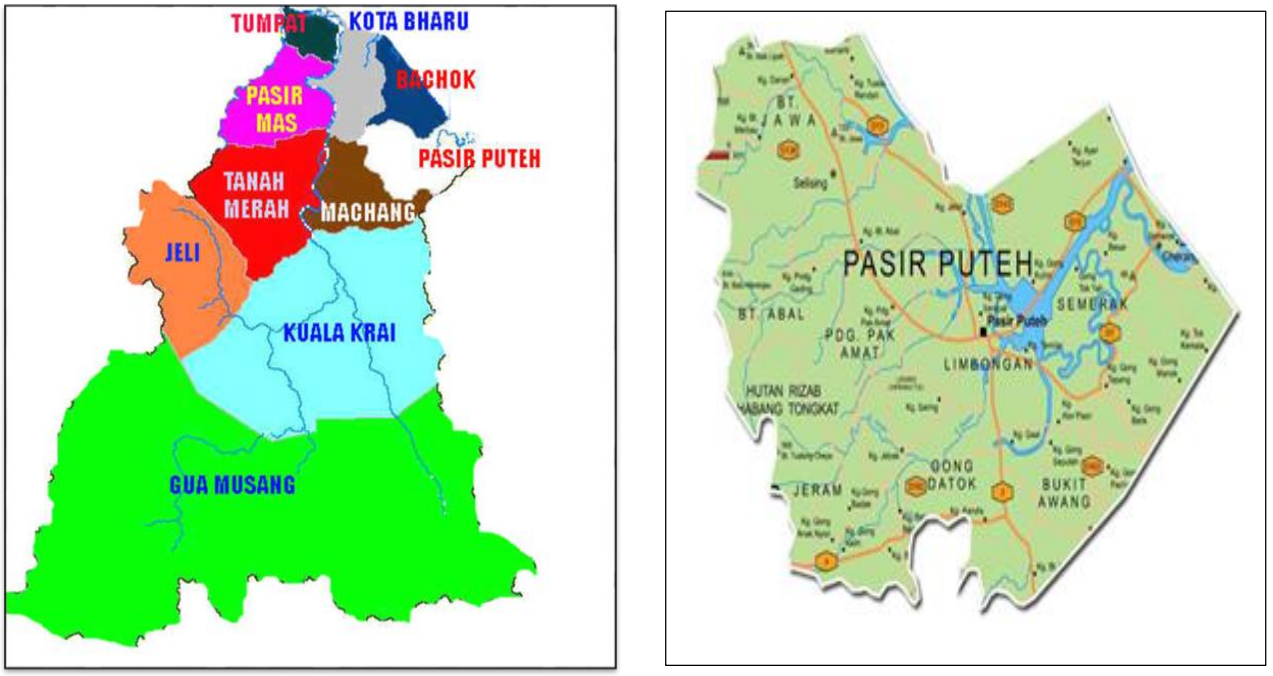

Figure 3.1: Pasir Puteh, Kelantan maps

3.4 Study Population

Populations involve in this study were basically the communities from the most affected district in Pasir Puteh, Kelantan. The objective to reach this communities was to determine community participation in mitigation, preparedness, response, and recovery activities to build resilient community towards flood. Other than that, it was also to determine the influencing factors of community to be more resilient towards flood in Pasir Puteh, Kelantan. Non-governmental organizations (NGO) or specifically Bantuan Bencana NGO (BBNGO) was involved in this study in order to identify NGO efforts to build resilient community towards flood in Pasir Puteh, Kelantan.

3.5 Sampling Size

In this study, the sample selection of subjects in population do not have equal chances to be selected as research respondents, and this kind of sampling was called as non-probability sampling. The researcher selected a sample based on specific characteristics and subjects without these characteristics were not being selected from the population. Sample size in this study were consisted of communities from Selising, Pasir Puteh which has been adversely hit by flood. According to the information of locality involved with flood which was obtained from village head, the population involved with flood in Selising, Pasir Puteh were 120 which means the sample size were 92 based on Table 3.1 made by Krejcie and Morgan (1970).

Table 3.1: Table for determining sample size from a given population

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size.
S is sample size.

3.6 Sampling Strategy

This study was started with the selection of subjects in population from most affected territorial division in order to conduct and carry out the data collection regarding to this study. Since this study focuses on building resilience community efforts towards flood, the communities were selected from the most affected area in order to determine the level of resilience among them based on the efforts that they had been taken to be more resilient. Other than that, non-governmental organization which was directly involved in flood activities was being interviewed in order to gain more information on what they had been contribute to build resilience community towards flood.

3.7 Sampling Method

The sampling method was based on the researcher's knowledge of the communities who were living in a flood risk zone. It was therefore more appropriate to use a purposive sampling technique where specific groups of people were selected according to specific characteristics, such as, in this case, vulnerability to and resilience against flood risks.

3.8 Data Collection Technique

The following sections presented the quantitative and qualitative phase of data collection to capture information from participants and non-governmental organization. The methods or techniques employed were questionnaire and semi-structured interviews. Such techniques enabled the researcher to answer the first, second, and third research questions which were:

I. *What are the factors influencing community to be more resilient towards flood in Pasir Puteh, Kelantan?*

II. *How NGO make efforts to build resilient community towards flood in Pasir Puteh, Kelantan?*

III. *Is it community take part in mitigation, preparedness, response, and recovery activities in order to build resilient community towards flood?*

3.8.1 Questionnaire Survey

A Likert-style format was used to indicate to what extent the respondents would 'strongly agree', 'agree', 'neutral', 'disagree', or 'strongly disagree' to a question or statement. For each locality, the questionnaires were numbered separately and verified for completeness. Some aspects of consistency were checked. For example, the number of family members in each age group should have added up to the number of family members stated while the number of elderly persons should normally have been not more than two. After these simple verifications, the questions were suitably coded and then transferred to an SPSS format for quantitative analysis. The questionnaire used for this study was attached in Appendix B.

3.8.1.1 Structure of the Questionnaire

The questionnaire were drafted along these major themes in order to facilitate the process of collecting data relevant to the study:

(i) Household characteristics (age, family size, house ownership, education level). These factors influence the capacity of households to cope with, resist and recover from the impacts of natural hazards;

(ii) Experience of flood hazard;

(iii) Exposure to flood hazards; and

(iv) Resilience – coping strategies and adapting to floods.

3.8.1.2 Pilot Study

The main objective of designing a pilot study was to investigate and collect data from a group of individuals regarding their perception of the risks of flood hazards. The study by Houston et al. (2007) was first used as a guide to design the pilot questionnaire. The initial draft pilot questionnaire was designed to ensure the suitability and clarity of the questions and decide whether the sequences in the questioning were appropriate. The questionnaire for the pilot survey was attached in Appendix B. The purpose of the pilot survey was to test the questionnaire using a small sample of individuals living in ten of the case study areas. The survey was conducted among 10 inhabitants from the general flood zone which has the same characteristics of flood.

3.8.2 Semi-Structured Interviews

This section aimed to present the views of the non-governmental organization (NGO) on how they operate to reduce vulnerability, ensure rapid recovery, and develop community resilience to future disasters or in other words, the efforts that had been taken by them to build resilient community towards flood. Semi–structured interview was carried out to find out their specific responsibilities with regard to resilience building measures. The semi-structured interviews contained open-format questions. The NGO was free to give an account of their involvement in the mitigation, preparedness, response, and recovery phase of a flood disaster and their role in flood disaster management. The representative of NGO was being asked list of questions and the replies were recorded using a voice-recorder.

3.9 Validity and Reliability

For quantitative method, internal consistency was the best way to estimate reliability by grouping questions in a questionnaire that measure the same concept. One common way of computing values among the questions on your instruments was by using Cronbach's Alpha. Cronbach's alpha splits all the questions on your instrument every possible way. In the end, your computer output generated one number for Cronbach's alpha and just like a

correlation coefficient, the closer it is to one, the higher the reliability estimate of your instrument which has the alpha value greater than 0.70 (Hair et al, 2010).

Table 3.2: Internal consistency of Cronbach's Alpha

Internal Consistency	**Cronbach's Alpha**
Excellent	$\alpha \geq 0.9$
Good	$0.7 \leq \alpha < 0.9$
Acceptable	$0.6 \leq \alpha < 0.7$
Poor	$0.5 \leq \alpha < 0.6$
Unacceptable	$\alpha < 0.5$

The findings from qualitative method was then integrated and checked for consistency by triangulation. When the sample size in a qualitative research were small, data triangulation was used to improve the reliability of the research. Triangulation was a technique used by surveyors, but it has been adopted by social scientists to assess and enhance the validity of research findings (Modell, 2009). It enabled the researcher to verify and draw inferences from qualitative and quantitative findings (Östlund et al., 2011) that can be converged and assessed, meaning that plausible conclusions can be drawn.

3.10 Data Analysis

The task of handling and analyzing such a large amount of data in quantitative method was made easier by using SPSS Version 22 *(Special Package for Analyzing Social Science).* Both analysis of pilot and actual study were analyzed using this software.

3.10.1 Reliability Analysis

In order to ensure the reliability of the variables of this study, the Cronbach's Alpha internal consistency method was used. The value of Cronbach's Alpha for each variables were measured after conducting the pilot study to ensure the suitability and clarity of the questions and decide whether the sequences in the questioning were appropriate. The Cronbach's Alpha values are shown in Table 3.3 as followed which indicate 'Good' internal consistency. The SPSS output of reliability analysis of the questionnaire was attached in Appendix C.

Table 3.3: Reliability coefficients (Cronbach's Alpha) values

Cronbach's Alpha	N of items
0.736	37

Other than that, according to Patton (2002), the process of analyzing qualitative data was known for taking out rich information and narrowing it down into actual size. For the purpose of this study, no computer software was involved in data analysis. Qualitative data analysis in this research was being done manually due to a small sample size, complexity, and the possibility of losing sight of meaningful data.

Transcript of the interview as attached in Appendix D was analyzed manually, and the themes highlighted were grouped along the components of community resilience. As perceived by the non-governmental organization (NGO), the components that contributed most to community resilience were institutional, infrastructural, and community competence followed by economic and social and, lastly psychological as shown in Table 4.5.

3.11 Research Ethics

The ethical issues as stated in the Handbook of the University of Gloucestershire of the *Research Ethics: A Handbook of Principles and Procedures* (University of Gloucestershire, 2008) were strictly adhered to. The confidentiality and the anonymity of the households were ensured. The householder's name, income and ethnicity were not asked during the survey, thus reassuring the interviewees of privacy and respect. The principle of informed consent, whereby the person should be free to take part or refuse to answer, was observed throughout this study.

3.12 Research Methodology Framework

The Figure 3.2 showed the flow diagram of research methods that has been done in this study.

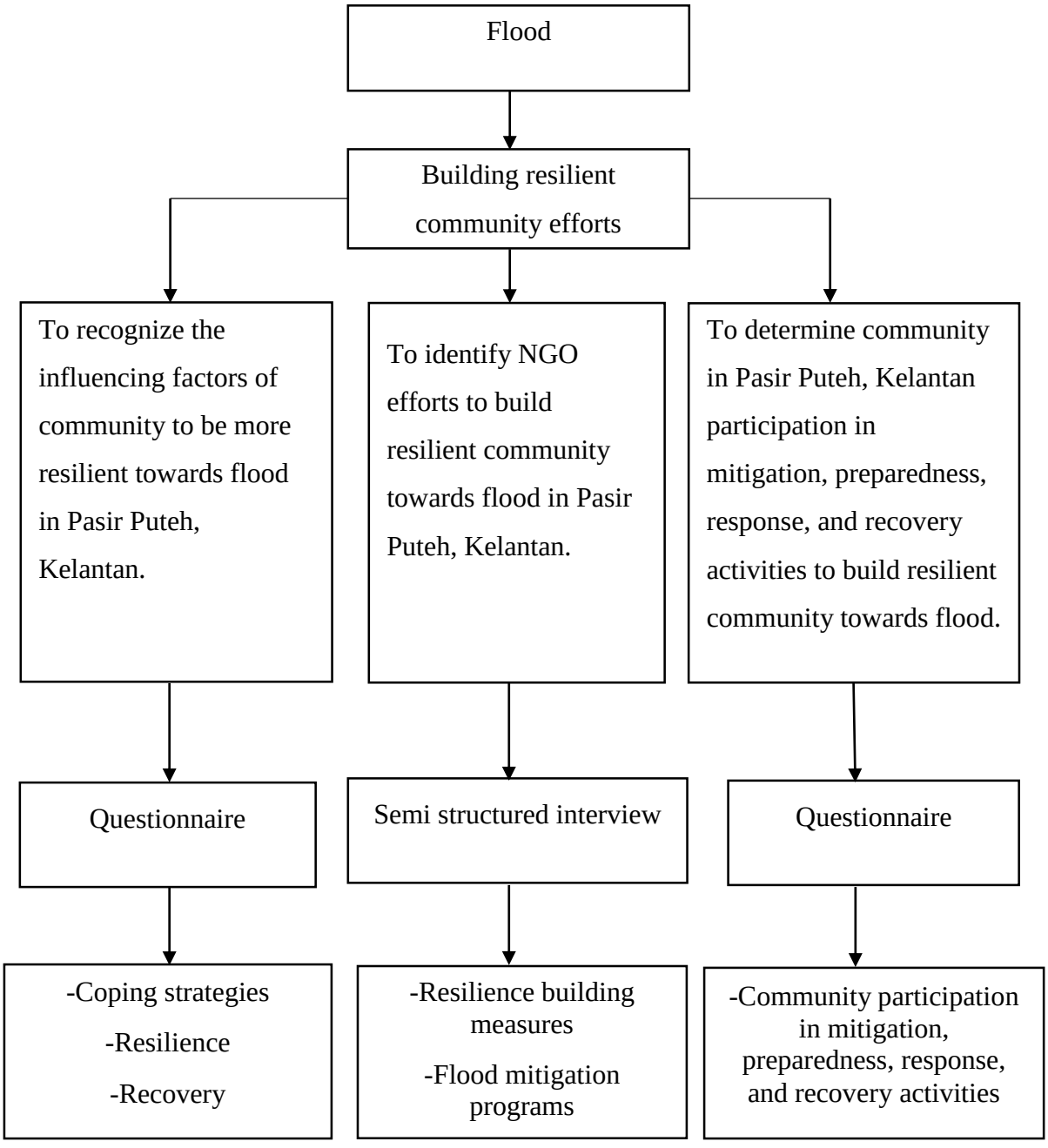

Figure 3.2: Flow diagram of research methods used in the study

3.13 Summary

This chapter has described and justified the methodologies that have been used. A framework of the research design was developed to illustrate the steps to be taken during the course of the research project. Questionnaires were being distributed for participants who were affected by flooding. Responses from the participants were then transcribed for quantitative analysis. Semi-structured interviews were carried out with NGO involvement to identify their efforts in building resilient community towards flood. The results of the questionnaires and NGO's interview were provided in the next chapter

CHAPTER 4

DATA ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents a descriptive analysis of the data that were obtained from the questionnaire. The answers provided by the households reflect mostly the perceptions of the respondents and relate mainly to research question I and III:

Research question I: What are the factors influencing community to be more resilient towards flood in Pasir Puteh, Kelantan?

Research question III: Is it community take part in mitigation, preparedness, response, and recovery activities in order to build resilient community towards flood?

Other than that, this section also presents the analysis of the information obtained from the semi-structured interviews on the efforts of non-governmental organization (NGO) in building resilient community towards flood. The analysis of the information collected through semi-structured interviews provides a holistic picture of flood mitigation efforts and contributes to addressing the research questions II:

Research question II: How NGO make efforts to build resilient community towards flood in Pasir Puteh, Kelantan?

The major themes explored in the questionnaire are as follows:

I. Household characteristics, which influence the capacity of households to cope with, resist and recover from the impacts of natural hazards

II. Flood experience and characteristics

III. Exposure to flood conditions

IV. Socio-economic conditions of households

V. Recovery (getting back to normal, short- and long-term assistance)

VI. Resilience - coping strategies and capability to adapt to flood

4.2 Household Characteristics

This section explores the household characteristics of the flood-affected group or community from Selising, Pasir Puteh, Kelantan that was selected for the case study .The number of households in the sample is 92, which comprises 487 members.

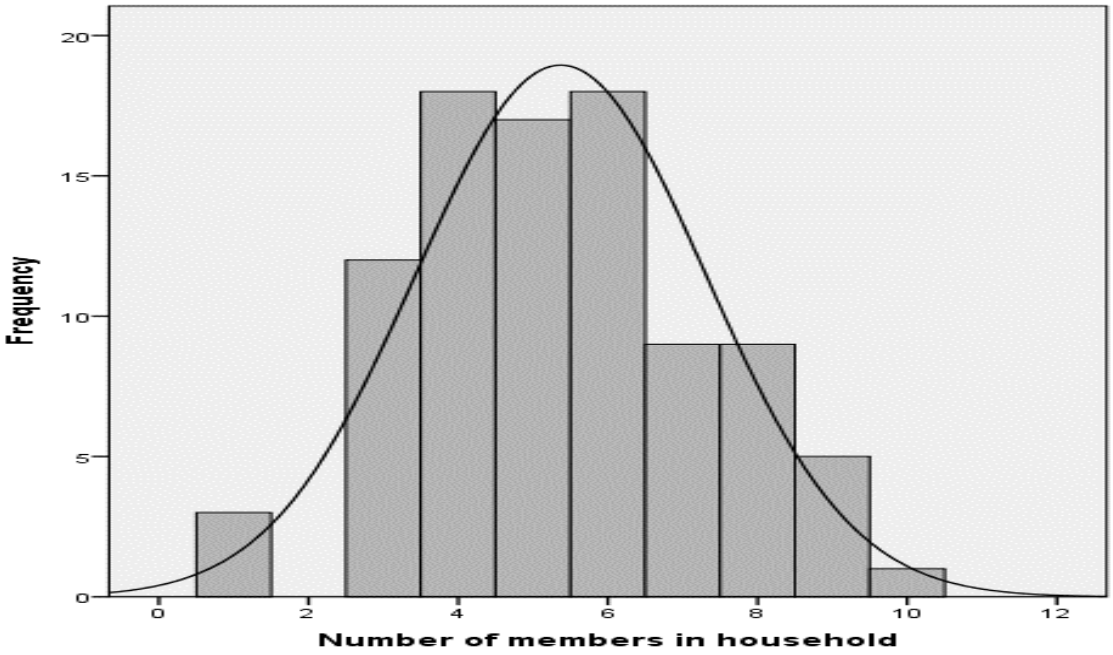

Figure 4.1: Frequency distribution of the number of members in Selising, Pasir Puteh households

I. Distribution of Number of Members by Households

The results of the analysis of the questionnaire survey found that the average number of members in each household was 5.4, with 52% (n=49) of households having more than 4 members as shown in Figure 4.1 and Appendix E.

II. Age Group of Household Members

The distribution of number of members by age group is given in Figure 4.2, which shows that 17.7% of members were children below the age of 14 years and 5.5% were elderly persons above 60; both groups are generally considered as vulnerable. In households with elderly persons in Selising, Pasir Puteh, the experience and local knowledge gathered on flood events over the years indicated some degree of inherent resilience.

In studies of older adults, strong social networks have been found to be associated with higher resilience levels (Adams, Sanders, & Auth, 2004; Easley, 2003; Felten, 2000; Garmezy, 1991; Hinck, 2004; Kinsel, 2005; Lamond et al., 2009; Montross et al., 2006). Hardy, Concata, and Gill (2004) assessed resilience in community-dwelling older adults who experienced a stressful event within the past 5 years and found that strong social support was not associated with resilience; however, living with others was associated with greater resilience. It appears that social networks may serve as a protective factor for individuals when faced with adversity.

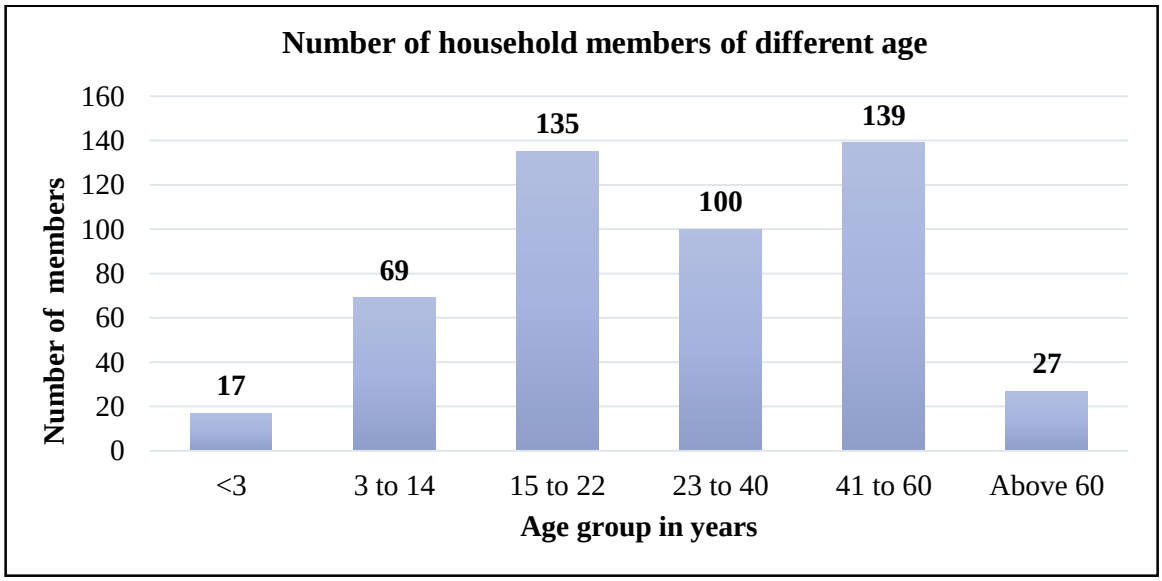

Figure 4.2: Number of Selising household members within different age groups

III. Householders' Level of Literacy

Out of the 92 households who responded, 13% had a level of literacy of up to primary level, almost 85% of up to secondary, and a few of up to tertiary level as shown in Table 4.1 and Appendix E. It is said that informed people interpret risk communication differently from ordinary people (Haynes et al., 2008), so this information can be used to investigate how households' level of literacy could influence their understanding of warning systems, preparedness, and coping capacity, and the use of science and technology in recovery, awareness, and resilience-building. Most households had a good basic level of literacy of up

to secondary school. In general, the groups that were more educated were found to be less vulnerable to flood hazards due to their greater awareness of flood risks compared to those with a lower educational level. In a study by Few and Pham Gia Tran (2010) households with a low level of literacy were not able to understand information and communications on health risks and health protection. Hence, resilience were increased as the community were educated enough to understand or took actions that could result in resilience building.

Table 4.1: Level of literacy of householders in Selising, Pasir Puteh

Householders' level of literacy household	Number of respondents	% of total respondents
Primary	12	13
Secondary	78	84.8
Tertiary	1	1.1
None	1	1.1
Total respondents	92	100

4.3 Influencing Factors of Community to be More Resilient towards Flood in Pasir Puteh, Kelantan

This section discusses the findings from the analysis of the quantitative data as responses to Research Question I.

4.3.1 Experience of Flood Hazard

I. Frequency of Flood Hazard

The experiences of flooding as shown in Table 4.2 and Appendix F over the period of three years prior to the survey, as recalled by the 92 respondents, were: more than 95% of householders that responded agreed or strongly agreed to having experienced a flood during the period, 80% agreed or strongly agreed to having experienced more than one flood, and

about the same percentage agreed to having experienced a flood every year. The results of the survey showed that the communities were more likely to experience flooding as they lived in flood risk zones, wetland areas, along river banks, and close to stream. They were thus more vulnerable and more liable to encounter both tangible and intangible impacts.

In a survey in Illinois, USA, 68% of 1236 respondents had spent some money on some kind of flood protection. The willingness to spend some money on some kind of flood protection indicates that the communities were moving towards resilience state.

Table 4.2: Experience of flooding as expressed by households in Selising, Pasir Puteh

Experience of flood	**Number of respondents**	**Agreement scale in percentage**					
		Strongly agree	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**	**Total**
In past 3 years	92	80.4	19.6	0.0	0.0	0.0	100
More than once in past 3 years	76	22.8	57.6	2.2	13.0	4.3	100
Every years in past 3 years	72	60.9	25.0	12.0	1.1	1.1	100

4.3.2 Exposure

I. Living with Flooding

Most of the householders in the sample surveyed had different reasons for living in a wetlands area as shown by Table 4.3 and Appendix G. Some lived there because of job proximity, others due to the closeness of relatives and their own choice. A high proportion

of householders (53% of n=49 respondents) settled there as close to their relatives. Responses from the questionnaire survey showed that most householders occupied flood risk zones largely by the closeness to their relatives and were aware of their vulnerability. Some coping strategies were practiced during flood events, but their effectiveness depended mostly on the availability of resources.

Regarding on the analysis, it was found communities were aware of their vulnerability towards flood, but due to the job proximity, close to relatives, and also on their own choice, they were still live there. However, since they practiced some coping strategies due to flood event, it could be said that they were in resilience state. This could be proved as some authors like to define resilience as the opposite of vulnerability, meaning that high levels of vulnerability imply a low resilience and vice-versa (Timmerman, 1981; Cannon, 2008; Adger, 2000; Shaw, 2006). Others consider that resilience and vulnerability are not opposing concepts but that resilience may be linked to vulnerability. For example, Buckle et al. (2001) considered that a person may be vulnerable to flooding but may have resilience in terms of having enough personal skills to rebuild and recover. Similarly, in a study by Akter and Mallick (2013), it was found that highly vulnerable poorer household groups were more resilient and better able to withstand disaster shock than were heir well-off neighbours. In such cases, resilience is taken to be clearly related to the response capacity, which is a component of vulnerability, and thus it would not be the opposite or 'flip side' of vulnerability (Gallopin, 2006; Folke et al., 2006; Cutter, 2006).

Table 4.3: Reason given by householders in Selising, Pasir Puteh for living on site

Reasons given by households for living on site	**Number of respondents (n)**	**% of responses**
Job proximity	12	13.0
Close to relatives	49	53.3
Own choice	31	33.7

4.3.3 Socio-Economic Conditions of Households

I. Land Occupation and House Ownership

Of the 92 householders that responded, some 98% owned land, and about 98% (n=92) had built houses as shown Table 4.4 and Appendix G. About 2 householders (2% of all householders) lived in rented houses or in temporarily built shelters on rented lands. The data analysis showed that an existing of socio-economic conditions regarding on communities housing conditions. The majority of the community in Selising, Pasir Puteh lived in houses they owned but were equally exposed to flood conditions.

Socio-economic status was a significant predictor in pre and post disaster stages, as well as for the physical and psychological impacts. For example, poor people were less likely to prepare for disasters or buy insurance, but they have proportionally higher material losses and face more obstacles during the phases of response, recovery and reconstruction (Fothergill & Peek, 2004). A recent study from Japan showed that the residents' preparedness for floods depends on the ownership of a home, fear of flooding and the amount of damage from previous floods, rather than on previous experiences with and anticipation of floods. (Motoyoshi *et al*.,2004). Thus, land occupation especially house ownership was a strong influencing factor of the community to be more resilient towards flood since they were more prepared towards flood.

Table 4.4: Land and house ownership in Selising, Pasir Puteh

	Number of respondents (n)	**% of total household**
Own the land	90	97.8
Own the house	90	97.8
Live in low-cost housing renting	2	2.2
Live on rented land	2	2.2

4.4 NGO Efforts to Build Resilient Community towards Flood in Pasir Puteh

This section presents the analysis of the information obtained from the semi-structured interviews on the efforts of non-governmental organization (NGO) in building resilient community towards flood. The analysis of the information collected through semi-structured interviews provides a holistic picture of flood mitigation efforts and contributes to addressing the research questions II:

- *How non-governmental organization (NGO) make efforts to build resilient community towards flood in Pasir Puteh, Kelantan?*

The semi-structured interview was conducted with BBNGO president in Kelantan which discussing on reducing vulnerability and in building the short- and long-term resilience that make up the community. The semi-structured interview was also meant to examine the responsibilities of the NGO, the arrangements they make, and the actions they take to reduce vulnerability and build resilience during the preparedness, response, and recovery phase. Their views on the role of science and technology and what the community itself could undertake to mitigate the impact of flooding were also sought.

Table 4.5: The types of resilience as defined by Cutter et al. (2008) and those redefined and adapted for the study

Types of community resilience	Definition of forms of resilience (Cutter et al., 2008, p. 604)	Re-definition of the types of resilience adapted from Cutter et al., 2008
Social	Demographic characteristics of the community, access to resource	Household characteristics, social network, equality, access to communication
Economic	Measure of property loss, business disruption	Property ownership, employment status, loss of belongings
Institutional	Organisations, communication technology, emergency response plans, leadership, 'command and control' measures	Engagement with local institutions for flood recovery, views on flood governance, community flood experience, flood characteristics
Infrastructure	Include the physical system, pipelines, road miles etc	House type, access to services, built environment, land use development, coping strategies
Community competence	Highlights population wellness, quality of life and well being	Living with flood risk, neighbourhood relationship, values and beliefs, local knowledge on flood
Psychological	-	Living with flood trauma, stress and uncertainties about the future

4.4.1 Social Resilience

From the analysis of the NGO's interview, it could be deduced that nearly all the NGO were focused on providing assistance and saving the lives of vulnerable persons during and immediately following a flood event. Those that were considered most vulnerable and least resilient to flood were households with a low and high income. The priority was on saving lives, as highlighted in the following statement:

'Our NGO or Bantuan Bencana NGO (BBNGO) was started in May 2014 and we work together on 26th December 2014. We combine a few NGOs together and currently we have 44 NGOs that commit with us which including national NGOs namely Medical Relief Society Malaysia (Mercy Malaysia), IKRAM Malaysia (IKRAM), AIR BANTU, Pertubuhan Amal Perubatan Ibnu Sina Malaysia (PAPISMA), MY CARE, Yayasan Amal, Royal Military College (RMC PUTERA), and many more. Therefore, our NGOs worked together to assist flood victims immediately during flood event and we called it as relief efforts. We made significant contributions in alleviating the immediate suffering of the victims stuck by flood as we provided fresh food, canned food that will be distributed from house to house by 4x4 ride.' (BBNGO president)

The analysis showed that those who were most concerned with short-term, long-term social aspects, and emergency assistance of community well-being were the non-governmental organizations (NGOs). NGOs that were engaged in the relief and emergency operations gave priority to assisting vulnerable households, especially those with children, or with disabled, sick, and elderly persons from life-threatening floods. In addition, while these actions helped save lives, they were effective as short-term and long-term measures during the recovery phase. The NGO would not leave the vulnerable communities alone to fend for themselves, but then they helped in many ways. Regarding long-term measures, the NGO was invested in structural such as house building for flood victims and encouraging community participation in flood risk reduction and in building resilience.

4.4.2 Economic Resilience

BBNGO president considered that addressing the adverse impacts of flooding was an important factor in building economic resilience among the communities. NGO gave priority to the factor of house ownership as part of the resilience building effort.

'For long term recovery, NGOs invested in structural such as house building for flood victims whereas for short term recovery, we did built temporary shelter for communities so that they could stay there for a while after facing with traumatic flood events that involving the loss or damage of their belongings especially their house.' (BBNGO President)

The analysis revealed that, in the relief and emergency stage of the recovery phase, a modest amount of assistance was provided to low and high income households since they have equal impact due to the flood event. Those who had lost some or most of their belongings were provided with some basic necessities and a small amount of cash to 'get back to normal'. After the initial support, NGO would not left themselves to meet their long-term needs and they tried to complete the recovery process. BBNGO president said that they have the resources to meet all the needs of the communities. Such costs involved extra expenses for cleaning, repairing, and maintaining the drainage systems before the next flood events. The NGO believed that their efforts should be coordinated with and supplemented by those of the communities, who should share the responsibility to deal with the deplorable state of the environment. Like the communities, the NGO felt that the distrust between them had to be addressed if synergy between the authorities and the community was to be achieved for mutual benefit.

4.4.3 Institutional Resilience

A few of the factors that were considered included assistance, and the role of science and technology.

I. Assistance

Several institutions were involved in providing assistance, which could be short or long term. It was considered as an important element in resilience building; however, most of the assistance was short-term in nature, primarily during the relief and emergency stage. In the relief and emergency stage of the recovery phase, a modest amount of assistance was provided to households who had lost some or most of their belongings. They were provided with some basic necessities to 'get back to normal'. However, after the initial support, they were assisted to meet long-term needs to complete the recovery process. This condition was gathered from the following extract:

'For recovery stage, we start to create or innovate a well where it can be used manually because at that time the electricity is not available for about two weeks. Therefore, in case of the electricity are still not there, flood victims can use it for their convenience.' (BBNGO President)

'Other than that, for long term recovery, NGOs invested in structural such as house building for flood victims. Then, we were also created a BBNGO strategic plan workshop a month after flood event which was on 7th February 2015. In that strategic plan, we have flag proclamation where we pledge that we need to work on it regarding of comprehensive safety operating procedures, disaster preparedness, and strengthening ties between the federal and state governments.' (BBNGO President)

II. BBNGO President's Opinions on the Role of Science and Technology in Disaster Mitigation and Resilience Building

Science and technology were considered by the BBNGO president as having an important role to play in the preparation, and timely dissemination. Regarding efficient and timely warnings, the following points were raised:

'Flood victims informed us about floods at their places via telephone calls. Upon receiving call from them, the first thing that we need to do was to verify in terms of how many people involved were there. Other than that, we need to call every village head to ratify whether the assistance has arrived or not. If not, we will send our people there.' (BBNGO President)

'I think that whatapps application at that time (during flood event) was very useful because if there was network connection, the important messages on flood will be sent out automatically.' (BBNGO President)

The analysis showed that the institutional element of community resilience scored the highest number of themes. From the viewpoint of BBNGO, the elements that contributed most to institutional resilience were the timely dissemination and the role of science and technology.

BBNGO president viewed the contributions of science and technology as being crucial in developing community resilience against flooding. He stated that science and technology played a vital role in the real-time data collection; in the processing, dissemination, and sensitisation of data; and in the communication of flood warnings. The NGO recognized that scientific knowledge would be most effective if expert knowledge were integrated with a community's local knowledge during the decision-making for risk reduction management.

4.4.4 Psychological Resilience

The affected communities were living with psychological and emotional stress. Therefore, it took them longer to get back to normal after each flood event. The NGOs were aware of the psychological impacts of flooding, and suitable mechanism to address the issue was in place as conveyed in the following statement:

'During the flood event, as far as we could assess they were all mix in terms of income background. But, I can say that wealthy people more traumatized since they lost a lot of precious property such as luxury cars, leather sofa set, and many more that were sink due to the flood event'. By that, we have a trauma center and we were also trained priests so that they can go to the communities for endurance, and counseling purposes.' (BBNGO President)

The authorities were aware of the psychological impacts of flooding within community groups and recognized that suitable mechanism to address the issue was in place. Based on the interview with BBNGO president, there was a perceived need to strengthen psychological resilience. For this purpose, there was a requirement to retain the help of psychologists, psychiatrists, and community physicians and promote rehabilitative programs to assist people in distress. In this regard, the provision of psychological health support (Carroll et al., 2010) should be envisaged by non-governmental organization.

4.4.5 Community Competence Resilience

A most important aspect of overall resilience building is related to community competence. It includes many aspects of self-help, awareness, community cohesion, cultural values, ethics, and collective action. The perspectives of NGO in these areas in strengthening community resilience are considered under the following sub-sections:

I. Awareness Building and Involving Local NGOs

In addition to the statement made by the NGO on the need for the sensitization of communities on cleaning up their environment, other actions were suggested by the NGO representative:

'*Our NGO could meet individually with the families concerned and reiterate the advice. It could monitor the situation more closely and keep in contact with the families during the whole flood cycle. The NGO has done more regarding the long-term assistance to enhance resilience. For example, the local NGOs could collaborate, and draw up a plan in the event of flooding. They could act as a platform for interacting with the local and national authorities as well as with national firms and other NGOs.' (BBNGO President)*

The perspectives of the NGO's focused on two key aspects of fostering community competence. These are:

- awareness building by involving local NGOs
- networking and taking responsibility

Government institutions and NGOs collaborate on developing sensitization programs for communities at risk of flood hazards. They also agreed on the need for a more '*holistic*' approach in flood risk management with an emphasis on community participation in decision-making for long-term resilience building.

4.4.6 Infrastructural Resilience

As perceived by the NGO, infrastructural resilience was a major contributor to the overall community resilience. It comprised the issue of drainage system. The following statement conveys the assistance of NGO in terms of infrastructural building which was the drainage system:

'We did built drainage system for communities so that it could help to reduce the vulnerability resulting from flood. At least, when the water rise up, the drainage system could brought the water flow away.' (BBNGO President)

Infrastructure/ environmental resilience was perceived by the NGO to be major contributors to the overall community resilience. These comprised issues about the state of the built environment, flood characteristics, and coping strategies in Table 4.5. Non-governmental organization perceived that flood hazards were increasingly seen as being caused by the encroachment on flood risk zones and the poor maintenance of drainage systems.

Cottrell (2005) considered that community participation with other NGO was essential in hazard-mitigation planning. In this sense, conflicting views between communities and NGO on the environment could be resolved by incorporating community participation in the decision-making process.

NGO perceived that keeping the state of the built environment in good condition was a crucial element in fostering the quality of life of communities. A clean environment also has a beneficial influence on both the physical and psychological health of a community (Faber and Kreig, 2002). For the welfare of a community, a sound environment depends not only on the community but also on other forces, such as support from other stakeholders. As a way to build community resilience, NGO have recently undertaken clean-up campaigns and the sensitization of local communities about the importance of keeping their environment clean.

In short, the semi-structured interview with the local NGO representative showed that NGOs were in a better position to liaise effectively with flood victims with there was official specific mechanism to involve the affected communities in the decision-making processes either at civil society or official levels.

4.5 Community Participation in Mitigation, Preparedness, Response, and Recovery Activities to Build Resilient Community towards Flood

4.5.1 Collaborating with the Community

About 93% (n=86) of all householders responded that they collaborated with their neighbors by providing them with moral support, and some 100% provided food and short-term assistance. About 93% of householders participated in helping neighbors or in collaborating with them in planning to mitigate the impacts of flooding. Other than that, 88% were ready to collaborate with local authorities and 100% were ready to collaborate with NGOs in flood mitigation planning.

In responding to hazards, squatter communities in Kuala Lumpur have developed resilience through networking among themselves as well as with government officials and by adapting a number of affordable structural modifications. Zahari and Ariffin (2013) found that by communicating about risk and sharing knowledge with members within their communities as well as following guidance by the responsible government agencies, those people are able overcome their vulnerabilities to the hazards presented in their daily lives. Thus it can be seen that social processes, such as community cohesion, good leadership, and individual support for collective action, are critical factors that influence the perception that people have about their community's ability to build resilience and cope with disturbing events.

The principles that undergird community involvement and collaboration are the same as those that form the foundation of democracy itself (Pickeral, 2005). Collaborative networks are tools for involving the full fabric of the community and, by doing so, make disaster resilience easier to achieve. As outlined in the National Response Framework (FEMA, 2008), local communities are ultimately responsible for managing hazards and disasters, and that responsibility requires the engagement of all community stakeholders in the private and public sectors, and faith-based organizations and NGOs (FEMA, 2008).

Mohanty (2006) found that the disposition to help each other during flood events acted as a '*safety net*' and '*shock absorber*' and helped in reducing the vulnerability of the poor, the findings from this study showed that such solidarity existed to an extent among the community groups in Selising, Pasir Puteh. Other than that, according to Paton (2006b), 'Participation in identifying shared problems and collaborating with others to develop and implement solutions to resolve them engenders the development of competencies (e.g. self-efficacy, action coping, community competence) that enhance community resilience to adversity.'

4.4.2 Precautions Taken Before a Flood

As regards actions taken ahead of a flood event, about 70% of householders (n=64) took essential precautions, such as stockpiling food, 77% and 62% move to relative's and neighbor's place respectively. However, about 54% of households were willing to move to refugee center as shown in Figure 4.4 and Appendix J. This could be because householders were afraid of losing their personal belongings or for various other personal reasons.

From the analysis, it could be said that communities were taking the precautions step before a flood which indicates good efforts in resilience building amongst them. A report by UN/ISDR (2005) stated that disasters cannot be prevented but that the risks associated with them could be mitigated or reduced by developing suitable coping and adaptation strategies or resilience. Schelfaut et al. (2011) suggested that community participation in flood mitigation plays an important role in promoting resilience.

Several research results (e.g. Terpstra et al. 2009; Miceli et al. 2008; Grothmann and Reusswig 2006) indicate that disaster preparedness is positively associated with the feeling of worry about the risk. Similarly, the willingness to adopt precautionary measures is positively related in many cases with the residents' level of risk awareness (Neuwirth et al. 2000; Floyed et al. 2000). Therefore, since the communities in Pasir Puteh, Kleantan many precaution steps before flood event, it could be said that their level of awareness were high and this revealed the increase of their resilience.

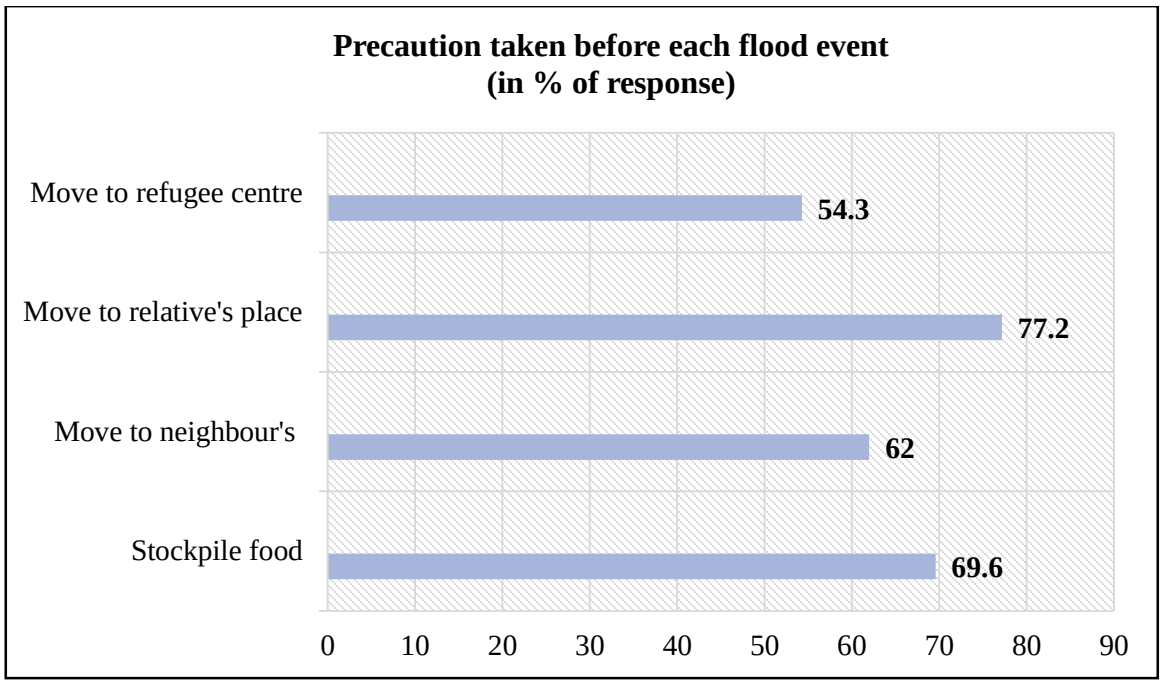

Figure 4.4: Types of precaution taken ahead of each flood event in Selising, Pasir Puteh

4.4.3 Adapting to Flood Hazards

One of the most common adaptive measures taken by 78% of the 72 householders who responded to this question was to raise the floors above the previous water mark. Some 20 householders who did not raise the floor level agreed or strongly agreed that they accepted things as they were and lived through the event.

In order to cope with flood events, the majority of households in Selising, Pasir Puteh built higher floors after a flood hazard as a means of reducing their exposure to future associated risks. Building higher floors around the property were used as longer-term adaptive strategies, but these could be afforded only by households that were economically well-off. As a last resort**,** household groups with limited means in Selising, Pasir Puteh adapted to flood conditions by accepting things as they were and aimed to live through the events. Such an approach to flooding would further add to their vulnerability and lessen their likely resilience to future events.

Each community has access to resources and the ability to manipulate and make decisions that single individuals do not. Since all disaster planning and response requires the immediate involvement of a wide range of local institutions, they are typically the appropriate level of focus for emergency planning and response activities. A community-level focus on resilience - as opposed to a "one-size-fits-all" or "top-down" approach – results in local participation, ownership, and flexibility in building resilience (John and Paul, 2000). Moreover, because communities are parts of greater wholes (states, regions, and nations), a bottom-up community resilience approach builds state, regional, and national resilience concurrently (Bruneau, Chang, Eguchi, Lee, O'Rourke, and Reinhorn, 2003). According to Wisner, Blaikie, Cannon, and Davis (2004), strengthening local coping capacity can help empower local communities rather than foster institutional dependency. Thus, the adapting strategies that were practiced by the communities towards flood in Selising, Pasir Puteh indicates that they had given their best effort in order to build resilient by raising the floor above the previous water mark.

4.4.4 Reliance for Flood Protection

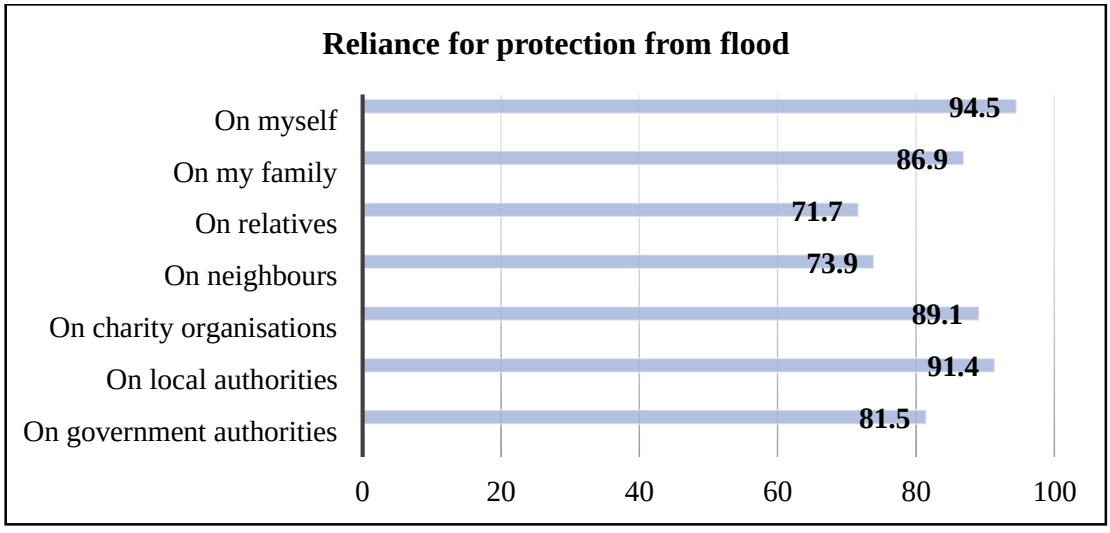

Figure 4.5: Reliance for protection from floods in Selising, Pasir Puteh

About 94% of the 87 householders who responded said that they relied on themselves and their families, for protection against flooding in Figure 4.5. In addition, some 89%, 91%, and 82% of households also relied on various external sources which were charities, local authorities, and the government) for protection during flood events. Some 74% relied on neighbors or their own community for flood protection. In general, community group in Selising, Pasir Puteh appeared to place more trust in their own, families, and relatives.

4.5 Recovery

I. Getting Property Back to Normal after Flood

Of the 92 responses, nearly 83% of households restored their houses to normal weeks after a flood event. Some took a longer time to recover, while a significant 6 (7%) households got their houses to normal immediately after a flood event.

Table 4.6 shows the perception of the householders of being exposed to damp conditions in a flooded environment. A higher percentage of householders stayed in damp conditions for more days compared to those who stayed in such conditions for a short while or a day. Exposure to living in damp conditions was disproportionately distributed amongst households. It was found that some of the families remained in damp conditions for many days and suffered social disruption and economic stress, as they were constantly concerned about not having enough resources to improve their housing conditions.

UN/ISDR adopted in 2005 the *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters* (UN/ISDR, 2005). The framework was expected to encourage nations to involve communities in recovery within the context of DRR management (UN/ISDR, 2005). It is used operationally by several governments in recovery following disasters. For example, this approach is being applied in Australia to build or strengthen community resilience. The shift is from a previous top-down approach to risk reduction (Haque and Etkin, 2005) to a more innovative approach where recovery is seen not

Table 4.6: Perception of households in Selising, Pasir Puteh to live in damp condition

	Number of respondents	Agreement scale in percentage					
		Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
For a short while	92	0.0	0.0	0.0	59.8	40.2	100
For a day	76	0.0	1.1	1.1	60.9	37.0	100
For many days	72	39.1	58.7	0.0	1.1	1.1	100

II. Perception of Householders of Living Conditions after a Flood

The perception of living conditions after a flood varied among householders. Of the 92 householders who responded, some 60% agreed or strongly agreed that their living conditions had improved after the flood. However, of these, the majority felt that the improvement was only slight. Only a very small percentage felt that the living conditions had deteriorated. In some households in Selising, Pasir Puteh living conditions remained unchanged or deteriorated after a flood event, a situation that added to the '*ratchet effect*' of vulnerability (Pelling, 2003).

III. Forms of Assistance Given in the Recovery Phase

After a flood, some of the householders received short-term assistance from their relatives and from external sources including the government authorities. Various forms of assistance were received as shown in Figure 4.3 and Appendix Q: 92 householders (100% of the replies) received food, and 56 households (61%) received housing materials help while other forms of assistance included money, furniture, clothes and mattresses.

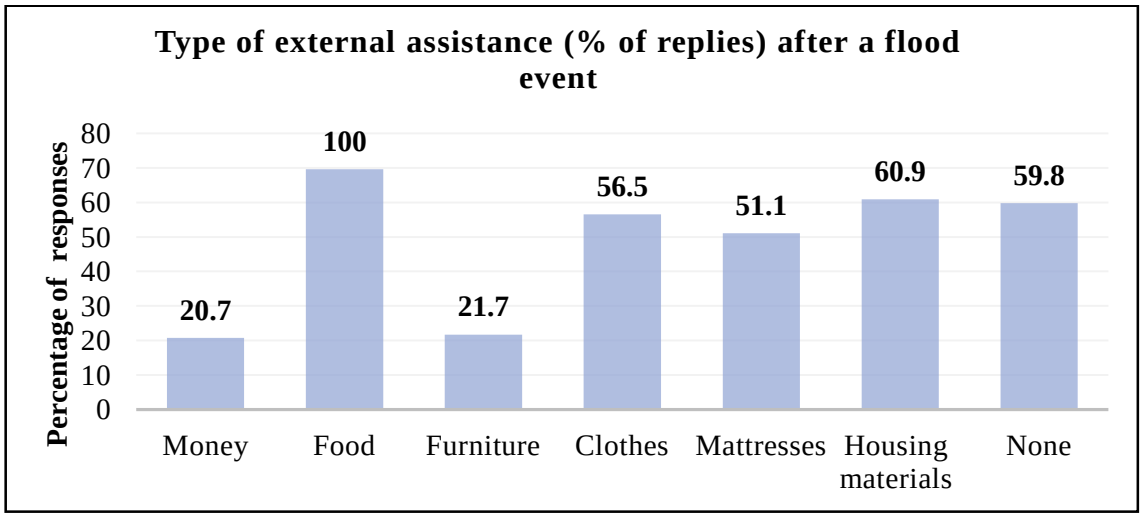

Figure 4.3: Forms of external assistance received by households in Selising

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Introduction

This study has provided the researcher with a unique opportunity to delve into the real life situation of communities and investigate their vulnerability and resilience in the flood event. In order to meet those objectives, a set of research questions were established, which drove the choice of approaches on how best to find answers to the research questions.

The case study in conjunction with a mixed methods research approach were found to be powerful enough in providing reliable and consistent findings. Quantitative research generated factual and reliable outcome data on the vulnerability and resilience of household groups while qualitative research produced rich, detailed, and valid processed data based entirely on the perspectives and interpretations of the participants rather than of the researcher's. Together both research approaches provided valuable tools and techniques in answering the research questions and in meeting the objectives of this thesis.

The concept of community resilience was further examined in terms of six types of resilience, which were used as indicators to generate the factors that affect community resilience. They also represented valid ways of examining and assessing the ability of local communities to recover. Evaluation of results in terms of the types of resilience revealed a number of factors that were gradually increasing their level of vulnerability and adversely impacting on their resilience. The findings of this study suggested that the various types of

resilience had to be reinforced in order to achieve recovery and community resilience. The key issues that were found to be essential to recovery and to reinforcing community resilience were: social networking, integration of local knowledge with that of experts and empowering community participation in decision-making.

5.2 Conclusion

This research has identified a lot of efforts in reducing vulnerability and in building resilience among affected community groups in Pasir Puteh, Kelantan. The communities and non-governmental organization (NGO) take the responsibilities in order to achieve resilience community. The factors that influence the community to build resilience that has been recognized in this study which are the experience towards flood, exposure to flood, and socio economic make the communities become more proactive to protect themselves from natural disaster which is flood so that the level of vulnerability in the future can be reduced.

NGOs' involvement with vulnerable community groups give a significant positive impact towards resilience community as the NGO give them the awareness talk, ask them to join any discussion on flood preparedness and many more. Other than that, the NGO also providing them with short and long term assistance during and after flood in terms of food, shelter, housing material, building the well and many more stuff that have been given to community.

In addition, community participation in mitigation, preparedness, response, and recovery activities help them a lot in taking precautionary measures before and after flood event or in other words, the community becomes more resilience towards disaster specifically, flood because of the experience that they have been through and they learnt from that event to be more prepared for future flood event that will be struck their house and property.

Disaster resilience is everyone's business and is a shared responsibility among communities, the private sector, and government. Community leaders and government officials face decisions every day that may pit short-term interests against longer-term goals. Increasing resilience to disasters will require decisions and actions that are informed and forward-looking.

Last but not least, although disasters will continue to occur, actions that move the nation from a reactive to a proactive approach will reduce many of the societal and economic burdens and impacts that disasters cause. Building the nation's resilience is a long-term process, one that will be socially and politically challenging, but the reward for our efforts will be a safer, healthier, more secure, and more prosperous nation.

5.3 Recommendations

The analysis on the efforts in building resilient community towards flood leads to the following recommendations:

The pure knowledge of living in a flood-prone area stimulates the acquisition of information about self-protection. However, this does not necessarily lead to flood proofing or retrofitting measures. Therefore, more information is needed about the effectiveness and the cost–benefit ratios of different precautionary measures. Further, specific information, e.g. different information leaflets with flood mitigation options for different groups of people, would be helpful. Tenants, homeowners, elderly people, or large households all have different abilities to perform precautionary and emergency measures. Therefore, information about private precautions has to meet people's interests and capabilities in order to convince them that they will be able to reduce their potential flood damage significantly.

Despite the potential to mitigate flood losses, the flood impact, particularly the water level and the contamination of the flood water, affect the cost of damage and degree of recovery to a great extent. Therefore, financial precautions, i.e. flood insurance, should be strongly recommended, especially in areas with low insurance cover.

People's knowledge about the flood hazard and about self-protection, as well as good warning information, would help them to better perform emergency measures. Therefore, flood warnings should be released with more detailed information about expected water levels, time to peak flows and recommendations for appropriate response. However, the time and the number of people available to undertake emergency measures are the most important factors during the response phase. Therefore, longer lead times of early warnings are needed. Further, it would be worthwhile to think about improved response capacities in flood.

Establishment and strengthening of a Community Disaster Information Center (CDIC) is important for effective disaster reduction planning and action. The purpose of CDIC is to collect, collate, analyze, and disseminate disaster related information in the community. There should be a regular flow of information between the community groups and the local level government and non-government organizations; municipal authorities, local government, and many more.

Next, disaster risk communication is a very important activity for a community mobilizing for disaster risk reduction. However, the public awareness approach assumes that people are ignorant and therefore government, NGOs and technical experts need to raise their awareness. The experience has shown that the local communities may know a lot of strategies to deal with the disasters. The experience also show that it is important to develop a common understanding amongst the local authorities, communities, and other actors like the media, schools, monks or imams, and business owners in order to promote effective disaster preparedness. It is significant that all parties living in an area understand each other's opinion and form a common strategy. This approach of communication and learning amongst the local level partners is described as disaster risk communication

Last but not least, to enable the community to undertake disaster risk reduction measures on a sustainable basis, it is essential to form a community-based organization or strengthen an existing one to deal with disaster risk reduction. The form of community organization can vary depending upon the situation in a community. It is important to have an understanding of the existing organizations within the community, which might be a youth

group, women's union, farmers' association, community cooperative or a local elected committee. However, if there is no organization yet in the community, a community-based Organization (CBO) can be established. The objective of the Community-based Organization (CBO) is to implement community disaster reduction plan. This will enable local community to become better prepared for impending disasters and to become disaster resilient in the long term.

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Appendix A

Gantt chart

PROJECT TASKS	SEMESTER 1														SEMESTER 2													
	WEEK																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Finding a title																												
Understanding Project Scope and Problem Statement, Research Questions and Objectives																												
Literature Review																												
Develop Methodology																												
Submission of Proposal																												
Slide Preparation																												
Data Collection																												
Data Analysis																												
Final Report Writing																												
Submission of Final Report																												

Appendix B

Questionnaire

MAKLUMAT PENYERTAAN

TAJUK

KAJIAN MENGENAI USAHA MEMBANGUNKAN MASYARAKAT YANG BERDAYA TAHAN TERHADAP BANJIR DI PASIR PUTEH, KELANTAN

Tujuan kajian ini adalah untuk menentukan usaha yang telah diambil untuk membina masyarakat yang berdaya tahan terhadap banjir di Pasir Puteh, Kelantan. Soal selidik ini telah direka untuk mengumpul maklumat untuk mencapai sasaran yang dikehendaki dan hanya akan digunakan untuk pembelajaran. Penyertaan anda dalam penyelidikan ini adalah secara sukarela. Semua maklumat akan dirahsiakan dan sebarang maklumat peribadi akan dihapuskan sehingga kajian ini selesai.

Sila jawab ini sebaik mungkin. Soalan ini hanya mengambil masa 10 minit untuk dijawab. Sila kembalikan kertas soal selidik selepas anda selesai menjawab. Sebarang pertanyaan yang berkaitan dengan soal selidik ini, sila hubungi 013-9111612 atau e-mel kepada Yusoff_nuraishah@yahoo.com.

Disediakan oleh;
Siti Nor Aishah Binti Yusoff
Ijazah Sarjana Muda Keselamatan dan Kesihatan Pekerjaan
Fakulti Teknologi Kejuruteraan
Universiti Malaysia Pahang

BAHAGIAN A: CIRI-CIRI ISI RUMAH

Keahlian isi rumah

<table>
<tr><td>1</td><td colspan="2">Nyatakan bilangan ahli keluarga dalam isi rumah [ ] contoh jawapan: 7 orang pada ruangan jawapan yang disediakan</td></tr>
<tr><td>2</td><td>Nyatakan bilangan ahli keluarga mengikut kumpulan umur pada ruangan jawapan yang disediakan

contoh: 7 orang

contoh jawapan:

Umur Lelaki Perempuan

Kurang daripada 3 tahun [1] [ ]

3-14 tahun [2] [ ]

15-22 tahun [ ] [ ]

23-40 tahun [ ] [2]

41-60 tahun [1] [1]

>60 tahun [ ] [ ]</td><td>Umur Lelaki Perempuan
Kurang daripada 3 tahun [ ] [ ]
3-14 tahun [ ] [ ]
15-22 tahun [ ] [ ]
23-40 tahun [ ] [ ]
41-60 tahun [ ] [ ]
>60 tahun [ ] [ ]</td></tr>
<tr><td>3</td><td colspan="2">Nyatakan tahap pendidikan ketua isi rumah. Sila (√) pada ruangan jawapan yang dikehendaki.

Sekolah rendah [ ]

Sekolah menengah [ ]

Pengajian tinggi (universiti) [ ]

Tiada [ ]</td></tr>
</table>

BAHAGIAN B: PENGALAMAN BANJIR

Sila tanda (√) disetiap ruangan yang disediakan.

Pengalaman terhadap banjir

1. Adakah harta benda anda pernah ditenggalami oleh banjir?

Ya ☐ Tidak ☐

2. Apakah yang menjadi punca kepada banjir terhadap harta benda anda?

Ketidakupayaan sistem saliran ☐

Banjir Sungai ☐

Anda dikehendaki menjawab semua soalan. Terdapat Lima (5) pilihan jawapan untuk setiap soalan iaitu "*Sangat bersetuju (5)" , "Setuju (4)" , "Neutral (3)" , "Tidak bersetuju (2)" , dan "Sangat tidak bersetuju (1)"***. Sila bulatkan pilihan jawapan yang dikehendaki.***

		Sangat bersetuju	Setuju	Neutral	Tidak bersetuju	Sangat tidak bersetuju
3	Saya telah mengalami kejadian banjir dalam tempoh 3 tahun yang lalu	5	4	3	2	1
4	Saya telah terjejas lebih daripada satu kejadian banjir selama 3 tahun yang lalu	5	4	3	2	1
5	Saya telah terjejas oleh kejadian banjir setiap tahun selama 3 tahun yang lalu	5	4	3	2	1

BAHAGIAN C: MUDAH TERDEDAH PADA BAHAYA

Sila tanda (√) pada ruangan jawapan yang dikehendaki.

Keterdedahan kepada banjir

1	Saya tinggal di zon banjir yang boleh dikategorikan seperti:	(a) Pedalaman	[ ]
		(b) Pantai	[ ]
		(c) Ditebing sungai	[ ]
		(d) Di bawah cerun gunung	[ ]
		(e) Berdekatan aliran sungai	[ ]
2	Rumah saya terletak di:	(a) Kawasan bandar	[ ]
		(b) Sebuah penempatan pinggir bandar	[ ]
		(c) Kawasan luar bandar	[ ]
		(d) Kawasan luar bandar yang ramai	[ ]
		(e) Kawasan luar bandar yang terpencil	[ ]

Faktor sosial

Anda dikehendaki menjawab semua soalan. Terdapat Lima (5) pilihan jawapan untuk setiap soalan iaitu "*Sangat bersetuju (5)" , "Setuju (4)" , "Neutral (3)" , "Tidak bersetuju (2)" , dan "Sangat tidak bersetuju (1)"***. Sila bulatkan pilihan jawapan yang dikehendaki.**

			Sangat bersetuju	Setuju	Neutral	Tidak bersetuju	Sangat tidak bersetuju
3	Berapa lamakah tempoh ahli keluarga anda mengalami banjir?	(a) Untuk seketika	5	4	3	2	1
		(b) Untuk sehari	5	4	3	2	1
		(c) Untuk beberapa hari	5	4	3	2	1
4	Ahli keluarga saya tinggal dalam komuniti yang dapat digambarkan seperti:	(a) Hidup dalam keadaan yang sesak	5	4	3	2	1
		(b) Kekurangan perpaduan komuniti	5	4	3	2	1
		(c) Kurang sokongan daripada pihak berkuasa tempatan	5	4	3	2	1

Sila tanda (√) pada ruangan jawapan yang dikehendaki.

Faktor ekonomi

5	Nyatakan jenis rumah anda:	(a) Terpisah *(contoh: rumah satu tingkat)*	☐
		(b) Rumah berkembar *(contoh: rumah semi-d)*	☐
		(c) Rumah dua tingkat	☐
6	Pendudukan rumah:	(a) Memiliki rumah sendiri	☐
		(b) Sewa persendirian	☐
		(c) Menyewa rumah kos rendah	☐
7	Pendudukan tanah:	(a) Memiliki tanah sendiri	☐
		(b) Disewa	☐
		(c) Hartanah kerajaan	☐
8	Saya tinggal di sini kerana:	(a) Dekat dengan jarak pekerjaan	☐
		(b) Dekat dengan saudara-mara	☐
		(c) Pilihan sendiri	☐

BAHAGIAN D: PEMBANGUNAN DAYA TAHAN

Anda dikehendaki menjawab semua soalan. Terdapat Lima (5) pilihan jawapan untuk setiap soalan iaitu "*Sangat bersetuju (5)" , "Setuju (4)" , "Neutral (3)" , "Tidak bersetuju (2)" , dan "Sangat tidak bersetuju (1)"***. Sila bulatkan pilihan jawapan yang dikehendaki.**

Mekanisma sokongan

			Sangat bersetuju	Setuju	Neutral	Tidak bersetuju	Sangat tidak bersetuju
1	Untuk berlindung daripada banjir, saya bergantung harap kepada:	(a) Saya sendiri	5	4	3	2	1
		(b) Keluarga saya	5	4	3	2	1
		(c) Saudara-mara saya	5	4	3	2	1
		(d) Jiran-jiran saya	5	4	3	2	1
		(e) Organisasi amal	5	4	3	2	1
		(f) Organisasi tempatan (NGO)	5	4	3	2	1
		(g) Kuasa kerajaan	5	4	3	2	1
2	Setiap kali banjir, saya menyesuaikan diri dengan mengambil langkah struktur seperti berikut:	(a) Tinggikan lantai rumah saya	5	4	3	2	1
		(b) Saya menerima kejadian banjir seperti ini	5	4	3	2	1
		(c) Saya lalui kehidupan semasa kejadian banjir	5	4	3	2	1

3	Saya menerima tanggungjawab untuk mengambil tindakan seperti:	(a) Elakkan daripada membahayakan keluarga saya	5	4	3	2	1
		(b) Lindungi rumah saya	5	4	3	2	1
		(c) Elakkan kerosakan barang-barang saya	5	4	3	2	1

Mekanisma mengatasi

			Sangat bersetuju	Setuju	Neutral	Tidak bersetuju	Sangat tidak bersetuju
4	Sebelum kejadian banjir, saya mengambil langkah berjaga-jaga seperti berikut:	(a)Bergerak ke pusat perlindungan	5	4	3	2	1
		(b) Pindah ke tempat saudara-mara	5	4	3	2	1
		(c) Pindah ke tempat jiran	5	4	3	2	1
		(d) Stok makanan dan barangan yang diperlukan	5	4	3	2	1
5	Semasa kejadian banjir, saya mengambil langkah-langkah berikut dengan jiran saya dengan menyediakan:	(a) Tempat berteduh	5	4	3	2	1
		(b) Makanan	5	4	3	2	1
		(c) Psikologi/ Sokongan moral	5	4	3	2	1
6	Dalam merancang langkah-langkah	(a) Bekerjasama dengan jiran saya	5	4	3	2	1

	persediaan untuk mengurangkan kesan daripada kejadian banjir, saya mengambil langkah-langkah seperti berikut:	(b) Bekerjasama dengan pihak berkuasa setempat	5	4	3	2	1
		(c) Bekerjasama dengan NGO	5	4	3	2	1
		(d) Tiada satu pun di atas	5	4	3	2	1

Pemulihan dan bantuan terhadap kejadian banjir.

Sila tanda (√) pada ruangan jawapan yang dikehendaki.

7	Saya dapati rumah saya kembali kepada keadaan normal/asal:	(a) Sejurus selepas banjir	☐
		(b) Seminggu selepas banjir	☐
		(c) Sebulan selepas banjir	☐
		(d) Tidak pernah kembali kepada keadaan normal	☐

Anda dikehendaki menjawab semua soalan. Terdapat Lima (5) pilihan jawapan untuk setiap soalan iaitu "*Sangat bersetuju (5)" , "Setuju (4)" , "Neutral (3)" , "Tidak bersetuju (2)" , dan "Sangat tidak bersetuju (1)"***. Sila bulatkan pilihan jawapan yang dikehendaki.**

		Sangat bersetuju	Setuju	Neutral	Tidak bersetuju	Sangat tidak bersetuju
8	Keadaan keluarga saya sejak peristiwa banjir yang lepas telah bertambah baik dengan ketara	5	4	3	2	1
9	Keadaan keluarga saya sejak peristiwa banjir yang lepas telah bertambah baik sedikit	5	4	3	2	1

10	Keadaan keluarga saya sejak peristiwa banjir yang lepas tidak bertambah baik	5	4	3	2	1
11	Sejak peristiwa banjir yang lalu, kehidupan saya telah merosot dengan ketara	5	4	3	2	1

			Sangat bersetuju	Setuju	Neutral	Tidak bersetuju	Sangat tidak bersetuju
12	Saya mendapat bantuan banjir dari:	(a) Komuniti	5	4	3	2	1
		(b) Saudara-mara	5	4	3	2	1
		(c) Kerajaan	5	4	3	2	1
		(d) Pihak berkuasa tempatan (NGO)	5	4	3	2	1
13	Saya mendapat bantuan banjir dalam bentuk:	(a) Duit	5	4	3	2	1
		(b) Makanan	5	4	3	2	1
		(c) Perabot	5	4	3	2	1
		(d) Pakaian	5	4	3	2	1
		(e) Tilam	5	4	3	2	1
		(f) Perkakas rumah	5	4	3	2	1
		(g) Tiada	5	4	3	2	1

TERIMA KASIH ATAS PENYERTAAN ANDA

APPENDIX C

Reliability analysis of pilot study

Cronbach's Alpha Value

Cronbach's Alpha	N of Items
0.736	37

Appendix D

Semi-structured interview

Interview with President of Bantuan Bencana NGO (BBNGO)

Original and Transcript text from semi-structured interview

Assalamualaikum, selamat pagi prof. Nama saya Aishah. Pertama sekali setinggi tinngi ucapan terima kasih saya ucapkan kerana sudi menerima lawatan saya kesini untuk sesi temu ramah berkenaan dengan usaha NGO dalam membentuk masyarakat yang berdaya tahan terhadap banjir di Kelantan.

Waalaikumussalam, pagi (sambil mengganggguk kepala)

***Soalan**: Okay prof…sebagai permulaan, boleh tak prof berkongsi bilakah Bantuan Bencana NGO (BBNGO) ini ditubuhkan?*

***Jawapan**: Erm, ok. As we know, banjir ni berlaku masa 2014, end of 2014 and kita start our NGO ataupun kita start pertubuhan gabungan Bantuan Bencana NGO Malaysia in May tapi kita start bekerja bersama 26 haribulan Disember 2014 which is one day after Christmas day. Kita bekerja bersama maksudnya kita combine a few NGOs together. Sekarang ni, kita ada lebih kurang 44 NGO yang commit dibawah gabungan ini…erm, termasuk NGO-NGO yang besar jugak lah, yang national punya. Dibawah kita, ada beberapa NGO yang saya kata 44 tu, contohnya, erm di Malaysia, kita ada Medical Relief Society Malaysia (Mercy Malaysia), ada IKRAM Malaysia (IKRAM), AIR BANTU, kita ada PAPISMA, kita ada Pertubuhan Amal Perubatan Ibnu Sina Malaysia (PAPISMA), MY CARE, Yayasan Amal, Royal Military College (RMC PUTERA) dan banyak lagi la. Tu antara NGO-NGO yang besar lah.*

***Soalan**: Sebagai pekerja NGO merangkap pengerusi BBNGO ye prof, boleh prof jelaskan apakah bentuk bantuan yang diberikan kepada mangsa banjir?*

***Jawapan**: Kita ada 4x4 drivers…erm, kita ada radio amateur. Jadi kita ada banyak NGO yang bergabung bersama. So, masa banjir ni, semua pakat tolong saje. So, bila teruk sangat, bila kita bantu tu, memang masa tu kita panggil lebih kepada relief effort immediately after…tengah-tengah banjir lagi, air tengah naik lagi. Ada yang bagi masakan panas, fresh food, ada yang bagi barang- barang kering rumah ke rumah. Mula-mula kita bagi pusat pemindahan. Apabila kita bagi pusat pemindahan, we find that there's a problem. Kita lihat barang-barang itu akan disimpan disekolah dalam stor and they will not distribute immediately. Dia jadi…macam dia kata nak save for another two weeks or three weeks. Orang yang berdekatan, dia tak bagi. So, bila benda tu berlaku, kita pack secara kecil, house to house. Kita hantar rumah ke rumah, family packs kita panggil. Whatever yang kita dapat, fresh food ke apa ke, kita akan hantar keluar dan jugak termasuklah bantuan air bersih, buat boring air. Pastu, recovery lah, Stage recovery ni, kita start buat perigi mana yang takde kan. Kita innovate perigi, ada yang pakai…apa ni…manual. Some of our NGOs beli benda tu di Bangkok sebab masa tu elektrik takde dua minggu…some places takde dua minggu. So, kalau elektrik takde lagi, diaorang boleh guna yang manual tu lah.*

Soalan: *Prof, macam mana mangsa banjir berhubung dengan NGO untuk dapatkan bantuan?*

Jawapan: *Sebab kita…memang NGO kita masuk ke kawasan banjir secepat mungkin. Bila orang tu telefon, call mengadu…saya pun tak tahu macam mana dia dapat phone number (ketawa)…saya pun heran. Sebab BOMBA pun dah surrender, so, we have to verify first. Contohnya, kita dapat call, mintak bantuan untuk di kem kijang, dekat PCB kan…kita kena verify berapa orang kat sana. Kena telefon ketua kampong, Tanya sama ada dah sampai bnatuan belum?, BOMBA dapat sampai tak?...kalau tak dapat, kita hantar orang kita. Kadang-kadang, kita punya volunteer memang dia ada kat kampung, diaorang akan call. Kita dapat whatapps, masa tu very useful because whatapps bila ada line, dia akan hantar automatically. Whatapps very useful. Dr Hafiz, Dr Rizal…person who verify nama ketua*

kampung untuk hantar bantuan sebab akan ada orang yang take opportunity ambil barang-barang kita bawak lari tempat lain. Masa tu kami takde 4x4…diaorang bawak their 4x4, kita provide minyak, duit sikit. Sekarang, kita ada dua Isuzu 4x4.

***Soalan**: Kalau boleh saya tahu prof, adakah mangsa-mangsa banjir ni terdiri daripada kumpulan berpendapatan rendah sahaja?*

***Jawapan:** Campur semuanya. Orang kaya paling teruk sekali. Kereta BMW tenggelam…hutang lagi kan. Kusyen kulit, set sofa…hutang lagi. Dia lagi traumatized. Sebenarnya, orang takde benda ni, tawakkal je…takde apa ni…sikit je.*

***Soalan**: Bantuan dari NGO tu sendiri biasanya berbentuk bantuan jangka pendek ataupun bantuan jangka panjang?*

***Jawapan**: Dua- dua ada. Fasa pembinaan semula ni, NGO kita juga involve. Facilitate pembinaan rumah, pembinaan temporary shelter. Then, bulan lima, kita…infact bulan dua, kita dah buat bengkel. So, what are the things that we need to do dalam bengkel tu. Kita panggil pelan strategic Bantuan Bencana NGO (BBNGO). Orang masih lagi kelam kabut, kita dah buat bengkel dah. Ni kita punya bengkel in February…7 February 2015. Baru sangat lepas banjir, sebulan selepas banjir. Kita ada pengisytiharan panji…berjanji atau mengakui we have to do this. Kita ada SOP yang komprehensif mengenai persediaan bencana, megeratkan hubungan kerajaan pusat dan negeri, latihan-latihan sesuai. This is probably what interested in. Disaster preparedness among orang-orang kampung, jugak workers yang akan menyelamatkan orang kampung. Bila kita buat perisian, kita work on it la…kita work balik la.*

***Soalan**: Prof, macam mana NGO-NGO berhubung Bagaimanakah anda berhubung untuk membantu keluarga yang terjejas akibat banjir?*

***Jawapan:** Kita akan jumpa dan bincang dekat USM, Pusat Islam…first centre. Mereka datang dengan sendiri. Dia tahu kita berkumpul kat situ dan dia perlukan pertolongan kita.*

Ada wakil dari setiap NGO, IKRAM, PAPISMA. We do a lot of work. Menteri pun datang…empat orang menteri datang without invitation. Kenapa kita form this NGO? Sebab kita lihat kerajaan ada limitation dia. Ada benda dia yang dia tak boleh buat kan. Sebab saya sendiri sebagai pengerusi kat situ, saya attend mesyuarat dengan Majlis Keselamatan Negara (MKN) for three to four times. Kita tengok dia does not facilitate…erm, kerja cara dia tu tidak boleh membantu. Contohnya, macam barang-barang kita pun yang sampai dengan kapal terbang, dia bawa ke kem askar apa semua tu kan. Kita Tanya sape yang nak bagi ni, dia kata JKM (Jabatan Kebajikan Masyarakat) which is impossible lah. So, kita separate dengan dia, kita buat sendiri.

Soalan: *Macam mana ye prof cara BBNGO berfikir untuk menyumbang kepada daya tahan dan kemampanan terhadap komuniti?*

***Jawapan**: Program pelan strategik Bantuan Bencana NGO ni kita buat bengkel. Kita bengkelkan and present to the public and daripada situ, kita buat perancangan strategik for long term. All this is to make sure kesejahteraan community. Kita educate the community. Kita sempat beli bot apa semua. Orang mintak tolong kan, takkan nak buat senyap. Padahal kita orang awam tak boleh la nak buat kerja ni. Patutnya, tentera ataupun BOMBA, but in certain things, we have to be proactive.*

APPENDIX E

Household characteristics

Number of members in household

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	3	3.3	3.3	3.3
	3.00	12	13.0	13.0	16.3
	4.00	18	19.6	19.6	35.9
	5.00	17	18.5	18.5	54.3
	6.00	18	19.6	19.6	73.9
	7.00	9	9.8	9.8	83.7
	8.00	9	9.8	9.8	93.5
	9.00	5	5.4	5.4	98.9
	10.00	1	1.1	1.1	100.0
	Total	92	100.0	100.0	

Education level of householder

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	primary school	12	13.0	13.0	13.0
	secondary school	79	85.9	85.9	98.9
	none	1	1.1	1.1	100.0
	Total	92	100.0	100.0	

APPENDIX F

Experience of flood

Experienced flood hazard for last 3 years

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	agree	74	80.4	80.4	80.4
	strongly agree	18	19.6	19.6	100.0
	Total	92	100.0	100.0	

Affected by more than one flood event for last 3 years

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	4	4.3	22.8	22.8
	disagree	12	13.0	57.6	80.4
	neutral	2	2.2	2.2	82.6
	agree	53	57.6	13.0	95.7
	strongly agree	21	22.8	4.3	100.0
	Total	92	100.0	100.0	

Affected by flood events every year for last 3 years

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	1	1.1	1.1	1.1
	disagree	1	1.1	1.1	2.2
	neutral	11	12.0	12.0	14.1
	agree	56	60.9	60.9	75.0
	strongly agree	23	25.0	25.0	100.0
	Total	92	100.0	100.0	

APPENDIX G

Exposure

Living with flooding

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	job proximity	12	13.0	13.0	13.0
	close to relatives	49	53.3	53.3	66.3
	own choice	31	33.7	33.7	100.0
	Total	92	100.0	100.0	

Socio-economic conditions of household

House occupation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	own the house	90	97.8	97.8	97.8
	low cost housing renting	2	2.2	2.2	100.0
	Total	92	100.0	100.0	

Land occupation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	own the land	90	97.8	97.8	97.8
	rented	2	2.2	2.2	100.0
	Total	92	100.0	100.0	

APPENDIX H

Resilience-coping and adapting to flood

Collaborating with neighbors

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	neutral	6	6.5	6.5	6.5
	agree	59	64.1	64.1	70.7
	strongly agree	27	29.3	29.3	100.0
	Total	92	100.0	100.0	

Moral support

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	neutral	6	6.5	6.5	6.5
	agree	60	65.2	65.2	71.7
	strongly agree	26	28.3	28.3	100.0
	Total	92	100.0	100.0	

Food

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	agree	72	78.3	78.3	78.3
	strongly agree	20	21.7	21.7	100.0
	Total	92	100.0	100.0	

APPENDIX I

Collaborating with local authorities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	neutral	11	12.0	12.0	12.0
	agree	56	60.9	60.9	72.8
	strongly agree	25	27.2	27.2	100.0
	Total	92	100.0	100.0	

Collaborating with NGO

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	agree	69	75.0	75.0	75.0
	strongly agree	23	25.0	25.0	100.0
	Total	92	100.0	100.0	

APPENDIX J

Precautions taken before flood

Move to refugee center

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	neutral	12	13.0	13.0	13.0
	agree	50	54.3	54.3	67.4
	strongly agree	30	32.6	32.6	100.0
	Total	92	100.0	100.0	

Move to relative place

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	1	1.1	1.1	1.1
	neutral	9	9.8	9.8	10.9
	agree	71	77.2	77.2	88.0
	strongly agree	11	12.0	12.0	100.0
	Total	92	100.0	100.0	

Move to neighbors place

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	4	4.3	4.3	4.3
	disagree	4	4.3	4.3	8.7
	neutral	15	16.3	16.3	25.0
	agree	57	62.0	62.0	87.0
	strongly agree	12	13.0	13.0	100.0
	Total	92	100.0	100.0	

APPENDIX K

Stockpile food and necessary items

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	neutral	3	3.3	3.3	3.3
	agree	64	69.6	69.6	72.8
	strongly agree	25	27.2	27.2	100.0
	Total	92	100.0	100.0	

Reliance for flood protection

Myself

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	1	1.1	1.1	1.1
	neutral	4	4.3	4.3	5.4
	agree	60	65.2	65.2	70.7
	strongly agree	27	29.3	29.3	100.0
	Total	92	100.0	100.0	

My family

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	2	2.2	2.2	2.2
	neutral	10	10.9	10.9	13.0
	agree	60	65.2	65.2	78.3
	strongly agree	20	21.7	21.7	100.0
	Total	92	100.0	100.0	

APPENDIX L

My relatives

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	3	3.3	3.3	3.3
	neutral	23	25.0	25.0	28.3
	agree	54	58.7	58.7	87.0
	strongly agree	12	13.0	13.0	100.0
	Total	92	100.0	100.0	

My neighbors

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	neutral	24	26.1	26.1	26.1
	agree	48	52.2	52.2	78.3
	strongly agree	20	21.7	21.7	100.0
	Total	92	100.0	100.0	

Charity organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	neutral	10	10.9	10.9	10.9
	agree	58	63.0	63.0	73.9
	strongly agree	24	26.1	26.1	100.0
	Total	92	100.0	100.0	

APPENDIX M

Local organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	neutral	8	8.7	8.7	8.7
	agree	65	70.7	70.7	79.3
	strongly agree	19	20.7	20.7	100.0
	Total	92	100.0	100.0	

Government authorities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	1	1.1	1.1	1.1
	neutral	16	17.4	17.4	18.5
	agree	54	58.7	58.7	77.2
	strongly agree	21	22.8	22.8	100.0
	Total	92	100.0	100.0	

Recovery

Getting property back to normal after flood

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	immediately after the flood hazard	6	6.5	6.5	6.5
	weeks after	76	82.6	82.6	89.1
	months after	10	10.9	10.9	100.0
	Total	92	100.0	100.0	

APPENDIX N

Perception of households live in damp condition

Improved significantly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	1	1.1	1.1	1.1
	neutral	36	39.1	39.1	40.2
	agree	49	53.3	53.3	93.5
	strongly agree	6	6.5	6.5	100.0
	Total	92	100.0	100.0	

Improved slightly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	1	1.1	1.1	1.1
	neutral	7	7.6	7.6	8.7
	agree	56	60.9	60.9	69.6
	strongly agree	28	30.4	30.4	100.0
	Total	92	100.0	100.0	

Remain unchanged

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	26	28.3	28.3	28.3
	disagree	65	70.7	70.7	98.9
	neutral	1	1.1	1.1	100.0
	Total	92	100.0	100.0	

APPENDIX O

Deteriorated significantly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	41	44.6	44.6	44.6
	disagree	51	55.4	55.4	100.0
	Total	92	100.0	100.0	

Forms of assistance given in the recovery phase

Money

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	17	18.5	18.5	18.5
	disagree	46	50.0	50.0	68.5
	neutral	4	4.3	4.3	72.8
	agree	19	20.7	20.7	93.5
	strongly agree	6	6.5	6.5	100.0
	Total	92	100.0	100.0	

Food

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	agree	64	69.6	69.6	69.6
	strongly agree	28	30.4	30.4	100.0
	Total	92	100.0	100.0	

APPENDIX P

Furniture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	16	17.4	17.4	17.4
	disagree	38	41.3	41.3	58.7
	neutral	16	17.4	17.4	76.1
	agree	20	21.7	21.7	97.8
	strongly agree	2	2.2	2.2	100.0
	Total	92	100.0	100.0	

Clothes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	10	10.9	10.9	10.9
	disagree	5	5.4	5.4	16.3
	neutral	18	19.6	19.6	35.9
	agree	52	56.5	56.5	92.4
	strongly agree	7	7.6	7.6	100.0
	Total	92	100.0	100.0	

Mattresses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	8	8.7	8.7	8.7
	disagree	9	9.8	9.8	18.5
	neutral	11	12.0	12.0	30.4
	agree	47	51.1	51.1	81.5
	strongly agree	17	18.5	18.5	100.0
	Total	92	100.0	100.0	

APPENDIX Q

Housing materials

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	5	5.4	5.4	5.4
	disagree	2	2.2	2.2	7.6
	neutral	23	25.0	25.0	32.6
	agree	56	60.9	60.9	93.5
	strongly agree	6	6.5	6.5	100.0
	Total	92	100.0	100.0	