Community Resilience of People of Kampong Kamal Muara, North Jakarta, Indonesia

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Abstract

This research focuses on the resilience to flooding events of the people of Kampong Kamal Muara, in North Jakarta, Indonesia. Flooding has been a major threat in coastal cities in Indonesia. The coastal areas are considered to be the most vulnerable areas to flooding events due to sea level rise and land subsidence. In addition, rapid urbanisation and industrialisation of the coastal area of Jakarta have changed the land conditions and exacerbated the flooding events' frequency and impact. This research explores crucial resources for the capacity of communities to live, or cope, with flooding events. Their resilience is examined through several networked resources: economic development, social capital, information and communication, and community competence. The research finds that social capital is the key strength of the community.

Vulnerability of the community is explored through interactions of the coupled human and environment systems. This research showed disparities of impacts experienced by the target community. The data collected showed that some adaptations practised by the community and the government are ineffective in the longer term. Finally, it is important to understand that although the community seems to be able to cope with the flooding events, they are not necessarily resilient. This finding shows that resilience and vulnerability are related in a way that government interventions, both economically and politically, can have a significant impact to enhance resilience and reduce vulnerability.

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Bahasa Indonesia Glossary

RT = Rukun Tetangga, a unit of neighbourhood which comprises up to 50-80 households, governed by a head of RT. A head of RT is the lowest level of the formal leadership hierarchy in kampong.

RW = Rukun Warga, an RW comprises several RTs. A head of RW leads several heads of RT.

Kelurahan = sub unit of sub-district, usually comprising several RWs

Chapter 1: Introduction

1.1 Background

The impacts of climate change, which include the increasing frequency and intensity of droughts and storms, sea level rise, and flooding are already being felt in Asia and the rest of the world (Francisco 2008). A study by ADB in 2009 projected that the impact of climate change on Southeast Asia will be worse than other places, as Indonesia, Philippines, Thailand, and Vietnam could suffer losses equivalent to more than double similar estimates for the global average by 2100 (Uy and Shaw 2010). In Indonesia, a sequence of severe floods has occurred in 2002, 2007, 2013 and 2014 (Tempo 2015). Jakarta is frequently exposed to regular flooding and it is one of the most densely populated regions in Southeast Asia (Yusuf and Francisco 2009). Approximately 70% of the area of Jakarta was flooded in 2007 (Susandi et al. 2011). The flood was even worse in 2013 (Uy and Shaw 2010). Based on a study by EEPSEA on climate change vulnerability, Jakarta in Indonesia was identified as the top-most vulnerable region in Southeast Asia (Yusuf and Francisco 2009).

1.2 Kampong Kamal Muara

Originally founded by the Dutch as the city of Batavia in 1619, Jakarta is currently the capital city of Indonesia and has approximately 25 million inhabitants (Kurniawati 2009 as cited in Wilhelm 2011b). The city consists of five municipalities which are North Jakarta, South Jakarta, East Jakarta, West Jakarta, and Central Jakarta.

In Jakarta, 60 % of the city's inhabitants live in kampongs that are often located in flood prone areas and comprise low-income households (Bronger 2007 as cited by Wilhelm 2011b). Kampongs are characterized as informal, dense settlement structures, which feature substandard physical housing and infrastructure (Wibawa 1997 as cited by Wilhelm 2011b). They can be differentiated from other settlements according to socio-economic factors (Soemantri 2009 as cited in Wilhelm 2011b). Kampongs represent urban-village communities in cities. They are administratively formed by Rukun Warga (RWs), which have several Rukun

Tetangga (RTs). Each RT covers roughly 50 households (Simarmata et al. 2013). RWs are established in order for households to have better access to government's programmes and represent residents who live in the neighbourhood to create a better neighbourhood (Simarmata et al. 2013). Thus, RWs and RTs were established to provide services and give a voice to the citizens.

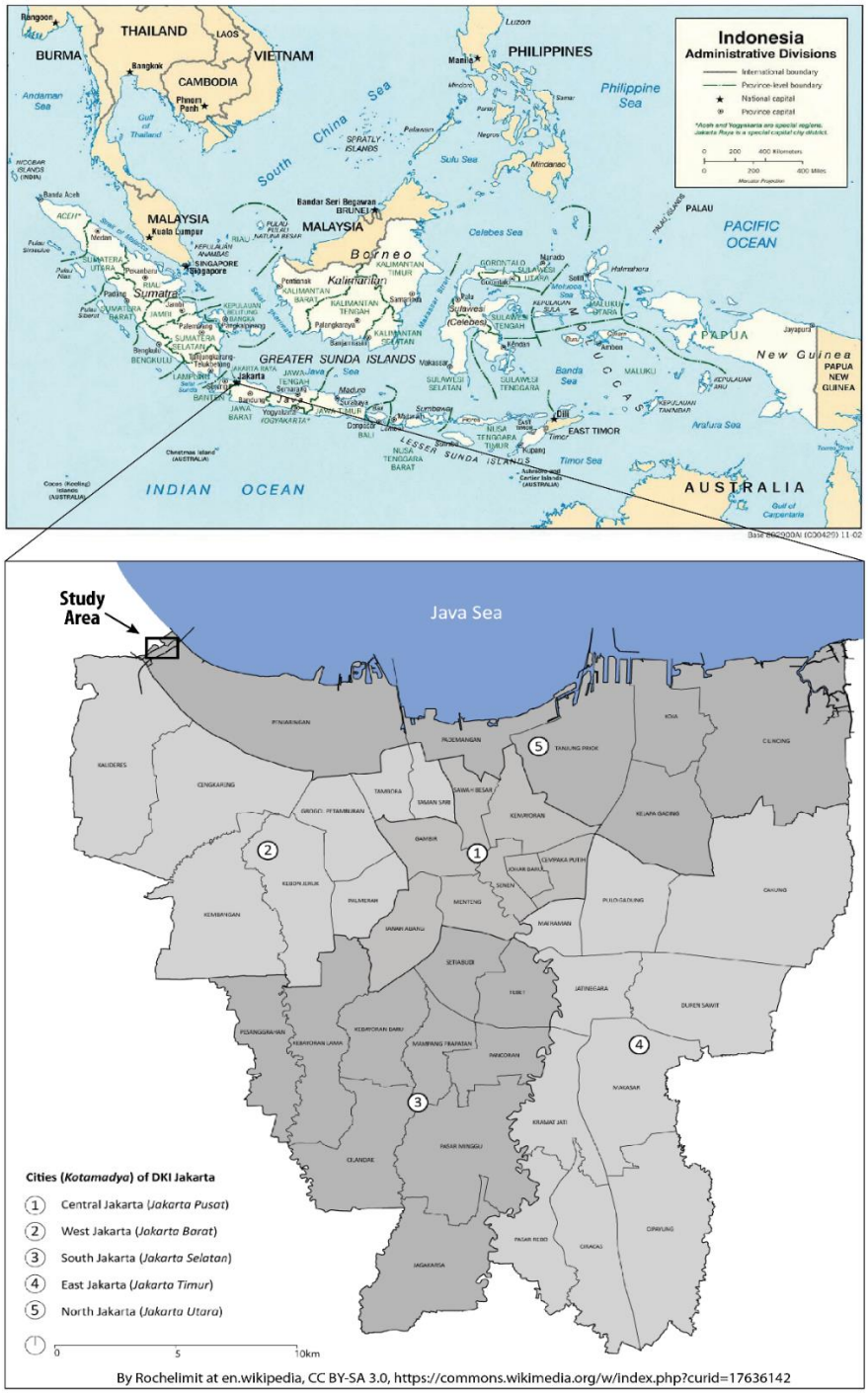
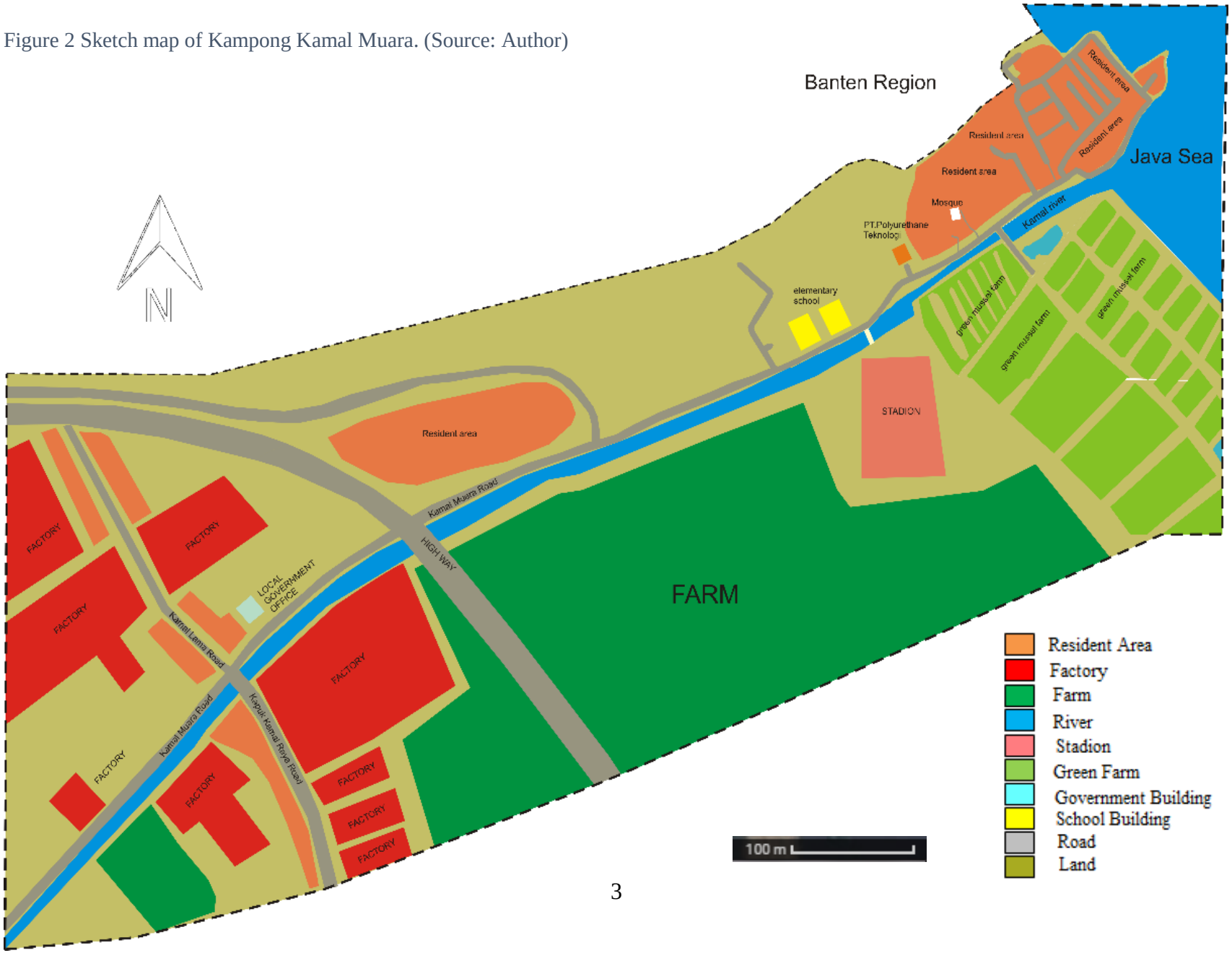


Figure 1 Map of Indonesia with detail of Jakarta and location of the study area. (Source: Max Oulton).

Figure 2 Sketch map of Kampong Kamal Muara. (Source: Author)



Kampong Kamal Muara (KKM) is one of the kampongs in Jakarta. It is located in Penjaringan Sub-district in the North Jakarta municipality, as shown at Figure 1 and 2. KKM is a native village of the Betawi tribe that has settled for more than 60 years in coastal areas (Simarmata et al. 2013). KKM has a population of 1,480 households (Simarmata et al. 2013). Fishing is the major livelihood for this community, although some people have started to work in industrial areas near the village, and in other informal sector employment due to a decrease in fishing incomes (Simarmata et al. 2013). For KKM, heads of RW and RT are elected by the residents and legalized by the decree of the mayor. They function to accommodate and represent people's aspirations and to communicate the aspirations to the government of Jakarta (Simarmata et al. 2013).

In addition, social leaders in KKM are not only from formal institutions.They include cadres from informal institutions and social leaders, such as Islamic recitation groups (Pengajiaan), Drivers of Empowerment and Family Welfare (PKK), and early childhood education (PAUD).

Floods threaten the lives of residents in the KKM communities. KKM started to have significant flooding in November 2002 (Simarmata et al. 2013). More recently, the flood water levels have been getting higher and the intensity of flooding has significantly increased since 2012. In the past, floods occurred following the full moon phenomenon and happened once a month, but now their frequency has increased to 3-4 times a month (Simarmata et al. 2013). As a disaster prevention effort the government of Jakarta built dikes by the end of 2012. As a result of this mitigation effort, the dikes reduced the magnitude of the floods although the frequency still remains (Simarmata et al. 2013). The floods expose KKM communities to refuse, pollution, and sewage, which disrupt the lives and the health of these communities (Simarmata et al. 2013).

Climate-related hazards that frequently occur in North Jakarta include floods caused by sea water or high tide (Firman et al. 2011). Regarding sea level rise and climate change, it has been projected that with the juxtaposition of the high sea tides and the subsidence rate, approximately 25% of the Jakarta population will be severely affected by inundation from the sea within the next 15 years (Brinkman and Hartman 2008). The area that is likely to suffer the most is North Jakarta

(Brinkman and Hartman 2008, Firman et al. 2011). Consequently, this municipality, which includes the KKM communities, is among the most vulnerable places in Southeast Asia (Brinkman and Hartman 2008, Firman et al. 2011).

There is existing research on the vulnerability of kampong communities (Simarmata et al. 2013, Wilhelm 2013). These studies have found that social capital and local informal leadership in the community play a crucial role in kampong community resilience. However, previous studies have not discussed the resilience as a dynamic process that is embedded in adaptive capacities that fluctuate as disasters happen year by year (Cutter et al 2008). Thus, this study aims to capture the resilience of the KKM communities and explore resilience as a dynamic process in relation to the progression of flooding events in Jakarta.

1.3 Disaster Risk Reduction Policy in Indonesia

The Indonesian government often approaches flood issues with environmental engineering projects to build dikes (stop banks) and flood canals (Sagala et al. 2013, Wilhelm 2011b), and recently introduced drainage pumps (Putera 2015) which were proven to be ineffective to solve the floods for a longer term (Sagala et al. 2013). The disaster response schemes of Jakarta government include an early warning system, safety advisory, community self-help, and safety equipment (Firman et al. 2011). Although, Jakarta authorities claimed there have been comprehensive efforts to manage floods including incorporation of nontechnical aspects such as economic, socio-cultural, and governance measures, the implementation of non-technical aspects is still limited (Putri and Aditi 2010 as cited in Sagala et al. 2013). In fact, the Jakarta Government tends to focus on natural science and engineering rather than reducing vulnerability and strengthening the resilience of its people (Sagala et al. 2013, Simarmata et al. 2013). Thus, the government's effort is seen to be more reactive rather than preventive (Sagala et al. 2013).

Hewitt (1973) identified the dominant paradigm in disaster management as 1) heavily based on environmental engineering and natural science, 2) with an emphasis on monitoring, predicting, and controlling natural events, and 3)

prioritising the formulation of disaster plans and emergency measures. The aforementioned approaches by the Government of Jakarta are consistent with the characteristics of the dominant paradigm approach to natural hazards.

Some community based organizations have taken actions through several measures that cover the issues of raising awareness, understanding of flood impacts, and knowledge on how to take action when flood occurs, identifying vulnerable groups and the assessment of people's capacity in dealing with floods (Sagala et al. 2013). While these have contributed to the non-structural measures, they have not been able to address to the millions of people living in Jakarta. Thus, at the household level, people tend to carry out action individually, rather than collectively (Sagala et al. 2013). In this case, households with less capacity suffer the most (Sagala et al. 2013).

1.4 Research Questions

The following research questions that I seek to answer with this study are:

1. Are there any factors that enhance the exposure of Kampong Kamal Muara community to flooding events?
2. What factors play role in the community's sensitivity to flooding events?
3. What are the impacts of flooding events on the community and how does the community cope with flooding events?
4. What range of adaptive responses to flooding events have been employed by the community and the government? What are the consequences of these responses?
5. What are the impacts of government's policy on the community's resilience and vulnerability?
6. What are the characteristics of this community that should be strengthened in order to enhance community based resilience to flooding events?

To summarise, I want to investigate how interactions of the structure and characteristics of the Kampong Kamal Muara community with the Indonesian political and social systems shape the resilience and vulnerability to hazards of the Kampong community.

Chapter 2: Literature Review

2.1 Introduction

Disaster, vulnerability, and resilience have been important discourses that have evolved in the context of Third World countries, particularly in relation to how they may be affected by climate change. Since Indonesia is a tropical country that is regarded to be "disaster-ridden, poverty-stricken, and disaster prone" (Bankoff 2001 29), the disaster, vulnerability, and resilience discourses are appropriate to analyse flooding events in Indonesia. The dominant view of disaster sees disasters as natural, unavoidable events, and in the domain of geophysical explanations (Bankoff 2001; Hewitt 1983). Thus, "disaster prevention is seen as largely a matter of improving scientific prediction, engineering preparedness, and the administrative management of hazard" (Bankoff 2001 24).

However, Wisner et al (2004) argue that separating "natural" disasters from the social framework that influences how hazards affect people, is unhelpful both to understand disasters and to mitigate them. As a critique of the hegemonic view, many scholars (Hewitt 1983, Bankoff 2001, Wisner et al. 2004, Cannon and Muller-Mahn 2010) assert that disasters are not natural and are not merely the matter for the scientific and engineering domain. Disasters happen not only because of natural events, but also as a product of social, political, and economic environments; because these factors structure the lives of different groups of people (Wisner et al. 2004). Thus, disasters are a complex mix of natural hazards and human actions that are influenced by social-political-economic systems that operate within societies (Hewitt 1983, Bankoff 2001, Wisner et al. 2004, Cannon and Muller-Mahn 2010) and cannot be separated from one another (Wisner et al. 2004). As a component of disaster, vulnerability is considered because of socioeconomic systems that put people at risk of harm from hazards (Bankoff 2001, Wisner et al. 2004, Canon and Muller-Mahn 2010). Vulnerability combined with the frequency and magnitude of hazards and the ability of government agencies and communities to prevent or mitigate, and prepare for hazardous events makes three components of disaster risk (Wisner 2002 as cited in Wisner et al. 2004).

Issues of resilience emerged later than vulnerability. This concept originated in ecology (Holling 1973). While vulnerability has focused on how social, political, and economic systems structure humans' lives and expose them to different risks of harm (Wisner et al. 2004), resilience sees humans in a different light. Humans are seen as having agency where they have some power to adapt to disasters (Cutter et al. 2008, Norris et al. 2008). The relationship between vulnerability and resilience has not been very well articulated in the literature (Cutter et al. 2008). However, the concept of adaptive capacities is one with perhaps greater common acceptance, which can be found in relation to both concepts of vulnerability and resilience (Turner et al. 2003, Norris et al. 2008).

This chapter outlines theories that explain the conditions that underpin vulnerability and resilience of the Kampong Kamal Muara community. In addition, I discuss models that were utilised to analyse the conditions of the community after experiencing frequent flooding events. These models are Turner et al.'s (2003) model of vulnerability, and Norris et al.'s (2008) model of resilience. Turner et al.'s (2003) study views that vulnerability consists of interactions among exposure, sensitivity, and resilience. On the other hand, Norris et al. (2008) view resilience as a set of networked adaptive capacities. Following the study by Norris et al. (2008), this research views resilience as sets of adaptive capacities and adaptive capacities as the combination of vulnerability and resilience.

2.2 Vulnerability

Vulnerability has been a significant theme in social science since the 1970s (Schneiderbauer and Ehrlich 2004). The emergence of the concept of vulnerability challenged the analysis of disasters using merely prediction of physical hazards that was the dominant view prior to the 1980s (Birkmann 2006, Hewitt 1983). The vulnerability concept has influenced multifaceted studies on disasters since then.

Wisner et al. (2004 11) define vulnerability as "the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of natural hazards." Along with Wisner et al.,

UNISDR (2004) defines vulnerability as "the conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards" (as cited in Birkman 2006 12). After more than three decades, there is still no universal definition of vulnerability.

The notion of vulnerability has been developed in many studies (Adger 2006, Cutter et al. 2008). Cutter et al. (2008) classified three major schools of thought that analyse the causes of vulnerabilities. The first group (see Wisner et al. 2004) argued that vulnerability stems from social and political systems that cause disparities of access to resources (Cutter et al. 2008). The second group (see Alexander 1993, Heyman et al. 1991) argued for proximity to the source of hazard as the causes of vulnerability (Cutter et al. 2008). The third group, for instance Hewitt and Burton (1971) and Cutter et al. (2008), analysed the combination of spatial location and the insights of social-biophysical systems as the causes of vulnerability (Cutter et al. 2008). Adger (2006) argues that among these three perspectives, common conclusions can be drawn relating the vulnerability of the people to social, political, and economic system and resource distribution. The systems lead people into different levels of risk based on their entitlement and their access to resources and power relations (Wisner et al. 2004).

Researchers also agree that vulnerability is associated with common terms, such as exposure, sensitivity, and adaptive capability (Adger 2006, Cutter et al. 2008, Turner et al. 2003). Exposure is the nature and degree of perturbations or stresses that a system or a group of people may experience (Adger 2006). The characteristics of these stresses include their magnitude, frequency, and the duration of the hazard (Turner et al., 2003). Sensitivity is the degree to which a system or a group of people is affected by such perturbations (Adger 2006, Cutter et al. 2008). Turner et al. (2003) argue that both social and environmental conditions play crucial roles influencing a system's sensitivity to stress, which is manifested in the impacts of that stress. Adaptive capacity is the ability of a system to cope, to adjust, to moderate the impact, and to recover from that stress (Adger 2006, Cutter et al. 2008, Turner et al. 2003). These terms are widely used in the literature in analysis of vulnerability.

Critics of the concept of vulnerability have focused on the way people tend to be positioned as helpless victims of circumstances (Norris et al. 2008). It tends to position them as passive recipients of aid or objects of media, political, and research interests. For instance, some news regarding flooding events often portrayed victims of flooding events as "being trapped in the house and helplessly waiting for evacuation" (see Putra 2016) rather than reporting some initiatives conducted at grassroots during the disaster events. Such initiatives, for instance, are found by Simarmata et al. (2013) in their study that shows people of kampongs in Jakarta have successfully developed and mobilised their limited resources during flooding events in order to communally cope with difficulties during the disaster events. This representation of vulnerability can be disempowering for people who are experiencing disasters. In addition, the concept of vulnerability fails to recognise that human beings have resources and initiatives to overcome adversity. Along with these critics, the concept of resilience has been shifting the focus of research in disaster and global environmental change studies.

2.3 Resilience

The use of the term resilience first started in the field of ecology. Holling (1973) described the term resilience as a ''measure of the persistence of systems and their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables" (Holling 1973 14). UNISDR (2009 24) defines resilience as "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."

Multiple definitions of resilience exist within the literature, with no single broadly accepted definition (Klein et al. 2003, Manyena, 2006, Leichenko 2010, Weischelgartner and Kelman 2015). Although it has been gaining currency in the field of social science, the concept of resilience has been criticised by various scholars. The first critique regards the connection between its origin and its argument in human rationality during critical conditions. In ecology, it is argued that organisms will behave rationally at optimum capacity when they are facing critical conditions (Holling 1973). However, Canon (2008 as cited in Canon and

Muller-Mahn 2010 625) argued that people will not behave rationally or act according to "an externally designed pattern of rationality" even when faced with severe crises conditions. The concept of resilience fails to take into account people's own rationality, or cultural determinants that can drive human behaviours during crises which can be considered as equally valid rationalities (Canon and Muller-Mahn 2010). This aspect differentiates human beings from any other organisms.

The second, failure of the resilience concept is that it does not acknowledge power relations within human systems. With resilience and the ecosystem focus, there is a significant loss of the idea that it is power relations that are embedded in socio-economic and political systems that expose people to different levels of risk (Cannon and Muller-Mahn 2010, Wisner et al. 2004). Thus, this concept distracts from discussions about the root causes of disasters (Cannon and Muller-Mahn 2010, Weischelgartner and Kelman 2015).

Third, the viability of equivalent measures to resilience has been questioned (Cannon and Muller-Mahn 2010, Weischelgartner and Kelman 2015). Weichselgartner and Kelman (2015 10) assert a need to identify and determine which criteria, such as "to where", "to what level" and "in what direction" resilience should be considered appropriate. Cutter et al. (2008) define resilience in the direction of being a capacity to re-organize, not only to return to pre-disaster states, but also to move to an advanced state through learning and adaptation. However, some studies, like Norris et al.'s (2008), do not specify a level of resilience. Despite Norris et al. (2008 130) defining resilience as "a process linking a set of adaptive capacities to a positive trajectory of functioning and adaptation after a disturbance", they do not specify to what degree of functioning a system must work in order to be considered resilient. However, the study specifies resources that are considered crucial for a community to be able to adapt and to be resilient.

Furthermore, some authors refer to resilience as the flip side of vulnerability (see Folke et al. 2002). However, Gallopin (2006) argues that vulnerability is not the opposite of resilience. Along with Gallopin (2006), most geography literature agrees that the relationship between vulnerability and resilience is not linear and

that these characteristics are not entirely independent (Adger 2006). Cutter et al.'s study (2008) also viewed resilience and vulnerability as separate but often linked concepts, although they do not specify how they are connected see Figure 3.

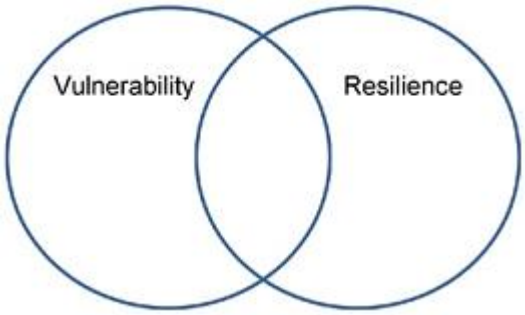


Figure 3 Cutter et al.'s (2008 600) concept of the linkage between vulnerability and resilience. Reprinted with permission.

Adaptive capacity has been considered as a linked concept to resilience and vulnerability (Norris et al. 2008, Turner et al. 2003). Adaptive capacity is defined as the ability of a system to adjust to environmental changes and disasters, to moderate their potential damage, to take advantage of opportunities, or to cope with the consequences (IPCC 2007). Some research categorizes the idea of adaptive capability as parts of resilience and/or use this term interchangeably with resilience (see Norris et al. 2008; Turner et al. 2003). Political ecology and global environmental change studies incorporate the idea of adaptive capability in resilience (Cutter et al. 2008). Birkmann (2006) viewed resilience as an integral part of adaptive capacity, while some other researchers (Gallopin 2006, Turner et al. 2003) assert that adaptive capacity is a nested component within the structure of vulnerability (Cutter et al. 2008). On the other hand, Norris et al. (2008) and some researchers (Burton et al. 2002, O'Brien et al. 2004, Smit et al. 1999) argue that adaptive capacity is the main component of resilience. According to Norris et al. (2008), resilience is constructed through a set of adaptive capacities and community resilience is from a set of networked adaptive capacities. Thus, adaptive capacity can be considered as a shared feature of both notions of vulnerability and resilience. However, the relationships among vulnerability, resilience, and adaptive capacity are not well articulated in literature (Cutter et al. 2008).

The concept of resilience has also been classified as both an outcome and a process (Cutter et al. 2008). Manyena (2006) argues that as an outcome, resilience is defined as the ability to bounce back or to cope with hazard events. On the other hand, Cutter et al. (2008) described resilience as a process of a continual learning, capacity building, and policy improvements. To understand the application of resilience in disaster risk reduction, positioning resilience as an outcome or a process is important (Cutter et al. 2008).

2.4 Modelling vulnerability and resilience

Several models of vulnerability and resilience have been developed. Two useful models are Turner et al.'s model of vulnerability (2003), and Norris et al.'s (2008) model of resilience as network of adaptive capacity. These models each highlight different aspect of resilience and vulnerability, and their causal factors and outcomes associated with them.

2.4.1 Turner et al.'s Model of Vulnerability

Turner et al. (2003) established a vulnerability model by including a focus on interactions of human and environmental systems, vulnerability that resides in the coupled system, perturbations that emerge from the interactions and the impact, and the coupled systems' response to the perturbations. The focus on the coupled system in the framework of Vulnerability is conceptualised with three main components; exposure, sensitivity, and resilience, as shown in Figure 3. The three components of the vulnerability model operate in multiple spatial, functional, and temporal scale. The spatial scale is shown the Figure 4, from place (in blue box) to region (in yellow), and to global scale (in green).

Turner et al. (2003) argued that hazards can arise from within and/or outside of a local system. Furthermore, vulnerability may be influenced by conditions that that are distant, such as phenomena that occur globally or policies at national level (Turner et al. 2003, Wilhelm 2011).

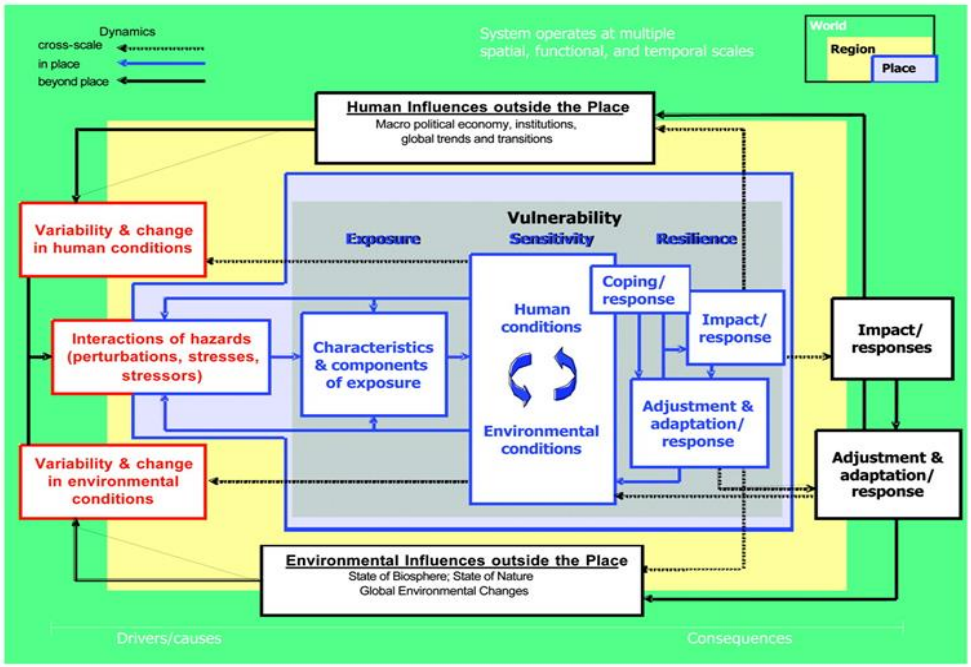


Figure 4 Vulnerability Model by Turner et al. (2003 8076). Reprinted with permission.

Exposure is the degree to which, or the way, a unit system experiences a hazard or stresses (Turner et al. 2003, Adger 2006). The exposure is analysed through characteristics of the hazard and its components that lead to significant variations of consequences of a hazard (Turner et al. 2003). The characteristics of the hazards can be frequency of the hazard, magnitude, and its duration, while the components of exposure can be ecosystem, climate conditions, and geographical conditions of a referenced unit as shown in Figure 4 (Turner et al. 2003).

Sensitivity is manifestation of the interaction between human and environmental conditions that shape the quality of a system in relation to a hazard (Wilhelm 2011a). The conditions of the human system can be analysed in terms of entitlement (to services and infrastructure, for instance), economic structure, and role of institutions (Turner et al. 2003). As for the environmental system, geographical conditions and climate change are some of conditions that shape the environmental conditions (Turner et al. 2003). Turner et al.'s (2003) model of

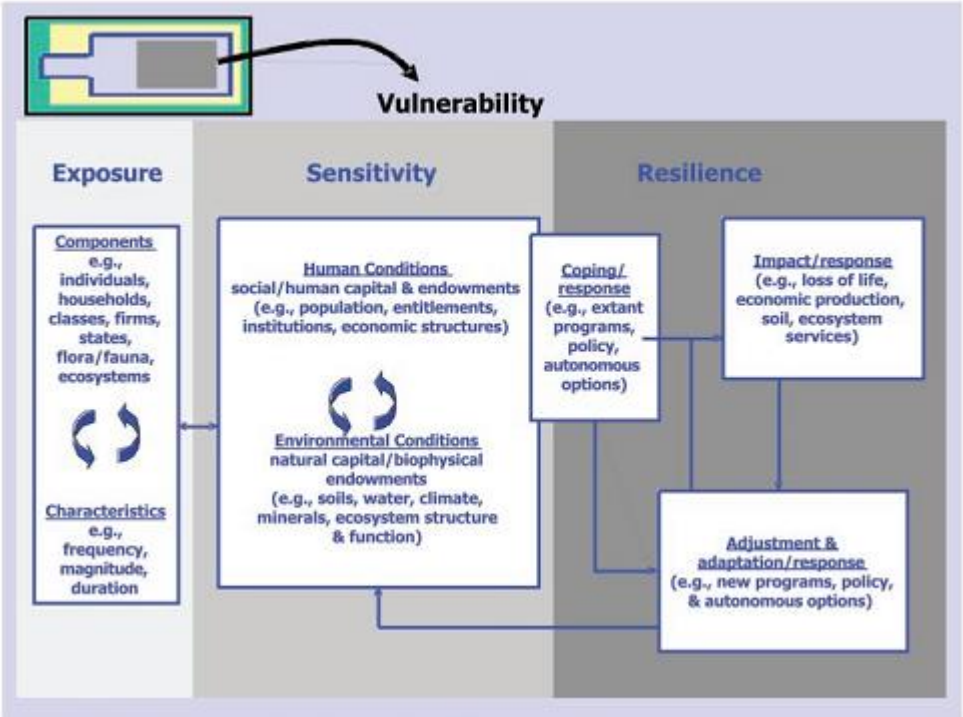


Figure 5 Detailed Vulnerability Model by Turner et al. (2003 8077). Reprinted with permission.

vulnerability highlights influences of the human-environment coupled system in determining sensitivity and coping mechanism to any sets of exposure. Moreover, resilience is directly linked to the coupled human and environmental conditions. The resilience concept consists of three interlinked components which are: 1) impact, 2) coping mechanisms, and 3) adjustment and adaption

Impact of a hazard can be the loss of life or economic production, or damage of ecosystem, as shown in Figure 5. Coping mechanisms were characterised as actions or policies that take effect as the impacts of a hazard are experienced (Turner et al. 2003). Coping mechanisms can be individually or collectively implemented, as well as being autonomous or policy directed (Turner et al. 2003). Coping mechanisms that are used in human systems influence the ability of the

environmental system in coping with impacts of a hazard, and vice versa (Turner et al. 2003). Coping mechanisms can lead to adjustment and adaptation (Turner et al. 2003). Adjustments and adaption are defined as significant system-wide changes in the human–environment conditions, such as a new program or policy, as illustrated on Figure 5 (Turner et al. 2003). Finally, resilience here is viewed as an outcome of collective coping mechanisms, responses, and adaptation.

Turner et al.'s (2003) model has strength in highlighting the interactions of human-environment coupled systems in analysing vulnerability (Cutter et al. 2008). However, this model is criticised by Cutter et al. (2008) for difficulty in differentiating exposure and sensitivity.

2.4.2 Resilience as a network of adaptive capacities

Norris et al. (2008) defined resilience as a process linking a set of resources to positive improvement and adaptation after a hazard. The resources accompanied with their dynamic of being redundant, robust, and rapid are captured as adaptive capacities (Norris et al. 2008). Thus, they assess resilience through networks of adaptive capacities. The adaptive capacities that are considered very crucial for resilience are classified into 4 groups; 1) Economic Development, 2) Social Capital, 3) Information and Communication, and 4) Community Competence, as shown in Figure 6.

First, economic development as a set of resources is assessed through 1) the volume and diversity of economic resources, and 2) distribution of economic resources and social vulnerability. Social capital consists of several aspects which are 1) social support, 2) social embeddedness, 3) sense of community, 4) attachment to place, 5) organizational linkages and cooperation, and 6) citizen participation, leadership and roles.

As shown in Figure 6, the third set of resources includes community competence, which is evaluated through 1) community action, 2) critical actions and problem solving skills, 3) collective efficacy and empowerment, and 4) political partnership. The last set of resources is information and communication that are reviewed through several aspects; 1) narratives, 2) responsible media, 3) skills and infrastructure, and 4) trusted sources of information.

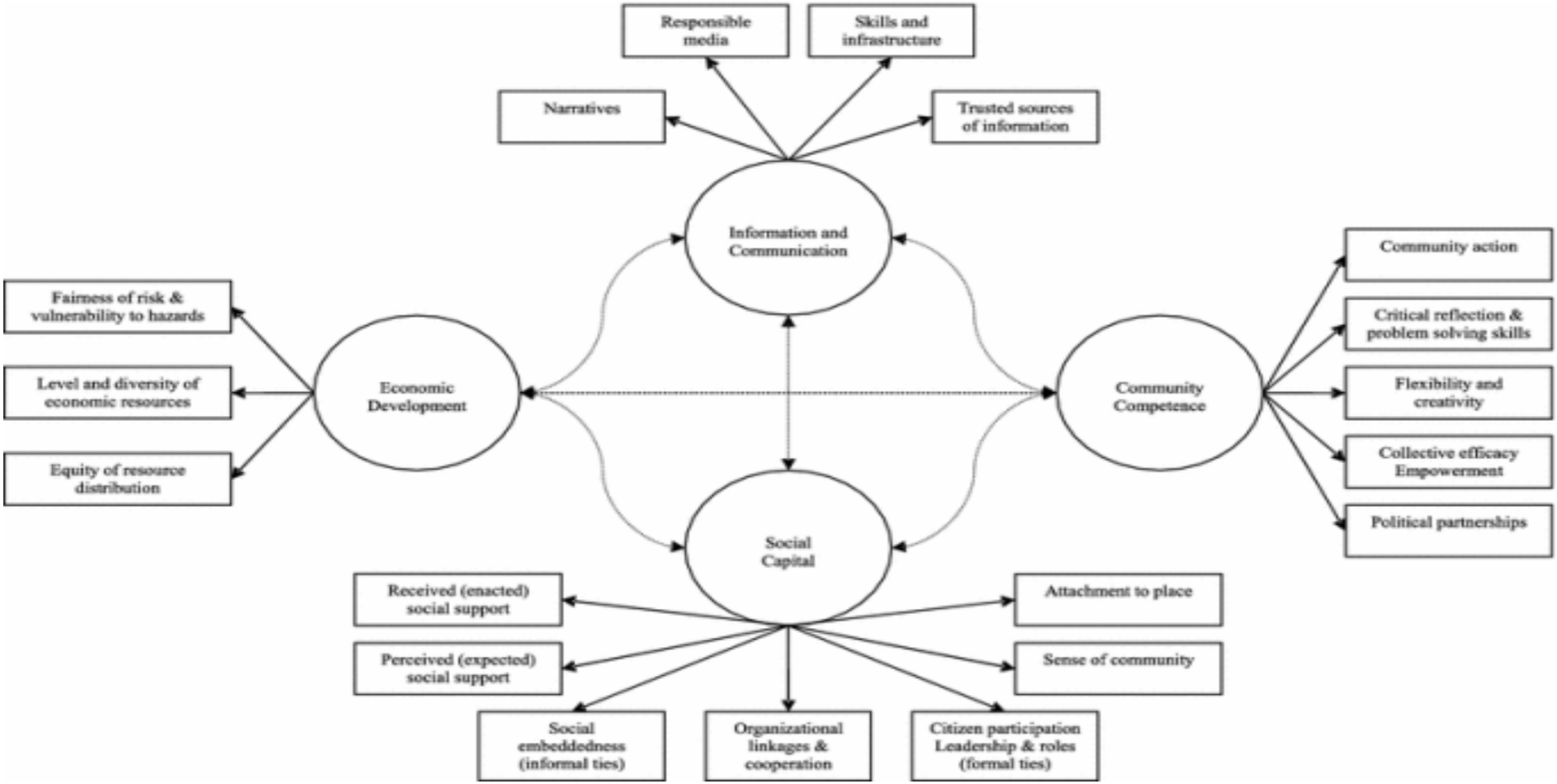


Figure 6 Norris et al.'s (2008 136) model of community resilience as networked adaptive capacities. Reprinted with permission.

2.4.3 Pressure and Release Model

Establishing the Pressure and Release (PAR) model, Wisner et al. (2004) portray vulnerability as a dynamic progression on three different spatial scales, from global to local. Risk is conceptualised as a function of pressures and vulnerability (Wisner et al. 2004). Pressure on the global scale is termed the root causes of vulnerability. The root causes are political and economic ideology that influence the distributions of resources. These root causes together with stressors on the national scale, which are lack of institutions, and rapid urbanization and industrialization, formed dynamic pressures to the focus unit such as a community. The dynamic pressures lead the focus unit into unsafe condition, which take place at local level (Wisner et al. 2004). The unsafe conditions are conceptualised as conditions where the focus unit is settled in disaster prone areas, has dependency on a single sector economy or low pay income, and lack of disaster preparedness. This model also focuses on how different groups are affected differently by hazards. Cutter et al. (2008) highlight their criticisms of this model for being insufficient in addressing interactions of coupled human-environment system.

2.5 Conclusion

Disaster related research has shifted its focus away from the concept of vulnerability towards analysis of resilience (Canon and Muller-Mahn 2010). Studies have also highlighted concerns related to the associated shift in focus from socio-economic systems as root causes of vulnerability to relying on human actions in surviving and reviving from disaster (Berkhout et al. 2003, Adger 2006, Canon and Muller-Mahn 2010). The consequences of this shift of focus has been translated into policies that force humans to adapt and accept the logic of the capitalist systems, which have become the dominant economic systems globally, while they are dealing with disasters (MacKinnon and Derickson 2012, Weichselgartner and Kelman 2015, Welsh 2013). However, some studies view the concept of resilience as a better way to see human beings, as they are positioned as active actors rather than as passive victims as portrayed by the concept of vulnerability (see Cutter et al. 2008, Norris et al. 2008). It is for these reasons that many researchers prefer the notion of resilience to vulnerability (Cutter et al. 2008; Norris et al. 2008).

I intend to incorporate the concept of vulnerability when referring to risk factors such as sensitivity and exposure, whereas adaptive capacities is a linked concept to both vulnerability and resilience. In this study, adaptive capacities are viewed as capacities that are affected by the availability of social, economic, and political resources. These resources are then connected to form a set of networked resources, which are crucial for resilience. The common terms in vulnerability studies, such as exposure and sensitivity, will be used in Chapter 4 for the analysis of the vulnerability of the community of Kampong Kamal Muara. The analysis will be based on Turner et al.'s (2003) model of vulnerability, whereas in Chapter 5, an analysis of resilience of community of Kampong Kamal Muara will be based on Norris et al.'s (2008) model of resilience. Adaptive capacity will be positioned as a shared feature that links the concepts of vulnerability and resilience. Finally, a model, which is modified from Turner et al.'s (2003) model and Norris et al.'s (2008) model, will be presented in discussion part in Chapter 6. This model is specific to condition of the community that has been researched.

Chapter 3: Methodology

3.1 Introduction

The research was conducted in the community which resides in the area of Kampong Kamal Muara (KKM), North Jakarta, Indonesia. In this chapter, I discuss various methods used in obtaining data for this research and issues experienced when using these methods, and outline the limitations of my research topic. The methods include semi-structured interviews, focus group discussions, the recruitment of participants, as well as data analysis. Finally, I also reflect on my own positionality as researcher.

Semi-structured interviews and focus group discussions were used as my main methods of data collection. These two methods of data collection allow conversational, informal, open responses (Longhurst 2010). The total number of participants from KKM community was 28 people. Participants include villagers who reside in RW 1 and RW 8 of Kampong Kamal Muara and two officers at the provincial office of the disaster response agency (BPBD), two officers of the planning bureau (Bappeda), and three officers of the data centre of the disaster response agency of Jakarta province.

I did on-site recruitment of my participants as I walked through and observed the community at Kampong Kamal Muara. I also implemented the snowball technique to get some recommendations from my earliest participants for more participants. Not all people that were recommended were willing to participant or they were not at home when I tried to contact them.

This research focused on KKM community's experience of flooding and the impacts floods have had on their lives and livelihoods, and the ways that they recovered and adapted to the frequent flooding events. Research questions focused on the community's perceptions of flood events, factors that expose them to flooding, and resources and strategies that they implement to mitigate, and recover from, flooding events. This research aims to capture the dynamics of vulnerability of the people of KKM and identify which resources are crucial for their resilience to flooding events.

3.2 Qualitative Methods

Qualitative methodologies provide an alternative paradigm of knowledge creation to that of quantitative techniques (Dyck 2005 882). Focusing on the nature of things, qualitative research assesses meanings, characteristics, metaphors, symbols, and descriptions of things (Berg 2007). For the field of human geography, qualitative methodologies provide a variety of ways of data collection such as ethnography, sociometry, historiography, case studies, unobtrusive measures, interviews, and focus group discussions (Berg 2007). Accommodating subjective experience and focusing on meaning, these methods are useful to analyse humans' social relations to space and place (Dyck 2005 882). Furthermore, qualitative research tends to assess the quality of things using words, images, and descriptions, rather than numbers (Berg 2007). With its interest in human agency, this type of research provides the researcher with "a means of accessing unquantifiable facts about the actual people researcher observe and talk to or people represented by their personal traces" (Berg 2007 9), including their intentionality and their lived experiences (Dyck 2005). In the human geography field of study, by using these methods, the researcher is enabled to explore and understand human's perceptions as well as "how meanings were produced in the context of interacting social and geographical worlds" (Dyck 2005 882). Human agency, embodiment and emotion, being within nature, and the performativity of place are four major themes in current qualitative research in human geography (Davies and Dwyer 2007).

Using qualitative methods enabled me to put myself into the research process and to be aware of how my biography and identity shaped my interactions with the community I researched as well as my own perceptions and positionality (England 1994, Longhurst 2010, Maxwell and Reybold 2015). Through qualitative research methods, I seek to understand the influences of my positionality and to use it productively to investigate my topic of interest (Maxwell and Reybold 2015).

Regarding the researcher's influence on the research, qualitative research has been criticised for its subjectivity (Berg 2007, Maxwell and Reybold 2015). I used triangulation, by combining several methods of data collections, in order to obtain

a better, more substantive picture of reality; a richer, and more complete array of symbols and theoretical concepts (Berg 2007).

3.2.1 Semi Structured Interview

Semi structured interviews are interviews that are conducted with a predetermined order but still ensure flexibility in the ways that issues are addressed by the informant (Dunn 2000 as cited in Longhurst 2010). This type of research method is chosen as it allows people to describe and talk about their lives in their own words in an informal setting (Eyles 1988 8). Through this interaction, the researcher can get insights into what people do and think as well as how they perceive their lives and actions (Longhurst 2010). In some literature, this method is referred as in-depth interviewing (Eyles 1988). In addition, semi structured interviews are chosen since they allow a combination of structure and flexibility in natural and interactive ways for data generation (Legard et al. 2003). This combination enables researchers to "use a range of probes and other techniques to achieve depth of answer in terms of penetration, exploration and explanation" (Legard et al. 2003 141). In addition, the interviews make it possible to generate new knowledge or thoughts (Legard et al. 2003) that can enrich the data. The interviews enabled me to get a deeper understanding from each interviewee. They were conducted with key representative persons of provincial agencies that were mentioned previously to gain the insights into government's efforts in flood event response and public participation in policymaking issues. Furthermore, I explored the citizens' perceptions of vulnerability and resilience to flooding events and I gained insights to the grassroots efforts and hints to factors that restricted in mitigating flood risk and building adaptive capacity after flooding events.

3.2.2 Focus Group Discussions

In addition to the interview method, there were focus group discussions. A focus group is a small group of people led in a discussion, in an informal setting, that is facilitated by a researcher to talk about a particular topic that has been designated (Berg 2007, Longhurst 2010). Focus group discussions allow the researcher to obtain opinions of a larger number of people for comparatively little time and expense (Longhurst 2010). Since they are informal discussions that depend on interactions among members of the group, focus groups allow spontaneity during

the focus group session (Finch and Lewis 2003). “The language they use, the emphasis they give, and their general framework of understanding is more spontaneously on display” (Finch and Lewis 2003 171). In this context, the focus group discussions provide “social constructions” of ideas about and perceptions of the issue through the interactions (Finch and Lewis 2003 172). The social constructions are important in understanding how people understand an issue (Finch and Lewis 2003). Focus group discussions showed socially constructed ideas about flooding and how the participants managed to recover after the flood events.

It was planned that there would be two different groups of focus discussions which were one focus group discussion for people from KKM, and one focus group discussion for the government agencies, NGOs, and academics. However, due to scheduling limitations with government agencies, NGOs and academics, the group discussion for those stakeholders could not be conducted. As for people of KKM, there were two focus group discussions which were held on 5 July 2015. Each session of focus group discussion took about one hour to be completed.

The final part of the research combines the primary data and theories of the vulnerability, resilience, social learning, social capital, public participation and sustainable development in the literature within the context of mitigation and response of flooding events in Indonesia.

3.3 Access to Participants

I contacted local government agencies and researchers who have been working with the community to ask for local contacts to the community. My first point of contact to the community was head of RW1 and his wife. I was directed to head of RT 5 and RT 4, and some female villagers who are actively involved in local organization in KKM. The heads of RT 4 and RT 5 recommended several names of people to be interviewed. After interviewing these people, I also asked my participants for their recommendation as to whom could also be interviewed. My criteria of selection for people to be interviewed were based on age, gender, economic condition, and their level of participation in local organizations.

Table 1 Informants from KKM community

Name (Pseudonym	Gender	Age	Occupation	Active in Organization	Ethnicity
Syamsul	Male	50	Informal	Yes	Betawi
Nori	Female	28	Housewife	No	Betawi
Sri	Female	43	Housewife	Yes	Javanese
Siti	Female	54	Have convenience store at home	No	Betawi
Masyitoh	Female	53	Clothes retailer at traditional market	No	Betawi
Joko	Male	60	Fisherman	No	Bone
Cucu	Female	41	Laundry labour	No	Sundanese
Ina	Female	42	Housewife	Yes	Bugis
Imas	Female	Unknown	Housewife	No	Betawi
Dodi	Male	36	Fuel retailer	Yes	Betawi
Subur	Male	40	Fisherman	Yes	Betawi
Basuki	Male	52	Tailor	Yes	Betawi
Husen	Male	Unknown	Unknown	No	Betawi
Reni	Female	38	Housewife	No	Betawi
Iyah	Female	50	Housewife	No	Betawi
Kinah	Female	Unknown	Housewife	No	Betawi
Imasnah	Female	45	Housewife	No	Betawi
Titin	Female	31	Housewife	No	Betawi
Atun	Female	37	Housewife	No	Betawi
Ridwan	Male	44	Fisherman	No	Betawi
Umar	Male	41	Fisherman	No	Betawi
Kokom	Female	29	Housewife	No	Betawi
Ipeh	Female	52	Housewife	No	Betawi
Modi	Female	50	Housewife	No	Betawi
Jeni	Female	43	Housewife	No	Betawi

As is shown in Table 1, from on-site recruitment and snowball sampling (Longhurst 2010) of people of KKM, my research participants were nine males and ten females. Their age ranged from 28 years old up to 60 years old, with a variety of informal jobs and incomes from one NZD to five NZD per day. Five people were actively involved in local organizations, and 14 people were not actively involved in social organizations around their kampong. Those people who are actively involved in community organizations are local neighbourhood leaders such as heads of RTs and RW, members of the Family Welfare Movement

(PKK), members of Early Education organizations (PAUD), and members of Islamic Recitation groups.

As for government agencies, I chose to interview several officials of related stakeholders including two officers of Indonesia National Agency for Planning (BAPPEDA) of Jakarta, and four officers of Agency of Disaster Response (BPBD), as shown in Table 2 below.

Table 2 Informants of the research from government's office and NGO

Name (Pseudonym)	Gender	Age	Office
Dika	Male	32	Bappeda
Andy	Male	32	Bappeda
Meri	Female	29	Pusdalops BPBD
Rahman	Male	42	Pusdalops BPBD
Veri	Male	40	BPBD
Rian	Male	53	BPBD
Sodikin	Male	50	FPBI

These officers are in charge of city planning and disaster response in Jakarta province. In addition to these agencies, I also interviewed one member of a provincial organisation that has been actively working with BNPB to propose contingency planning for Jakarta. The organisation is Forum of Disaster Care for Indonesia (FPBI). All my interviewees' and focus group discussion participants were recruited voluntarily with oral consent.

3.4 Critical Reflection on the Interviewing Process and Focus Group Discussion

Bahasa Indonesia, the national language of the Republic of Indonesia, was spoken to the participants of this research in both Focus Group Discussions and the interviews. Participants from KKM were not able to speak English. I was fully informed about local protocols in KKM by previous researchers who conducted their research at Kampong Kamal Muara. Some participants from KKM helped

me as local escorts and assisted in interpreting the local dialect of the KKM community if they spoke Betawi.

I tried to hand a written consent form and information sheet in Bahasa Indonesia to participants after explaining the research topic, their rights as participants, and assurance of their confidentiality. I experienced refusal to sign written consent forms from most of the interviewees from KKM. As soon as they saw those papers, they somehow felt intimidated that they might say the wrong thing, and be in trouble because of my research, although I explained about confidentiality. For instance, I tried to make an appointment with the head of RT 1 several times through his wife since he was not at home every time I was in KKM. When I started casual conversation about my research and tried to recruit the wife of the head of RT1 to be my interviewee, she agreed and seemed relaxed. However, as soon as I handed out the consent form to her, she looked uncomfortable and felt uneasy. Then, she felt that signing papers seemed to be something "official" which can imply bad consequences for her husband's job, if she said something "wrong." She explained her experience of being interviewed for some previous research, and some of her statements were written exaggeratedly in a news article. She refused to be interviewed but helped me to recruit other participants by suggesting several names.

Reflecting on this issue, I recall Linda McDowell's argument that maybe because I am a young woman that I was perceived as being unthreatening and the interviews being "not so official" (as cited in England 1994 85) before I handed a consent form to the people. Therefore, at the beginning they were relaxed when I started a casual discussion and explained that I was doing research on flooding events at their *kampong*. However, signing a paper, although it is a written consent form, was perceived as something official and a serious matter. This made most of them uncomfortable and unwilling to continue conversation although in the end they agreed to give verbal consent to be interviewed and to be in a focus group discussion. I anticipated this in my ethical application mentioning that I would take their oral consent just in case they refused to give written consent. The problem of written consent can be related to the fact that in research there is a power relation between researcher and the researched (England 1994).

Exploitative publication which was experienced by the wife of head of RT1 reminded me to be sensitive to power relations among my participants and to minimise any possible negative consequences to them (England 1994). Feminist researchers advise to address these power relations in order to "give voice" to the researched, for instance by using lengthy interview quotes and sharing prepublication text (England 1994). I indicated in the information sheet, consent form, and ethical application to be willing to share prepublication text if requested by my informants. However, none of them has requested this text.

The interviews are informal. I realise that interviewing requires the researcher to be an empathetic listener and good conversationalist (Eyles 1988). I did not follow the same sequence of questions and tried to tailor the wording of the questions to each particular individual (Eyles 1988). Using these strategies, I wanted to ensure that questions have the same meanings for all respondents and to put respondents at ease during the interviews (Eyles 1988 8). I adopted these strategies after experiencing some awkward moments during my second interview. My second respondent was not very sure of what I was asking; I had to reword some terms so that she understood my questions. During the interviews, my respondents were eager to describe and talk about their experiences dealing with repetitive flooding events in their own words. This is the essence of using informal semi-structured interviews (Eyles 1988 8).

As for focus group discussions, it was difficult to organize due to the people's working schedule and the lack of common space to have the discussions. I found the space of the focus group discussion matters a lot in determining people's decision to attend the focus group discussion. The first discussion was conducted in place which was established by a local NGO. Because a considerable distance from their kampong and the context of this place being a "formal and well established building", some participants were discouraged to attend the focus group discussion. The second focus group discussion were conducted in a participant's house which is located at the kampong. It was easier to have participants to attend to this discussion. During the second discussion, the participants seemed to be relaxed to speak their opinion due to their perception of the place as informal and their familiarity in the setting. Moreover, I also found

that it was crucial for the researcher to facilitate the discussions so that the discussions focused on the topic.

3.5 Interview and Focus Group Discussion Analysis

The interviews and focus group discussions schedules were written in English then translated into Bahasa Indonesia together with the consent form and information sheet. The interviews and focus group discussions were conducted in Bahasa Indonesia for the convenience of the participants. Translated transcripts of the interviews and focus group discussions were produced upon return to Waikato University. It was a lot of work translating all the data collected into English. I took extra care when translating the data into English to not lose the essence of the participants' views.

I transcribed the first ten interviews after each interview was done. However, the remaining transcriptions of interviews and the two focus group discussions were delayed until I arrived to Hamilton due to some medical conditions. Since the interviews were conducted in Bahasa Indonesia, they later then were translated into English. It did take a lot of time to translate. I also made little notes during the interviews for some words that were emphasised by respondents. These notes were useful for me as an accompanying source when I transcribed the interviews. While transcribing I started to identify dominant themes for vulnerability and resilience. For vulnerability, the dominant themes are geographic and environment conditions, land use change, climate change, flood frequency, economic conditions, adaptive response, and government's policy and supports. For resilience, physical capital, social capital, adaptation, and government's support are the dominant themes.

Themes that were mentioned by respondents, such as heightening houses' floors and building higher storage in the ceiling, were coded and categorised as implied by emic coding techniques (Crang 2005). These data in emic coding were then related to the theories. Adapting Turner's (2003) model of vulnerability and Norris et al.'s (2008) model of resilience, I tried to contextualise my findings and connect these two concepts of resilience and vulnerability. Refining, categorisation and re-categorising, which included the development of different

sub-categories, enabled me to explore the complex interrelations between vulnerability and resilience of the community.

3.6 Limitations

This research aimed to capture dynamics of resilience and the vulnerability of people of Kampong Kamal Muara in experiencing flooding events. Within this community, adults have a major role in decision-making as well as in family livelihoods. Therefore, this research limits its focus to adult participants and discusses initiatives of flood adaptation and recovery by adult member of the community and by organizations that focus on adult members of the community.

Some organisations and NGOs have been actively involved in initiatives to educate children of Kampong Kamal Muara in understanding and mitigating flooding events. However, since the programs are not the focus of this research, I did not pursue further communication with the organisations.

3.7 Critical Positionality

A researcher's identity shapes interactions between the researcher and research participants (England 1994; Valentine 1997 as cited in Longhurst 2003). It is important to be reflexive and to recognize the researcher's positionality in order to be critical about how knowledge was being constructed during the research interactions (England 1994). I am female, 27 years old, middle class, Indonesian but not originally from the community I was researching. With this identity, I played out a role as supplicant-researcher (England 1994) seeking insights to how the KKM community experiences and adapts to frequent flooding events. I am both an insider-researcher as I am Indonesian just like the community members who are also Indonesians, and as an outsider since I am not originally from the area.

Being an insider-researcher, I have a better understanding of the culture being studied and can adapt to the flow of social interaction relatively quickly (Bonner and Tolhurst 2002) since I can speak Bahasa Indonesia. However, being an insider researcher led me into encounters where I was to make assumptions about what I was observing and what I was asking without probing deeper to question the

underlying reasons for the phenomena due to my familiarity with the setting or the existing knowledge that I have (Bonner and Tolhurst 2002). Being reflexive helped me to be more self-conscious when I was interacting with my participants and observing the community. Thus, I acknowledge that my positionality and subjectivity affects and influences this research.

I am also aware that my identity filters the data and my perceptions and interpretation of this research (England 1994). I recognise that knowledge is not value-free (England 1994). My motivation for doing this research is to enrich work on community resilience in a developing country while linking the concepts of vulnerability and resilience. This research reveals adaptive capacity as a connection between vulnerability and resilience as well as resources that are crucial for community resilience.

3.8 Conclusion

I implemented semi-structured interviews and focus group discussions as my main methods of acquiring data from Kampong Kamal Muara Community. The issues of consent form access to participants had significant impacts on the data collection methods and the quality of data gathered. This is qualitative research that aims for in-depth and detailed data from personal stories and experiences and does not intend to be representative of Indonesian community as a whole. I acknowledge my subjectivity and positionality that affected how I interacted with my participants, and how I interpreted data in this research.

Chapter 4: Vulnerability of the Community of Kampong Kamal Muara

4.1 Introduction

Turner et al's (2003) model of vulnerability is applied in this chapter to outline vulnerability of the community of Kampong Kamal Muara (KKM). Turner et al. (2003) modelled vulnerability with three components that are exposure, sensitivity, and resilience. The resilience concept in Turner et al.'s (2008) model covered the impact of disasters, coping responses, and adjustment responses. However, the resilience aspect in this chapter will focus on the adjustment strategies that have been implemented as adaptive responses toward flooding events. Therefore, three components of the vulnerability of the community that are discussed in this chapter are: 1) exposure, 2) sensitivity, and 3) adaptive response to flooding events.

4.2 Exposure

Components, including geographical and environmental conditions, which expose people of KKM to hazards and lead to significant variation of impacts of the flood hazard, are classified as exposure in this chapter.

4.2.1 Geographical Conditions

Kampong Kamal Muara is located in a low lying coastal area. This area is identified as flood prone due to its location adjoining to the sea (Simarmata et al. 2013). Moreover, some areas of the kampong's contour are shaped into a basin which causes the area to be inundated for longer periods by floods during the monsoon season (Simarmata et al 2013).

4.2.2 Changes in Environmental Conditions

Being asked about what causes flooding in their kampong, people of KKM mention various causes which generally can be classified into God's acts, and human's acts. Human's acts which were recognized by people of KKM as the causes of environmental changes included: 1) rapid increase of house building, 2) underground water extraction, 3) garbage littering, and 4) industrialization of the areas around their kampong.

First of all, rapid growth of population in the kampong has lead into increasing demands for housing and housing development. The increase of the number of houses affects the kampong's landscape in three elements; its land, its trees and green areas, and its swampy areas. First, the housing took up most of the permeable areas of the kampong's land in that the distance between one house to another house is as narrow as 30 cm to 50 cm as shown in Figure 7.

Figure 7 Due to significant increase of population and house building, a narrow distance between houses is a common condition to see. (Source: Author)

This typical narrow distance between houses in the kampong is not sufficient to give space for either waterways or water permeable surfaces. In consequence, during wet seasons and high tides, these areas can easily be inundated by rain or water from the sea.

Second, trees, that used to feature in the kampong's landscape, have long gone too. Syamsul, male, 50 years old described how his kampong was when he was teenager:

> In the past, here, in Kamal, when I was a child, flooding events hardly ever occurred. Up until I graduated from Junior High School in 1984, I can remember that there were no floods at all.

> At that time, there were many trees and grass (around the kampong). Any trees can be planted here. Nowadays, there is no trees at all here. They are replaced by houses (Interview: Syamsul, 28 June 2015).

Within three decades, the landscape of kampong Kamal Muara has changed significantly. There are no longer any trees and green spaces in the kampong areas. These changes are perceived as contributing causes to the flooding events in the kampong.

Third, swampy areas are understood to be water containment areas to prevent flooding events by interviewees. However, the existence of swampy areas has changed significantly due to the housing increase in the kampong. The areas that used to be swampy, are nowadays dense housing sections. Subur, 40 years old, male, identified some areas that used to be swampy areas before.

> The areas behind the security booth and by the sea banks used to be some water containment space. The area by the sea banks were converted into housing area in 1998 (Interview: Subur, 30 June 2016).

Government policy played a role in the change of the sea banks area. Those houses, which were mentioned by Subur in the quotes, originally belonged to inhabitants of stream banks near the kampong. They were relocated to the embankment of the sea due to government's project to build a sports stadium for their sub district. The people were moved from one flood prone location to another flood prone location, from a river bank to the embankment of the sea.

> The stadium by the river bank, it was a housing area. Because of the stadium development, those people moved here (Interview: Ina, 29 June 2015).

The soil, trees, green spaces, and swampy land; these three significant components that used to function well to absorb water, have been converted into dense housing in Kampong Kamal Muara (KKM). The lack of these elements has increased the chance for exposure to flooding events. Finally, population growth

which leads to a rapid increase of housing and changes in the environmental condition of the kampong, has consequences for the people of KKM in that they are exposed to flooding events and more sensitive to the hazards because of their higher population density.

Second, another human act that is considered to be a contributing factor to flooding is underground water extraction. The underground water extraction was believed to cause land subsidence of the kampong. Siti, female, 54 years old, mentioned the following about ground water extraction.

> The flood is God's act, but I think it is the problem of too many buildings while underground water extraction pulls down the soil (Interview: Siti, 28 June 2015).

Land subsidence is a major issue in Jakarta. The subsidence rates along the coast of Jakarta vary from 9.5 cm/year to 21.5 cm/year (Chaussard et al. 2013). One of the major causes of land subsidence is groundwater extraction (Abidin et al. 2011). Rapid population growth and increasing economic activities have led to the increase in water need (Abidin et al. 2011). However, due to inadequate piped treated surface water supplies, approximately 64% of water needed in Jakarta is fulfilled by groundwater extraction (Ali 2011 as cited in Abidin et al. 2011). This phenomenon of groundwater extraction also happens in Kampong Kamal Muara. Therefore, by 2002 – 2005, it was detected that Kamal Muara had experienced a lowered acquifer water level by about 0.71 m and subsidence of approximately 4.3 cm in 2001 – 2002 (Abidin et al. 2011). Based on the interviews conducted with people of Kampong Kamal Muara, the land subsidence rate at their area is approximately 10 cm/year. As a consequence of land subsidence, during high tides, tidal flooding has been affecting Kampong Kamal Muara since 2007.

Figure 8 Water containment space where people usually litter their garbage rampantly. (Source: Author)

Third, there is an issue of the garbage littering habits of the people of Kampong Kamal Muara (see Figure 8). Some interviewees stated that the kampong gets the impact of garbage littering from the areas that share borders with KKM. The area is officially under the authority of another province, Banten. Kokom, female, 29 years old, whose house is next to a littering site in KKM, shared her point of view.

> My husband sees the garbage from that side, from Banten. That is the border with Banten. From the dyke, the water and garbage flows to water containment space right in front of our house. Also, people (from KKM) litter garbage into that water containment space and most of the time my family and I are the first to be exposed to the garbage when our kampong is flooded. I wish I could tell people if we litter, it can cause the flooding and exposure to the garbage. I wish people could just burn their garbage, not littering them here (Interview: Kokom, 15 June 2015).

One of the surviving water containment spaces in the kampong was rapidly changed into a "dumping site." It is caused by the water flow from the neighbouring kampong which shares the border of Banten Province with the Kampong Kamal Muara and littering habits of KKM people.

Fourth, industrialisation is also considered as a contributing factor to flooding events. Factories, and industrial storage, surround kampong Kamal Muara. Development of factories and industrial areas near the kampong is also recognized as a process that took up water containment spaces around the kampong. Joko, male, 60 years old, recalled the occurrence of the first flooding events preceded by the building of industrial areas surrounding their kampong. He introduced the function of rice fields to contain the water from the Kamal Muara stream.

> The flood started to occur since the factories were built (near our kampong). It used to be safe here because water flowed to the rice fields (Interview: Joko, 29 June 2015).

Iyah, female, 50 years old, has the same opinion as Joko's about the rice field function in reducing the risk of flooding events.

> There used to be many spaces for water containment around this kampong, and also rice fields. Nowadays, rice fields have been converted into industrial areas. No more rice fields (Interview: Iyah, 30 June 2015).

The introduction of industries and factories has been witnessed by people of KKM to be changing the landscape of their surroundings. They are aware that it has an impact on their sensitivity to flooding events. In addition, the waste of the factories is recognized by people of KKM to be polluting Kamal stream at their village.

> Not only Kamal stream used to be deep, but also its water used to be good for bathing and swimming. Kids used to bathe at the stream. It is not possible anymore. [The water quality degradation is caused] by waste pollution, from the factories (Interview: Umar, 2 July 2015)

In summary, a significant increase in the number of houses in the kampong coupled with industrialisation has had the impact of taking up spaces for permeable surfaces in the kampong and its surrounding areas. In addition, ground water extraction and garbage littering are recognized as contributing acts toward causing flooding events. These acts and phenomena are perceived by people of Kampong Kamal Muara as the cause of both tidal and rain floods.

4.2.3 Climate Change

Penjaringan district, where Kampong Kamal Muara is located, is considered to be a vulnerable area to climate change by the Ministry of Marine Affairs and Fisheries in 2010 (Bengen and Tahir 2013). The exposure of the area to climate change impacts is considered to be high because of the combination of sea level rise and land subsidence (Simarmata et al. 2013, Abidin et al. 2011, Chaussard et al 2013). Sea level rise rates at the coastal area are approximately about 4–5 mm/year (Renimaulia et al. 2010 as cited in Abidin et al. 2011).

Basuki, male, 52 years old, related the start of flooding events to the issue of increase of global temperature.

> It starts to flood when there is issue about increase of global temperature. Since then the high tidal flood started to occur (Interview: Basuki, 30 June 2015).

Among the interviewees, only one person mentioned this topic, though. It seems that people of Kamal Muara are not familiar with floods' connection to climate change.

Climate change is related to the change of the tidal flooding pattern and its frequency. Most of literature on climate change indicated that these phenomena come with the risk of more frequent extreme events affecting human beings and the environment (IPCC 2014).

4.2.3.1 Flood frequency

Kampong Kamal Muara had never experienced any significant floods prior 2007 (Interview: Syamsul, 28 June 2015). The occurrence of the floods in KKM started in 2007. This flood was perceived as the biggest flood that has ever hit them.

People of KKM described it as a “Tsunami like” flood. Sri (43 years old, female) described the flood as “black water goes up from the sea, in a very quick motion.” After this flooding event, the kampong started to experience floods until the present. The floods experienced are both from rain and the tidal surge. However, the most frequent floods are tidal.

People of Kamal Muara recognised two kinds of tidal floods, big and small floods. The big tidal floods usually occur several times from November up to December, with height variying from 20 cm up to 1 metre. Sometimes this flood is combined with the water from rain during the wet season. In addition, small tidal floods used to occur during the new moon and full moon phase. These are called small floods because the height is relatively low, and they mostly inundate the walking paths and only some houses with lower floors.

Table 3. Historical occurrences of big tidal floods in Kampong Kamal Muara. Source: combined from Kompas, Republika, and Liputan 6.

Year	Month of occurrences of Tidal Flood
2007	November - December
2008	January - March
2011	May, November - December
2012	November - December
2013	November - December

Table 3 shows historical occurrences of big tidal floods in Kampong Kamal Muara which were reported on TV news reports and in newspapers. After the 2007 tidal flood, there was a series of the big flood occurrences up to 2013. As for the water volume of tidal floods, people agreed that since a dam on Kamal stream was heightened in 2012, tidal floods have not been as big as in 2007 or other previous years (Interview: Nori and Masyitoh, 28 June 2015). Although not being reported on the news, the frequency of these small tidal floods has been increasing

lately. These recent years, small tidal flood occurrences do not have any pattern nor do they appear to be based on moon position any longer. Siti, female, 54 years old, described the small tidal floods as below.

> Small tidal floods have no specific pattern these days. They used to be once a month or during the new month. But these days, (small) tidal floods are not really based on moon conditions. They are not seasonal either. Nearly every night the road is flooded. (Interview: Siti, 28 June 2015)

Inconsistency in patterns of the small tidal flood occurrences and their increasing frequency is in line with the notion of the impact of climate change and sea level rise on coastal areas. The combination of factors mentioned previously along with climate change impacts has increased the KKM people's exposure to flooding events.

4.3 Sensitivity

This section outlines the sensitivity of people of Kampong Kamal Muara, which is viewed from several aspects: the people's income, their entitlement to infrastructure and services, and influence of government's policies as a powerful institution.

4.3.1 Income

Many of the men (approximately 50%) in Kamal Muara are fishermen (Interview: Syamsul, 28 June 2015). Some other parts of the population work at industrial areas near their village and some others work at home for their home-based-business, while others work informally such as drivers, and *ojek* (motorbike taxi) drivers. For this community, men are the main breadwinners and women do domestic work at home and support their husbands with informal jobs near their houses. Types of informal jobs are laundry labour, convenience store attendant, and labour work at a green mussel farm.

The households have diversity in terms of income. The jobs can be classified into five categories; 1) fishermen who own their own boat, 2) fishermen who do not have their own boat and other informal workers in the kampong, 3) motor taxi and

public transportation drivers, 4) factory workers, and 5) owners of skill-based-home-business. First, fishermen who own their own motorized boat earn roughly NZ$10-NZ$15 per day if the season is good. They earn more than fishermen who do not own their own boat because having motorised boats as their capital saves them from paying boat rental. Boat rental is a major take from fishermen's income besides the boat fuel.

The second group is fishermen who do not own their own motorised boat and people who work informally at this kampong. They may earn NZ$1.5 – NZ$5 per day under the best conditions. Income for these informal jobs is generally not steady. During the flooding events or variable seasonal conditions like strong winds, both groups of fishermen cannot do fishing. It will be worse if tidal surges combined with heavy rain cause sequences of flooding events during the wet seasons (usually from December to March). These conditions will expose them to flooding events while they have no income during this time.

Third, motorbike-taxi and public transportation drivers earn approximately NZ$5-NZ$8 per day during school days. However, they earn less money during school holiday seasons. The worst periods, during big prolonged flooding events, are when they cannot work since the main access road to go in and out of the kampong is inundated.

> My husband drives (car for public transportation) to Cengkareng-Kamal. The passengers are mostly students. During school holidays, there are not many passengers for him. During this time, he usually earns up to IDR 30,000 – IDR 40,000 (approximately $3 NZ–$ 4 NZ), which is barely enough for us with our three children (Interview: Cucu, 29 June 2015).

Cucu's husband's and the drivers' incomes are sensitive to the flooding events, since their work depends on the seasonal conditions and on the only access road which is affected by the tidal floods.

Fourth, people who work in the industrial sector earn approximately NZ$2 to 5 per day. The amount of their income from working at factories is a little bit more than those who do informal jobs at KKM and they have more steady income, the

money is just enough for basic needs of survival only. Finally, the fifth group, people who own their skill-based-home-business like tailoring, earns more in the community, approximately NZ$10–13 per day when they get many orders.

4.3.2 Infrastructure and Services

Besides having low income, there are several issues concerning infrastructure and services around the kampong: 1) lack of access to hygienic water, 2) lack of a proper drainage system, 3) lack of toilet and sanitation facilities, 4) poor housing conditions, and 5) insufficient waste management services. First, the people of this kampong do not have access to piped, treated water. Thus they have a lack of access to hygienic water for their basic needs. Most of the people of kampong Kamal Muara do not have their own reliable well for water consumption. They used to have wells, but now most of the wells no longer function since the ground water has been polluted by salt-water intrusion.

> We buy water from the mosque. People here do not have any proper wells since the water (from their well) became smelly (Interview: Siti, 28 June 2015).

Most of the people, therefore, need to buy water for their daily consumption and basic activities. For most of them, this is really taking up a large part of their income.

> It cost IDR 60,000 (approximately NZ$6) to buy water for bathing per month. Other fees are charged for water for drinking supply. Water for drinking costs us IDR 4,500 (approximately NZ$4.5) for one or two days (Interview: Titin, 2 July 2015).

Titin, female, 31 years old, has a small family, consisting of her, her husband, and her young daughter. For her family of three, water consumption takes up nearly 65 cents per day, while her husband only earns approximately NZ$4 –NZ$5 . Water consumption, as the primary need of their life, takes a large part of the households' income. It depends on the size of the family. The bigger the family, the larger the amount required to fulfil their need for water. For Ina, 42 years old, a mother of three, the amount of money spent for water is nearly five times Titin's expenses.

> This morning, I pay IDR 10,000 (approximately NZ$1) only for water to bathe for one day. If I buy water for washing dishes and clothes, it will cost me IDR 20,000 (approximately $NZ2). Sometimes, I go to my neighbour who has a well (so I get a cheaper price for the water). However, their pump has broken for three days. Thus, water here is really precious, we sometime reuse water (if it is still reusable). We try to make the water last as long as possible (Interview: Ina, 29 June 2015)

On the other hand, people who have their wells fully functioning do not experience these kinds of hardship that were experienced by Titin, Ina, and other households who do not have their own reliable hygienic water source. Thus, there are some variations on how the problem of not having access to pipe-treated water affects the community of Kampong Kamal Muara.

Second, the lack of proper water drainage systems for household waste is recognized as another condition that leads to more frequent exposure to the flood.

Figure 9 Water waste builds up in front of people's houses due to improper drainage system. (Source: Author).

As shown in Figure 9, a house was nearly inundated by water. The water is from a tidal surge and/or rain as well as household water waste that was blocked because there was no proper drainage for the water.

> People have no (proper) drainage. The water waste gets to (small) sewerage in the front of the houses. Most of the time, the waste was stuck, could not flow to smaller stream if it is not sucked out with a water pump (Interview: Iyah, 30 June 2015).

Some areas of the kampong did have small sewerage systems in front of the houses. However, these small systems are overwhelmed when there is excessive water input from either the tidal surge or the water waste. In addition, siltation or garbage that was littered sometimes blocks the sewerages. The use of the water pump to drain the water might help in some cases. However, people also consider this solution to be expensive due to high electricity cost it may incur.

Third, the lack of proper sanitation is another issue that is experienced by the KKM community. Most of the people of KKM do not own their own toilet at home. To access public toilets in their kampong, they have to pay some amount of money each time they use the toilets. Therefore, it costs more for those who do not have their own toilet to maintain their day-to-day life. Titin, a mother of one, 31 years old, narrated her expenses on using the public toilets.

> I do not have a toilet, there is just a space for taking a bath. Many people here do not have their own toilet at home. I pay IDR 2,000 (approximately 20 cents) every time I go to the public loo (Interview: Titin, 2 July 2015).

The IDR 2,000 can be so much if it is multiplied by the several times Titin or other people go to the public toilets. Thus, the people who do not have their own toilet, only use public toilet if they want to move their bowel. It means that their urine goes untreated to their water waste or the surrounding soil. They are exposed to the water waste during the flood.

Fourth is housing conditions. The majority of houses in Kampong Kamal Muara are permanent one-storey brick houses, the floors of which are around 10–20 cm

from the ground. Since the house is permanent on the subsiding ground, there is not much that can be done to mitigate the impacts of the house sinking other than modifying the flooring.

These houses used to have nice flooring with tiles. However, after experiencing flooding events, many houses in Kampong Kamal Muara now have soil floors. Some people have changed their flooring to stilt flooring, fibre flooring, or green mussel shells flooring. The soil floors, if they are flooded, take a longer time to dry and the floor gets muddy. However, it is easier for them to clean the flooring, just by sweeping it with brooms. As for using the fibre flooring, Kokom, female, 29 years old, shared how frustrated she was using the fibre flooring during flooding events.

> If the flood is high, I feel sad. Our flooring is made of plastic fibre, like zinc for roofing, like plastic with cork in the middle. The floor was lifted up and became buoyant during the flooding events. It was not comfortable to walk in the house since the floor was not stable (Interview: Kokom, 15 June 2015).

Kokom's house floor is not wet, but she was not happy with the flooring. The floating floor gives her emotional pressure and discomfort. Moreover, some houses of the participants of this research tended to be over crowded. Reni's (female, mother of three, 39 years old) house was a three-bedroom-structure which was inhabited by three different families and grandmothers. This kampong is definitely heavily populated.

The fifth, issue is the waste problem. Actually, KKM subscribed to a waste collection system, which is handled by a government agency. However, to be able to throw garbage in to the appointed dump site, people are required to pay approximately $NZ1.00 per month to have their waste collected (Interview: Titin, 2 July 2015). Some people who cannot afford to pay for the waste to be collected end up littering the waste into the river or water containment space, or burn their own garbage. This phenomenon shows why poverty can lead people into unsustainable practices.

Lacking particular types of infrastructure is a core dimension of poverty (Department for International Development 1999). As has been outlined, for people of Kamal Muara, a core dimension of their poverty is lack of services for hygienic water supply, sanitation, drainage systems, over crowded housing, and waste management. Accordingly, a large portion of their income is used to fulfil such basic needs. In addition, lacking waste management and a proper drainage and sewerage system made people of KKM more likely to be exposed to garbage and polluted water. Their health is likely to be affected by water-borne diseases, such as diarrhoea and some diseases that are suffered after the flooding events can be severe, and take a lot of money and time to heal. For instance, Nori, 28 years old, a mother of one, said that her son was very sick, that he couldn't even walk after being exposed to dirty flood water in 2007. The sickness of her son cost a lot of their funds since it took months for the son to recover. Thus, they are more sensitive to health deterioration when they are exposed to flooding events.

4.3.3 Influence of Government's policies

There are two major government policies that were recognised by interviewees as having a significant impact on their livelihoods and their ability to cope with flooding events: 1) reclamation of islands on the North Jakarta coastline, and 2) subsidy cuts on fossil fuel.

The first policy that was recognised as very influential is reclamation of islands off-the coast of Kampong Kamal Muara. The reclamation of islands off the shore of North Jakarta was part of the National Capital Integrated Coastal Development (NCICD) project which was announced in 2014. NCICD included several mega development projects which are: 1) islands reclamation for development of an integrated city, 2) an outer layer of sea wall, and 3) development of a giant sea wall and reservoir in the north of Jakarta (Afrianti 2014). Heavily based on engineering, this policy was argued to be Jakarta's defence against sea level rise and tidal floods, as well as tackling rapid growing population in Jakarta by providing more spaces offshore of North Jakarta (Witteveen Bos nd). Despite the government's campaign on this policy, citizens of North Jakarta, especially fishermen, doubted the true intention and who will benefit the most from this project (Deny 2015).

Figure 10 Blueprint of Jakarta reclamation project. Source: Kuiper Compagnons (n.d). Retrieved from https://www.kuiper.nl/en/projects/the_great_garuda_to_save_jakarta/ .

As shown in Figure 10. there are 17 islands that will be developed in the reclamation project. Currently, two islands are being developed (Interview: Ina, 29 June 2015). Since the sea is the main source of livelihood for the majority of people of KKM, the development of artificial islands near their coast has several impacts on them: 1) blocking access to the sea, 2) taking up productive spaces that were valued by people of the kampong which consequently disrupted their livelihoods, and 3) polluting the sea water.

First the direct impact of this reclamation policy is blocking people of Kampong Kamal Muara's access to the sea. Ina, a mother of three, 42 years old, whose husband works as a boat driver for leisure fishing, shared how this reclamation project affected their livelihood.

> The ongoing projects made the seabed shallow because the excessive soil from the site drifted off and filled up the seabed. It caused disruption in our livelihood since my husband only can go to the work once a week. This condition lasted for several weeks until the shallowing seabed was dredged out so that he can go to the sea again (Interview: Ina, 29 June 2015).

Second, the reclamation project took up the productive spaces such as *bagans* (fishing nets with stilt huts and lights), mussel farms, and mud crab spots.

> The islands disrupt our livelihood. I mean, the place where they are currently developing islands is the place where we, fisherman, catch mud crabs (Interview: Subur, 30 June 2016).

As a consequence of the loss of the productive spots, many fishermen in KKM have complained about the decrease in their income because of the decrease of their fishery catchment. Dodi, 36 years old, who works as fuel retailer to fishermen in the kampong, gave an example how this loss affects him and his kampong's economy.

> They used to get many crabs or other seafood. Let say if they used to get 10 kg of crabs, nowadays they can only catch 2 kg at the maximum. I was affected by this change too, when fishermen do not get many seafood from the sea. Especially this year, when the earning from the sea is low, economical transactions here are also decreasing (Interview: Dodi, 30 June 2016).

In addition, fishermen have been affected by the project since *bagans* (fishing nets with stilt huts and lights) spots were evicted. The eviction of *bagans* has significant impacts on the fishermen of KKM since the *bagan* is recognised as an effective way to catch fish. In addition, the compensation for the evictions is not even close to the cost spent to build the *bagans* (Interview: Dodi, 30 June 2016).

Not only fishermen, but also seafood farmers, experienced the impacts of this reclamation project. Working at green mussel farms used to be one of the informal jobs that were popular for women and teenagers in KKM. The productivity of the farms is reliable. However, the farms of green mussels have closed down. There are two reasons why the farms were being shut down. The first is because the farms were exposed to water pollution claimed to be caused by the island reclamation. The on-going work at the island has mixed up sea water with the sediment including pollutants on the seabed (Interview: Ina, 29 June 2015). Subur, fisherman, 40 years old, shared the same view on the cause of pollution as shown below.

> There has been too much waste pollution since last year (2014, when the project got intense). They brought up the polluted sediment up from seabed when they started filling in sand to the sea. Thus, the water gets mixed with the pollutant (Interview with Pak Subur).

Most of interviewees shared the same perception about polluted water. Dodi added his explanation:

> The situation became worse since the green mussel farms had been shut down a month ago because the areas were taken over for the project development of artificial islands. It is all gone, now fishermen are left abandoned.

So, the reclamation project has decreased the income of people of Kampong Kamal Muara by blocking their access to the sea, polluting the water, and taking up productive space previously used for fisheries.

The second significantly influential policy is subsidy cuts on fossil fuels. This policy subsequently has increased the price of fossil fuel and caused domino effects of increasing prices of goods. Ina, 42 years old, a mother of three, shared her experience of how this policy affected her family.

> Increase of fuel price, the decrease of the boat passengers, and the need to go further toward the sea because fish is harder to get make us struggle to manage the money for our living (Interview: Ina, 29 June 2015).

Since fishermen of Kamal Muara need to go further out to sea to get fish, their consumption of fossil fuel has been increasing. The cost of fossil fuel has increased not only due to the increasing distance they need to sail to fish, but also because of government's policy to increase fossil fuel price since the end of 2014. Another multiple impact of increasing fossil fuel prices is market inflation for daily basic needs and public transportation. Prices of basic food supplies rose up as soon as the increased prices of fossil fuels were announced. For fishermen's households, the policy has put them into a situation where their income has been

decreasing due to increasing living cost as well as the increasing cost to do fishing. In addition, for non-fishermen's households, like industrial workers, their income remains the same, despite the increase of living costs. As compensation for the cuts of fossil fuel subsidies, poor families are supposed to get some amount of financial support, which is approximately NZ$20 per month and is paid for three months (Infopublik 2015). However, this financial support has been found to be ineffective and many poor households do not have access to this support (Adrianto 2014). In general, this situation caused both categories of households to struggle more in keeping up with the increase of their living cost while their income decreases or remains the same.

Therefore, the policies mentioned are influences from outside the kampong that have significant impact on capability of community of Kampong Kamal Muara in maintaining their day to day life. This includes impacts on their vulnerability and resilience.

4.4 Resilience

Flooding for people of Kamal Muara is something that has been a part of their life. They said "sudah biasa" which means they are very familiar with the floods. Resilience in this chapter is divided into two sections: 1) impacts, and 2) coping and adaptive responses. The section on impacts of the flooding event will outline the short term and longer term impacts of the flooding events. In addition, coping responses will outline short term, immediate responses employed by people to cope with the flooding events. Adaptive responses are then discussed as longer term actions to mitigate the flooding events in their kampong.

4.4.1 Impacts

This section discusses two different aspects of the impact of flooding events in Kampong Kamal Muara: 1) how flooding events affect the lives of people of KKM, and 2) how the impacts may be experienced differently by people of this community.

First of all, there are two categories of flood that affect this community which are rain flood and tidal flood. Rain flooding is not very significant as compared to tidal flood events. This area is not as greatly affected by river floods as in other

parts of Jakarta. They are more influenced by the sea and tidal surge. The rain usually just exacerbates the tidal flood during the wet season. In this context, this research focuses on the tidal flooding. As noted earlier the people of Kamal Muara experience the big tidal floods and the small tidal floods. Big tidal flooding events were experienced once a year up to 2013. Small tidal flooding events used to occur twice a month, for several hours during the new moon and full moon period. However, the occurrence of small tidal floods has become unpredictable and more frequent in recent years. These two types of tidal flood affected people's life in both the short term and longer term. As mentioned earlier, the community of Kampong Kamal Muara had never experienced flooding events until 2007 when the community experienced the biggest tidal flood. They recognized the flooding event in 2007 as a start of significant big tidal flood sequences that occur once a year (Interview: Syamsul, 28 June 2015).

During the big tidal floods, which can last from several hours up to two weeks, the community was affected in several sectors: economy, social, and health. There are several short-term impacts on these three sectors. Economically, if the big tidal flood lasted more than one day, the people of Kamal Muara cannot work at the fish market as it is not opened during big tidal floods. Moreover, people who work in industrial areas had difficulties in getting to work since the only road access is flooded. Also, convenience stores in the kampong did not open. Basically, there are not many economic transactions happening as a short term impact. Thus people have less or no income during the big tidal flood events. In addition, the big tidal floods sometimes caused damage to their assets like their house flooring, walls, furniture, and some important documents. This damage can have a longer-term impact, which will be discussed in the next paragraph. Socially, the short-term impacts are that the school is closed because of inundation, and/or children cannot go to school because their house and the walk path are inundated (Interview: Umar, 2 July 2015). The children of Kampong Kamal Muara used to get exposure to water-borne disease if they tried to walk through the inundated walking path which was not paved until a few years ago (Interview: Titin, 2 July 2015). Moreover, for adults, although they chose to stay at home during big tidal flood, they said the flood disrupted their daily activities. Third, the impacts of floods on their health are that they are exposed to water-

borne diseases, like diarrhoea and skin infections, during and after the flooding events.

Furthermore, people of the kampong were also exposed to oil-pollution and snakes from the sea, before the stop bank near the Kamal Stream was heightened in 2012 (Interview: Iyah, 30 June 2015)

After several days, the big tidal flood may recede, people clean their house, and life seems to go back to normal in the kampong. However, there is damage incurred by this community. The damage can occur to parts of houses, cupboards, drawers, mattresses, electronic appliances, and many other household assets. Most of the people that were interviewed indicated they could hardly afford the replacement of their damaged belongings after the big flood in 2007. Since then, the annual sequence of big tidal floods which occurred in recent years has caused considerable further damage. An example is Sri's household. Sri, female, 45 years-old, narrated about how the reoccurring tidal floods damaged their assets.

> Our belongings are damaged because of the flooding events. Our mattress was one of those that were damaged in 2007 because our house got inundated by the dirty water and the garbage. In 2007, the flood was so sudden that people just ran to save themselves. In 2009, when the flood struck, I was not at home, our mattresses were spoiled again. In 2007, our floor tiles were damaged (Interview: Sri, 28 June 2015).

Similarly, the reoccurring big tidal floods have left Cucu's household almost unfurnished.

> Yes, the flood (in 2007) was this high up to my waist. There is hardly anything left after several times of flooding. You see we do not have many furniture at home. That was a drawer, I cannot really say it is a drawer anymore, it is not useable actually. The lower part of it is not used any longer (but the upper part is still used by us) (Interview: Cucu, 29 June 2015).

Cucu, Imas, female, a mother of two, told the reasons why the furniture in her house is falling apart.

> Look at that drawer, it has fallen apart (because of reoccurring tidal floods). We have cut its base several times. If the tidal flood did not recede in three to four days, it destroyed our belongings (Interview: Imas, 30 June 2015)

Cucu's and Imas' families cannot afford to replace their chests of drawers, similar to other interviewees who cannot replace their damaged goods mainly because of their limited financial conditions. Imas gave her reason why they cannot replace the damaged furniture.

> Cupboard and dishes rack was damaged…. We cannot repair the damaged stuffs because we don't have money for that. So, just let it be (Interview: Imas, 30 June 2015).

Therefore, most of households in KKM do not have much furniture left in their homes. Most of the money earned by the people of KKM is only sufficient for daily survival. If the people manage to have a little saving, repairing the house itself will be prioritised, rather than replacing their furniture. For instance, Joko, male, 64 years old, a father of three, shared the hardship they went through which made them unable to fix the damage of their house.

> We could only repair so little of it for the column of this house because my earning is hardly enough for our daily needs (Interview: Joko, 29 June 2015).

Thus, the reoccurring big tidal floods every year have damaged and reduced the people of Kamal Muara's assets. Although the value of the loss may be lower than ones incurred in CBD areas in Jakarta, this loss is very significant to the people of KKM, changing their life quality and significantly reduced their limited assets and capacity to mitigate, cope with and recover from the next flooding events, a pattern recognised in other disaster affected settings (Wisner et al. 2004). In addition, not being able to replace the essential assets for their livelihood can cause longer term impacts including livelihood disruption (Wisner et al. 2004).

Cucu, a mother of three children, shared how the 2007 “Tsunami like” flood disrupted her family’s livelihood.

> Before the flooding events, I have five *PlayStation* game consoles which are rented hourly for our income. When it was flooded, all of the game consoles were damaged. We do not have money to replace it up to now. That was the turning point for us that I have to do laundry and ironing for living due hardship caused after floods (Interview: Cucu, 29 June 2015)

Before the 2007 flooding event, Cucu supported her family by earning money through renting five *Playstation* game consoles at her home. Those game consoles were essential assets for their family livelihood. She recognized that before the flood, it was not as difficult as it is now to earn money. Unfortunately, they were damaged during the 2007 flood and her family were not able to replace them until now. Because of this loss, she has to do an alternative job to help her husband support their family. Her alternative job is a labour job, washing and ironing people’s clothes. It is a tough job for her and she is very upset with the loss that caused her to do this job. For Cucu, flooding events have had a severe longer-term impact on her family’s livelihood and have changed the quality of their family life.

In summary, the flooding events in KKM have significant impacts on the community’s life. The hazardous events affected people’s economic conditions, their social activities, and their health in the shorter-term during and after the flooding events. In addition, the losses incurred during the annual flooding events have severely decreased people’s assets, and disrupted their livelihood in the longer term.

Secondly, the flooding events affected people in this community differently. People mentioned that the height of big tidal flood events has reduced since 2012 (Interview: Basuki, 30 June 2015). This was recognised as a result of the construction of the stop bank near Kamal Stream (Interview: Masyitoh, 29 June 2015). Nevertheless, they still experience “leakage” which was described as

having water intruding onto their kampong's walking path and surrounding their house.

> I cannot remember when was the last time my house got flooded. It is only the walking paths that got water leakage in the afternoons (Interview: Basuki, 30 June 2015)

Basuki, male, 52 years old, who has more income compared to other people in the kampong, managed to heighten his house flooring several times within six years after 2007. Thus, his house is higher than most of his neighbour's houses and he only experiences the leakage in the walking path. In this regard, Basuki and his family are less exposed to small tidal floods. However, some interviewees experienced more damage from the "leakage" as "small tidal floods" since the water usually inundated their house up to their ankles (Interview: Joko, 29 June 2015). In contrast, Joko shared how frequent he and his family experienced the small tidal floods.

> My house's floor gets inundated nearly every day. The flood may have receded after several hours, but the floor has not dried yet when the water comes again. It is usually this high (pointing his leg) (Interview: Joko, 29 June 2015).

Joko is a fisherman with a small non-motorised boat. His income is low and he is the only person who works to support his wife and his unmarried daughter. As shown in Figure 11, Joko's house is lower than the walking path. While the walking path has been raised up several times after flooding events, Joko unfortunately could not continuously raise his house flooring due to his family's financial difficulties. Furthermore, the clearance between the flooring and the ceiling has become very low since he has already raised the flooring on two occasions. As a consequence, his house gets inundated by small tidal floods nearly every day.

Figure 11 Joko's house which is lower than the walking path in front of his house. (Source: Author).

Another interviewee, Kokom, female, mother of one, 29 years old, experienced the small tidal flood every day too. Kokom's husband does not have a formal job and their family income is not steady. Moreover, her house is located in the swampy area. After 2007, her house flooring submerged but her family cannot afford to heighten the flooring by doing soil filling. Thus, they are only able to use fibre cork flooring and her house is inundated every day.

> The big flood only happens several times in a year, around twice a year. However, the water from the tidal surge gets into my house nearly every day (Interview: Kokom, 15 June 2015).

From these three people, it can be seen that economic conditions and income influence how hazards affect people in different way. While Basuki was not affected by the leakage that much, Kokom and Joko suffered from the small tidal floods nearly every day.

Age is another category of how hazards affect people differently. Children and older people of the community tended to suffer more compared to other age groups. Imas, mother of three, said that her children get sick easier than her since they like to play in the dirty flood water (Interview: Imas, 30 June 2015). On the other hand, Masyitoh, female, 58 years old, shared her experience of taking care of her sick husband and her elderly mother during the flooding events.

> During the flooding events, we cannot evacuate too far from home because I have to take care of my mother and my husband. My mother is old, and my husband is sick. Thus, we cannot evacuate to emergency shelter … too many hassles. However, staying at home, it is also hard for my husband and my mother because they cannot sleep properly in our flooded house (Interview: Masyitoh, 29 June 2015).

After the flooding events, Masyitoh's mother became ill and her husband's sickness worsened due to the difficult access to hygienic water, food, and a quality rest.

In summary, floods had worsened the financial situations the people who experienced them frequently (Van Voorst 2016). Socially, big flooding events disrupted the activities, like going to school, going to work, for most of the people of Kampong Kamal Muara. However, the small tidal floods and their frequency is experienced differently by the people of KKM. There are disparities of distribution of the risks and impacts of floods experienced by people of KKM community. In this case, the factors that influence the disparities which are economic conditions, health conditions, and age.

4.4.2 Coping and Adaptive Response

People of Kamal Muara perceived floods as "frequent life experiences" (Van Voorst 2016 27) and part of their daily life as they said "sudah biasa" (which literally means they are used to the flooding events).

> …Although we live near the sea, the floods had never been that high (more than one metre). We somehow managed to deal with it. The highest water could go is as high as my thigh, just above

> my knee [approximately 80 cm] (Interview: Kokom, 15 June 2015).

For Kokom and other people of Kampong Kamal Muara, floods have become "an expected, frequent, and recurring aspect of their daily lives" (Van Voorst 2016 207) and they have established individual and communal coping mechanisms and adaptations to deal with them.

Some people like Ina and Sri were actively involved in food preparation at evacuation shelters during flood events. Sri and Ina were recognized as highly involved in local organizations which are affiliated to the Kamal Muara sub district office. On the other hand, some people like Imas refused to go to to the evacuation shelter. During the big floods other than the 2007 event, most of people of Kampong Kamal Muara chose to stay at home. Since they cannot do much activity at home, they somehow rely on food supply provided by the sub district office through people like Ina, Sri and the heads of the Rukun Tetanggas (RTs). However, some of them claimed that the support sometimes comes late and they are forced to be self-reliant and try to buy food from outside of their kampong.

Moreover, during the big flood some people still managed to go to work by riding a motorcycle and having extra clothes and footwear for change when they arrived to their workplace. However, often their motorcycle died and they got stuck on their way to work during these flooding events. As for children, if their school is not closed during the flooding events, they will go barefoot walking through the inundated areas, and then put on their shoes when they arrived at school. This coping mechanism has consequences in that the children are exposed to skin diseases because of their contact with the dirty flood water.

Some ways of adaptation have been used by the people of Kampong Kamal Muara. The adaptation varies from 1) using water pumps to keep the house dry, 2) raising the floor of the house, 3) changing their house design into stilt houses, 4) creating an emergency storage space in the ceiling, and 5) making water a barrier in front of their door.

The first is using water pumps to keep their house dry. Not all households have a water pump. A non-government organization had supported the inhabitants of Kampong Kamal Muara by giving water pumps. But, these water pumps have to be shared with other households since one water pump was given for several households (Interview: Cucu, 29 June 2016). In addition, since the water pump is powered by electricity, some households cannot afford to use them (Interview: Imas,30 June 2016). Also, since the water is salt water, the water pump can easily be broken within short period of time (Interview: Subur, 30 June 2016). Those are some disadvantages of the usage of the water pumps by people of Kampong Kamal Muara. In addition, water pumps are maladaptations as they increase fossil fuel consumption and greenhouse gas emissions.

Second, in the midst of financial adversity and frequent flooding events, if the people of KKM managed to have some savings after the floods, usually the money would be used to raise the flooring of their house. The frequent tidal flood events led people of KKM to heighten their house floor several times. This kind of adaptation only lasted for 2 -3 years until the house was flooded again by because raising up the flooring is not a sustainable adaptation as the land keeps sinking and sea level continues to rise. In general, most of the households in KKM had heightened ("*uruk*") their house floors three or four times up to the present (Interview: Dodi, 30 June 2016). Each *uruk* would be around 20 – 30 cm,

Figure 12 An example of house raising in Kampong Kamal Muara. (Source: Author).

and cost approximately NZ$500 if raised with soil (Interview: Subur, 30 June 2016). In some cases, people can only afford to raise the house's floor with solid soil or roughly cover it with stones and the skin of green mussels, without being able to properly pave the floor with cement or tiles (Interview: Jeni, 3 July 2015). However, the wealthier among the community can afford to build their house much higher than the average people surrounding them with a more compact pavement as shown in Figure 12.

As shown in Figure 10, some people in the kampong who have two storey houses just abandoned their first floor since they can't keep up with raising their house.

Figure 13 First floor of a house was abandoned due to frequent flooding events. (Source: Author)

However, unfortunately for Joko, his house is only one storey and he has no other space to escape to as he could not afford to raise his ceiling due to financial issues and the floor has become so close to the ceiling.

> The length of distance between floor and our ceiling is very short now. The floor had been heightened two times. The last time was in 2011, it was raised up with two trucks of soil (Interview: Joko, 29 June 2015).

Making the flooring high without raising the ceiling means that people will have shorter height for their house, as mentioned by Joko in the quotes above. This

means that at some stage, people cannot continue raising their floor without considering having to raise their ceiling too. Raising the ceiling is much more expensive than raising up the flooring. Thus, Joko cannot continue to fight against the floods and his house's floor is left being lower than the walking path outside his house. Consequently, his house gets flooded every day. Joko's case was one of the worst impacts of tidal flood in this kampong.

The cost of raising the floor is expensive for people of Kamal Muara. Thus, this type of adaptation puts excessive burdens on their limited finances and not all households can afford to keep raising the floor. In addition, this adaptation is not sustainable as it did not last more than 2–3 years.

Third, some people who cannot afford to continuously raise the house flooring changed their house design into stilt houses. These stilt houses have proven to be effective in preventing the houses from being flooded, but some other problems occurred. As Titin mentioned.

> We changed our house into stilt house. Since the change, our house is hardly flooded. However, the space between our flooring and the water has become the place for the mosquitos to grow. We are concerned about Malaria mosquitos (Interview: Titin, 2 July 2015).

Since Titin's house is located in the swampy area, the stilt house seems to be effective. However, the design caused another concerns related to their health because of mosquitos.

Fourth, an adaptation that was made by the people of KKM is a building emergency storages for their valuable belongings which are called *"rangonan*." *Rangonan* is located in their house's ceiling and made by lining it with bamboos (Figure 14).

Figure 14 Rangonan, a higher storage to save valuable assets during flooding events, made by lining up bamboo on the ceiling. (Source: Author)

Kinah, 45 years old, found that *rangonan* is very helpful in saving her family's only mattress, as she mentioned.

> When the water gets through our house. I firstly put up our only mattress on *rangonan* so it wouldn't be wet or spoiled by the dirty water. *Rangonan* is also good to save our clothes (Interview: Ipeh, 2 July 2015).

Fifth, a water barrier in front of the house's door is another common feature that can be found in the houses in Kampong Kamal Muara (Interview: Imas, 30 June 2015). With height around 5 cm to 10 cm, this barrier is only effective in stopping quite small tidal floods from coming into the house.

Communally, the people of Kampong Kamal Muara tried to mitigate the flooding events by conducting working bees to clear up the sewerage left by the flood water. This type of activity, is usually initiated by their head of RT. However, the activities are not well scheduled and usually conducted only once in a while. As for the evacuation shelter and food, during the several times of the big floods, the community has worked together in creating an evacuation shelter and providing emergency foods while waiting for the support from government to arrive (Interview: Sri, 28 June 2015). However, to repair the damage of their kampong

facilities that were caused by the floods, people are reliant on the government's support since they have very limited financial capacity (Interview: Husen, 30 June 2015).

My research found that there was no meeting to record what has been learnt during the flood events. However, there is a meeting called *Musrenbang* where people can propose what they think is needed for their community. However, not all people have access to this kind of meeting. The poorest of the poor like Pak Joko have never been involved in a community meeting, although he and his family suffer the most.

In summary, there are coping mechanisms and adaptations that have been used by people of Kampong Kamal Muara. However, the adaptations are not sustainable and place a heavy burden on the people's financial conditions although they say that they are used to the flooding events. The flooding events and the adaptations have placed tremendous amounts of pressures on the people's resources, especially their time and financial resources. However, there are several other resources that played vital roles in supporting people's adaptive capacity and in result strengthening people's resilience. These resources will be discussed in the next chapter.

4.5 Vulnerability of Kampong Kamal Muara community

The people of Kampong Kamal Muara live within the low lying flood prone coastal area. Geographical conditions and sea level rise, together with population growth and industrialization, which unintentionally sealed the ground, have seen this kampong experience land subsidence which leads to frequent flooding events. Since this kampong is heavily populated, a large number of people are at risk of being affected by flooding events. Besides, because they are mostly within low income categories, the people lack access to power and do not have a say in directing government's policy on flooding management. Thus, the policies regarding flood management, especially the island reclamations have worsened their livelihoods that depend on the sea.

In this case, changing in human and environmental conditions, combined with hazards associated with the low lying coastal areas, have disrupted people's life through frequent flooding events.

As for resilience of the kampong inhabitants, their current adaptations do not seem to be sustainable, have consumed much of their financial resources and as a result worsened their poverty. Finally, the capitalist system has re-structured the kampong inhabitants' ability to exercise their rights and the distribution of power. Therefore, the people hardly have any voices on the government's policy nor were they were well informed before the policy was going to be implemented. Global environmental change such as sea level rise and climate change are among changes in environmental condition that exacerbate people's exposure to flooding events.

4.6 Root causes of vulnerability

Root causes of vulnerability are often found in historical events and in the distribution of power and resources (Wisner et al. 2004). They reflect the exercise and distribution of power in a society (Wisner et al. 2004). People who are economically marginal and/or live in environmentally 'marginal' environments, like flood prone coastal land in Kampong Kamal Muara, tend also to be of marginal importance to those who hold economic and political power (Wisner et al. 2004). Their limited access to power means that they have no say in the policies that have significant impact on them. In addition, although they claim to be natives of the land, not many people of this kampong possess their own land certificate, which means that they do not have documents needed to prove they legitimately to inhabit the land. In consequence, they are vulnerable to the risk of eviction.

Economically, Indonesia has implemented a neo-liberal system in which much of Jakarta's land and housings has been privatised to rich real estate companies (Texier 2008, Van Voorst 2016). The reclamation of islands project is one of the examples of how the government favours big real estate companies, which will accommodate houses for higher income Jakartans, and disrupt the livelihoods of the lower income kampong's inhabitants who are dependent on the sea and its

resources. In addition, the neo-liberal economy has directed the Indonesian government to cut a very crucial subsidy, namely fuel subsidy, which has a domino impact on the inflation of daily basic needs.

These root causes create three often mutually reinforcing sources of vulnerability. Firstly, if people only have access to livelihoods and resources that are insecure and unrewarding, their activities are likely to generate higher levels of vulnerability (Wisner et al. 2004). Secondly, they are likely to be a low priority for government interventions intended to deal with hazard mitigation (Wisner et al. 2004). Thirdly, the resources needed and/or the labour time required for their flood adaptations have decreased over time (Cutter et al. 2003) as a result of their economic and political marginality and low or uncertain access to livelihoods (Wisner et al. 2004), as was experienced by the community of Kampong Kamal Muara after the islands reclamation project commenced in 2014. This process has led to the decline of adaptive capacities which was clearly experienced by the poorest of the poor like Joko.

4.7 Conclusion

This chapter outlines the interaction between exposure, sensitivity, and resilience of the people of Kampong Kamal Muara. This interaction is linked into an analysis of the people's vulnerability. Lack of access to power and a neo-liberal economic system that has been implemented by the government of Indonesia are identified as the root causes of these people's vulnerability. In terms of resilience, the adaptations that are currently practiced by people of KKM do not seem to be sustainable and place burdens on their financial conditions. However, there are several other resources, beside financial resources, that are crucial for the people's resilience which will be discussed in the next chapter.

Chapter 5: Resilience as networks of adaptive capacities

5.1 Economic Development

This section outlines the economic and the physical conditions of the kampong. The discussion on economic conditions includes the lack of diversity and stability of the income of the inhabitants' of KKM, and resource equity and social vulnerability of the people. In addition, the physical aspects of the kampong will be discussed including building conditions, drainage and sewerage, waste collection services, and sanitation.

First of all, Norris et al. (2008) argued that community resilience depends not only on the volume of economic resources but also on their diversity. Reliance on a narrow range of natural resources can increase variance in income and decrease social resilience (Adger 2006, Cutter 2006). These conditions are shown in the community of KKM where the majority of inhabitants rely on fishery and seafood farming. Their livelihoods are unstable because of this dependence on sea conditions. Moreover, as for people working in informal sector employment, like motor-bike taxi drivers and informal transportation drivers, their incomes also vary based on seasonality. During school holidays and the big flooding events, the drivers cannot earn the amounts they used to earn on "normal" days. On the other hand, factory workers who might have more stable incomes than people with other occupations can be categorised as low wage earners which are sensitive to hazards, resulting in them becoming more vulnerable (Cutter 206). In addition, people with skills like tailors have highest incomes, but their incomes also depend upon seasonal demands for their skills. Moreover, since the majority of KKM inhabitants' incomes are low, the people find it hard to save up their money for emergency events. Thus, their dependence on a narrow range of resources, the instability of their income, and unavailability of diverse employment for this community can make their resilience low (Adger 2006, Cutter 2006, 2008, Norris et al. 2008). Moreover, unsustainable adaptations, such as raising floors, had also been a burden upon the people's financial conditions.

Problems with infrastructure and services such as the lack of piped and treated hygienic water, proper drainage and sewerage systems, a single access road and unavailability of formal transportation to and from the kampong, and waste management services are issues that cause this community to be significantly affected during flooding events. For instance, the ground water extraction which was caused by unavailability of pipe-treated water is one of the causes of significant land subsidence in Jakarta. The insufficiency of the infrastructure, like drainage and sewerage, caused this kampong become inundated more easily and for longer periods. Since the water forms pools for days, more people are exposed to water-borne diseases. In addition, these infrastructure and services issues exacerbate the poverty of KKM inhabitants by taking up a large portion of their income to fulfil their basic needs. For instance, they had to pay for each use of the public toilets since the people do not own their own toilet at home. Moreover, the structure of their homes and their limited financial conditions made it hard to repair the damaged part of their houses as well as to modify their houses significantly adjusting to the flooding events.

Second, mitigation plans for flooding events that were designed by the government, mainly focused on physical and engineering measures and failed to address the root causes of vulnerability of this kampong (Wisner 2001 as cited in Norris et al. 2008). The root causes of their vulnerability, which are economic and political marginality, were left unresolved. As a result, some decisions and policies that were made by the government disempowered the community, rather than empowering them in facing the flooding events. The community experienced flooding events more often compared to the higher income gated community in Pantai Indah Kapuk (PIK) who also live by the coast and in the same administrative sub district of Kamal Muara. The inhabitants of PIK were able to mitigate the floods by having a large retention lake in their real estate complex and by building their houses from better quality materials upon ex-swamp land filled to be above sea level (Interview: Sri, 28 June 2015). These differences showed that the environmental risk is not distributed equally and it placed the KKM community into a position of weaker hazard mitigation (Norris et al. 2008). Although, to an outsider, the KKM community may seem to be a homogenous-low-income community, there are still disparities within this community in

relation to the impact of the flooding events. As was discussed in the previous chapter, the way people experience the small tidal floods can vary from "leakages" based on their capacity to raise their house's flooring. Their income and their saving back up this capacity. The lower their income, the harder it is for them to save up their money. Consequently, if they cannot save up their money, they are unlikely to be able to raise their house flooring which causes them to experience the small tidal floods more often than the people who can afford to do so within a specific time frame.

5.2 Social Capital

The field data collection was conducted at RW 1 of Kelurahan (Kelurahan) Kamal Muara. RW 1 is populated by approximately by 5000 people. RW 1 is mostly inhabited by native Betawi with close kinship to each other.

> "All of my relatives are here. I have a big family. My parents have 11 children. I am the fifth one. My parents and all of my siblings live here too. Most of the people in this kampong are my extended relatives (Interview: Dodi, RW1, 30 June 2015)."

Close kinship is one of social characteristics of the KKM community. Therefore, the bonds that are established within this community are strong. This impact of the close kinship will be further discussed in the section on the sense of community and attachment to the place.

There are several aspects of social capital that are outlined in this chapter: 1) land ownership, 2) social support, 3) sense of community, 4) attachment to place, 5) leadership, and 6) citizen's participation.

5.2.1 Land ownership

Native Betawi who mostly reside in RW 1, claimed to own the land they are currently occupying on the basis of inheritance from their ancestors. Although they have been settling in the area for more than 50 years, not many of the people of KKM own a land certificate, which is proof their land ownership.

> Not many people here possess a land certificate. Let's say, for these area of three hectares' land, there might be only 5 -6

> people who own the land certificate (Interview: Husen, 30 June 2015).

Similar conditions were shown in a case study of riverbank settlers by Van Voorst (2016), where the people who cannot prove their legal documents of land ownership are vulnerable to evictions. Thus, people of KKM are also vulnerable to evictions, despite their confidence of their native rights to the land.

5.2.2 Social Support

In terms of social support, people of Kampong Kamal Muara have proven to circulate social support among themselves. First is the recommendation to evacuate. People of KKM get advice to evacuate from their heads of RTs or district officials in case of big flood events (up to 50 – 60 cm).

> Yes, there are officers from district office came. We were advised to evacuate, they once picked us up with some vans (Interview: Subur, 30 June 2015)

> For instance, our head of RT said not to evacuate too far from home, just evacuate to the mosque, then we evacuate to the mosque. The mosque is higher than our house, also these floods lately, the water is not as high as it was before the dyke near road was built (Interview: Siti, 28 June 2015).

People of Kampong Kamal Muara usually do not evacuate during a small tidal flood. If the floods are not high, approximately up to their ankle or their leg, they prefer to stay at home, or evacuate to the nearest place to their house, such as the mosque.

> No, I prefer to stay at home (if the flood is not high). I get used to staying at home (Interview: Umar, 2 July 2015).

> Since the flood happens frequently, we get used to it, if it is higher than our legs, we will probably evacuate to the mosque

> because mosque has a higher location (Interview: Reni, 30 June 2015).

Therefore, during the small floods, which are more frequent, people are mostly on their own. There is no support from government or their community for this kind of flood event.

In addition, during the occurrence of an unusually big tidal flood like in 2007, copying others' action, they spontaneously evacuated themselves to higher land as soon as they saw the magnitude of the event on their land. This kind of action is referred as emergency response (Norris et al. 2008).

> We did not know there will be a big flood [in 2007]. Nobody had a chance to rescue their belongings. I saw people run from the water, I took my kids and ran too (Interview: Modi, 2 July 2015).

Second is ability to borrow money from friends or relatives. Although most of the people interviewed say that to replace their damaged goods is very limited to their budget, they have an option to borrow money from their extended relatives.

> If I do not borrow money, how can I afford to replace our damaged television? So I borrowed the money from our relatives (Interview: Masyitoh, 29 June 2015).

However, it is true that since the goods are not insured and that they do not have savings, the people of KKM lose twice when flood occurs (Wisner et al. 2004). They lose the goods that are essential for their life, and although it is possible to borrow some money to replace the goods, they lose the time spent working to replace the goods and repay their debts. To some extent, the debt may further burden their economic conditions if they are borrowing from moneylenders with high interest fees (Van Voorst 2016).

Third is having a place to evacuate. People of Kampong Kamal Muara can either evacuate to evacuation shelters or to their relative's house. For the biggest flood which occurred in 2007, all people evacuated themselves as soon as they saw the

water rising up to their land. For other big floods, which usually occur around November to March as a combination of tidal surge and rain floods, people said they also evacuate themselves, either to drier areas where their relatives live which are approximately 20 – 30 minutes driving from Kampong Kamal Muara, or they evacuate to the higher land where there are evacuation shelters.

> During the big flood in 2007, my family and I evacuated to our relative's place at Tegal Alur, West Jakarta (Interview: Basuki, 30 June 2015).
>
> We evacuated to Dadap, my relative's house (Interview: Reni, 30 June 2015).
>
> I saw people run to the stadium and higher land. But I just directly escaped to Kayu Besar to my relative's house (Interview: Muhamad, 30 June 2015).

The choices to evacuate to their relatives or not to evacuate are related to several reasons such as some shelter can be too crowded and not very convenient for the people. Moreover, in the case of the 2007 tidal flood, they evacuated to their relative's houses since they wanted to go to as far as possible from the coast to be safe. But as soon as they found that the tidal flood had receded within several hours, they went back directly to their homes.

Lastly, there are several items that were distributed as a logistic support during several big flooding events a few years ago. The logistic support included water pumps to drain flood water from their houses, cleaning kits like mops, and buckets, and food. The food at evacuation shelters is usually organized by local organizations or community members whose homes are not flooded, if only several parts of kampong were being flooded (Soebijoto 2011). Sometimes, emergency food is funded by the kelurahan office. The problem is that food distribution is not quick and is not evenly distributed. Therefore, people claimed that they still needed to buy food for themselves and their families. In addition, people who did not evacuate usually did not get the food supplies or they received the food quite late. Moreover, other essential goods such as blankets are rarely supplied at the evacuation shelters.

> No, if there is any support from government, it is less likely I will get it. So, if government distributes some supplies or supports, I hardly get any. I did not get the water pump (while our neighbours got it) (Interview: Imas, 30 June 2015).

> There was some logistic support. Sometimes we suddenly get it, but sometimes it just reached houses in front of us (Interview: Kokom, 15 June 2015).

There are layers of houses in the kampong since it is a heavily populated area. The population in Kampong Kamal Muara is high while the supplies of goods and food during flooding events were limited. One of the heads of RT that was interviewed claimed that he struggled to go door to door to distribute some food supplies for people who were not evacuating. Moreover, one interviewee claimed that it will be easier for them to get social support and supplies if they actively approached donors directly. It is clear that distribution of social support is challenging. To explain this situation, perhaps, the distribution of support depends on one's embeddedness in the community, political connections, and social class which determine the availability and accessibility of resources (Norris et al. 2008). The problem of uneven distribution of social support and logistics does have an impact on peoples' trust as well as their sense of belonging to their community. Further discussion on this problem will be continued in next section. Finally, the capacity to distribute post disaster resources to those who most need them is important for community resilience (Norris et al 2008).

5.2.3 Senses of Community

Senses of community here are considered through two criteria; trust and sense of belonging, and sharing mutual concerns and values. Among participants interviewed, a sense of belonging to their society is clearly shown as most of them are related in close kinship systems. They know each other well since they grew up together in their childhood.

However, the sense of belonging can be betrayed by uneven distribution of support by government to the community. One of the research participants said that she felt that she was neglected when her neighbours got funding support to

raise their house flooring while she was not considered, although her house was very frequently flooded too.

> Several years ago, I heard that my neighbours got government support to raise their housing floor. Soil and paving was included in the support. But, my house was just passed by. I felt disappointed since I had to clean up water from my house every day [without even being considered for the support]. I did not complain directly though, I felt shy to complain (Interview: Cucu, 29 June 2015).

The feeling of being neglected and abandoned is a negative emotional experience since perception of trust is habitual as long as the related actors remain "relatively disappointment-free" (Luhmann 1985 25 as cited in Van Voorst 2016 132). Disappointments, like those experienced by Cucu, can accumulate if she and other people of KKM experienced many events that challenged their habitual perceptions of trust (Van Voorst 2016). When a critical point has been reached, the trust and behaviour may change radically (Van Voorst 2016 132). Examples of changes were outlined in Van Voorst's (2016) study of riverbank settlers who began to challenge the government's policies after experiencing too much disappointment and distrust. Thus, uneven distribution of support has an impact on the sense of belonging to community through this kind of emotional experience.

Secondly, there are mutual concerns and shared values. Participants in this research are concerned about their neighbours who are in a much worse situation than themselves. However, as they are also struggling to survive, they can barely do anything for their neighbours. In addition, people of KKM share the concern of their land to being flooded. They are concerned about their ability to continue to protect their homes and belongings by raising their house flooring. Walking paths in their kampong are also a shared concern among participants in this research. Walking paths in the kampong are related to the concept of their wellbeing. Research participants said that when the walking path was not yet being paved, it was basically made from bamboo. Bamboo walking paths were not safe and did not prevent people from KKM becoming exposed to dirty flood water on their

way to work or sending their children to school. This improper infrastructure failed to protect them from having flood-related skin diseases. Therefore, having the walking path heightened and paved was on the community's priority list. They claimed since walking paths have been paved and heightened, they can avoid their exposure to dirty flood water when they are going out of their house and their kampong. In summary, walking paths in KKM are an important contributor to their wellbeing and their access to the world outside their kampong.

Their mutual concerns are realised into some forms of mutual action for their kampong. People of KKM may not be able to fund long-term repairs of their kampong since their financial condition is very limited. However, they realised their mutual concerns through actions in working bees for repairing walking paths. They supported the work as much as they could. Women usually supported the works by providing some snacks for the people who were working, while men also supported voluntarily with their labour. These works were usually funded by government for the materials, but required labour of locals to work voluntarily.

Despite a claim that people of KKM wanted to protect their land and their livelihoods in Kampong Kamal Muara, there was an opinion that they lacked awareness of their kampong's cleanliness.

> Yes, (last week there was a working bee, working together to clean our neighbourhood). But, since then, there is no more working bee. Any time after flooding events, we usually will do working bee again. I personally feel that we need to do working bee every week so that sewerage will be clean and will not be pooled up in the Kampong. So, each of us needs to care about our neighbourhood (Interview: Siti, 28 June 2015).

> Our kampong used to have some people cleaning up our neighbourhood. At that time our kampong was clean. They were given incentives from ADRA [fund from the US] a bag of rice per week. Since the fund is finished, they did not want to work anymore. I am wondering why they just want to clean up on the basis of incentives, like they do not have their own awareness

> and sense of belonging to the cleanliness of this kampong. We should care more about our kampong. But, it is hard here (to make them realise). Therefore, to my people, I do not comment on them often. I want them to realise it by themselves. If I see garbage, I just take it to the garbage bin. I want them to do so too, at least up to several meters around their house (Interview: Dodi, 30 June 2015).

It was argued by one of the research participants that working bees for neighbourhood cleaning are only conducted when the works were scheduled, not on a regular basis by themselves. Therefore, it is likely that people of KKM lack a specific sense of duty. Moreover, it was claimed by a head of an RT that his people only care and do cleaning if there are rewards for them. There seems that there is a conflict of collectivism versus self-interest.

Another case of conflict was the management of the flood gates which were recognised as being crucial in managing the water flow into and out their kampong. However, there was conflict about who should open and close the gate as there were no arrangements as to who should carry out this duty regularly and consistently.

> A flood gate, which is directly connected to sewerage near our house, is important (to manage tidal flood). We need people to open and close the gate so that the tidal surge can recede. But no one is hired for that duty. It is just us people who do it, only if people remember to do it (Interview: Kokom, 15 June 2015).

> Flood gates function well if they are closed (when tide is high). If it is not closed, water will reach to the walking path in the kampong in one hour. Yet we do not have specific people assigned to guard the flood gates. The problem is people are lazy to close it (Interview: Ridwan, 2 July 2015).

Some participants who live close to the flood gates stated they want other people of the kampong to get involved in doing the opening and closure of the gates since most of time it was only them who managed the flood gates on their own

initiative. At this stage, they realise that they are interdependent and need to work together toward the hazard's threat (Eldstein 1988 as cited in Norris et al. 2008). If the concerns regarding the need to work together for the cleanliness and the flood gates management could be discussed and resolved into scheduled agendas, these resolutions would increase the sense of community (Norris et al. 2008).

5.2.4 Attachment to Place and Willingness to Relocate

Place attachment is an emotional connection to one's neighbourhood (Norris et al. 2008). For people in Kampong Kamal Muara, their land means so much. From interviews, there are three main reasons for their love of the land, and their reluctance to relocate. First, for the native Betawi, the land specifically has been connected to them since they were born there and the place where they want to die, as well as where their relatives are around.

> This is the land where I live and where I want to die. My ancestors were here too. It is as if we are addicted to this place, we cannot move. We cannot leave this place (Interview: Dodi, 30 June 2015).

> I inherited this house from my grandmother. This is our own land and I want to keep this land for my children and grandchildren (Interview: Iyah, 30 June 2015).

> It is our destiny (to have our land flooded), we just try to survive. This is where our land is and where my parents' live. Want it or not, we have to stay here (Interview: Imas, 30 June 2015).

This attachment is integral to their self-definition (Brow and Perkins 1992 as cited by Norris et al. 2008) as native Betawi whose pride and ancestors lie beneath these geographical areas. As mentioned by Iyah, her inheritance to the land from her elder made her feel to be the legitimate occupier of the land and have the duty to protect the land for her descendants. Moreover, their connection to the land underlies their every possible effort to survive and recover from flood hazards in Kampong Kamal Muara. Thus, place attachment is crucial for the community's resilience (Norris et al. 2008).

Second, the reluctance to be relocated is also related to their livelihood. Over 50 % of men in Kampong Kamal Muara are fishermen. Being close to the coast and sea is enabling them to work and earn money for their family. Displacement from their kampong can have adverse impacts on their livelihoods since it will be difficult for them to adjust to land-based jobs.

> (Willingness to relocate) depends on the owner of houses here. The big flood does not occur every day. As people of Jakarta, our house being flooded is something we are used to. Personally, we do not want to move, my husband's job is around here. I have to follow my husband (Interview with Bu Kokom).

> We are used to this condition. We try to survive no matter what happens. Floods do not surprise us any longer. It is like our daily meal.…. If we are going to be relocated, it should be somewhere not far from here. I am concerned about our livelihood if we are relocated. People here only know how to do fishing at the sea, it will be hard to adapt (if we are far from the sea) (Interview: Ina, 29 June 2015).

> I do not want to be relocated. I am a fisherman, a fisherman if he is away from coast, it will be overwhelming for me (Interview: Subur, 30 June 2016).

Third, people of Kampong Kamal Muara mentioned some cases of insufficient compensation for relocations that they knew of which were experienced by other communities. "Studies of earlier evictions in Jakarta have shown that slum squatters at riverbanks generally received insufficient compensation for their loss, or nothing at all, which is justified by the government by stating that these settlers do not hold the formal rights to their land or house" (Human Rights Watch 2006; Mariani 2003 as cited in Van Voorst 2016 124). Since the price of land in Jakarta is so expensive, they think if they sell the land to move out from the kampong, they might not be able to afford buying any land in other parts of Jakarta. They believe they will not be in any better condition if such cases of insufficient

compensation happened to them. Thus, the people of Kampong Kamal Muara do not want to move from this area. Moreover, they believe if they are to be relocated into *rumah susun* (state stacked social housing), the cost of living in the new housing will be high and insecure as they will not own the place, just being able to rent it (Interview: Imas, 30 June 2015).

Some studies (Texier 2008; Yunianto 2014) have shown that relocating slum squatters and kampong inhabitants to *rumah susun* failed to settle the people properly because the cost of living in the new places is too high (between NZ$30 – 40 per month for rent) and there were inadequate or bad sanitation in the new housings. In addition, relocating them to a new place without considering the origin of the people and their social ties will threaten individual and communal aspects of self-definition, and have devastating impact on the people's livelihoods as well (Norris et al. 2008).

These are the three reasons that are influencing people's attachment to KKM. Although the kampong is frequently flooded, they try to survive and try to get used to it because the place means so much for their livelihoods and roots of their families and their ancestors. Moreover, as Cucu said, although it seems tough to live in Kampong Kamal Muara, she thought it is more convenient compared to what people in Kampong Pulo (also a flood prone riverbank area of Jakarta) experience.

The sense of community was shown to be playing a crucial role in the topic of relocation for some interviewees. They considered that they are one whole community and that the decision on whether they are willing to be relocate or not, should be made on basis of their community's consensus.

> About relocation, we will agree to relocate if all of our neighbours agree to move too. So that we will relocate to a new place together (Interview: Cucu, 29 June 2015).

5.2.5 Leadership

At the lowest hierarchy of formal leadership in the kampong, the RT plays a crucial role in mobilising the people of their community to work together for events such as working bees. Their role in bringing people together to work for

cleanliness of their kampong is crucial. Syamsul, head of RT 5 for instance, goes door to door in order to let people know if there is any scheduled *working bee* for their kampong. Another instance is Dodi, head of RT 4, who tries to be a role model for his people. Besides that, these leaders successfully led their people to work together on various projects for repairing their kampong's walking paths. These projects are usually funded by the National Program of People Empowerment (PNPM), but require people of the kampong to work voluntarily since the funding only covers for the costs of materials. During the work on these projects and also in *working bees*, the community was mobilised into a positive synergy where men voluntarily worked on the repair of the walking path, and women supported them by providing snacks.

Moreover, informal forms of leadership also take place through organizations like the Family Welfare Movement (PKK) and Islamic Recitation Group (*Pengajian*). These organizations have been actively involved in emergency response during the flooding events. Members of PKK often establish and run public kitchens during disasters like flooding events and fires. The members of PKK also take part in various training programmes including emergency response and evacuation procedures. The only problem is that the information that they get is not passed on to the majority of the people in the kampong. Therefore, such useful information remains with only small number of people in KKM.

Beside the existence of significant grassroots leadership in the kampong, there is conflict among the leaders. For example, head of RT and head of RW may not be on good terms since they were competing with each other during their running for election of head of RW. Consequently, the head of RT is likely to be dismissed if there is information regarding his activities passed on to head of RW by district officials.

> Sometimes we see people clean up our water drainage, but they are not organized by RT. No one reported to head of RT prior the cleaning up. Those people are organized by somebody else, sometimes they got paid for cleaning up. But there was no coordination with head of RT (Interview: Modi, 2 July 2015).

In addition, the important function of the flood gate in managing water to prevent flooding in the kampong is recognized. The issues with the flood gate management have been mentioned in previous section. Since the function of the flood gates is crucial, there is a need for an active leadership in the kampong to organize the operation of flood gates.

In conclusion, the existence of grassroots leadership in the kampong brings people of KKM together to engage in some forms of adaptation through working voluntarily for the repairing and cleaning of their communal facilities, such as walking path and sewerage and drainage system. However, there are two issues that can be a hindrance for this grassroots leadership to be more impactful; distribution of knowledge and political conflict.

5.2.6 Participation

The meaningful participation of people in their community organizations is recognized as an important aspect in resilience (Norris et al. 2008). Among the approximately 500 people who live in RW 1, there is only a small fraction who are actively involved in local organizations such as PKK, the Islamic recitation group, and the early childhood education organization (PAUD). Members of PKK from RW 1 are approximately 10 women, the Islamic recitation group includes 30 women, and PAUD approximately has 20 members. Some youth of KKM are involved in youth groups such as mosque organization for youth, and Karang Taruna (Youth Organization). However, this research will not discuss youth organization any further. In addition, there is no organisation for men of KKM. However, the mosque is an important meeting point for men of KKM and head of RTs to exchange ideas and opinions.

> (After flooding events), we have discussions among head of RTs and head of RW. There is no scheduled meeting (with people of KKM). Sometimes, I give them advice to clean drainage after two or three months. We usually talk in the mosque (Interview: Syamsul, 28 June 2015).

Women are less involved in informal talks among men, because they are either shy or reluctant to be involved in such conversations. This phenomenon is shaped

by the culture in which the men take care of these “masculine” or public domain talks.

> I don’t usually join any talks. Men do that. So, my husband sometimes joins the talks (Interview: Reni, 30 June 2015).

As is shown in quotes by Syamsul, after the flooding, there is no formal discussion about flooding events in terms of social learning as was theorized by Cutter et al. (2003). The talk may be organized among the leaders of the kampong (head of RTs and head of RW) which do not involve ordinary people. The talks were not documented, and no formal recommendations were sent to the government officials. Neither did officials ask for some feedback to the people of KKM after the flooding events occur. However, people of KKM do get involved in working together to clean their neighbourhood aftermath of flooding events and as advised by their leader.

> No, there is no meeting. After floods occur, we just try to get back to a normal day. What we do usually is to clean sewerage (Interview: Iyah, 30 June 2015).

> No, there is no meeting. There are some meetings, but not about flooding events. We usually clean the sewerage and drainage system to prevent our kampong being flooded again. Those are our common preventive activities (Interview: Imas, 30 June 2015).

In contrast with the majority of people of in KKM, members of the informal organizations like PKK, PAUD, and Islamic recitation group are actively involved in various initiatives, government events, and emergency responses around their community.

In summary, people of KKM with the lead of their heads of RTs and RW have been actively participating in preventive measures at the community level. These measures are adjusted to their limited finances. In terms of having a more sustainable and impactful measure, the community has not developed a mechanism of social learning which is recording their lessons learnt and their

recommendations to government for policy development. Despite their active involvement in the initiative of preventive measures, the majority of people are left out during decision-making. People who come to the meetings about the kampong's proposals to government are heads of RTs, heads of RW, and some prominent figures in the kampong. Those people are the decision makers of the kampong. These kinds of meetings diminish the chances for people like Joko, the poorest of the poor among the society, to have a voice although he and his family experienced the worst impacts of tidal floods.

5.3 Information and Communication

First, the Kamal Muara case is viewed as non-wide impact flooding events compared to other areas. Therefore, the flood warning is not closely watched as in other areas and they are seen to be least prioritised for warnings, as shown by the quote of one of the officials from the disaster response agency below.

> Kamal is not flooded by river. The stream is from Sunter and Angke. It tends to be more like tidal flood. There is one monitoring system at the Fish Market in Kamal Muara. However, water in Kamal Muara does not usually have impact to further areas rather than its surrounding kampongs, just up to several meters from coast lines. Let's say, at 3 AM the water is 1.74 metre, with status of being Standby 3, but three days ago it was Standby 2 with no impact. That is the level of seawater surface. It can raise for up to 4 times in a month (Interview: Rahman, 10 July 2015)

Being least prioritised, the people encounter other issues relating to warning systems. They mentioned that they do not have precautions given prior to the flooding events. They usually know it after the floods hit them. Therefore, there was no chance for them to secure their belongings (during 'tsunami like' floods). The lack of pre-flood warning has proven to cause devastating losses for the people of Kampong Kamal Muara as was narrated in detail in the previous chapter. Although the officials perceived that the floods do not cause huge impacts for the wider community, the early warning could have made the people prepared to save

their belongings in safe places before the floods occurred which could reduce the losses caused they experience. Scholars (Cutter et al. 2008, Norris et al. 2008) have recognised early warning systems as a significant resource of information that can prevent a signifcant losses during hazardous events.

Second, institutionally, there are coordination problems during emergencies and incompetent officials. The problem is that every official unit on duty (SKPD) has their own bank data. It is not well integrated, which means there is no *one command, one system*. The scattered data and confusing commands during the emergency have slowed the support distribution, as indicated by an official below.

> I think we should have an integrated system like the one in Australia. If there is an emergency, then every on duty office unit will coordinate into one command system, take part actively as instructed either as liaison officers or some other roles. We do some forms of coordination, but the problem is that people who are sent to coordination meetings, sometimes, were incompetent officials. He or she either was not able to put policy into practices to the level of field executive because he or she may not be the key person of their force unit. Therefore, he cannot implement the policy into practices. (Interview: Rahman, 38 years old, 10 July 2015)

Third, the government of Jakarta started to compile contingency plans in 2013. However, there are issues in the creation of contingency planning ranging from incompetent officials to handle the documents required, poor involvement of people at the grassroots level, and lack of drills (Interview: Andika, 13 July 2015). The contingency plan theoretically can be very helpful to make the community more organized in mitigating and responding to the flooding events or other emergencies. However, due to the issues mentioned above, the contingency plan is not working as was expected.

Fourth, there are conflicting answers about whether the people have been informed about emergency evacuation and have been involved in drills. For PKK members, they have been trained for emergency evacuation, but the majority of

interviewees claimed that they have not been involved in any drills though they instinctively know where to evacuate or not to evacuate during the flooding events. The trained members of PKK mentioned that in emergency occasions, the conditions did not run as they were trained. They claimed to have posted banners of information showing evacuation routes on every alley of the kampong. But during the field trip, I hardly saw any of the information posted in the kampong.

These are several issues related to information and communication of the flood mitigation and responses. There are crucial roles of government officers in giving pre-event warning, a better process of contingency plan compilation, and better coordination within the government agencies and to the people, that could be improved in order to enhance the resilience of the community.

5.4 Community Competence

Norris et al. (2008) stated community competence is related to the ability to have communal decision-making, and to collaborate effectively to achieve the pre-agreed goals. The competencies are argued to be rooted in empowerment and collective efficacy. In addition, Cutter et al. (2008) added local knowledge as a part of community competence. This section will discuss the aspects mentioned by Norris et al. (2008) and Cutter et al. (2008). Community competence is outlined in terms of their ability to undertake collective actions and decision-making, and their local knowledge as the basis of resource for the collective actions.

In terms of local knowledge, the people of Kampong Kamal Muara are well aware of the risk of flooding events. Although they are uncertain about how they are going to continue to adapt to the conditions, they are not irrationally deciding to stay in Kampong Kamal Muara.

The collective actions and decision-making processes in Kampong Kamal Muara were influenced by the role of the local leader in the kampong. However, as was mentioned in the previous chapter, there was no specific meeting organized in order to have collective decision making and recommendations to government related to their experiences of being exposed to flooding events. Such collective meetings were argued by Cutter et al. (2008) to be very crucial for community

resilience. They call the process social learning. Social learning is important in giving government feedback on what policies need to be improved for future flooding events. This issue might be due to less collective efficacy (Norris et al. 2008). Benight (2004 as cited in Norris et al. 2008) argued that collective efficacy drives people to speak, decide, and act on behalf of their community, which in turn lessens the adverse impacts of the flood loss.

This lack of collective efficacy may be related to lack of empowerment in the community (Norris et al. 2008). “Empowerment is a process through which people lacking equal share of valued resources gain greater access to and control over the resources” (Rappaport 1995 as cited in Norris et al. 2008). The empowerment can occur through more participative decision making by the government and political mechanisms that involve citizens in decision-making (Norris et al. 2008). Unfortunately, most of the decision-making on development and flood mitigation was derived from technical assessment (Interview: Rahman, 10 July 2015). From this case, it can be seen that empowerment and public participation need to be improved in order to enhance people’s resilience.

5.5 Conclusion

Finally, the effectiveness of a community in responding to hazards is shaped by a combination of resources (social capital and economic capital), and government actions in shaping their exposure to hazards. The government lacks institutions that provide a basis for coordinating with people, and their involvement in decision-making. Thus, resilience of the community of Kamal Muara is related to their roots of vulnerability, lack of access to power and resources.

Chapter 6: Conclusion

6.1 Are people of Kampong Kamal Muara resilient?

The people of Kampong Kamal Muara have to a large extent endured the frequent flooding events for several years. However, the flooding events have worsened their poverty and the adaptations to the flooding events had placed a heavy burden on their financial conditions. Beside economic considerations, there are several resources that are crucial in enhancing people's resilience, which are social capital, information and communication, and community competence. The combination of these resources is highly influenced by government's role in empowering the community. Empowerment depends on the degree to which the people of the kampong are given voices in policy development, which may have huge impacts on their lives. It would also mean that they would give more chance to access economic resources and political power. The resilience and vulnerability of the community of Kampong Kamal Muara (KKM) are related. Enhancing the resilience of the people can also reduce their vulnerability.

When resilience is viewed as a dynamic process of continual learning, capacity building, and policy improvement, the people of Kampong Kamal Muara do not show the explicit indicators of being resilient. In the dynamic process of maintaining resilience, flood hazards had depleted the crucial resources for further resilience of the people of Kampong Kamal Muara. Thus, although the community seems to be able to cope with flooding events, they are in reality becoming less resilient and more vulnerable.

Their desire to stay in the kampong is rational for them for both economic and social reasons. Economically, Kampong Kamal Muara has been the place in which their livelihoods are located and the price of land in other parts of Jakarta city will be much higher and they cannot afford to relocate. Socially, the kampong is associated with the strong ties of kinship and has deep meaning as the home of the people's ancestors.

6.2 Connections between resilience and vulnerability

This research has connected two different theories of resilience and vulnerability. The connection was started by viewing adaptive capacities as a shared aspect of resilience and vulnerability. Finally, the root causes of vulnerability are concluded to be a significant force that influences people's resilience.

6.3 Reflection on the use of the models

Using the models of Turner et al. (2003), I found it difficult to differentiate exposure and sensitivity. This experience was validated by Cutter et al's (2008) work that refers to the confusion between the two concepts. The use of the pressure and release model (Wisner et al. 2004) was helpful in giving insight to the bigger picture of the root causes of the people's vulnerability although the model does not elaborate on the interaction of the coupled human and environmental systems. Thus, the use of these two models has complemented each other. Moreover, as for the use of Norris et al.'s (2008) model helped me to view resilience in a broader way as connected to adaptive capacities which pinpoint several resources that are crucial for people's resilience to flooding events. Based on the experience of using these three models, I propose a model which is modified from these three approaches (Figure 15).

As shown in the figure 15, adaptive capacities are clearly indicated to be shared aspects of the resilience and vulnerability concepts. Adaptive capacities are viewed from two perspectives. First, there are adaptive responses which cover immediate as well as long-term responses and actions in order to cope and adapt to hazards. This view of adaptive capacities is influenced by Turner et al.'s (2003) model. These actions were demonstrated by the KKM community by modifying their house structures and storage systems, for instance. Second, adaptive capacities that are manifested as networked resources to support resilience. Components of adaptive capacities as networked resources are categorised into four different sets of resources from the model of Norris et al. (2008): social potential, economic development, community competence, and information and communication. Moreover, the global economic system, global environmental

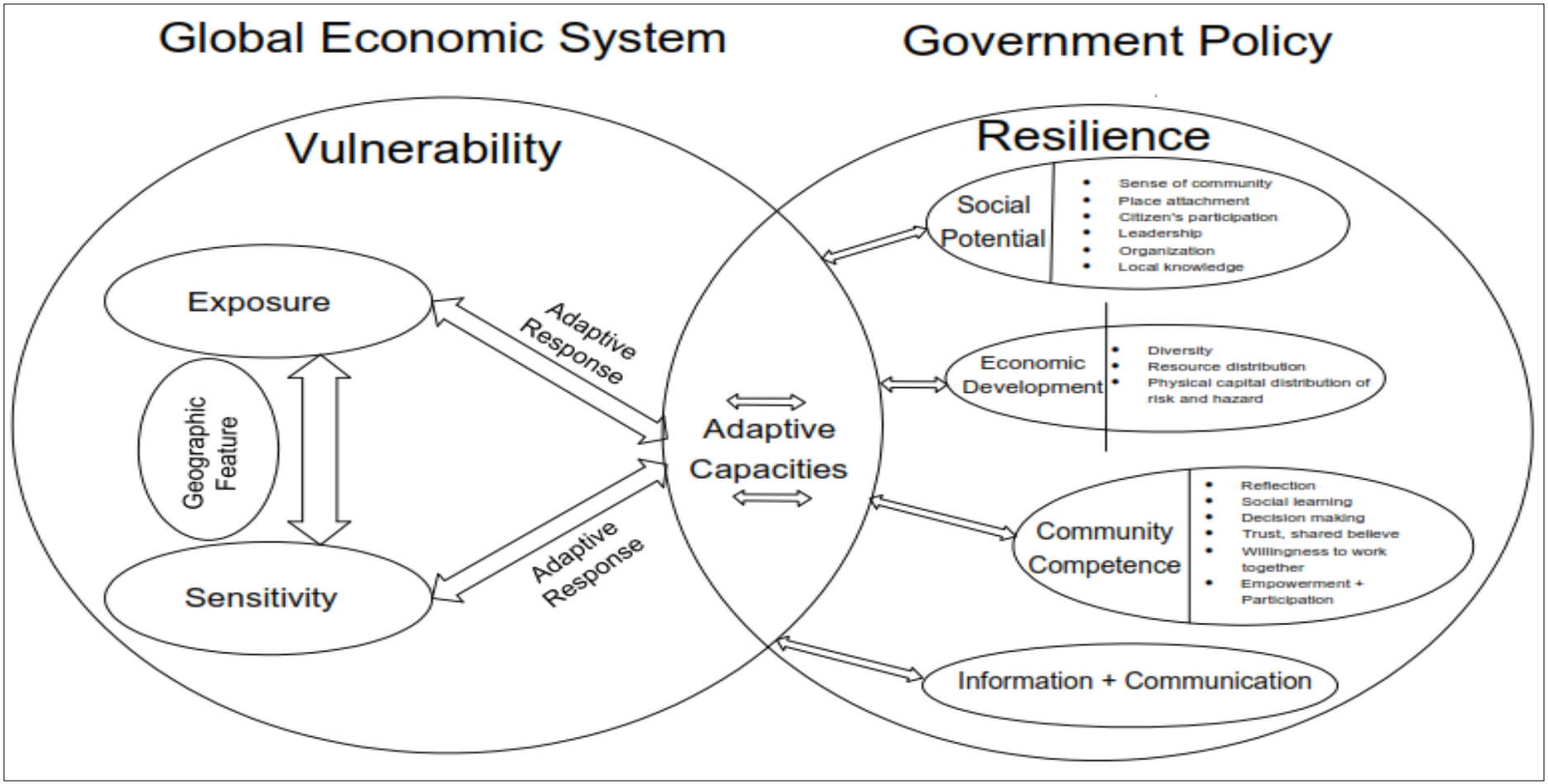


Figure 15 Vulnerability and Resilience Model, adapted from Turner et al. (2003), Cutter et al. (2008), and Norris et al. (2008).

change, and government's policy (root causes in Wisner et al.'s (2004) Pressure and Release Model) had a multitude of impacts on both people's resilience and vulnerability.

6.4 Conclusion

This thesis aims to explore the vulnerability and resilience of a community and review resources that may support its improved resilience. Geographical condition, changes of land use, and climate change have contributed to people's exposure to flooding events. Low income and dependency on a narrow range of economic resources have exacerbated people's sensitivity to the impact of flooding events as well as limiting people's budgets for their recovery and adaptation after the flooding events. Moreover, limited infrastructure and services in the kampong were other issues that influenced people's sensitivity to flooding impacts. The impacts of the flood are experienced differently among the community members. Some factors such as economic status, health conditions, and age, have been shown to influence how people of Kampong Kamal Muara experienced flood differently. Social, political, and economic dynamics from kampong level to national level have impacts on structuring people's vulnerability as well as resilience. Although Kampong Kamal Muara may seem to be able to cope and adjust to flooding events, the flooding events and the adaptations have been an ongoing burden to their financial conditions. Some adaptations are ineffective for the longer term as well as being maladaptations. Social capital is the asset that has the greatest potential to build the strength of the KKM community. Empowerment and giving the people's voice to policy making is needed in order for them to become resilient.

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Appendix One: Information Sheet for Interview

UNIVERSITY OF WAIKATO

FACULTY OF ARTS AND SOCIAL SCIENCES

Community resilience to flooding events of Kampong Kamal Muara Communities in North Jakarta, Indonesia

I am a geography graduate student at the University of Waikato. As part of my Master thesis I am undertaking research on community based resilience to flooding events. The aim of this research is to explore social factors that have influence in enhancing community based resilience in Kampong Muara Kamal. I am interested in examining people's experience in coping with and recovering from flooding events

Interview

For this research, I hope to conduct several interviews. The interview will be approximately half an hour to an hour in length. Your opinions and thoughts are important so you are welcome to bring up any issues which you view as important to my research.

I would like to invite you to participate in an interview. I would like to audio record the interviews so that I have an accurate account of your views and opinion.

You have the right to:

- Ask further questions about the research at any time during the course of the research
- Withdraw, change, and add your comments up to a month after the interview and/or focus group discussion.

- Choose not to answer any question during the interview and/or ask for audio recorder to be turned off during the interview.
- Contact me or my supervisor at any time if you have any queries or hesitations about our research.

Confidentiality

Your confidentiality will be assured throughout. No one apart from the researcher whose name is on this sheet will have access to the information you provide. All data will be kept in a password locked computer and secure location that is accessible only to the researcher. The audio records will be erased five years after the research has been completed. I will ensure your individual answers during the interview and the focus group discussion become anonymous in the final report and any other publications

This research project has been approved by the Human Research Ethics Committee of the Faculty of Arts and Social Sciences. Any questions about the ethical conduct of this research may be sent to the Secretary of the Committee, email: fass-ethics@waikato.ac.nz , Faculty of Arts and Social Sciences, University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand.

The Results

The data from this research will be collated and the results will be used to write a report for my Master's thesis. Four copies of my thesis will be produced, three hard copies, and one accessible online. The findings may also be used in presentations and journal publications.

What next?

If you would like to take part in the research, I will contact you in the next week so we can organise a time to meet. If you have any questions about the research, feel free to contact me or my supervisor.

Thank you in advance for your time and favourable consideration in this research.

Rini Mayasari
085273727807
rm196@students.waikato.ac.nz

Supervisor:
Associate Professor John Campbell
(+64) 07 838 4466 ex 8089
jrc@waikato.ac.nz

Appendix two: Information Sheet for Focus Group Discussion

UNIVERSITY OF WAIKATO

FACULTY OF ARTS AND SOCIAL SCIENCES

Community resilience to flooding events of Kampong Kamal Muara Communities in North Jakarta, Indonesia

I am a geography graduate student at the University of Waikato. As part of my Master thesis I am undertaking research on community based resilience to flooding events. The aim of this research is to explore social factors that have influence in enhancing community based resilience in Kampong Muara Kamal. I am interested in examining people's experience in coping with and recovering from flooding events

Focus group discussions

For this research, I hope to conduct approximately two focus group discussions. Focus group discussions are informal discussions of 5 -10 people where you can offer your views about the topic and also hear what others have to say. Each focus group discussion will approximately take two hours.

I would like to invite you to participate in a focus group discussion. I would like to audio record the focus groups so that I have an accurate account of your views and opinion.

You have the right to:

- Ask further questions about the research at any time during the course of the research
- Withdraw, change, and add your comments up to a month after the focus group discussion.

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- Choose not to answer any question during the focus group discussion
- Contact me or my supervisor at any time if you have any queries or hesitations about our research.

Confidentiality

I cannot ensure your confidentiality for the focus group discussion. However, I will ask everyone involved in the focus group discussion to respect the confidentiality of the group and not to discuss it with others. In addition, all data will be kept in a password locked computer and secure location that is accessible only to the researcher. The audio records will be erased five years after the research has been completed. I will ensure your individual answers during the focus group discussion become anonymous in the final report and any other publications.

This research project has been approved by the Human Research Ethics Committee of the Faculty of Arts and Social Sciences. Any questions about the ethical conduct of this research may be sent to the Secretary of the Committee, email: fass-ethics@waikato.ac.nz , Faculty of Arts and Social Sciences, University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand.

The Results

The data from this research will be collated and the results will be used to write a report for my Master's thesis. Four copies of my thesis will be produced, three hard copies, and one accessible online. The findings may also be used in presentations and journal publications.

What next?

If you would like to take part in the research, I will contact you in the next week so we can organise a time to meet. If you have any questions about the research, feel free to contact me or my supervisor.

Thank you in advance for your time and favourable consideration in this research.

Rini Mayasari
085273727807
rm196@students.waikato.ac.nz

Supervisor:
Associate Professor John Campbell
(+64) 07 838 4466 ex 8089
jrc@waikato.ac.nz

Appendix Three: Consent Form – Individual Interview

RESEARCH CONSENT FORM – INDIVIDUAL INTERVIEW

Description of the project:

The aim of this research is to explore social factors that have influence in enhancing community based resilience in Kampong Muara Kamal. I am interested in examining people's experience in coping and recovering from flooding events, what are the coping strategies and strategies that are implemented to mitigate the impact of the future flooding events, and why such strategies are implemented.

I have read the information sheet and understand that:

- I can refuse to answer any questions, terminate the interview and can withdraw from the research up to a month after my interview.
- All information will remain confidential.
- My identity will remain anonymous unless I state otherwise.
- All information collected will remain secure in a locked cupboard or a password-locked computer accessible only to the researcher.
- Information will be used for a Master's thesis, presentations, and journal articles.

I consent to our conversation being audio-recorded **YES / NO**

I (your name) _____ agree to participate in this research and acknowledge receipt of a copy of this consent form and the research project information sheet.

_____ (to be signed and dated by participant) _____ (to be signed and dated by Rini Mayasari)

Appendix Four: Consent Form – Focus Group

RESEARCH CONSENT FORM – FOCUS GROUP

Description of the project:

The aim of this research is to explore social factors that have influence in enhancing community based resilience in Kampong Muara Kamal. I am interested in examining people's experience in coping and recovering from flooding events, what are the coping strategies and strategies that are implemented to mitigate the impact of the future flooding events, and why such strategies are implemented.

I have read the information sheet and understand that:

- I can refuse to answer any questions, terminate the focus group discussion and can withdraw from the research up to a month after my focus group discussion.
- All information will remain confidential. Shared information in this focus group discussion will be kept private to those within the group.
- I will be anonymous unless I state otherwise.
- All information collected will remain secure in a locked cupboard or a password-locked computer accessible only to the researcher.
- Information will be used for a Master's thesis, presentations, and journal articles.

I consent to our conversation being audio-recorded **YES / NO**

I (your name) _____ agree to participate in this research and acknowledge receipt of a copy of this consent form and the research project information sheet.

_____ (to be signed and dated by participant)

_____ (to be signed and dated by Rini Mayasari)

Appendix Five: Semi-structured interview schedule – KKM Communities

Semi-structured interview schedule to KKM Communities

This schedule outlines some of the topics that I would like to discuss during this interview. You do not have to answer every question and you are welcome to bring up other issues not covered in this schedule. I am interested in hearing about your thoughts on how you respond to, recover from, and methods to mitigate the impacts of flooding events.

1. Have you experienced flooding events?
2. When were they?
3. What do you think are the root causes of flooding events?
4. How do you perceive floods? Do you think they are a form of disaster?
5. How frequently do flood events occur in your neighbourhood? When do flooding events usually occur? Is there a season for flooding?
6. Do you think recent flooding events have become worse year by year? Do previous flooding events reduce your assets and your capability to cope with subsequent flooding events? When did the worst flood occurred? Why was it the worst? When did the lightest flood occur? Why do you think it was the lightest?
7. How do flooding events affect your daily life?
   Prompts:
   a. Does flooding make you unable to go to work or school?
   b. Do flooding events reduce your income?
   c. Have you ever needed to evacuate yourself or others when floods occur?
   d. Do you get sick during or soon after the flooding events?
   e. Do you ever experience of loss of or damage to your properties due to flood events?
   f. What things about flooding events hit you, your family, and your community, the most?

8. How do you and your family cope with the floods?

   Prompts:

   a. How do you go to work or school when floods occur?
   b. How do you manage to evacuate yourself and family?
   c. If you do not move away, how do you protect yourself, your family, and your properties?
   d. How do you support and feed yourself and your family during the flooding events?

9. Are there any evacuation efforts that are initiated by your Kampong communities?

   Prompts:

   a. Who initiates and leads the evacuation effort in your Kampong?
   b. Who provides the funds for the evacuation initiatives?
   c. Do you get actively involved in the initiative? Why? Why not?

10. How do you perceive government efforts in responding to the recent flooding events? Do you have any examples of government responses to the recent flooding?

    Prompt:

    Does the government get involved in the evacuation process and supplying foods for the evacuation tent?

11. How quickly do you think you, your family and your community recover after the flooding events?

    Prompts:

    a. Did you manage to replace or fix the damaged or lost properties? Was it easy to do that?
    b. Was it easy to fix the damaged infrastructures in your neighbourhood?

12. After the flooding events, are there any efforts to fix any broken infrastructure and community discussions to reflect on the experiences during the flooding events?

    Prompts:

    a. If your community reflects on its experience of coping with the flooding, is it held regularly after the flooding events? Who initiates this reflection? Have the reflections been recorded into a report and

passed on to government? Do you take and implement the reflections as a feedback for improvement of your own future disaster responses and mitigation efforts at home?

b. Are there any occasions where this kinds of reflection can be given as a feedback to government?
c. If the government has been informed, do you think that the government incorporates the feedback into their policies for future mitigation and disaster response policies?

13. Do you know of any government efforts and policies that have been implemented to support your community in mitigating and coping with flooding events?

    Prompts:

    a. Besides having dikes near your kampong, is there any other government efforts to support your community in mitigating and coping with flooding events?
    b. If flooding events are to occur, how and from who, do you get the information and early warning?

14. Would you move to another place if government was to relocate you due to frequency of flooding events? Why? Why not?
15. Are there any significant social and political events and policies that you think have influenced your capability in coping with flooding events in your kampong? What are they?

    Prompt:

    Do the fuels' price increases affect your financial capability and your ability to cope with flooding events?

Appendix Six: Semi-structured interview schedule – Government officials

Semi-structured Interview for government officials

This schedule outlines some of the topics that I would like to discuss during this interview. You do not have to answer every question and you are welcome to bring up other issues not covered in this schedule. I am interested in hearing about your thoughts on flooding events, flood responses and mitigation, and what should we prioritise in mitigating the impacts of floods and enhancing people's resilience.

1. What do you think are the root causes of flooding events?
2. What kinds of policy and efforts do your institution implement as part of flood responses and mitigation?
3. How do you perceive these efforts and policies? Have these efforts and policies been successful in mitigating and responding to flooding events? If not, why do you think this is the case?
4. What stakeholders and government institutions are working with your institution regarding flood responses and mitigation? Do you think the cooperation is effective? Why? Why not?
5. How does your institution evaluate its programmes and policies after flood events? Are there any post-flood-events meetings that are specifically organized to help communities and the government officials to reflect on their experiences during the flood occurrences? If yes, when and where are these organized? Who are invited to the meetings? If no, why not?
6. If there were any meetings, were results of the meetings recorded and considered in order to improve flood mitigation and response policies? If yes, do you have any examples? If no, why not? What are the barriers in implementing this feedback?
7. What do you think about the governments' policy evaluation regarding their policy on flooding events? Has it been effective?

Appendix Nine: Focus Group Discussion schedule – KKM Communities

Focus Group Discussion for KKM Communities

This schedule outlines some of the topics that I would like to discuss during this focus group. You do not have to answer every question and you are welcome to bring up other issues not covered in this schedule. I am interested in hearing about your thoughts on how you respond to, recover from, and methods to mitigate the impacts of flooding events. If you were involved in an interview, we may have already covered some of these questions.

1. Have you experienced flooding events?
2. When were they?
3. What do you think are the root causes of flooding events?
4. How do you perceive floods? Do you think they are a form of disaster?
5. How frequently do flood events occur in your neighbourhood? When do flooding events usually occur? Is there a season for flooding?
6. Do you think recent flooding events have become worse year by year? Do previous flooding events reduce your assets and your capability to cope with subsequent flooding events? When did the worst flood occurred? Why was it the worst? When did the lightest flood occur? Why do you think it was the lightest?
7. How do flooding events affect your daily life?
   Prompts:
   g. Does flooding make you unable to go to work or school?
   h. Do flooding events reduce your income?
   i. Have you ever needed to evacuate yourself or others when floods occur?
   j. Do you get sick during or soon after the flooding events?
   k. Do you ever experience of loss of or damage to your properties due to flood events?

l. What things about flooding events hit you, your family, and your community, the most?

8. How do you and your family cope with the floods?

   Prompts:

   e. How do you go to work or school when floods occur?
   f. How do you manage to evacuate yourself and family?
   g. If you do not move away, how do you protect yourself, your family, and your properties?
   h. How do you support and feed yourself and your family during the flooding events?

9. Are there any evacuation efforts that are initiated by your Kampong communities?

   Prompts:

   d. Who initiates and leads the evacuation effort in your Kampong?
   e. Who provides the funds for the evacuation initiatives?
   f. Do you get actively involved in the initiative? Why? Why not?

10. How do you perceive government efforts in responding to the recent flooding events? Do you have any examples of government responses to the recent flooding?

    Prompt:

    Does the government get involved in the evacuation process and supplying foods for the evacuation tent?

11. How quickly do you think you, your family and your community recover after the flooding events?

    Prompts:

    c. Did you manage to replace or fix the damaged or lost properties? Was it easy to do that?
    d. Was it easy to fix the damaged infrastructures in your neighbourhood?

12. After the flooding events, are there any efforts to fix any broken infrastructure and community discussions to reflect on the experiences during the flooding events?

    Prompts:

d. If your community reflects on its experience of coping with the flooding, is it held regularly after the flooding events? Who initiates this reflection? Have the reflections been recorded into a report and passed on to government? Do you take and implement the reflections as a feedback for improvement of your own future disaster responses and mitigation efforts at home?
e. Are there any occasions where this kinds of reflection can be given as a feedback to government?
f. If the government has been informed, do you think that the government incorporates the feedback into their policies for future mitigation and disaster response policies?

13. Do you know of any government efforts and policies that have been implemented to support your community in mitigating and coping with flooding events?

    Prompts:

    c. Besides having dikes near your kampong, is there any other government efforts to support your community in mitigating and coping with flooding events?
    d. If flooding events are to occur, how and from who, do you get the information and early warning?

14. Would you move to another place if government was to relocate you due to frequency of flooding events? Why? Why not?
15. Are there any significant social and political events and policies that you think have influenced your capability in coping with flooding events in your kampong? What are they?

    Prompt:

    Do the fuels' price increases affect your financial capability and your ability to cope with flooding events?