ANNA SMITS

# COLLECTIVE SOCIAL CAPITAL AND ADAPTATION STRATEGIES TO FLOODING

***A CASE STUDY OF THE NEIGHBOURHOOD KEMIJEN IN SEMARANG, INDONESIA***

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The photograph on the cover was taken by Stefan Ramaker. Other photographs in this thesis were also taken by him or by Huub van der Zwaluw or by me.

## Preface

Writing this thesis has had quite an impact on me. Conducting field work in Kemijen was certainly a reality check for me. I had never been out of Europe before and there I stood between the goats and the garbage with screaming neighbourhood children running around. The inhabitants were very friendly and lively despite the things that they are going through. The interviews with the inhabitants have learned me so much. Beforehand, I knew about the problems of flooding and land subsidence in Southeast Asia, but now I have my own experiences to draw on.

This was the first time I had to do a research from beginning to end on my own. Of course it has caused me stress and frustrations, but now I am proud of the result. I am very happy that I got to go to Indonesia together with other students. It was very nice to have some familiar faces around and to be able to sort things out together. Thank you Huub, Koen, Nuri, Stefan and Tom!

Doing research at Unika University was a great experience, also with the help of Mr. Danardono and our translator Jeany Winowobo. I would also like to thank Mr. Hadipuro and Mr. Setianto for their input. For helping us with our fieldwork, I would like to thank Mr. Puji and Mr. Sumono. Without their directions to several taxi drivers we probably never would have reached Kemijen!

Next to Indonesia, I have had my share of support in the Netherlands. I would like to thank my tutors, Lothar Smith and Martin van der Velde for their input, coaching and feedback. And of course I want to thank my loving family who had to listen to my complaints and kept on motivating me to go on.

Nijmegen, June 25th 2013

Anna Smits

## Summary

An increase in annual floods is troubling Southeast Asia. Natural causes are bad weather conditions and a rise in sea level. Man-made causes are pollution, urbanisation and the extraction of ground water. The latter two are also the cause of another environmental hazard troubling the area: land subsidence. This can be defined as “a movement of a surface downwards relative to a datum such as sea level”. Continuing land subsidence has a reinforcing influence on the flooding. These environmental problems have an immense impact on the daily lives of people living in the flood-prone areas. An important factor influencing the ability of people to deal with these shocks is the state of their livelihoods; these comprise the capabilities, assets and activities required for a means of living. People with low means of living are more vulnerable to external stress such as environmental hazards placed on their livelihoods and well-being. This is often the case for developing countries. Most countries in Southeast Asia are developing countries which means that the larger part of their population is living on a low income and is thus more vulnerable to the effects of flooding. One of the most vulnerable countries in Asia prone to frequent flooding is the densely populated Indonesia. In Indonesia the island with the most and highest risk areas is Java Island. The fourth biggest city of Indonesia is located on the north coast of the island: Semarang. Semarang is troubled by land subsidence and has experienced a severe rise in annual floods.

The flooding has an immense impact on the livelihoods of the inhabitants of Semarang. People do all they can to protect their means of living. This protection can be referred to as social security: “all ways in which individual people, households, and communities protect their livelihood and are protected socially against the shocks and stress that threaten its continuity and stability”. Social security is recognized as a human right, but unfortunately government’s adequate protection of the livelihoods of the inhabitants is not a given. Local policy in Semarang is not sufficient to protect all the inhabitants from the consequences of the flooding. Therefore people have taken up their own measures. These adaptation strategies are dependent of the inhabitants’ means of living and can be divided into different categories: 1. Economic adaptation strategies, 2. Technological / structural adaptation strategies, 3. Social / organizational adaptation strategies. This research emphasizes the fact that adaptation to flooding is an ongoing process integrated into the daily lives of the inhabitants. Prior researches on adaptation to flooding have shown a possible positive link between community behaviour and adaptation to flooding, but have not further elaborated on it. The importance of relations and community behaviour can be examined using one of the five key capitals belonging to the earlier mentioned livelihoods: social capital. Social capital can be defined as the ability to rely on relationships with other people, or organizations, in society to maintain a means of living. It is important to understand the construction of social capital at the local level, in order to understand the role it plays in adaptation to flooding at that same level. How does the neighbourhood respond to the effects of flooding in their area? What does the social capital of the inhabitants of that neighbourhood as a whole look like? Therefore, in this research the focus is on the collective forms of social capital. This refers to the networks in a community as opposed to the personal relations at an individual level. The examination of collective forms of social capital can help understand the ways these can be applied to adapt to flooding at a community level.

The theoretical background of collective social capital in this thesis is based on different distinctions and conceptualizations of social capital. An important aspect of social capital is ‘generalized reciprocity’, which can be explained by the following example: “I’ll do this for you now, without expecting anything immediately in return and perhaps without even knowing you, confident that down the road you or someone else will return the favour”.

Important for social capital at a community level (collective social capital) is the communal interest of the neighbourhood. In Indonesia neighbours are very important which creates strong community support in a neighbourhood. Therefore the communal interest can rely on community support through strong social networks. The neighbours rely on each other for support and in times of need, such as sickness or death, the whole neighbourhood comes to help and provides assistance as required. Important for Indonesian communities is ‘gotong royong’, which means mutual assistance. This mutual assistance is used for funerals, weddings and sickness. The institution ‘gotong royong’ is very old and has always been part of the inhabitant’s lives. There are different forms of ‘gotong royong’, such as ‘ronda’ (patrolling the neighbourhood together), ‘Dasa Wisma’ (informing of women, by women), ‘Posyandu’ (monitoring the children’s health). All these practices represent the collective social capital in a neighbourhood.

Another distinction is made between informal and formal social networks. Informal networks refer to relationships with family, friends, neighbours and colleagues, whereas formal networks refer to participation in formal organizations. There are also different approaches that have emerged in the literature on social capital. Important for this research is the ‘Networks View’ which stresses the importance of vertical as well as horizontal associations between people, and relations within and among other organizational entities. The Networks view emphasizes that intra-community ties are needed to give families and communities a sense of identity and common purpose. Another designation for these ties is ‘bonding capital’. Common purpose corresponds with the earlier mentioned community support and communal interest. On the other hand inter-community ties are needed, these cross various social divides, for example those based on religion, class, ethnicity, gender and socio-economic status. These ties are also called ‘bridging capital’.

There are also different forms of social capital that can be identified. The first is ‘obligations, expectations and trustworthiness of structures’, which are needed for the working of tight social relationships in a community. This investing in relationships by making obligations to another and thereby raising expectations and hoping that the other can be trusted to live up to those expectations, corresponds with the earlier mentioned ‘generalized reciprocity’. The second form of social capital is ‘information channels’. To obtain information is costly, social relations that are maintained for other purposes can be used to acquire information. ‘Norms and effective sanctions’ are the third form of social capital. This refers to a set of norms that is needed in order to create a situation in which an individual or group is able to act in daily life. In addition, effective sanctions are needed. For Indonesian communities an example of these norms is the norms of ‘gotong royong’.

The aim of this research is to contribute to a more complete understanding of the role of collective social capital in adaptation to flooding at community levels in coastal neighbourhoods. In order to do this, it combines the above theories of adaptation strategies and (collective) social capital. In order to make statements about the role of collective social capital in adaptation strategies to flooding at community levels, in-depth research is needed. With the help of thorough examination, the different stories and perceptions of the inhabitants can be interpretated with the help of stronger arguments. Collective social capital is highly dependent on one's perception and therefore it is a complex concept to examine. The research strategy is to obtain depth, detailing, complexity and a strong argumentation with a minimum of insecurity.

The primary empirical data was obtained through in-depth interviews. These interviews were conducted in the neighbourhood Kemijen in the East of Semarang. The neighbourhood is predominantly poor and is undergoing flooding and land subsidence. For the in-depth interviews there was made use of an interview guide based on the operationalization of adaptation strategies and collective social capital. The in-depth interviews were conducted with the help of a translator since not many people in the neighbourhood speak English.

The empirical research showed that in Kemijen there is a dichotomy between the 'more rich' and the poor people in their experience of the flooding and their adaptation to the flooding. For the rich it was almost 'institutionalised', because they did not experience severe consequences anymore. The dichotomy also showed in their perception on the rise of the 'water problems' over the years. Whereas the poor respondents answered affirmative, the rich said it had become less because they were less bothered by it because of their adaptations. Main consequences of the flooding are damage to their homes, destruction of their belongings and sickness caused by the (stagnant) water.

There are more informal networks than formal networks present in Kemijen. There is community cohesion and respondents spoke of communal interest and common purpose (surviving the water). They have a sense of common identity and feel comfortable in their neighbourhood. These outcomes represent the bonding capital, whereas the bridging capital is represented by the positive ties between the Christians and the Muslims in the neighbourhood. From this it can be concluded that the inhabitants of Kemijen share collective social capital, especially in the form of the tight relationships between neighbours. Norms and institutions in the neighbourhood contribute to the collective social capital. 'Gotong Royong' is employed in different forms, especially for helping each other at funerals, weddings or during sickness. Perceptions on 'ronda' were very diverse, whereas 'Dasa Wisma' and 'Posyandu' were commented on generally positive.

For the adaptation strategies, the main ones employed by the respondents are economic or technological / structural adaptation strategies. The main economic strategies are heightening of the houses or restoring of important belongings at a higher place. Here the concept of generalized reciprocity was not present at all; helping each other in this on a voluntary basis seemed to be out of question. The main technological/ structural strategies also contained heightening of the houses and restoring of belongings at a higher place. In addition there was a common strategy of simply 'doing nothing'. Either heightening of the house was enough, or people did not have the means to do

anything. The main social / organizational strategy was evacuation. This category did show an influence of collective social capital: The people in the neighbourhood work together in cooking food during the flooding and even share their meals. In addition they can use their social networks to find a place for evacuation.

During the empirical research, two paradoxical approaches to adaptation strategies came forward. One represented by a 'frame of individuality' in the thinking of the inhabitants and the other represented by a 'frame of collectivity'. When you look at adaptation in the neighbourhood from the individual perspective, there almost seem to be no collective adaptation strategies. When asking respondents for the first time whether they work together with the neighbourhood in protection from the water, most of them would answer no. A person's livelihood is his or her own responsibility and if an external influence of the government is not present, you have to provide your own social security. A general message of 'every man for himself' came forward.

However, when the conversation moved to social relations and institutions such as 'gotong royong', their frame of individuality seemed to shift to a frame of collectivity. Still this accounted more for cultural practices such as helping each other preparing for weddings and funerals. Nevertheless, there also came forward some more manifestations of the influence of collective social capital in their adaptation to flooding. More examples of the use of 'gotong royong' for adaptation to flooding were mentioned, such as patrolling the neighbourhood and alarming when the water comes. Based on this approach, it can be concluded that there is a clear influence of collective social capital in their adaptation to flooding in the form of the different institutions. Nevertheless these are more used for other purposes, such as working together for collecting money or helping for a wedding.

The two different approaches turned out to be dependent of the inhabitant's perceptions. A possible link between their social practices and dealing with the flooding did not exist to the most of them. This can be explained by the fact that institutions have existed for a long time and are integrated into their daily lives. Therefore it can be hard to acknowledge them in a different form. Most of the respondents did not acknowledge the use of collective social capital in adaptation to flooding at first, but rethought this after talking about social relations and institutions. When looking at the adaptation strategies when keeping the different aspects of collective social capital in mind, it can be concluded that it does contribute to the adaptation strategies. The collective social capital of the inhabitants of Kemijen helps them adapt to flooding by using their social networks and through their institutions. Most important examples are cleaning the environment together after a flooding, cooking together during the flooding, the patrolling and alarming when the water comes and the use of their relations for evacuation. These are all influenced by the present bonding and bridging capital and norms of 'gotong royong'.

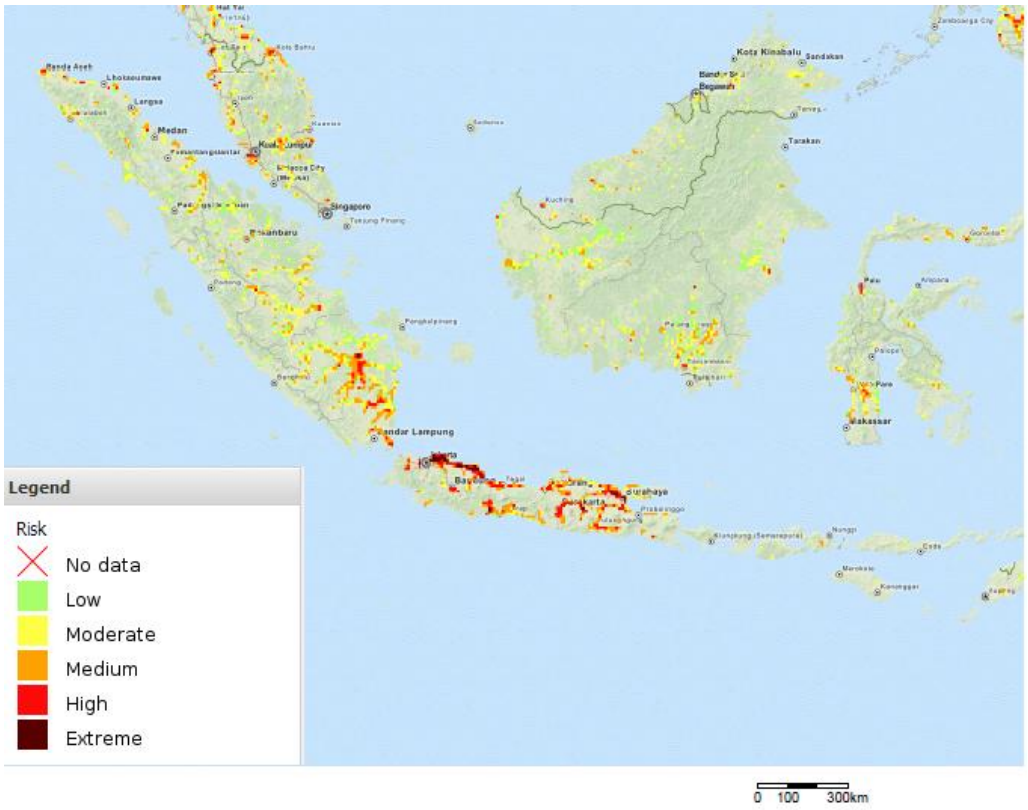
# 1. Introduction

## 1.1 Project framework

Southeast Asia is suffering from an increase in annual floods. A vast amount of people have been forced to leave their homes and the damage is still on the rise (Marcotullio, 2007). There are different causes that are responsible for this increase. Because of climate change the area is experiencing bad weather conditions and a rise in sea level. These natural processes have a reinforcing influence on the floods. Next to that there are the man-made consequences of urbanisation. The expansion of the cities leaves less room for water to drain and causes wood and natural soil to disappear. Other man-made causes are pollution and extraction of groundwater (Douglass, 2010). Low-lying coastal areas and their growing population are the main victims of the confining effects of annual flooding (McGranaham et al., 2007). Floods are not the only environmental problem troubling Southeast Asia. Another phenomena of frequent occurrence in the area is land subsidence. Land subsidence can be defined as “a movement of a surface downwards relative to a datum such as sea level” (Marfai & King, 2007, p. 651). Again, man-made causes can be identified. Xue et al. (2005) point out that human activities, such as geological actions and extreme groundwater withdrawal are the main causes.

The floods are worsened by continuing land subsidence (Harwatisari, 2009). These environmental problems have an immense impact on the daily lives of people living in the flood-prone areas. An important factor influencing the ability of people to deal with these shocks is the state of their livelihoods. “A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living” (Chambers & Conway, 1992, p. 6). People with low means of living are more vulnerable to external stress such as environmental hazards placed on their livelihoods and well-being (Ramaker, 2013). This is often the case for developing countries. Despite the fact that developing countries have the smallest share in the human’s contribution to climate change, they are the ones who suffer the most from the consequences: “People living in developing countries are also generally closer to the margin of tolerance to changing precipitation patterns, increased climate variability, and extreme weather events than those living in developed countries and thus more vulnerable to their effects” (Mearns & Norton, 2010, p. 14).

Most countries in Southeast Asia are developing countries which means that the larger part of their population is living on a low income and is thus more vulnerable to the effects of flooding. One of the most vulnerable countries in Asia prone to frequent flooding is the densely populated Indonesia (Dewi, 2007). “Out of a population of 234 million, more than 32 million Indonesians currently live below the poverty line” (www.worldbank.org). In figure 1 the flood risk areas in Indonesia are displayed. The island with the most and the highest risk areas is the worlds most populous island Java (Calder, 2007). 58% of the population of Indonesia lives on Java (Badan Pusat Statistik, 2010). The biggest and capital city of Indonesia is located on Java: Jakarta. Another one of the biggest cities of Indonesia is Semarang. Semarang is located on the north coast of the island (see figure 1) and has an area of 400 km2 and a population of approximately 1.5 million people. Semarang is a high flood risk area and has experienced a severe rise in annual floods (Harwatisari & Van Ast, 2011).

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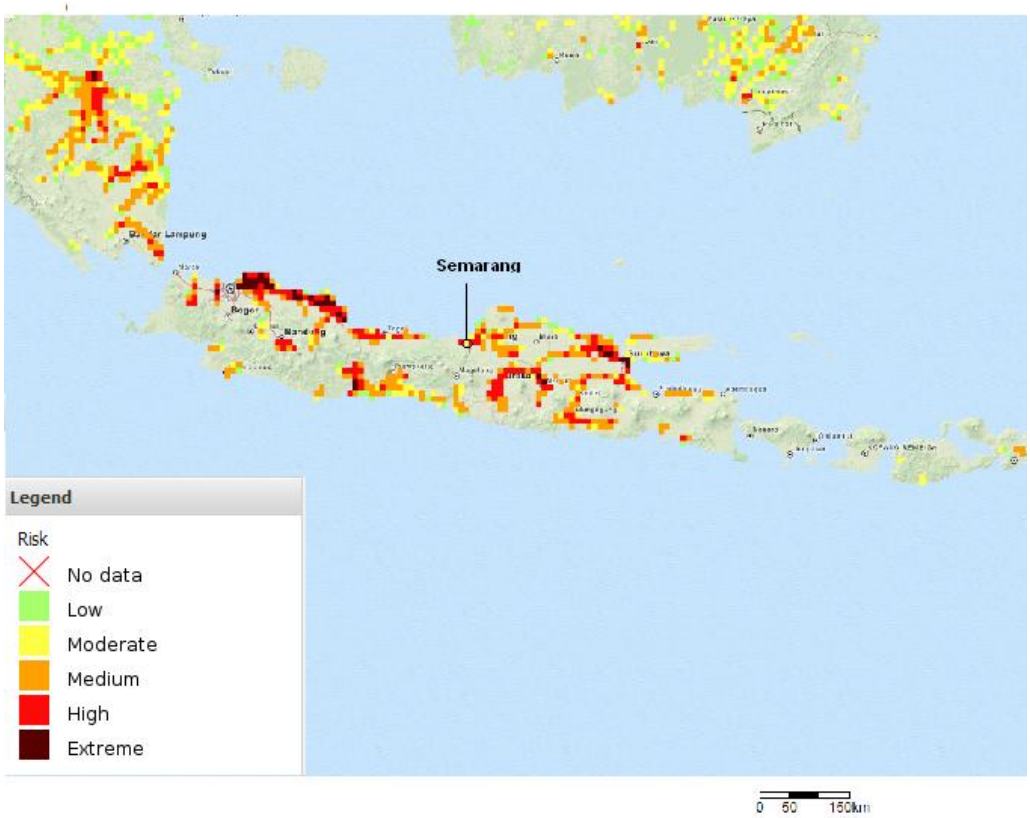


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**Figure 1: Flood Risk in Indonesia (1) and Java Island (2) (Global Risk Data Platform, 2013)**

In Semarang the floods are also worsened by continuing land subsidence. The low-lying coastal area in which the city centre is located is troubled the most (Marfai & King, 2007). "The rate of subsidence mostly ranges from 2 up to 10 cm per year. The maximum land subsidence observed (…) during the period of 1997-2000 is about 16 cm per year" (Marfai & King, 2007, p. 655). The tidal flood inundates 4 – 9 times a month and mostly gets to 0.5 meter height within 24 hours (Harwatisari, 2009, p. ii). It is predicted that the expansion of the tidal flooding will broaden outer of the coastal areas (Harwatisari, 2009).

The local inhabitants have developed their own ways of dealing with the flooding and its consequences. Research shows that their underestimation of the risks is not the main problem. People's behaviour is restricted by structural, social, cultural, economical, political and non hazard-related factors. They are forced to stay in the risk area and to protect their hearth and home in creative ways (Texier, 2008). These creative ways have been a topic of research for several times. Semarang's inhabitants' responses to flooding have been examined using the concepts of adaptive capacity (Marfai & Hizbaron, 2011), adaptation responses (Harwatisari, 2009) and coping mechanisms (Dewi, 2007). The different responses to flooding by the inhabitants are observed and analyzed in different ways. All three approaches recognise the fact that there are different stages in which the methods are applied, namely before, during and after the flooding. This research builds further on the prior studies by Marfai & Hizbaron (2011), Harwatisari (2009) and Dewi (2007). The concept used in this research namely further emphasizes the fact that response to flooding is an ongoing process. Where the prior studies define different stages, this research seeks to represent the ongoing process with daily adaptation strategies whether it is before, during or after the flooding. This is in contrast to the prior studies which define different stages in which different methods are applied.

In her analysis of the coping mechanisms of the inhabitants of Semarang, Dewi (2007) points out that the solidarity among the inhabitants is high. "For instance, people do 'gotong royong' cleaning the canal and the surroundings as anticipating before flooding to minimize the effect of the flood (Dewi, 2007, p. 68). 'Gotong royong' means mutual and reciprocal assistance and refers to local people of a neighbourhood working together (Bowen, 1986). This kind of behaviour is useful for dealing with environmental problems (Dewi, 2007). In his analysis of adaptation responses, Harwatisari (2009) mentions that the people are willing to carry out adaptations at a neighbourhood level. Marfai & Hizbaron (2011) speak of the adaptive capacity being built from collective understanding through the sharing of culture. All four do touch a subject of a social or cultural factor in different ways here, but none of them elaborates on it. In all three cases there seems to be a positive link between community behaviour and the adaptation to flooding. In order to find out what influence this link might have, this research further elaborates on the possible importance of this connection. Following this, questions can be raised about the importance of relations and community behaviour in a neighbourhood that is dealing with flooding.

The importance of relations and community behaviour can be examined using an important aspect of the earlier mentioned livelihoods. In studies of livelihoods the focus is usually on five key capitals to understand the scope and vulnerability of livelihoods. In this study the focus is on the social capital of the inhabitants of Semarang. Social capital can

be defined as the ability to rely on relationships with other people, or organizations, in society (Minnaar, 2010). It is important to understand the construction of social capital at the local level, in order to understand the role it plays in adaptation to flooding at that same level. In this way it can be related to the local effects within the meaning of directly coping with the shocks, but also the local application of adaptation and even mitigation. How does the neighbourhood respond to the effects of flooding in their area? What does the social capital of the inhabitants of that neighbourhood as a whole look like? How do their networks interact with the local adaptation to flooding? Therefore, in this research the focus is on the collective forms of social capital. This refers to the networks in a community as opposed to the personal relations at an individual level (Minnaar, 2010). The examination of collective forms of social capital can help understand the ways these can be applied to adapt to flooding at a community level.

An important factor influencing the ability of the inhabitants to adapt their vulnerable situation to environmental hazards is their access to knowledge. Access to knowledge resources is an important part of people's livelihoods, being able to contribute to ones means of living. How do the inhabitants use their access to knowledge to manage their vulnerable position? This question is central in the research of fellow student Stefan Ramaker (2013) with whom I conducted my fieldwork together. Another fellow student involved, was Huub van der Zwaluw who examined the influence of the social relations of inhabitants in their decisions about migration in the context of dealing with flooding (2013). All three researches concern social aspects of dealing with flooding and show overlap in the examined concepts: Managing of a vulnerable position corresponds with the examination of adaptation strategies, whereas research of the influence of social relations is in line with the examination of importance of collective social capital.

### 1.2 Research objective

Examination of the collective forms of social capital in a neighbourhood and its role in adaptation to flooding can be seen as theoretical research. This means that the context of the problem; 'flooding in Semarang' can be based on literature and studies on the subject. In addition, the collective forms of social capital and the ways these can be applied can also be examined on the basis of literature and studies on the subject.

The role of social capital in dealing with environmental problems is acknowledged in different studies. The World Bank's 'Climate Change, Disaster Risk and The Urban Poor', points out that, in slums where social networks and kinship ties are stronger, communities are more resilient (Baker et al., 2012, p. 53). In the coastal areas of Semarang, Dewi (2007) also indicates a high solidarity among the inhabitants and says it can be valuable for dealing with environmental problems. She does not explicate this further, whilst such understanding can be of great value to further research on the possible importance of this connection. Both researches display a link between community cohesion and dealing with shocks caused by environmental disasters. However, the first is about major shocks, such as the Tsunami of 2007, whilst Dewi talks about adaptation to flooding. Further understanding of the role of collective forms of social capital in adaptation to flooding at a community level, requires theoretical research (Verschuren & Doorewaard, 2007). This research contributes to the theoretical background of collective social capital and adaptation to flooding and does not seek to solve a practical problem.

Following on to the prior elucidation of key issues, the research objective is: *To contribute to a more complete understanding of the role of collective social capital in adaptation to flooding at community levels in coastal neighbourhoods*

The focus of this research is limited to the collective forms of social capital, because it is important to understand the construction of social capital at the local level, in order to understand the role it plays in adaptation to flooding at that same level. What does the social capital of the inhabitants of a neighbourhood as a whole look like? How do their networks interact with adaptation to the flooding? The examination of collective forms of social capital can help understand the ways these can be applied to adaptation to flooding at a community level. In addition, the examination of the local adaptation strategies to flooding can help understand where the collective forms can be applied.

### 1.3 Research questions

The neighbourhood examined in this research is Kemijen (for more information, see chapter 3). In order to develop further understanding about the role of collective social capital of local inhabitants in adaptation to flooding, it is necessary to capture the two phenomena in Kemijen as accurate as possible. This way of researching will produce descriptive knowledge (Verschuren & Doorewaard, 2007). In addition, insight into how collective social capital is constructed and what its role is in the community dealing with flooding produces explanatory knowledge. Overall the research has a strong explanatory approach, explaining adaptations arising because of the condition of annual flooding. Therefore the central research question is explanatory:

*Central question:*
*How does the collective social capital of the inhabitants of Kemijen, Semarang help them adapt to flooding?*

*Sub question 1:*
*What different adaptation strategies to flooding do the inhabitants of Kemijen, Semarang employ?*

*Sub question 2:*
*How can the different aspects of the collective social capital of the inhabitants of Kemijen, Semarang be described?*

*Sub question 3:*
*In what ways can the different aspects of the collective social capital of the inhabitants of Kemijen, Semarang be applied in collective adaptation strategies to flooding?*

The research objective contains two main concepts: collective social capital and adaptation strategies to flooding. Because we are looking at the role of one concept in the other, we are, in essence, looking at one dependent and one independent variable. Despite the fact that it is possible that the need to adapt to environmental problems can influence the role and applicability of social capital, it is not what is being examined in this research. This means that we are only looking at one part of the feedback loop between collective social capital and adaptation strategies to flooding. In this research we are only

looking at one direction of influencing, because the given time period would not be enough to examine two such complex processes. Therefore the choice was made to use a set of community level practices as starting point, referring to different aspects of the collective social capital of a neighbourhood. The independent variable, collective social capital, is expected to influence the dependent variable, adaptation strategies.

Flooding is an independent factor and represents the context of the problem. Therefore the first sub question is about adaptation to flooding, because in answering this question, the context will have to be examined. In addition, the dependent variable of adaptation strategies has to be captured accurately in order to be able to identify where the possible influence becomes manifest. The second sub question is about the independent variable of collective social capital. Again, a descriptive question is needed to get a clear sight on the different aspects of the variable. This is needed to be able to identify the influence of the different aspects of collective social capital. In conclusion, the third sub question is explanatory; in order interrelate the collective social capital of the local inhabitants and their adaptation to flooding.

### 1.4 Academic & societal relevance

The academic relevance of this theoretical research consists of developing further understanding of institutional resilience of collective forms of social capital to be able to integrate the value of collective social capital as a form of societal response in governance issues. Do institutions such as working together in cleaning the neighbourhood change as the intensity of annual floods rises? Can these different practices such as 'gotong royong' be seen as a contribution to the adaptation strategies of the inhabitants? As mentioned before, different studies acknowledge a role of social capital in dealing with environmental problems. It can be of great importance to examine how such a role, which is in the hands of the inhabitants, can be of influence. There are other factors, such as economical and political factors, which are more confining than dependent of the inhabitants. How can this social factor be seen influencing the effects of a natural disaster: flooding? Can it be used to mitigate the effects? At last, flooding is a present-day environmental problem on a global level that can never be examined enough until all the severe consequences are completely dealt with.

The societal relevance consists of the possible use of the outcomes for policymaking and adaptations to flooding made by the government. It might also be used as an example for other governments in South East Asia as regards to community responses to flooding. In addition the possible use of outcomes can not only be applied to adaptations by the government, but also by other organizations and institutions. The outcomes of the role of collective social capital can be applied to and by a community to improve the ways of adaptation to the floods in order to reduce the consequences.

The focus of this research is limited to the collective forms of social capital, because it is important to understand the construction of social capital at the local level, in order to understand the role it plays in adaptation to flooding at that same level. In addition, the focus is on one neighbourhood in Semarang in order to improve the depth of the research. These focuses also contribute to the feasibility of the research.

### 1.5 Research model

On the basis of the research objective and research questions, the research model can be developed (see figure 2). This model can be used to set out the different steps of the research. However, research is an iterative process, which means going back and forth between the different steps. Therefore the model is only guiding for the research process.

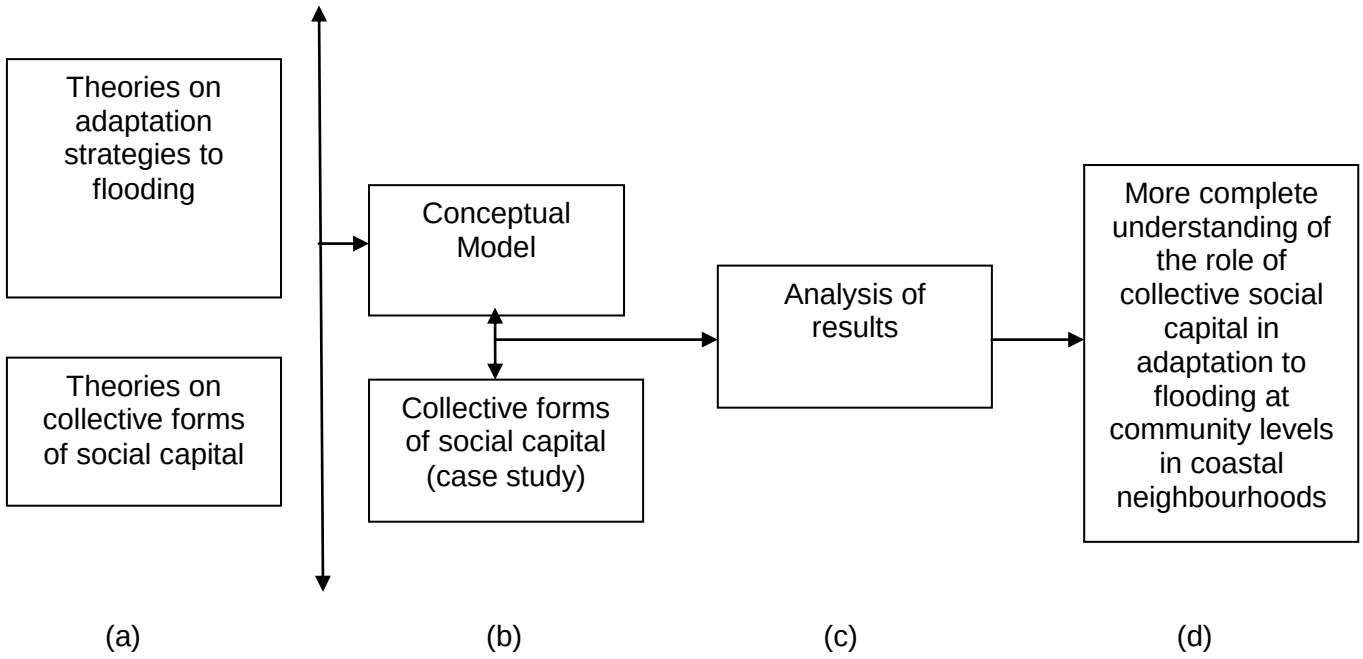


**Figure 2: Research model**

(a) Study of literature on adaptation strategies to flooding and on collective social capital, leads to a conceptual model (b) with which the collective forms of social capital and the ways these can be applied to adapt to environmental problems at a community level, can be examined. (c) Analysis of the results leads to a more complete understanding of the role of collective forms of social capital in adaptation to flooding at community levels in coastal neighbourhoods.

By means of literature study of the adaptation strategies and the collective social capital, a conceptual model is developed about the role of collective social capital in adaptation strategies to flooding. It is required to look at the different kinds of adaptation strategies to flooding and the different conceptualizations and aspects of collective social capital.

Next the research object, the collective forms of social capital, is examined. This was done in Kemijen, a neighbourhood of Semarang (for more information, see Chapter 3), by applying the conceptual model in interviewing and observing the units of observation: the local inhabitants of Kemijen. Here there was looked at the different adaptation strategies to flooding by the inhabitants, using the three adaptation strategies defined by Dewi (2007). These concern economic, technological/structural and social / organisational adaptation strategies. All three of the adaptation strategies are applicable to activities before the flooding, during the flooding and after the flooding (Dewi, 2007) (for further

discussion, see Chapter 2). In addition the inhabitants were interviewed about their adaptation to flooding.

The different aspects of the collective social capital of the inhabitants of Kemijen were examined through observation and research of the relations and networks on different levels in the neighbourhood. Also the inhabitants were interviewed about their relations and other aspects of collective social capital. For further elaboration, see Chapter 2: Theory in which the theoretical background of the concept is explained.

In the analysis of the results the application of the different forms of collective social capital of the inhabitants to their adaptation to the flooding are identified. Conclusions are drawn from this analysis and used to contribute to further understanding of the role of collective forms of social capital in adaptation to flooding at a community level.

### 1.6 Structure of this thesis

Having set out the theoretical framework, the research objective, the research question, the academic and societal relevance and the research model in this chapter, the remainder of this thesis is organized as follows: Chapter 2 represents the theoretical background of the research. Thereby it discusses theory on adaptation strategies and collective social capital. Chapter 3 is based upon this and discusses the methodological characteristics of the research, such as the research strategy and methods, the operationalization and the collection and analysis of the data. Subsequently the collected data is explicated. For this we start in chapter 4 with general information on Semarang, a basic description of the neighbourhood Kemijen and general findings and experiences of the fieldwork. This provides a background of the neighbourhood required for further analysis and the drawing of conclusions. Two different thematic approaches to adaptation strategies that came forward during the empirical research are then discussed. On one hand respondents answered from a frame of ‘individuality’ when talking about adaptation strategies and on the other hand this later on shifted to a frame of ‘collectivity’. In chapter 5 the approach of ‘every man for himself’ is set out. In contrast to this the approach of ‘working together in different ways’ is explained in chapter 7. In between these chapters, chapter 6 contains an interlude that positions the two chapters relative to each other. During these last chapters the outcomes of the adaptation strategies and the aspects of collective social capital are addressed. Finally, chapter 8 provides the key conclusions of the research in which the relation between theory and empiricism is central. In addition this chapter will provide recommendations that target further research and possible adaptations by different actors and a reflection on the research.

# 2. Theory

## 2.1 Introduction

For an interpretivist 'the real' is only cognizable through interpretation (Leroy, Horlings & Arts, 2009). The overall research philosophy of this thesis is 'interpretivism'. The interpretivist philosophy emphasises the difference between conducting research among people and conducting research of objects (Saunders, Lewiss & Thornhill, 2008). "It is necessary to understand differences between humans in our role as social actors" (Saunders, Lewiss & Thornhill, 2008, p. 116). Therefore it is crucial to enter the social world of the research subjects and understand their world from their point of view (Saunders, Lewiss & Thornhill, 2008). For this research it is important to understand the perceptions of the inhabitants of Kemijen, for example of risks, participation, important relations and values. Therefore it is important to not only look at objective practices such as building a dam against the water, but to link it to cultural practices such as 'gotong royong'. The stories of the inhabitants have to be interpreted in order to determine their aspects of collective social capital and the ways these are applied to adaptation to flooding. The following chapter explains different theories, approaches and concepts that are relevant for the research of the collective social capital of local inhabitants and its role in adaptation to flooding. It contains the theoretical background of adaptation strategies and collective social capital and the conceptual model.

## 2.2 Adaptation strategies

The livelihoods of the inhabitants of Semarang are influenced severely by the flooding. The people do all they can to protect their means of living. That does not mean that they try to averse all risks, but it could also mean that they choose to take a risk and recover from it afterwards. There are differential responses to flooding, including community responses and different types of responses. The protection of means of living can be referred to as social security: "all ways in which individual people, households, and communities protect their livelihood and are protected socially against the shocks and stress that threaten its continuity and stability" (Nooteboom, 2003, p. 33). The word use of 'all ways' emphasizes the fact that it is not only about financial security, but also about benefits in kind and other basic need areas such as education and food security (Van Ginneken, 1999). In relation to Semarang these 'benefits in kind' can be in the form of educating inhabitants about the flooding or the protection or recovering from diseases caused by the water. In addition it could mean that food security changes as a consequence of a flood. In accordance with the earlier mentioned differential responses, social security has different levels. The threat of floods has a collective character for example, whereas someone feeing unwell would be a more individual problem. A flood is a natural threat, whereas an individual being sick could be a consequence of their way of living or their poor immune system. This raises the question of which problem is whose responsibility. Who has to provide social security for a community being at risk from the consequences of flooding? And who has to provide social security when you get sick? Is it the state or is it the citizen himself?

In 1948, social security was recognized as a human right in the Universal Declaration of Human Rights. The right to social security was given legal substance and further developed as a concept by the International Labour Organisation. Social Security Minimum Standards were developed as guiding principles for governments to provide the human right of social security (Dijkhoff, 2012). Despite the recognition as a human right, government's adequate protection of the livelihoods of their inhabitants is not a given, especially not in developing countries. Therefore people need to create their own ways to provide social security, which corresponds with the definition using 'all ways'. This is also the case for the inhabitants of Kemijen, Semarang. As mentioned before, many of them have no other choice than to live in the flood-prone area (Texier, 2008). The local policy in Semarang is not sufficient to provide social security for all of the inhabitants and they have developed their own ways of protection in the form of adaptation strategies (Harwatisari, 2009). For this research, we are specifically looking at the adaptation strategies to flooding.

In order to examine the application of collective social capital to adaptation to flooding, a detailed analysis of the different strategies is necessary. Therefore a distinction between different adaptation strategies is made. For this research the three categories seen in Dewi's (2007) analysis of coping with urban flooding in Semarang, are used. Following Twigg (2004), she identifies three coping mechanisms. (1) Economic, (2) technological / structural and (3) social / organizational coping mechanisms (also see appendix 1 for an overview). Dewi (2007) points out that all three coping categories contain mechanisms that are applicable to coping activities before the flooding, during the flooding and after the flooding. This research further emphasizes the fact that response to flooding is an ongoing process that is integrated into the daily life of the inhabitants. Dewi (2007) defines 'a coping mechanism' as "the application of indigenous knowledge in the face of hazards and other threats" (p.3). Jha et al. (2003) define 'coping capacity' as "the manner in which people and organizations use existing resources to achieve various beneficial ends during unusual, abnormal, and adverse conditions of a disaster phenomenon or process" (p. 362). In both cases, 'coping' is more defined as to be during a certain stage of an environmental hazard. The term 'adaptation' seems to represent more of a process. 'Adaptation to climate change' is defined by Harwatisari (2009) as "a process when a system, individuals and communities seek to reduce the vulnerability or enhance resilience in response to observed and expected changes due to climate change" (p. 1). Marfai & Hizbaron (2011) explain 'adaptive capacity' as "the ability of a community to adapt and or improve their current state towards particular threats" (p. 209). Harwatisari (2009) literally talks about a process and 'the adaptation or improving of a current state' of Marfai & Hizbaron (2011) represents a situation that keeps on changing. Since this research emphasizes the fact that response to flooding is an ongoing process, the term 'adaptation' is more suitable here. Therefore from now on the term of adaptation strategies will be used instead of coping mechanisms. This switch of terms has no further consequences for Dewi's (2007) three categories, since these already contained strategies that could take place before, during and after the flooding. For this research these stages are seen as one ongoing process.

At first the economic adaptation strategies: "the definition of economic coping mechanism in the study area refers to the economic activities and diversification, including those strategies of the community linked to material goods and resources" (Dewi, 2007, p.

46). Examples of economic adaptation strategies are purchasing cheap food in advance, saving money and continue working (Dewi, 2007).

Technological / structural adaptation strategies can be defined by the structural activities employed by households that are living in the flood-prone area to cope with flood losses or damages. For instance, local people construct their houses using reinforced material to deal with the flood magnitude. Materials such as brick, cement, tile or ceramic and combinations of the three are the most common types of coping mechanisms in Semarang (Dewi, 2007, p. 46). A main adaptation strategy is heightening of the house in order to prevent the water from coming in (see figure 3).

**Figure 3: Woman in her heightened home**

Social / organizational adaptation strategies refer to those activities and the social relationships and networks among the community and local government that can help to minimize the flood losses and damage (Dewi, 2007). Examples are preparing a temporary place at a friend's or relative's place, helping other's community member in doing work and guarding the house to ensure the safety of belongings (Dewi, 2007). It is expected that this is the category where collective forms of social capital can best be applied. The relationships and networks mentioned in the definition agree with aspects of collective social capital. We will come to these aspects later.

As mentioned before, existing literature acknowledges a role of social capital in dealing with environmental problems: “in slums where social networks and kinship ties are stronger, communities are more resilient” (Baker, 2012, p. 53). These networks in the community shape different institutional forms (Adger, 2003). Guiding institutional principles influence community behaviour as is the case for a form of social / organizational adaptation strategies: the earlier mentioned ‘gotong royong’ (see appendix 1). This is a concept that is seen in the literature on coping with flooding and land subsidence in Semarang (Dewi, 2007; Harwatisari, 2009) and has become a key element in the Indonesian system of political and cultural power. ‘Gotong royong’ in the context of adaptation strategies can be translated as ‘mutual and reciprocal assistance’ and can be explained using the example of a Javanese village (Bowen, 1986).

“It calls up images of social relations in a traditional, smoothly working, harmonious, self-enclosed village on Java, where labour is accomplished through reciprocal exchange, and villagers are motivated by a general ethos of selflessness and concern for the common good” (Bowen, 1986, p. 546).

Both Dewi (2007) and Harwatisari (2009) mention that the inhabitants use ‘gotong royong’ for working together in cleaning the canals surrounding the house for example. More about guiding principles and how communal support can influence adaptation strategies will be addressed further on in this chapter.

### 2.3 Social capital

Social capital is a concept that is not simply defined, because it is easily influenced by subjectivity and therefore highly dependent of one’s perception. In order to come to a working definition of relevance to this research, different distinctions and conceptualizations of social capital will be described. Starting with a general definition of social capital, Robert Putnam (2000) describes the concept as “connections among individuals, social networks and the norms of reciprocity and trustworthiness that arise from them” (p. 19). Representing these connections, ‘relationships’ will be used as an aspect of social capital next to ‘social networks’ and the ‘norms of reciprocity and trustworthiness’. In his book ‘Bowling alone; the collapse and revival of American community’ (2000) Putnam claims that generalized reciprocity is the ‘touchstone’ of social capital: “I’ll do this for you now, without expecting anything immediately in return and perhaps without even knowing you, confident that down the road you or someone else will return the favour” (Putnam, 2000, p. 134). As the title points out, Putnam’s ideas are based on American society. In America, the role of the state is not as big as in the Netherlands for example. The Netherlands is a welfare state that has the primary responsibility for the well-being of the citizens; this means that a lot is regulated by the government in order to make sure that every person has access to equal living conditions. America, however, has more a philosophy of little interference of the state, because people are responsible for their own living conditions. People can help each other, but the state should interfere as least as possible. This little interference of the state will lead citizens to take their own measures (Hoogerwerf & Herweijer, 2008).

This more absent role of the state was also discussed in the section on social security. This pointed out that inadequacy of the state to provide social security leads to people trying to take care of their livelihoods and living conditions themselves. As the local

government in Kemijen, Semarang does not provide enough measures against flooding, the inhabitants have taken up their own adaptation strategies to manage their vulnerability. Since Putnam's generalized reciprocity is based on a society where the role of the state is small (2000) and in the case of Semarang, the role of the local government is not sufficient (Harwatisari, 2009) (Dewi, 2007), one could argue that there is a possibility that Putnam's ideas could be applied to the community of Kemijen. There is the similarity of the reticence of the state leading citizen to take their own measures (Hoogerwerf & Herweijer, 2008) and the reticence of the local government in Kemijen leading the inhabitants to take up their own adaptation strategies to manage their vulnerability (Harwatisari, 2009) (Dewi, 2007).

Generalized reciprocity or social capital can be seen on two different levels. A distinction can be made between the individual and the community level. Both individual and collective actions are fostered by social capital. Investing in social relationships can result in tangible private returns. For instance, using your social network one can find a job in return for the promise of returning the favour in the future (Minnaar, 2010). Some elements of the social capital can be traded, invested in, and inherited. This is an attribute of the individual, but cannot be evaluated without knowledge of the society in which the individual operates (Adger, 2003). Next to these individual acts of social capital, the community is collectively affected by social networks and civic participation. For example, poor neighbourhoods that are homogeneous and long-standing with dense social networks suffer less from crime than those who are not homogeneous and have a low density of social networks (Minnaar, 2010). This is an example of how communal interest; less crime, is influenced by collective social capital; strong social networks. Strong social networks, high levels of trust and membership in community organizations and the presence of safety nets generate positive outcomes (Godoy et al., 2007). This could mean that strong networks in Kemijen can generate positive outcomes for the community support of adaptation strategies. "Public social capital resides collectively in the networks of individuals and communities. These sets of collectively held networks shape different institutional forms" (Adger, 2003, p. 4). These different institutional forms can influence general norms and ideas, referring to Putnam's (2000) norms of reciprocity and trustworthiness. General norms can influence the norms of the members of a network in a way that they all agree on what is important for the community and what they need to do to take care of it. Their communal interest, adaptation to flooding, is influenced by norms in their community. Therefore in this research there will be a focus on the collective forms of social capital, so on the whole community of Kemijen and their collective behaviour.

In Indonesia neighbours are very important, especially in the rural context, which creates strong community support in a neighbourhood or village (Keasberry, 2002). Therefore communal interest can rely on community support through strong social networks and norms of reciprocity and trustworthiness. This accounts for less in an urban context, because of the anonymity in big cities. The different levels in a Javanese village emphasize the importance of mutual help between neighbours. A village is divided into hamlets ('dusun'), which are again divided into neighbourhoods ('rukun warga'). A neighbourhood is divided into groups of approximately ten households each ('rukun tetangga'). 'Rukun tetangga' literally means the bond of households. The direct neighbours rely on each other for support and are therefore more important than distant kin (Keasberry, 2002). "In times of need, such as sickness or death, the whole

neighbourhood comes to help and provides assistance as required" (Keasberry, 2002, p. 33). The identification of these networks in a neighbourhood in Semarang is relevant for examining the collective social capital. Examining the application of collective social capital in the urban context will be harder, because the big cities are more densely populated. This would lead to a too large network of neighbours to maintain. In the anonymity of the big cities, knowing your neighbours is not a given. It might be possible to apply collective social capital to smaller units, such as a street, or one level of a flat.

Looking at how the collective forms of social capital can be applied in a neighbourhood will contribute to the understanding of what their role is in adaptation strategies to flooding. The Indonesian norms on mutual assistance, either in the form of 'gotong royong', or within the bond of households, are an important aspect of collective social capital. Another task in which the inhabitants of the neighbourhood work together is 'ronda'. "Ronda consists of patrolling alternatively in rounds to guard (a part of) the village at night" (Keasberry, 2002, p. 260). 'Ronda' can be seen as a part of 'gotong royong'; the inhabitants work together to protect their neighbourhood. 'Ronda' was set up in the time that villages were suffering from attacks by stealing gangs (Keasberry, 2002).

In her research on 'Elder-care, old-age security and social change in Rural Yogyakarta, Indonesia', Keasberry (2002) mentions 'dasa wisma' in addition to 'ronda' and 'gotong royong'. 'Dasa wisma' is a task practiced only by women and refers to an activity to inform the women within the neighbourhood. The group of women is either mobilized by the wife of the village head, the wife of the hamlet head or the wives of the neighbourhood heads (Keasberry, 2002, p. 261). The group gives information and organizes activities. 'Dasa wisma' can also be seen as a type of 'gotong royong'.

Another social practice concerns the well-being of children. 'Posyandu' (see figure 4) was developed to reduce infant/ child mortality and birth rates. It includes several activities such as "family planning, nutrition, immunization, diarrhoeal disease control and other local problem solving efforts" (Leimena, 1989, p. 266). 'Posyandu' is lead by a group of local (mostly) women.


**Figure 4: Office of Posyandu in Kemijen**

Two other dimensions that are recognized in literature on social capital are informal and formal social capital. Informal social capital consists of the networks of social relationships with family, friends, neighbours and colleagues, whereas formal capital refers to participation in formal organizations (Minnaar, 2010). According to Putnam (2000), those who participate actively in formal organizations, make things happen in society. Informal collective social capital thus is represented by the networks of family, friends, neighbours and colleagues in a community, whereas the formal collective social capital refers to the participation of the community in formal organisations that serve the communal interest. As stated before, Putnam's ideas are based on American society, where the state plays a small role. If this is also the case for Kemijen, it would seem that the informal collective capital will be more present than formal collective capital. This is because shortcoming of the local government leads to networks of neighbours organizing themselves. For this research it can be of importance to look at both the informal and the formal collective social capital, since these can play different roles in adaptation to environmental problems.

In addition to dimensions, there are also different approaches to the role of social capital. Woolcock and Narayan (2000) identify four different views that have emerged in the literature on social capital. The 'Communitarian View' equates social capital with local level organisations, namely associations, clubs and civic groups. The view implies that the presence of social capital always has a positive effect on a community's welfare. The second perspective is the 'Networks View' and "stresses the importance of vertical as well as horizontal associations between people, and relations within and among other organizational entities" (Woolcock & Narayan, 2000, p. 7). The 'Institutional View' puts the emphasis on social capital as a dependent variable. The vitality of community networks and civil society is largely the product of the political, legal, and institutional environment. At last, the 'Synergy View' integrates the work emerging from the institutional and the network literature and looks at the synergy between government and citizen action (Woolcock & Narayan, 2000).

Since this research focuses on the collective social capital of the local inhabitants of Semarang, the perspective that is the most suitable is the Networks View. The Networks view emphasizes that intra-community ties are needed to give families and communities a sense of identity and common purpose (Woolcock & Narayan, 2000). Another designation for these ties is 'bonding capital' (Putnam, 2000). The sense of identity and common purpose correspond with the earlier mentioned norms, institutional principles and communal interest. Thence it seems that bonding capital can play a big role in adaptation strategies being able to rely on community support. The Networks view also stresses that inter-community ties are needed, these cross various social divides, for example those based on religion, class, ethnicity, gender and socio-economic status (Woolcock & Narayan, 2000). These ties are also called 'bridging capital' (Putnam, 2000). "Different combinations of these dimensions, it is argued, are responsible for the range of outcomes that can be attributed to social capital" (Woolcock & Narayan, p. 7). Looking at bridging capital in Semarang can be relevant to identify other influences of collective social capital than community support based on a sense of common identity.

After dimensions and perspectives, a distinction can be made between three different forms of social capital. Hereby we follow James S. Coleman (1988) and his famous article 'Social Capital in the Creation of Human Capital'. He starts with the 'obligations, expectations and trustworthiness of structures', which are needed for the working of tight social relationships in a community (Minnaar, 2010). Coleman describes this way of investing in relationships in a simple manner:

"If A does something for B and trusts B to reciprocate in the future, this establishes an expectation in A and an obligation on the part of B. This obligation can be conceived as a credit slip held by A for performance by B. If A holds a large number of these credit slips, for a number of persons with whom A has relations, then the analogy to financial capital is direct. These credit slips constitute a large body of credit that A can call in if necessary- unless, of course, the placement of trust has been unwise, and these are bad debts that will not be repaid" (Coleman, 1988, p. 102).

This form of social capital corresponds with Putnam's earlier mentioned generalized reciprocity (Putnam, 2000).

The second form of social capital is 'information channels'. To obtain information is costly, social relations that are maintained for other purposes can be used to acquire information (Coleman, 1988). To keep one's knowledge up to date, close ties with people who can provide the necessary information are of great importance (Minnaar, 2010).

'Norms and effective sanctions' are the third form of social capital identified by Coleman (1988). This refers to a set of norms that is needed in order to create a situation in which an individual or group is able to act in daily life. In addition, effective sanctions are needed (Minnaar, 2010). For example, effective norms and sanctions on crime make it possible to walk freely at night outside in a city. However those same norms and sanctions can constrain other peoples' behaviour. A community with strong and effective norms about young persons' behaviour can prevent them from having a good time (Coleman, 1988). An important form of capital is formed by the norm that a person should act in the interests of the collectivity. This kind of norm can be reinforced by social support, status, honour and other rewards (Coleman, 1988). These norms and sanctions match with Putnam's norms of reciprocity and trustworthiness and the concept of bonding capital. When a community in Semarang has strong and effective norms about participating in a neighbourhood patrol, it will not go unnoticed if one community member does not participate. Since neighbours are very important in Indonesia, this kind of behaviour can be seen as a violation of honour and status. Possible sanctions could be exclusion or a reprimand. This way the norms and institutional principles in a neighbourhood take care of the community support needed to serve the communal interest.

The form of generalized reciprocity can contribute to understanding the relationships between the inhabitants of Kemijen. The examination of the information channels can also expose other relationships. Finally, gaining an understanding of the norms and effective sanctions of the neighbourhood, can give us a valuable insight into why people act the way they do in the situation of adaptation to flooding.

In this chapter, the importance of strong networks, norms and communal interest was emphasized. When government policy which provides social security is inadequate, people have to protect their livelihoods themselves. This protection is influenced by institutions and norms of social networks. Examining these aspects in Kemijen, can give insights into how community support is constructed there. What kind of bonding capital can there be found, do the inhabitants share norms of mutual assistance? In addition, it is needed to look at how the community responds to a structural impact: flooding. How is this influenced by community support? It is important to look at how Coleman's norms and sanctions can be applied to the community adapting to this environmental problem. The different forms of 'gotong royong' in Kemijen have to be identified in order to relate them to the different adaptation strategies. For each adaptation category, there has to be an examination where norms of mutual assistance can be applied. The category of social/ organizational adaptation strategies is mostly based on these norms and therefore is expected to be very important for understanding the role of collective social capital in adaptation to environmental problems.

### 2.4 Conceptual model and operationalization

The theoretical background of the former paragraphs is shown in the conceptual model in figure 5. The two most important concepts as identified in chapter 1 are the collective social capital of the inhabitants of Kemijen and their adaptation strategies to flooding. The research question asks about the role of the one in the other, and thus there is a one-headed arrow representing the influence of collective social capital on adaptation strategies. It was also made clear that the flooding forms an independent factor, influencing the adaptation strategies of the inhabitants.

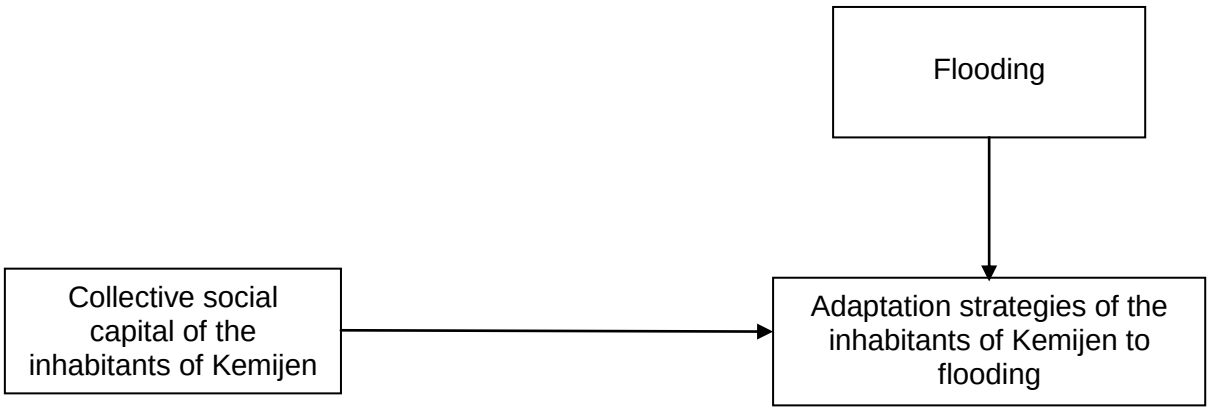


**Figure 5: Conceptual model**

The elements of the theoretical background have to be operationalized for the purpose of the empirical research. The two main concepts contain different dimensions. In paragraph 2.1 three different adaptation strategies to flooding and land subsidence were identified. These form the dimensions for the concept of adaptation to flooding (see figure 6).

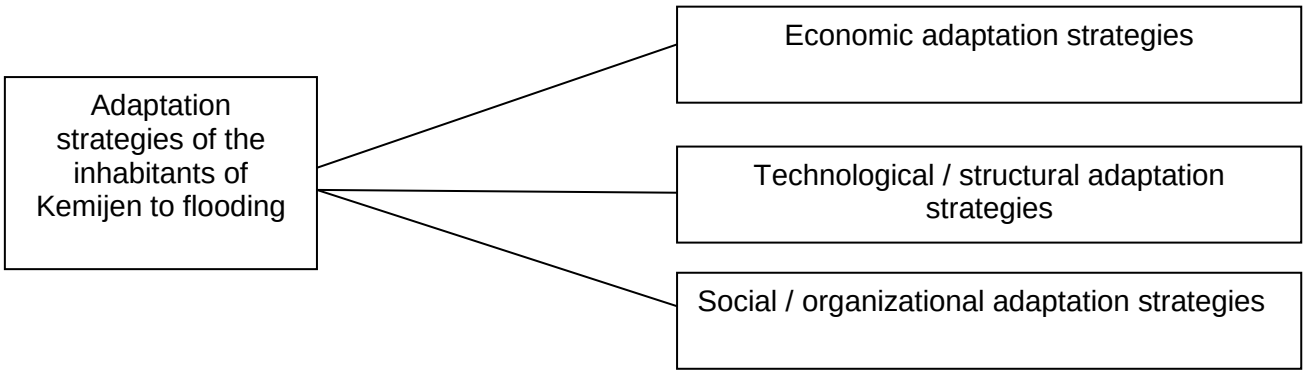


**Figure 6: Dimensions of adaptation strategies to flooding**

In addition to dimensions, indicators are needed to identify the different strategies within a category. In paragraph 2.1, a few examples of categories were given following Dewi's analysis of coping with urban flooding in Semarang (2007). For the operationalization, we also follow Dewi's example, by using her distinctions between different coping mechanisms (also see appendix 1) as indicators (see figure 7, 8,9).

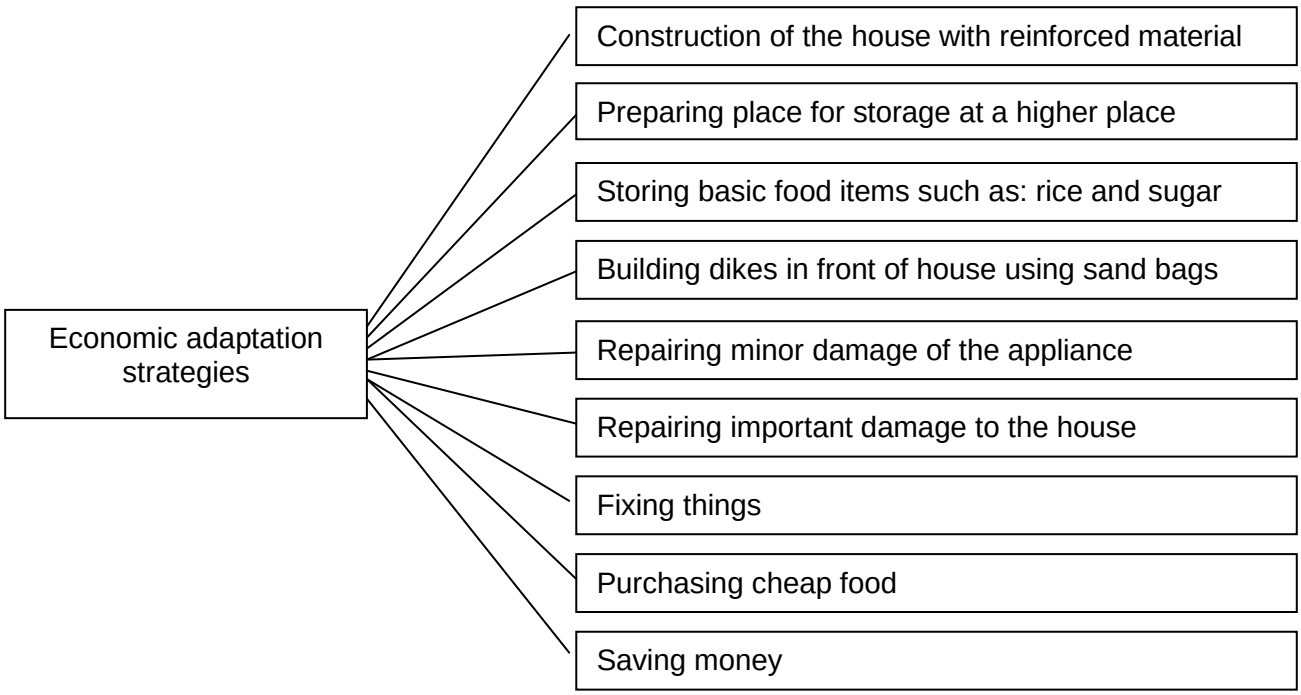


**Figure 7: Indicators of economic adaptation strategies**

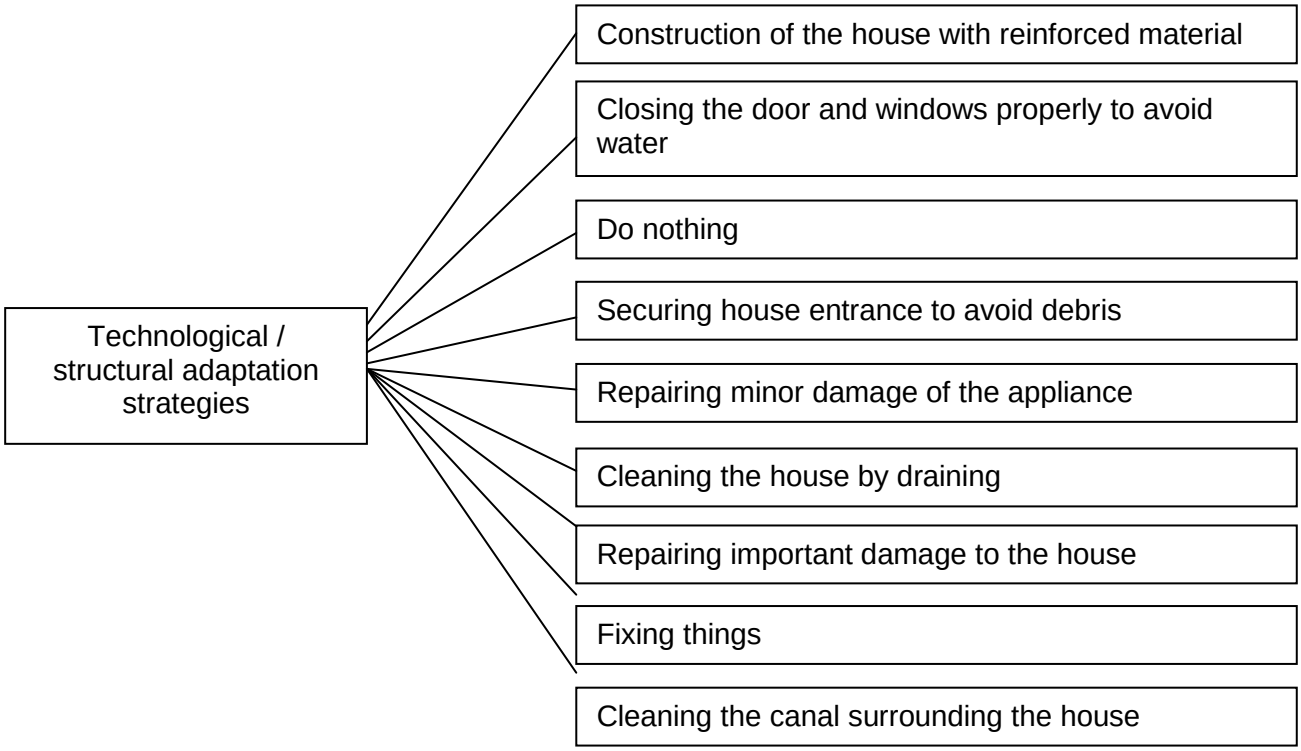


**Figure 8: Indicators of technological/ structural adaptation strategies**

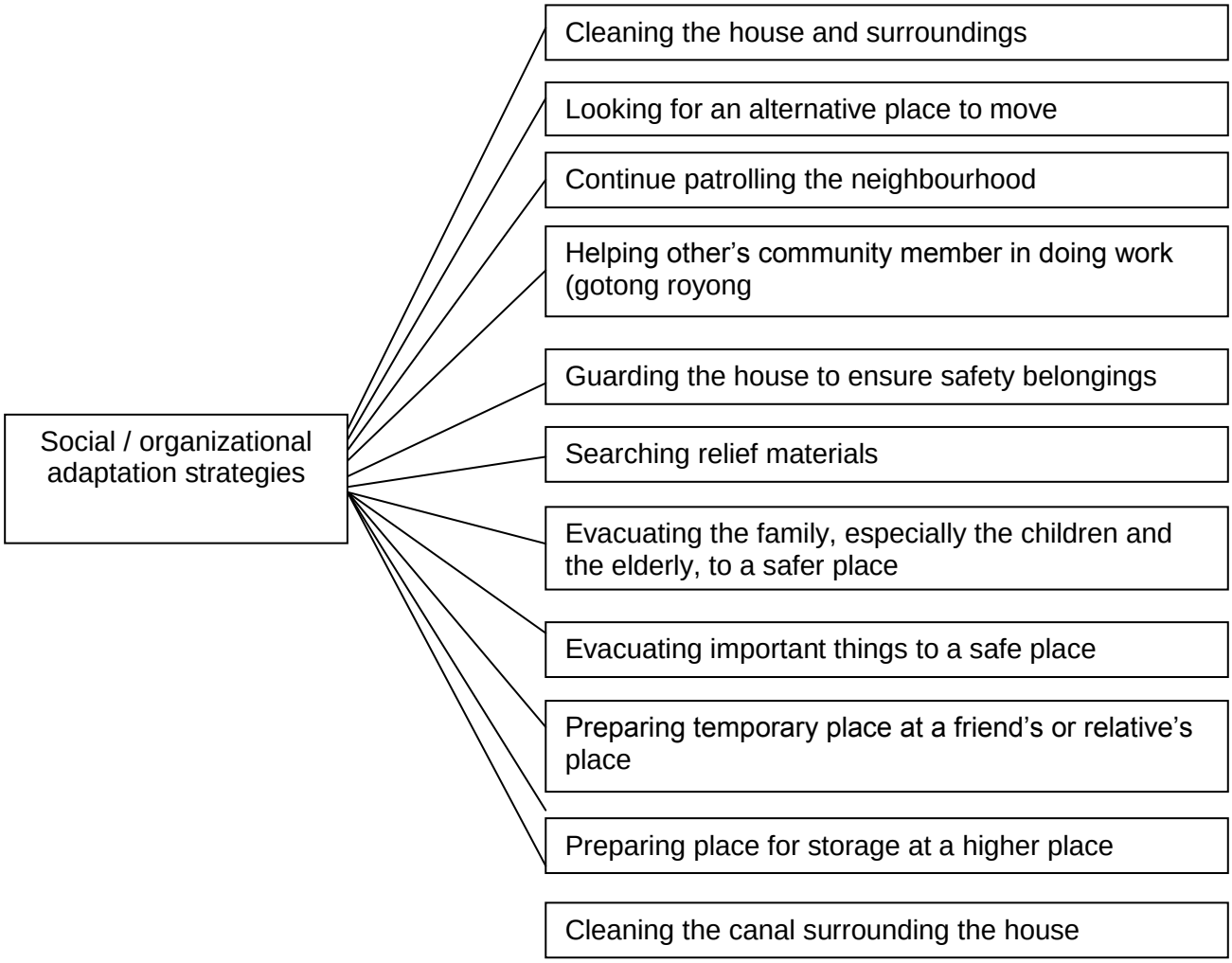


**Figure 9: Indicators for social / organizational adaptation strategies**

For the second main concept, collective social capital, different theories were examined. The different conceptualizations are integrated in the operationalization of collective social capital (see figure 10). To keep it orderly, however, the dimensions are divided into 'potential of collective social capital' and 'action of collective social capital'.

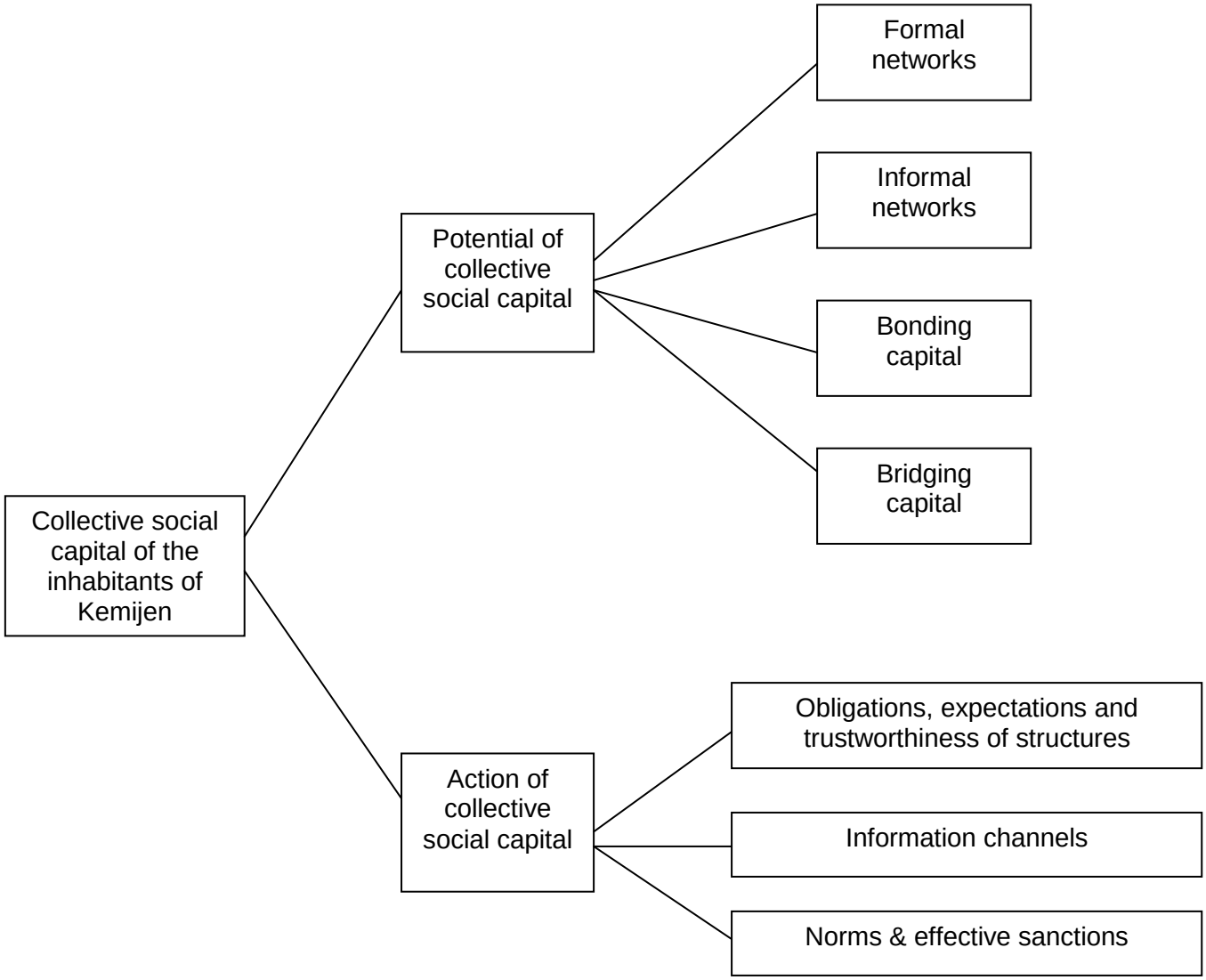


**Figure 10: Dimensions of collective social capital**

In order to examine the different dimensions of collective social capital, indicators are needed (see figure 11). We will start with the dimensions belonging to potential of collective social capital. Formal networks refer to the participation in formal organizations. Since we are looking at the collective social capital, it is important to look at whether there are formal organizations which serve the communal interest. Informal networks represent networks of family, friends, neighbours or colleagues in a neighbourhood. In the section on bonding capital (inter-community ties) the importance of a sense of identity and common purpose between family and community members was emphasized. Finally, bridging capital (intra-community ties) crosses various social divides such as those based religion, class, ethnicity, gender, and socio economics.

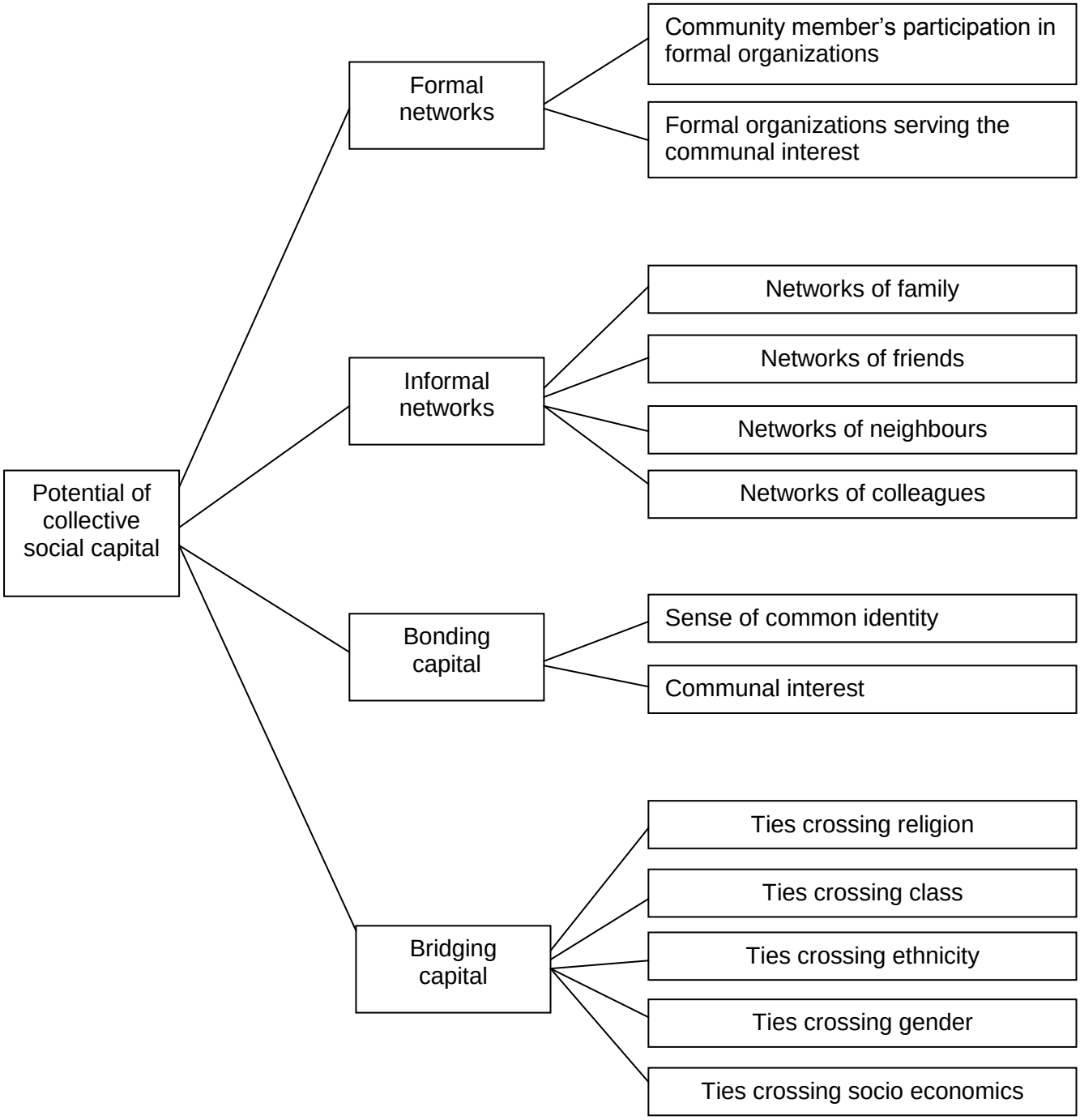


**Figure 11: Indicators for dimensions belonging to potential of collective social capital**

The dimensions belonging to action of collective social capital also require indicators (see figure 12). Coleman's (1980) identification of obligations, expectations and trustworthiness of structures corresponds with Putnam's (2000) generalized reciprocity. On the one hand it is about acting in your own interest by investing in relationships. So doing something for someone and expecting something back. On the other hand it is about obligations and expectations that are imposed by norms, such as mutual assistance or 'gotong royong'. For information channels, in order to keep one's knowledge up to date, it is useful to keep close ties to people who can provide necessary information. In addition, information can be obtained via social relations that are originally kept for other purposes. Finally, the norms and effective sanctions are very important. Institutions can impose norms and sanctions in order to control processes in a community. In addition, subjective norms where the community members agree upon can also form guiding principles for people's behaviour.

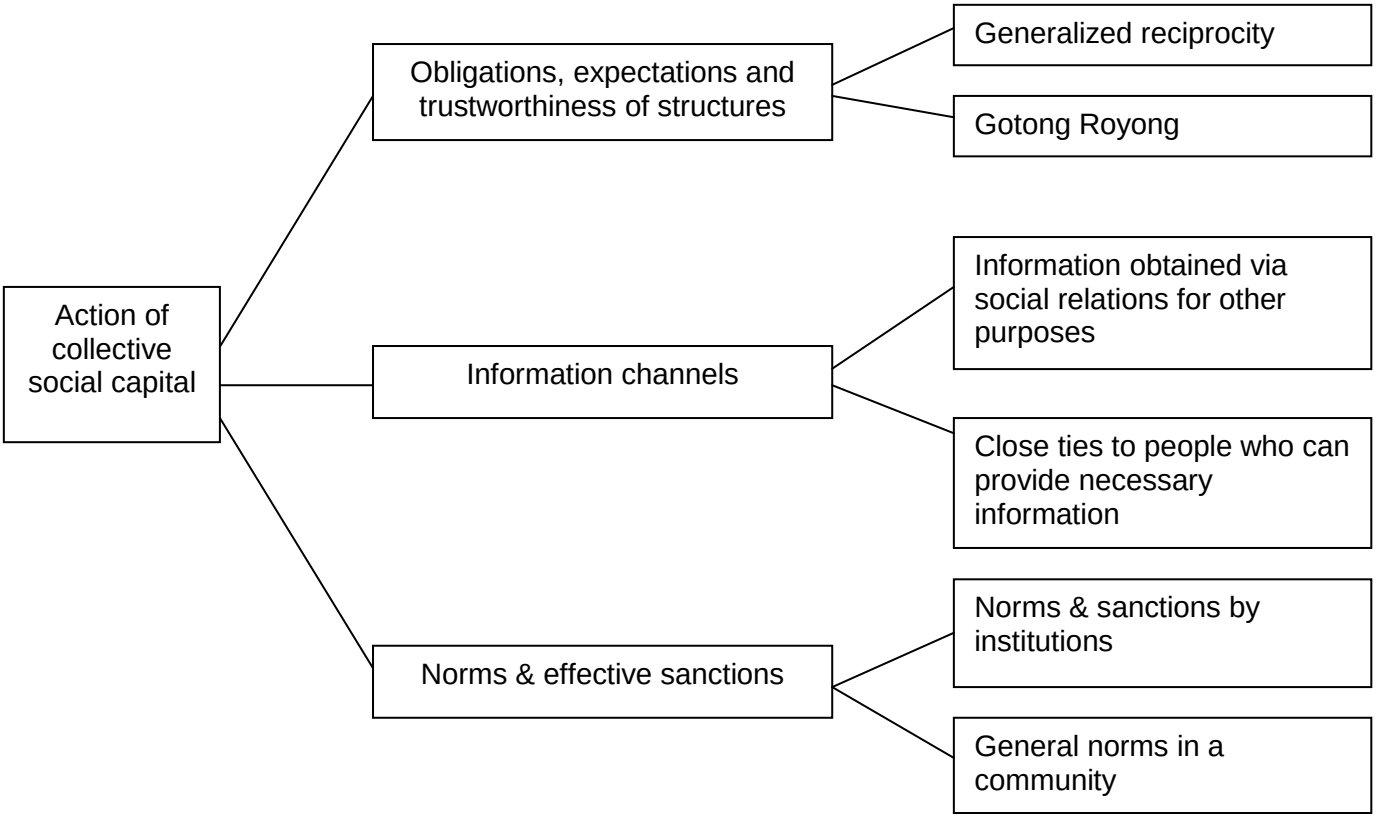


**Figure 12: Indicators for dimensions belonging to action of collective social capital**

# 3. Methodology

## 3.1 Introduction

*"When the flooding or rob comes everyone focuses only on their own home"*, we were told by a respondent. Later we found out that they clean the environment together after a flood in the neighbourhood. This was interesting research material we found when examining the influence of such an aspect of collective social capital as 'gotong royong' in adaptation strategies. What is the explanation for this dichotomy? And what answers to the research question does it provide? This chapter explains how the relevant research material was obtained and how it was analyzed in order to answer the research questions (Verschuren & Doorewaard, 2007). The obtaining of the research material was done in cooperation with Stefan Ramaker & Huub van der Zwaluw. In succession this chapter contains the characteristics of the research strategy, the research methods, the collection and analysis of the data.

## 3.1 Research strategy

In order to be able to make statements about the influence of collective social capital in the adaptation strategies of the inhabitants in Kemijen, in-depth research is needed. With the help of thorough examination, the different stories and perceptions of the inhabitants can be interpretated with the help of stronger arguments. Collective social capital is highly dependent on one's perception and therefore it is a complex concept to examine. The research strategy is to obtain depth, detailing, complexity and a strong argumentation with a minimum of insecurity (Verschuren & Doorewaard, 2007). In order to accomplish that, the scale of the research is small: a neighbourhood in Semarang (Kemijen).
In addition, the research is qualitative. As mentioned in the chapter about theory, the overall research philosophy is 'interpretivism'. This means that it is crucial to understand the world of the research object from their point of view (Saunders, Lewiss & Thornhill, 2008). This point of view can best be obtained through a more qualitative approach (Verschuren & Doorewaard, 2007). For this research use is made of primary empirical data collected trough in-depth interviews, because the information needed about collective social capital and the changing institutions such as 'gotong royong' has not been collected yet. Primary empirical data is needed to emphasize the inhabitants' perception on these concepts. Collective social capital hasn't been well addressed in foregoing research and therefore primary collection of data is necessary.

It is of great importance to collect the data among the inhabitants of Kemijen for being able to make statements about the phenomena in Kemijen. This empirical research consists of a case study. Using a case study, a researcher tries to obtain an in-depth and integral insight on one or several space-time constrained objects or processes (Verschuren & Doorewaard, 2007). In this research these processes concern the collective social capital of the local inhabitants and their adaptation to flooding. The thematic case is the theoretic construct of the collective forms of social capital. In order to embed this thematic case locally, a neighbourhood in Semarang: Kemijen and its inhabitants are used as units of observation; this means there is made use of a single case study. It gives coincidence a bigger role, but on the other hand it provides more opportunity for in-depth examination of the complex processes.

Kemijen is an appropriate neighbourhood for this single case study (see figure 13). It is suffering from flooding of the river caused by heavy rain and a rise in sea level. In addition, Kemijen is troubled by land subsidence which fortifies the effects of the flooding. The local government policy is inadequate and doesn't protect the inhabitants from the flooding. Therefore the inhabitants have taken up their own measures. These measures are influenced by the fact that a large part of the neighbourhood is poor and therefore can't move out of the flood-prone area (for more information, see Chapter 4). The inhabitants live in an area that is undergoing flooding and land subsidence and they have taken up their own adaptation strategies. Therefore they are suitable units of observation for this research.


**Figure 13: Kemijen, Semarang**

The research objective is to contribute to understanding of the role of collective forms of social capital in adaptation to flooding at a community level. In this research we focus on Kemijen in Semarang. This means that we are studying the collective forms of the social capital of the inhabitants of Kemijen, their adaptation strategies to flooding and the interrelation between the two. These are three units of analysis that are each covered by one of the sub questions given in chapter 1 and operationalized in chapter 2. Analysis of the collective social capital of the inhabitants and the ways in which it can be applied will play a big role in determining the possible influence it has. Analysis of the different adaptation strategies is needed to find out where this influence becomes manifest. At last analysis of the interrelation between the two is important for identifying the role of the collective social capital of the inhabitants in their adaptation strategies to flooding.

### 3.2 Research methods

For determining the research methods, thinking needs to be translated into perceiving and theory needs to be translated into empiricism (Verschuren & Doorewaard, 2007). The main sources of information are the inhabitants of Kemijen. To obtain the depth and detailing mentioned as research strategy in paragraph 1, in-depth interviews were made use of. This qualitative method allowed emphasis to be put on the perceptions of the respondents on collective social capital and changing institutions. The interviews were individually, in order to be able to completely concentrate on a respondents' story. There were the exceptions of one pair interview and two interviews where passersby stopped and started complement to the story. We decided not to interrupt passersby or deny pair interviews, because we thought it might be interesting to compare the answers of the different interviews. In addition, we wanted to try to avoid offending anyone. The interviews turned into conversations that sometimes could last for one and a half hour. We were often told that they were happy that we came to listen to their story. This resulted into a relaxed and often informal atmosphere. This method of in-depth interviews is useful to get information on the non-visible adaptation strategies of the inhabitants. In addition it can give more complex information on the aspects of collective social capital of the inhabitants and on the institutions such as 'gotong royong' in the neighbourhood. For the interrelation between the adaptation strategies and the collective social capital, there was a focus on what drives the use of a certain strategy and to the different applications of collective social capital.

In addition to the method of depth interviews, there was made use of observations. By walking around through Kemijen, different adaptation strategies became visible; the main ones being the heightened houses and the small canals surrounding the houses. Pictures were taken for the purpose of detailed documentation of the observations for analysis later on.

At last, there were also a few interviews with experts on their area of expertise. Two of them were scientists and one was the coordinator of the water board for the polder Banger. They mostly told us what they knew that they thought could contribute to our research. We got useful background information from those interviews.

#### 3.2.1 Interview guide

In order to make sure that all the topics required for the analysis were discussed, an interview guide was used for the in-depth interviews. The three researches of my fellow students and me are integrated into one interview guide. The overlap between study of the role of collective social capital in adaptation strategies; the influence of access to knowledge in the way people manage their vulnerable position (Ramaker, 2013); and de influence of social relations in inhabitants' decisions about migration in the context of dealing with flooding (Van Der Zwaluw, 2013);, enables a joint interview guide. Research on the managing of a vulnerable position corresponds with the examination of adaptation strategies. In addition, access to knowledge is in line with the dimension 'information channels' of collective social capital. Thereby study of the influence of social relations corresponds with the examination of the importance of collective social capital. And finally, the decision whether to move or not can be seen as an adaptation strategy. The guide contains both questions based on more researches as questions based on a specific

research. In this paragraph, the questions relevant for the examination of the role of collective social capital in adaptation strategies are explained.

Not many people in the neighbourhood speak English, therefore we made use of a translator: Jeany Winowobo (see figure 14). Jeany has studied English language at Unika University and is now majoring in environmental studies. She was not familiar with the neighbourhood on forehand, which made her an outsider like us. This way the possibility of prepossession was excluded. In addition her academic background connected very well with our research. To make it easier for Jeany, the English interview guide contained simple specific questions, which we had discussed beforehand. Nevertheless, the questions were only guiding principles. We asked questions, Jeany translated them, the respondents answered and then Jeany translated the answers for us and so on.

**Figure 14: Conducting in-depth interview with translator Jeany (right)**

The relevant questions for my research in the interview guide (see appendix 2) are based on the operationalization of paragraph 2.4. We started with asking some general information on age, job and household. During the interviews we decided to also ask which RW (Rukun Warga: hamlet) and RT (Rukun Tettanga: bond of households) they are part of. Following this, questions were asked about the water problems in the area. Because we wanted know how big of a problem the flooding was for them, we did not mention it in our question and used the more general term ‘water problems’. They were asked to describe the water problems their area is coping with in order to grasp their perception. To find out whether they experienced differences between the times of less floods and now, we asked them whether they could remember a time before an increase

of the water problems. If they did, they were asked to describe whatever differences between then and now that came to mind. Then a question followed on what they think is the major cause of the problems. We made clear that there were no wrong answers and that we were interested in their opinion. In order to get some information about the dimension of 'information channels', they were asked how they acquired that knowledge. In conclusion, we wanted information on how they experience a flooding. To help them bring back their memories, we first asked them when they last experienced a flooding. Following this, they were asked to describe what happened and how they experienced it.

Hereafter questions followed about their adaptation strategies. Adjusting to the overall low education level in the area, we talked about 'dealing with the problems' instead of adaptation strategies. First they were asked what they do to protect their home, household and belongings before, during and after the flooding. By using 'home, household and belongings' we hoped to give them some pointers in order to get an extensive description. 'Before, during and after the flooding' was also used to make clear that it was not just about cleaning up or repairing damage after a flood for example. To get more insight into what drives the use of certain adaptation strategies, they were asked in what way that protection helps to protect their home, household and belongings. In order to find out about a possible involvement of 'gotong royong' in their adaptation strategies, we asked them whether they worked together with other people from their neighbourhood in that protection. Following this, we wanted to know how big of a part of their daily lives adaptation strategies are. For this purpose, we asked them whether they were doing anything at that moment to prepare for the next flooding. In addition, keeping the dimension of 'information channels' in mind, they were asked whether they thought they had enough information on how to prepare. At last, following the dimension of 'formal networks', they were asked whether they are participating in any formal organizations that are dealing with the problems. During the interviews I decided also to ask them whether they are participating in any other formal organizations, in order to get a better idea of their formal networks.

The following section contains questions about the collective social capital of the inhabitants. Again, adjusting to the overall low education level, we introduced the topic simply as 'relationships'. We asked Jeany to first explain why we were interested in that topic and to ask permission for these personal questions. We explained relationships as 'ties or bonds between you and another person or group' and asked them to tell something about the ties that are important to them. In addition, family, friends, neighbours and colleagues were mentioned in order to get some more extensive information about all their relationships. Hereafter, following the dimension of 'bonding capital' they were asked why they have relationships with them and whether they had common purposes with them. To get information about the dimension of 'bridging capital', I asked them whether any of those ties are with people from a different religion or ethnicity. They were not questioned about the other indicators: the indicator of 'ties crossing gender' was already clear and I decided not to ask them about 'ties crossing class' and 'ties crossing socio economics' in order to avoid offending them and creating a tense atmosphere.

In conclusion, there followed questions about the institutions in the neighbourhood. The section was introduced as a topic of 'working together' and they were asked what 'gotong royong', 'ronda', 'Dasa Wisma' and 'Posyandu' mean to them. Hereafter they were asked to give any examples of these practices in their neighbourhood. In addition, we asked them about the differences between these practices before and after the increase of the water problems. In order to link the practices to their adaptation strategies, they were asked whether they thought these practices contribute to the protection of their neighbourhood against the water problems. Finally, I wanted to know something more about working together to help one specific household. They were asked whether other members of the neighbourhood help when a household gets in trouble because of the water problems. They were asked to give examples and whether it happened on a voluntary basis. That last question had to contribute to information about the dimension of 'obligations, expectations and trustworthiness of structures'.

The questions formed a useful guide for the interviews. Nevertheless not one interview was the same. Every respondent told had a different story which caused very diverse follow up questions. Our translator did a great job, but it was still hard because of the completely dependency of her. Despite this handicap, we got representative information, also through our evaluations with Jeany after the interviews.

### 3.3 Collection of the data

With some help of our contact persons at Unika University, we were introduced to two neighbourhood representatives of Kemijen. Mr. Puji and Mr. Sumono are on the water board that is part of a pilot polder project in Kemijen. We hoped that already being accepted by people that are part of the community would help us get more respondents and more honest information more quickly.

We started with respondents that were introduced to us by the neighbourhood representative, but during the interviews we got the feeling that these were quite influenced by their friendship with him. They would have pretty similar opinions and were very positive about the pilot polder project. In addition these were the more rich inhabitants. The goal was to get a representative population for the neighbourhood, so different genders, ages, incomes and compositions of households. Therefore we decided to select the respondents ourselves, by walking around and observing the different situations. When coming upon a situation that seemed interesting, we asked our translator to introduce us. In this way we got a very diverse population, because we made sure to pick out different ages and gender. Another important point of selection was the state of their house. We interviewed the inhabitants of little sunken slums in contrast to the ones of stone heightened houses. In practice this turned out to represent a dichotomy in the income level of the inhabitants; the 'more rich people' with enough money to heighten their house and the 'poor people' who could not do anything. In total we interviewed fourteen inhabitants from ages 21 to 70 including 7 men and 7 women. They had different backgrounds and seemed to have different levels of income. 8 of them lived in stone heightened houses, while 6 of them lived in sunken slums. 2 of the households were female headed households and the compositions differed from 2 to 9 people (see table 1).

| Respondent | Age | Gender | State of house | Household |
|---|---|---|---|---|
| Respondent #1 | 52 | Female | Stone, heightened | Mother, daughter |
| Respondent #2 | 46 | Female | Wood, sunken, permanently flooded | Mother, 2 children |
| Respondent #3 | 67 | Male | Stone, located on higher level, personal pump | Father mother, 3 children, grandchild |
| Respondent #4 | 70 | Female | Stone, heightened | Mother, father, son, daughter in law, grandchild |
| Respondent #5 | 37 | Male | Stone, heightened | Father, mother, 2 children |
| Respondent #6 | 56 | Male | Wood, sunken, sand floor | Father, mother, son |
| Respondent #7 | 28 | Female | Wood, sunken, sand floor | Mother, father, 2 children |
| Respondent #8 | 65 | Male | Own house: stone, too sunken to live in. House of son: stone | Father, Mother, 2 children, son in law, grandchild |
| Respondent #9 | 51 | Female | Bamboo, (a bit heightened with sand) | Mother, father 6 children, grandchild |
| Respondent #10 | 39 | Male | Stone, heightened | Son, mother, brother, sister in law, niece |
| Respondent #11 | 21 | Female | Stone, heightened | Daughter, father, mother, sister |
| Respondent #12 | 43 | Female | Stone, sunken, permanently flooded | Mother, father, 2 children |
| Respondent #13 | 27 | Male | Stone, wood, part sunken part heightened | Son, father, mother, nieces |
| Respondent #14 | 32 | Male | Stone, heightened | Father, mother, 2 children |

**Table 1: Respondents and their ages, gender, the state of their house and the composition of their household**

The experts were not based on a selection; we got introduced to them by our contact person at university.

### 3.4 Analyzing the data

The primary empirical data was transcribed, coded and analyzed. This happened with the help of the qualitative data analysis program Atlas.ti. The transcripts were coded and ordered in Atlas.ti. The codes are based on the operationalization in chapter 2 and on the questions of the interview guide (for an overview: see appendix 3). For example, there are codes named ‘communal interest’, ‘economic adaptation strategy’ and ‘general norms in a community’. There is also a specific code on the answer to the first time they were asked about working together in protection from the water. By using these codes, the relevant outcomes became clear. The relevant outcomes were structured per code in Atlas.ti. For the first sub question this summarizes the different adaptation strategies employed by the interviewees. In addition there is information about the drives behind certain strategies. Answers belonging to the second sub question give information about the different aspects of social capital in the neighbourhood in Semarang, especially the social networks and institutions such as ‘gotong royong’.

The third sub question already leads to exploration of the influence of collective social capital on adaptation strategies to flooding and land subsidence. Using the analysis of the first two sub questions, answers to the third sub question provide information on the interrelation between the two main concepts. By using the identified aspects of the collective social capital of the inhabitants, presence of these aspects in the identified adaptation strategies can be examined. Is there any sign of influence by collective social capital? The links that are found through this method, give insight into how the two concepts are interrelated. These insights can be used to answer the central question.

During the fieldwork, two different approaches of the role of aspects of collective social capital in adaptation strategies came forward: One that was based on a frame of individuality and one that was based on a frame of collectivity. The paradox of these two approaches was cause to include the frames in the analysis. Therefore the analysis explains the different approaches and embeds the relevant outcomes and the analysis of the primary empirical data in the different frames.

# 4. Case study: Kemijen

## 4.1 Introduction

A rusty bridge over a smelly river filled with trash, goats and chicken everywhere and a lot of curious looks marked my first encounter with Kemijen: A colourful neighbourhood with friendly inhabitants where the flooding has had its impact over the years. In order to understand this impact, it is important to explore the background of the neighbourhood. Therefore this chapter provides the background information that is needed for the remainder of this thesis. The analysis and the conclusions require some general knowledge about Kemijen. The paragraphs are both based on literature study as on empirical data in order to improve the description. At first general information about Semarang is provided, followed by a basic description of Kemijen. Thereafter the experiencing of the water problems by the inhabitants is discussed. At last the networks in the neighbourhood are described.

## 4.2 Semarang

Semarang city (part of Semarang Municipality) is located 500 km East of Jakarta on Java Island (Marfai & King, 2007) (see figure 15) and is the capital city of the Central Java Province. It has an area of 400 km2 and 1.5 million inhabitants and is the fourth biggest city of Indonesia (Harwatisari & Van Ast, 2011). It is projected that the population will be around 2 million in 2025. The main activities of the city are industrial estate, trade, education and tourism (Marfai & King, 2007). The last three decades Semarang has experienced a rapid population growth and constant economic growth. Unfortunately, this often has been at the expense of existing ecosystems and community systems (Rahardjo, 2000). This development has not been equally distributed either. In 2010, around 80 000 people lived beneath the poverty line, this is 5.6 % of the total population of the city (http://jateng.bps.go.id/). Thereby the numbers are not accurate, because of the large amount of homeless people and people living illegally mostly in slum areas.


**Figure 15: Semarang City (Marfai & King, 2007, p. 653)**

The city is growing fast in line with the increasing population. In the Semarang Municipality around 1,200 ha of low-lying swamps and fields have been urbanized over the last 20 years. High urbanization and high population pressure have changed the land use of catchment areas, embankments, swamps and fields into industrial estates and houses (Harwatisari & Van Ast, 2011) (Marfai & King, 2007).

In the census of 2010, there were 495 598 people who were so-called lifetime migrants, they were living in Semarang, but they were born somewhere else. 108 057 of that group had migrated to Semarang in the foregoing 5 years. That is quite a large

number, being 21, 6 % of the total amount of migrants living in Semarang in 2010 (http://sp2010.bps.go.id). It seems that migration has been on the rise in the past years.

Semarang can be divided into two major landscapes: a low-lying coastal area on the northern part and hill area on the southern part. “The residential growth, industrial expansion and agriculture in the lowland contribute to the land subsidence and the affected areas increase every year” (Marfai & King, 2007, p. 653). In addition Semarang suffers from three kinds of flooding: local inundation (caused by heavy rainfall), river flooding and tidal flood (from the sea) ( (Harwatisari & Van Ast, 2011). An area of more than 1,610 ha is undergoing inundation up to 2 km inlands from the coast almost everyday (see figure 16). Thereby in total 15,000 ha are vulnerable to flooding from the river (Marfai et al., 2008).

The local government of Semarang City has been using structural and non-structural measures to minimize the consequences of frequent flood. Unfortunately, they have not been sufficient (Dewi, 2007). “Though the local government of Semarang City has also been employing structural measures to counter the impact of the subsidence and inundation, the measures have been inadequate to solve the entire coastal inundation problem within the coastal and low-lying area of Semarang” (Marfai et al., 2008, p. 343).

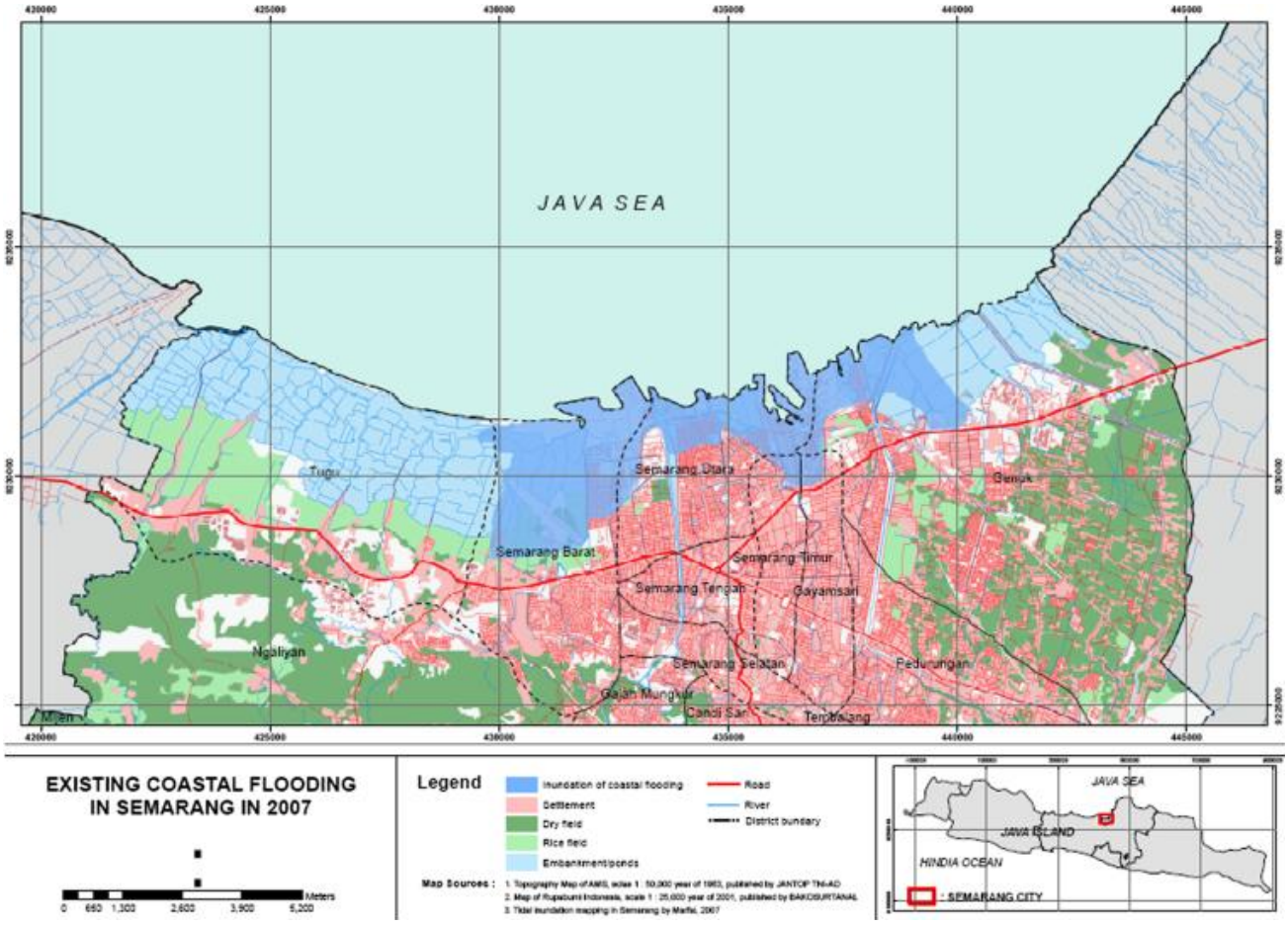


**Figure 16: Periodically inundated areas of Semarang (Harwatisari & Van Ast, 2011, p. 2).**

### 4.3 Basic description of Kemijen

The sub-district Kemijen lies in the most northerly part of the district East Semarang (see figure 17, 18). When we were in Semarang, we experienced that the neighbourhood is not well known by people in the city centre. Even our taxi drivers had a hard time finding it. In addition, there is not much English information to be found online. Out of experience, we know that Kemijen is suffering from both flooding by the river and by heavy rain. These floods are a consequence of the rising sea level, land subsidence and the climate change. The river next to Kemijen is the Banger River. One of the locals told me that Banger means 'dirty' in their dialect, which suits well, since the river is polluted with trash from the inhabitants. This self-called 'bad habit' is still a big problem and reinforces the problems caused by the floods.

The Banger River area has been selected for a 'pilot polder project', under the name 'Banger Pilot Polder'. It is a bilateral cooperation between the local government; The Semarang Municipality and the Dutch government. The polder is being developed by two Dutch companies with the support of Dutch funds (Peters, 2012). It is claimed that the pump will be operative in 2014. Due to several problems, the project has already had its delays. The inhabitants of the Banger area (of which Kemijen is one neighbourhood) have to pay for the maintenance of the pumps themselves.


**Figure 16: A: Semarang Tidur / East Semarang (http://maps.google.nl/maps?hl=nl&tab=il)**

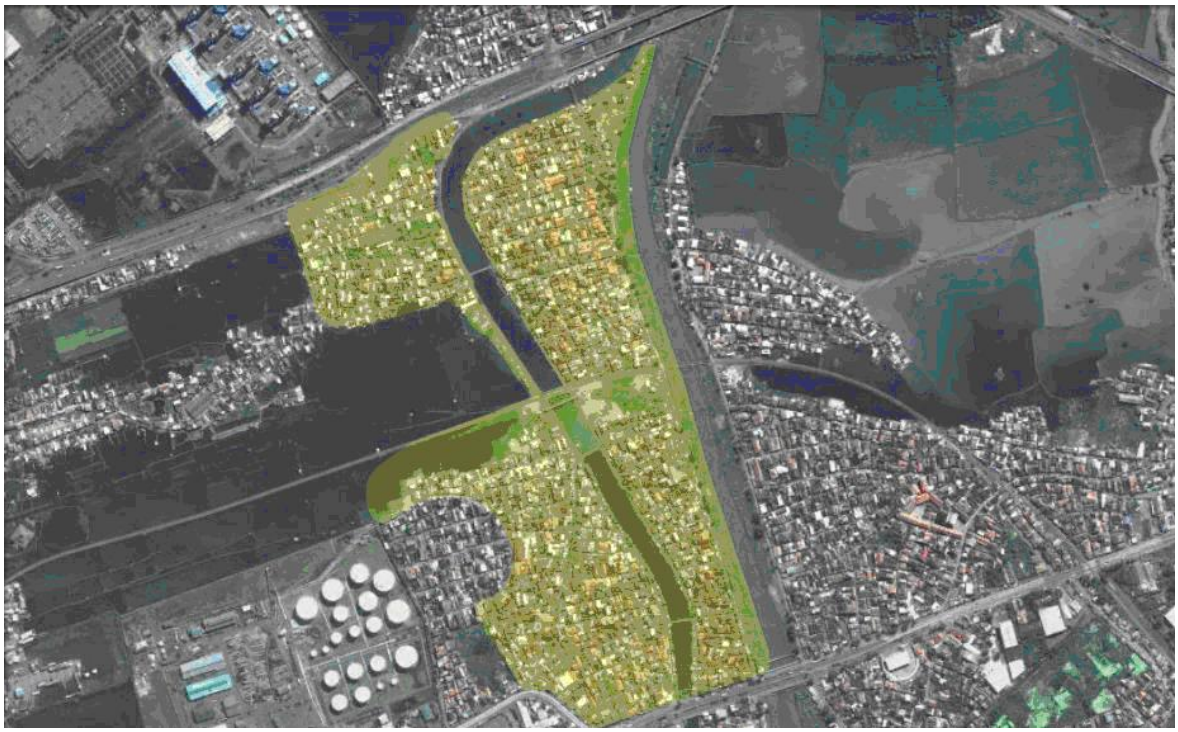

**Figure 17: Neighbourhood Kemijen based upon fieldwork and Dewi (2007) (Van Der Zwaluw, 2013)**

The Banger river area was chosen because in Semarang it was “the location with the highest urgency level for flood control” (Peters, 2012, p. 24). In addition it represents a mix of poor and rich people living together (Peters, 2012). This contrast between rich and poor is very visible in Kemijen. Ramshackle and sinking slums stand next to little heightened houses made of stone and glass. There are kids running around in school uniforms and there are kids running around in worn-out clothes without shoes on their feet. 26 % of the 3,382 households in Kemijen are living below the poverty line. Another 64 % of the households are vulnerable to poverty. The biggest part of the inhabitants works in the informal sector (Irawati & Winaktoe, 2009). We met one woman who makes snacks herself and sells them on the street. Another woman sorts through garbage, looking for useful things that she might be able to sell. In contrast we also talked with a construction worker, a ship mechanic and a man who repairs diesel motors.

The overall education level is very low. A large part is only graduated from elementary school, junior schools or secondary schools and there is also a group that hasn’t had any education at all (Irawati & Winaktoe, 2009).

The dominant ethnicity in the neighbourhood is Indonesian; there are hardly any other ethnicities to be found. In addition there are two main religions; households are often either Catholic or Muslim. There are no tensions between the two religious groups, all the respondents claimed to have friends of both. One man even told us that they celebrate each others holidays together. *“Even though there are some differences in religion, they visit each other on their big days. When the Muslims have ‘idelfitry’, the Christians come to their home and they celebrate. That happens the other way around when Christmas comes. They have the same purpose that is God”*

Kemijen is divided into different Rukun Warga's (RW's) (neighbourhoods) and Rukun Tettanga's (RT's) (bond of households). The practices of 'gotong royong' (mutual assistance) and 'ronda' (neighbourhood patrol) differ per RT or even per street. The practices of 'Posyandu' (children care) and 'Dasa Wisma' (informing the women) are more general, since this is done for different RW's by one group. The local government present in Kemijen is the PKK, which grants credit for economical, social and structural causes. Dasa Wisma is part of the PKK as well and Posyandu also receives funds from the government for the medicines of the children.

### 4.4 Look! Sinking house!

***Water problems in Kemijen***

During our first tour through the neighbourhood of Kemijen, we came upon several slums that had sunken so deep into the earth that the roof would just reach your middle. The neighbourhood representative tried his best to help us in our research, and would take us to every one of them. Not having a translator yet, the communication was limited that day. "*Come miss! Look! Sinking house! See? Yes? Sinking house!"* After pointing it out and urging us to take a picture ("*You want to take picture? Yes?*") (see figure 18), he would quickly move on to the next sunken slum and repeat the same words. Another word often used that day was 'pump'. Every street has its own pump, but it does not always work. The households of the street pay money for the maintenance of the pumps. The future pump as a part of the Banger pilot polder project has the goal to triumph where those pumps have failed in protecting the community from the water. Most of the streets in Kemijen are heightened, either with the help of government funding or from the households themselves. The tour also included a walk along the Banger River, during which Mr. Puji showed us all the places where the dike had broken. There is a railway that crosses Kemijen, which also functions as a dike next to the river.

**Figure 18: 'Sinking houses!'**

A new word we learned during our stay in Semarang was ‘rob’, which means sea tide. When asking people about the water problems in their area, most of them would mention the rise of ‘rob’ as a major cause of these problems. ‘Rob’ and heavy rain came forward the most often in the context of flooding. In addition the garbage in the river was seen as an important cause by some of the respondents (see figure 19). One of them was even very well informed and knew about the climate change and the melting of the poles, which he had read about in a magazine. Most of the people had their information from others or out of their own experiences. Some people were less informed: “*The level of the sea is higher, because of more and more boats in the sea”*, a poor woman told us.

**Figure 19: Fishing in the trash**

Not all people see the rise of ‘rob’ as a cause of flooding. Some of them would make a distinction between the water problem of ‘rob from the sea’, which appeared to be local inundation to them, and ‘flooding from the river’. Land Subsidence was less addressed in the respondent’s stories, despite it being extremely visible for the sunken slums. Nevertheless there were a few respondents who talked about the ground getting lower. One of them was the earlier mentioned well informed man, whose house has become uninhabitable because of the land subsidence (see figure 20). He now lives with his son, because he has no money for an own house. He sees the getting lower of the ground as a major cause and pointed out that it was caused by abbreviation and buildings near the seashore. In addition there was one respondent who talked about the disappearing of the ground as a reason for heightening his house instead of the more often mentioned protection from the water (see chapter 5).

**Figure 20: Uninhabitable**

The last time most of the respondents experienced a flooding was in February this year (2013) and in January before that. Some of them would mention other dates, such as last night, because the heavy rain also causes some parts of the area to be flooded (see figure 21). Notable is that floods caused by heavy rain are not seen as floods by everyone. That is 'just' flooding from the rain and does not cause that many problems because the water won't get that high. Nevertheless, most houses of the poor people do get flooded and therefore for them it is a flood. For the people who are not bothered by it, the flooding from the rain is almost institutionalised in their daily live. The ones answering with February where talking about flood coming from the river and indirectly the sea. There was even one woman who could still show us the consequences of that flood, because her (stone) house had been filled with water ever since. Another date mentioned was March; apparently a part of the dike broke, so the inhabitants living near got their houses flooded by the water coming out of the river.

**Figure 21: Flooding caused by heavy rain from the night before**

Notable are the extreme differences in answers to the question whether they could remember a time before the flooding increased. Some of them did acknowledge a rise in floods, but there were also a few who said it had gotten less. This was because of the heightening of their houses or roads and the building of dikes. Therefore their experience of a flood changed. The consequences of the water have become less bad for them, like was the case for the flooding caused by heavy rain.

The water problems in the area have several consequences for the inhabitants. Belongings are destroyed, such as machines, furniture and even a book collection. It also occurs that the electricity goes off during the flooding, which causes the electrical pump to stop working (there also is a pump on fuel). *"If the electricity is off, the whole family doesn't sleep. They are afraid that some of the equipment will be stolen by people"* Thereby the groundwater has become darker and contains a metal smell since the increase of the floods. The water that came through the tap (extracted from the ground) was yellowish and contained mud. Therefore they don't use groundwater anymore. The consequence mentioned every single time, was the sinking of the houses of the respondents. As mentioned before, most of them did not mention land subsidence itself, but saw the sinking as a consequence of the flooding. Some also talked about fishing ponds being destroyed because of the elevation and therefore causing more water to come their way. Other severe consequences concern the health of the inhabitants. The (stagnant) water can cause diseases and fever, diseases from the mosquitoes and often rash was mentioned as a consequence of the flooding. Thereby the biggest worries were about the children: *"Since her house has this situation, they sleep over the water and so the immune system is decreased, so they easily get sick. Especially for her children".* (see figure 22). Worries, fear and sadness are ongoing effects of the water problems troubling their area. *"Flooding has a big impact on their lives. It makes them stressed and it makes them mad. They just want to be free from the flooding"*

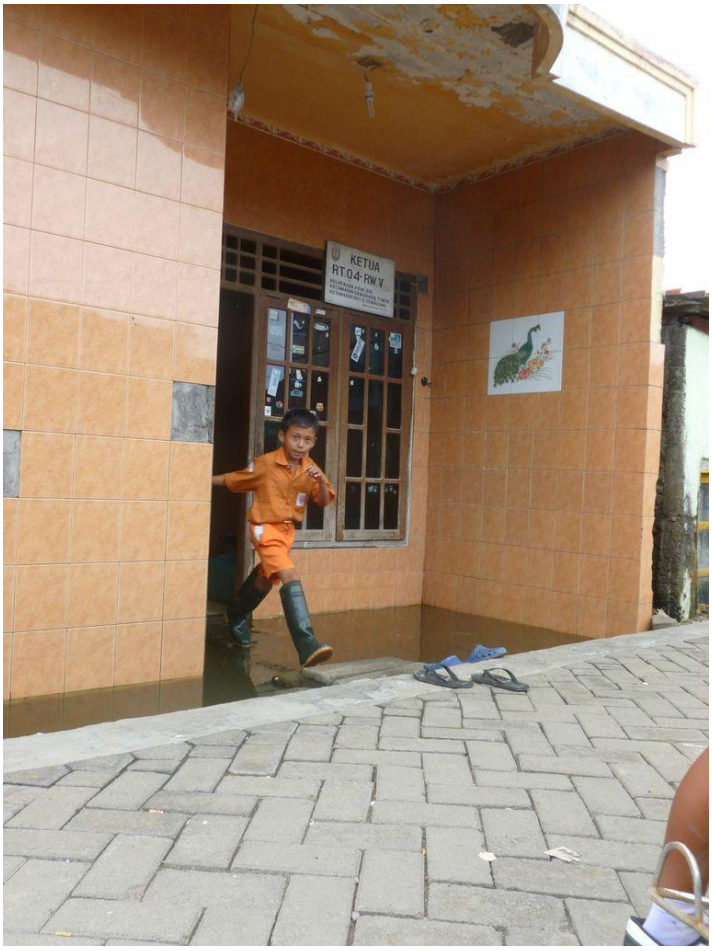


**Figure 22: Child living in a flooded home**

### 4.5 Networks in Kemijen

There seem to be more informal networks in the neighbourhood than formal networks. Almost every respondent was very positive about the neighbourhood and told they live very comfortable. Next to family neighbours are very important, family does seem more important in most cases, in contrast to the Indonesian norms on neighbours mentioned in chapter 2. Here Keasberry's (2002) quote of "people relying on their direct neighbours", which especially accounted for rural areas, was pointed out. Nevertheless people know each other very well and help each other when something happens, such as death or sickness. *"They live together, that makes them care for each other and help each other".* That sort of help turned out to be the most important form of 'gotong royong' (see Chapter 6). For respondents that had their family living outside of Kemijen, the neighbours played a bigger role. Some also claimed they did not want to move because of their good relationships with the neighbours. Often the relationships with friends were the same as the ones with the neighbourhood, which confirms a tight informal network of neighbours and community cohesion (see figure 23).


**Figure 23: The neighbourhood kids come and watch the foreigners together**

For the formal networks, there are some formal organizations active in the area, although not every respondent knew about them. There are local NGO's and private organizations that help during the flooding, or that try to help improve the economic situation. A lot of respondents mentioned the PKK, the local government, in which they did participate. *"Sometimes in PKK there is something like an instruction on how to prepare themselves for the flooding. That is the only kind of organization she participates in".* It does not seem like PKK necessarily has something to do with the government, because it is led by the local inhabitants. *"Because most of the people in the neighbourhood are poor, they help socially using the energy, not the money. For example the marriage, for people giving birth and for de death people. Sometimes they use the money from the PKK, because when they do PKK they collect the money and when some people need the money they can use that money".* 'The doing of PKK' means collecting charity money in the neighbourhood in this case, which has nothing to do with the local government.

The networks in the neighbourhood are strengthened by bonding and bridging capital. The bonding capital is present in the stories when respondents talk about common purpose and communal interest. *"They have the same feeling, the same situation: the flooding, they can't do anything to save their lives" "Their common purpose is to survive the water".* Very often living peacefully and happily together was pointed out as a common purpose with their relations. *"They live together and that makes them care for each other and they help each other"* In addition to this 'helping each other' 'Gotong royong' turned out to serve the communal interest for another respondent as well: *"They don't want to have any problems that can influence each other. That's why he also does 'gotong royong', because they solve problems together"* There was even one respondent who claimed to feel safer during the flooding, because she knows the people in the neighbourhood so well. *"This is like an old neighbourhood for people. So they know each other very well, so that makes them safe. So they don't think that they need any spatial protection during the flood, because they feel safe".*

As mentioned before, there are almost no differences in ethnicity. But ties crossing religion, as a part of bridging capital, are very present. Every single one of the respondents claimed they don't care about the religion of their friends. As it seems these 'crossing ties' don't really exist to them. "*He just helps without thinking about religion or ethnicity. The most important for him is the purpose. If he has a good purpose, he will help" "People here just help each other. For example the church, if there are free medicines the Christian people will inform the people here (a few Muslim households) to get the free medicines".*

# 5. Every man for himself

## *An individual approach to adaptation strategies*

### 5.1 Introduction

*"When the flooding or rob comes, everyone focuses only on their own home. And after the flooding, everyone cleans their own house"* The first time the respondents were asked whether they work together with other people from their neighbourhood in the protection from the water, most of them would answer no. They claimed that everyone was very individual. No one helps them and they help nobody. In this chapter there is a focus on the individual approach of the adaptation strategies by the respondents that came forward. At first the different adaptation strategies are discussed, followed by the drives behind adaptation strategies.

### 5.2 Adaptation strategies in Kemijen

The answers that came up when we asked them about protecting themselves from the water mostly concerned technological/ structural and economic adaptation strategies. The more rich people, the ones who had heightened homes, would often start with explaining how much it costs to heighten your home and how many times it has to be done. *"She has already heightened her floor four times since ten years ago. For one renovation it is about 2 million (rupiahs). Her last renovation was the heightening of the kitchen and the bathroom"* (see figure 23). The poor people restore their important belongings in a higher place, such as the stove, or important papers of the children's school. Very common places for higher storage turned out to be the table and the bed. *"Usually they put the stove on the table, so when the flood is here that is how they cook" "She usually puts some clothes on the bed and the electronics on the table".*

**Figure 23: Heightened kitchen**

Other economic adaptation strategies were the storing of some spare food, paying for the maintenance of the pump, saving money for the next heightening of the house and repairing equipments. *"They put the equipments that still could recover outside. She also put her book collection in the sun to dry".* There was one rich man who had bought a personal pump for his house, but he was the only one we encountered. *"They put water in a bowl and threw it away, so they drained the house. But now, because he feels tired, he bought the pump*". One respondent just puts sand in his house, because that is much cheaper than renovating. One woman had paid people to help her heighten her home with sand. *"She buys sand every year to make her house higher and she pays other people to help them".* Here it seems that generalized reciprocity is not present at all in the adaptation to the flooding. Helping on a voluntary basis seemed to be out of the question. There were not much different economic adaptation strategies, as almost everyone either heightens their house or stores their belongings at a higher place, as was already mentioned in chapter 4. This way it seems like for the economic adaptation strategies, it can be concluded that there is barely an influence of collective social capital.

Technological / structural adaptation strategies again concerned heightening and renovation of the home, usage of the pumps and putting sand on the floor. But also building dikes and making canals around the house. One respondent had heightened her bed with rocks to avoid the water damaging the wood (see figure 24). A strategy that was often mentioned was simply 'do nothing'. This strategy is both employed by the rich people who are not bothered by the water as long as their house is high enough and by the poor people who don't have the means to do anything. *"But now his house is already higher so he doesn't do anything" "He said no I don't do anything, because I don't have any money".* Another strategy is cleaning, since often they can not do anything to prevent the water from coming into their house. They can only recover from it. *"All she can do is just put the rubbish away".* A few respondents (2) mentioned that the environment was cleaned together with the neighbourhood. *"After the flood comes they clean out the canals and put the garbage in the dust bin"* The others (4) that mentioned cleaning as a strategy, claimed that everyone just did it for themselves. *"After the flooding happened everyone cleaned their own house and after being finished cleaning the house, they didn't help the others" "No one helps her to clean her house"* Again the strategies are not very diverse, because either heightening of the home is enough or they don't have the means to do anything. For the technological / structural adaptation strategies, the only influence of collective social capital that appeared to exist was the cleaning of the environment together. Therefore it still seems that the influence of collective social capital is small.

**Figure 24: Bed heightened with rocks**

When talking about the social / organizational strategies, the influence of a social factor became more apparent, but still mostly on a personal level. For instance there are people who evacuate to family or friends. *"She has family, friends and colleagues outside of Kemijen and sometimes she moves to their home to evacuate".* The possibility of evacuation to the Mosque was also often mentioned (see figure 25). One lady also told us about a flood free area near the bridge were people from NGO's, churches, schools or social community sometimes hand out meals for free. Also, and this is where working together did come forward, some people mentioned that during the flooding inhabitants of the neighbourhood cook together and share their meals. Apart from this, nothing new was mentioned.

**Figure 25: Heightened Mosque in Kemijen**

The main social / organizational adaptation strategy for the poor is evacuating. *"Because they have a good relationship some people offer her and her family to evacuate to their homes".* In addition some of the rich people claimed to open up their home to friends and family for evacuation. *"When the dike is broken in the area next to this area, the flood is that high. So people come to her house for evacuation".* After the foregoing categories of adaptation strategies, the one of social / organizational strategies seems to be the only one that clearly shows an influence of collective social capital, as was expected in chapter 3. The people in the neighbourhood work together in cooking food during the flooding and even share their meals. In addition they can use their social networks to find a place for evacuation.

As can be seen in the answers about protection, most people don't think of working together as an adaptation strategy. However, some of their answers did show an influence of social networks, such as evacuating to friends or family or cooking together with the neighbourhood. The general message was: Everyone has to protect himself and everyone just employs adaptation strategies that concern themselves. No one works together in protecting themselves from the water. Of course, there were a few exceptions of people who answered that they did work together: in the cleaning of the street together for instance. There was even one woman who told that they did work together, because when for instance a bowl would come floating by, they would bring it back to the owner. *"The bowl is coming with the water and people recognize it and bring it back".* But despite this little piece of collaboration, overall the answer was 'no'. It seems as if this 'frame of individuality' determines their perception on the social practices in the neighbourhood.

### 5.3 Drives behind adaptation strategies

The drives behind adaptation strategies also seemed to be driven by personal purposes. Logically, the biggest concern was the family's own safety and lives. *"She has family and friends outside of Kemijen and sometimes during the floods she moves to their homes to evacuate. To save their lives" "He was really worried at that time and he send is children to another place to evacuate"* In addition a very important drive was simply to be free of the effects of flooding. *"The main point is to be free from the flooding" "He is willing to move out of this place to avoid any flooding"*

The other main drive for employing or not employing a strategy was money. *"They don't mind to pay, because it is for their own good" "He thinks renovating is cheaper than buying a new house" "She doesn't have enough abilities, all she can do is just pray and pray" "Actually they want to make their house higher, but they don't have the money. The priority is for the children's school" "He is willing to move out of this area to avoid the flooding, but he doesn't have any money"* The drives behind restoring belongings and equipments at a higher place were the importance and the irreplaceability of the objects. *"The most important equipments are the television and the stove. And also the important documents, just like the certificates of the home. Those are the most important. So they store that at a higher place"*

One respondent mentioned distrust as a drive behind the strategy of guarding his belongings at night during the flooding. *"He told us that they were afraid some of their equipment would be stolen by people. That's why they don't sleep".* Another drive that kept a respondent up at night was fear. *"So even though the flooding is from the 'rob', the people here don't sleep. Because they are worried that maybe a tsunami can happen"*

The different drives behind adaptation strategies that were mentioned, confirm the claim that they seem to be driven by personal purposes. So no influence of collective social capital seems to be present here. On the other hand, it is logical that when asking people about the protection of themselves and their household, they come up with strategies that only concern themselves. However, when asking them about working together in protection of the neighbourhood for the first time, no real drives behind adaptation strategies that concerned the community became clear either.

## 6. Interlude

When you look at adaptation in the neighbourhood from the individual perspective, there almost seem to be no collective adaptation strategies. A person's livelihood is his or her own responsibility and if an external influence of the government is not present, you have to provide your own social security. Respondents even answered surprised sometimes, when they were asked whether people help each other in protection from the water. It appeared as if they did not even think of the possibility of using institutions such as 'gotong royong' as a community response to the water. As if those were two complete different stories. From this point of view, the usage of collective social capital is out of question. However, these were the answers we received after we just asked them about protection from the water and whether they worked together in that.

In chapter 4 we saw that there are a lot of close networks based on communal interest in Kemijen. That there is a sense of common purpose and that they all feel very comfortable in the neighbourhood. In addition, chapter 5 did show some influence of collective social capital in the adaptations to the flooding. How is it possible that for most of the respondents, this is not linked at all to their dealing with the flooding? Further on in the interviews, this turned out to be for a great deal dependent on their perception. Because when the conversation moved to social relations and institutions such as 'gotong royong', their frame of individuality seemed to shift to a frame of collectivity. Still this accounted more for cultural practices such as helping each other preparing for weddings and funerals. Nevertheless, there also came forward some more manifestations of the influence of collective social capital in their adaptation to flooding. Chapter 7 covers this frame of collectivity, by explaining the different social practices and institutions present in Kemijen. Chapter 5 and chapter 7 represent two contrasting approaches that came forward during the empirical research. They show a paradox between adapting to the flooding individually on one hand and caring for the neighbourhood and working together on the other hand.

# 7. Working together in different ways

## *A collective approach to adaptation strategies and more*

### 7.1 Introduction

In the chapter 5 we saw the thought of individuality being shared by most of the respondents. The adaptation strategies that they addressed, almost all only concerned themselves. Even when we asked them whether they worked together with other people from the neighbourhood in the protection from the water, they would answer no. However, further on in the interviews this turned out to be for a great deal dependent of their perceptions. When talking about their social relations and the practices of 'gotong royong', the earlier frame of individuality changed into a frame of collectivity. The respondents claimed to work together in different ways. The collective approach is covered in this chapter, by explaining the different institutions in Kemijen. At last, the change in these practices and their contribution to adaptation to the flooding is discussed. The number of respondents giving a certain answer is indicated between brackets: (.).

### 7.2 Gotong royong

Chapter 4 described the different social networks present in Kemijen. As it turned out, there are very close networks of family, friends and neighbours. After asking the respondents about these relationships, we would turn to a topic of working together. In the beginning of the interviews they had said that they did not work together in protection from the water. Now they started to recall more examples of 'gotong royong' in the context of dealing with the flooding. More people spoke of cleaning the environment together and of people evacuating to each other. In addition, watching the tide and alarming each other when the flood comes came forward by some respondents (5). *"They usually hit the electricity tower, the metal, to warn that the flood is coming, as quick information".* However, often 'gotong royong' was not used in the context of flooding. Most people spoke of assisting each other for weddings, funerals and sickness. *"She helps the neighbours when they have a party" "When a person from this area gets sick and has to stay in the hospital, they usually collect money and rent a car and to go together to the hospital to give him the money".* Collecting money for certain households that have suffered from the floods, is not often done. This is because everyone undergoes consequences of the flooding. Again the possibility of using 'gotong royong' in protection from the water did not exist for the people (2) whose answers still not referred to the situation of adaptation to the flooding.

The different forms of 'gotong royong' mean very much to the respondents. *"She is happy about the gotong royong, because she can help others and also be helped by others" "These things are important to him, for him it's like a culture. Because in an area that is full of flood like this, we cannot live individually".* Especially that last quote seems to belong to an inhabitant from a complete different community than the one that was interviewed about the adaptation strategies. Footnote is that this man did talk about working together in protection from the water the first time asked: he helped his parents in law and opened his house for evacuation, but according to him, nobody came. His vision that in an area that is full of flood people cannot live individually stood out. He was the only one that literally recognized the importance of collective social capital in their situation of adaptation to flooding.

### 7.3 Ronda

For the practice of 'ronda', the opinions were divided. In some streets the 'ronda' was not performed anymore, because of the laziness of the men who have to do it. *"For example, today is for him, but he didn't come. So the other will say: he didn't come, so why would I? That is a social problem. That is why the 'ronda' is not working".* Another woman told us men were lazy for 'ronda' in her RT as well, even though her bicycle was just stolen a week before. On the other hand there were streets were 'ronda' is still carried out. Stories about 'ronda' differed from it being purely for safety to it also being used in the context of flooding. *"Ronda is not for the protection of the neighbourhood against the water problems, but for safety only" "Because of the flooding the ronda is very active. The ronda in this area is not only for the criminals, but also for natural disasters such as flooding, or maybe fire".* The earlier mentioned alarming is also a form of 'ronda'. There were several respondents (5) who pointed that out as an example. *"They especially go in the late day and they warn people when the water comes. When the others sleep, the guard warns people".* Some told that 'ronda' was not active in their RT at the moment, because now they felt safe. During the holidays however, they would start again. *"Ronda will exist especially when the religious big days will come, because it is on the big days that they need more money and that is when the crime will be higher".*

### 7.4 Dasa Wisma & Posyandu

'Dasa wisma' is active in every RT, but also does not necessarily have anything to do with the flooding. One of the activities of 'Dasa wisma' is collecting money. They also have a special practice where they collect money and put some names together like a lottery. The name that gets picked gets all the collected money. This is also done with rice, every household contributes some rice and the winner takes it all. Another example of 'Dasa Wisma' already came forward, namely the cooking together. *"For Dasa Wisma they usually make like a public kitchen, they cook together for everyone!"* At last, the activity of giving information can also be used for giving information about the flooding or on how to prepare. However, this is often done in combination with the local government, the PKK. So it is not only done by 'Dasa Wisma'. The importance of 'Dasa Wisma' was recognized by all the respondents, but again most of them did not recognize a possibility of it being deployed for the protection of the neighbourhood.

'Posyandu' turned out to play quite a big role in the context of flooding. Most of the respondents told that 'Posyandu' is very important for them, because of their children. *"It is important to her. She first mentioned Posyandu, because it is taking care of her children".* After the flooding, Posyandu will hand out healthy food and free medicines against the diseases caused by the water. *"For the Posyandu, especially after the flood, people come and they ask some medicines".* There can be made use of 'Posyandu' for free, which is very important for the poor people in the neighbourhood. *"Monitoring the children growing especially means a lot to the poor people, because they don't have enough money to go to the doctor'.* Whether in the context of flooding or not, 'Posyandu' is very important. In addition, this institution shows a very clear contribution to the problems caused by the flooding, by protecting the children's health from the dangers caused by the water.

### 7.5 Changes and contribution of institutions

When asking about change in the forms of 'gotong royong' since the water problems had increased, almost every single one of them answered no. Except for a few who pointed out the change in 'Posyandu' that is giving more free medicines related to the flooding, but of course not all the respondents have to do with that. Again it seems as if they do not link 'gotong royong' to adaptation to flooding, even though they work together in building a dike or cleaning the canals surrounding the houses for example. There was only one respondent who specifically acknowledged that: *"Especially after the flooding, they clean out the canals and they put the garbage into the bin".* So even though it seems as if there is continuity in the existing practices, there are new practices that have developed following the dynamics of increasing flooding. The inhabitant's perception on the protection from the flooding seems to differ from the perception on thinking about working together. A link does not exist in most of the inhabitants experiences.

However, when they were asked whether the different social practices of 'gotong royong' contributed to the protection of the neighbourhood from the water, they would often answer positively. So in that case, they did acknowledge a link. But this probably also is a consequence of the direct question that was asked. Almost every respondent answered yes and this is where they came up with the different examples of the practices in the context of flooding such as the use of 'gotong royong' for building dikes, 'ronda' to watch the tide and the use of 'Dasa Wisma' to inform. *"Gotong royong helped to heighten the road"* (see figure 26). How can these answers come from the same respondents, with a few exceptions, that claimed that no one worked together in protection from the water?

Most of the respondents did not acknowledge the use of collective social capital in adaptation to flooding at first, but rethought this after talking about social relations and institutions (8). A small part did acknowledge this link at first (2) and another small part (2) still did not recognize the possible importance after asking about the contribution of the social practices to protection against the water.

Now, it seems as if the frame of 'every man for himself' can be deposed. But is that the case? The inhabitants of Kemijen work together in different ways, but not necessarily for the flooding. Nevertheless there are different examples given of cases in which the inhabitants do work together in their adaptation strategies. Where is the friction in their reality? Based on this chapter, it can be concluded that there is a clear influence of collective social capital in their adaptation to flooding in the form of the different institutions. Nevertheless these are more used for other purposes, such as working together for collecting money or helping for a wedding.


**Figure 26: Heightened road and flooded road**

# 8. Conclusions & Recommendations

## 8.1 Introduction

In this research the collective social capital of the inhabitants of Kemijen and their adaptation strategies to flooding were examined. The research objective was to contribute to a more complete understanding of the role of collective social capital in adaptation to flooding at community levels in coastal neighbourhoods. Chapter 5 and 7 gave different conclusions on the influence of collective social capital in adaptation strategies. The first showed an individual approach to adaptation to flooding, whereas the second displayed a more collective approach. What conclusion can be drawn from the two different frames of reality? This chapter starts with conclusions of the research, ending with answering the central question. This is followed by recommendations and a reflection on the research.

## 8.2 Conclusions

The empirical research showed that there is a dichotomy between the ‘more rich’ and the poor people in their experience of the flooding and their adaptation to the flooding. For the rich it was almost ‘institutionalised’, because they did not experience severe consequences anymore. The dichotomy also showed in their perception on the rise of the ‘water problems’ over the years. Whereas the poor respondents answered affirmative, the rich said it had become less because of their adaptations. Main consequences of the flooding are damage to their homes, destroying of their belongings and sickness caused by the (stagnant) water.

There are more informal networks than formal networks present in Kemijen. There is community cohesion and respondents spoke of communal interest and common purpose (surviving the water). They have a sense of common identity and feel comfortable in their neighbourhood. These represent the bonding capital, whereas the bridging capital is represented by the positive ties between the Christians and the Muslims in the neighbourhood. From this it can be concluded that the inhabitants of Kemijen share collective social capital, especially in the form of the tight relationships between the neighbours.

Norms and institutions in the neighbourhood contribute to the collective social capital. ‘Gotong Royong’ is employed in different forms, especially for helping each other at funerals, weddings or during sickness. Perceptions on ‘ronda’ were very diverse, whereas ‘Dasa Wisma’ and ‘Posyandu’ were commented on generally positive.

For the adaptation strategies, the main ones are economic or technological / structural adaptation strategies. The main economic strategies are heightening of the houses or restoring of important belongings at a higher place. Here the concept of generalized reciprocity was not present at all; helping each other in this on a voluntary basis seemed to be out of question.

The main technological/ structural strategies also contained heightening of the houses and restoring of belongings at a higher place. In addition there was a common strategy of simply ‘doing nothing’. Either heightening of the house was enough, or people did not have the means to do anything.

The main social / organizational strategy was evacuation. This category did show an influence of collective social capital: The people in the neighbourhood work together in cooking food during the flooding and even share their meals. In addition they can use their social networks to find a place for evacuation.

What do these findings mean for the central research question? The central research question was:

*How does the collective social capital of the inhabitants of Kemijen, Semarang help them adapt to flooding?*

Chapter 5 and 7 represented different approaches to this research question. In chapter 5 it came forward as if everyone's livelihood is his or her own responsibility. Overall, they did not seem to see the possibility of the use of the institution of 'gotong royong' for protection against the water. Chapter 7 showed that 'gotong royong' is very much employed in different forms in the neighbourhood. Despite the fact that it is mainly used for funerals, weddings or sickness, it also came forward that it is used for adaptation strategies. They clean the environment together, they cook together during the flooding, they alarm when the water comes and they use their social networks for evacuation. Despite these answers, there were still respondents (2) who did not acknowledge the possibility of a link between 'gotong royong' and adaptation to flooding.

This partly can be explained by the fact that the institutions of 'gotong royong' 'ronda' 'Dasa Wisma' and 'Posyandu' and other social practices have existed for a long time. They always have been part of their daily lives. Therefore it can be hard to acknowledge it in a different form.

Most of the respondents did not acknowledge the use of collective social capital in adaptation to flooding at first, but rethought this after talking about social relations and institutions (8). A small part did acknowledge this link at first (2) and another small part (2) still did not recognize the possible importance after asking about the contribution of the social practices to protection against the water.

The above is about the perception of the inhabitants. When looking at the adaptation strategies when keeping the different aspects of collective social capital in mind, it can be concluded that it does contribute to the adaptation strategies. The collective social capital of the inhabitants of Kemijen helps them adapt to flooding by using their social networks for this. Most important examples are cleaning the environment together after the flooding, cooking together during the flooding, patrolling and alarming when the water comes and the use of their relations for evacuation. These are all influenced by the present social networks, bonding and bridging capital and norms of 'gotong royong'.

### 8.3 Recommendations

Nevertheless, the collective social capital and especially the institution 'gotong royong' and its different forms are not used to the extent that they probably could be used. The main problem is the ignorance of the inhabitants of the importance of collective social capital. To improve that, the most important is that the inhabitants acknowledge the

importance of their collective social capital in their adaptation to flooding. In that way, they could start to integrate the adaptation to flooding more into their forms of ‘gotong royong’. Further research on this can also be recommended for the purpose of developing adapted practices by the local government. Both the inhabitants and the government have to see the importance of linking collective social capital to adaptation to flooding.

Another recommendation is that more research is needed on what can happen if the intensity of the flooding increases. To what extent of flooding is collective social capital able to contribute to the protection from it? Next to that, this research has shown the importance of collective social capital in adaptation to flooding in the case of Kemijen in Semarang. Therefore research on the same subject in other areas in Indonesia or even Southeast Asia could be very useful for more complete understanding of the role of collective social capital in adaptation to flooding at community levels.

### 8.4 Reflection

The neighbourhood Kemijen was a good research area, as it was suffering from flooding and land subsidence and people were willing to cooperate. A footnote that has to be made here is that in this area there has been a technocratic development over the past years, namely the introduction of the Banger pilot polder project. The neighbourhood representatives we met were part of this project. The first respondents that were introduced to us were very positive about this project and kept on bringing it back into the conversation. After we started selecting our own respondents, this became less. There were even some respondents who had not heard of the project or they were very dissatisfied with it. The introduction and development of the pilot polder form an extern influence that can have influenced a shift of mind regarding the flooding that we do not know of. Nevertheless, the pilot polder still has not been sufficient to protect the inhabitants from the water and therefore they still are employing their own adaptation strategies.

Working together with a translator definitely causes a restriction in empirical research. Not knowing exactly what someone is saying and not knowing exactly how the translator explains your words, are great disadvantages. Thereby the duration of the interviews was extended because of the translation in between each question and answers. For the analysis it is hard to base conclusions upon words that not directly come from the respondents. Nevertheless, by the combination of translation and evaluation afterwards, enough relevant research material was obtained.

Collecting primary data in cooperation with two fellow students has its benefits and disadvantages. Their questions could also uncover stories that were of importance for my research. In addition, when having trouble understanding something, deliberation could be useful. On the other hand, the fact that you are conducting an interview together means making compromises. For instance, about which respondent is suitable, in which order the subjects are covered and in what way a question best can be asked. Nevertheless the collaboration was very good and it was a valuable contribution to the experience of conducting a complete research individually for the first time.

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## Appendix 1: Different coping mechanisms employed by the people of Semarang

Dewi, A. (2007). Community-based Analysis of Coping with Urban Flooding: a Case Study in Semarang, Indonesia *International Institute For Geo-Information Science and Earth Observation* P. 47

| | |
|---|---|
| Economic (1) | Construction of house with the reinforced material<br>Preparing place for storage at the higher place (1,3)<br>Storing basic food items such as : rice and sugar<br>Building dikes in front of house using sand bags (1,2)<br>Repairing minor damage of the appliance (1,2)<br>Repairing important damage to the house(1,2)<br>Fixing things(1,2)<br>Continue working<br>Purchasing cheap food<br>Repairing minor damage of the appliance (1&2)<br>Repairing important damage to the house (1&2)<br>Saving money |
| Technological/Structural(2) | Construction of house with the reinforced material<br>Closing the door and windows properly to avoid water<br>Do nothing (1,2&3)<br>Securing house entrance to avoid debris<br>Cleaning the house by draining (1&2)<br>Repairing minor damage of the appliance<br>Repairing important damage to the house<br>Fixing things<br>Cleaning the canal surroundings the house (2&3) |
| Social/Organisational (3) | Cleaning the house and surroundings<br>Looking for alternative place to move<br>Continue patrolling the neighbourhood (ronda)<br>Helping other's community member in doing work ( gotong royong)<br>Guarding the house to ensure safety belongings<br>Searching relief materials<br>Evacuating the family, especially children and elderly to the safer place, such as: factory building, kelurahan office (local building office), mosque , friend's or relative's place<br>Evacuating the important things to the safe place (1,3)<br>Preparing temporary place at friend's or relative's place<br>Preparing place for storage at the higher place (1,3)<br>Cleaning the canal surroundings the house (2&3) |

## Appendix 2: Interview guide

**Interview guide**

In general
Respondent's name:

How many people are living in your house?

What is your relationship with them?

What job do you have?

Waterproblems
Now we want to talk to you about the waterproblems in this area:

Please describe what kind of waterproblems this area is coping with?

Do you remember the time before the increase of the waterproblems? What are the differences between then and now?

What do you think is the major cause of the waterproblems?

- How did you acquire that knowledge?

When was the last time you experienced a flooding?
- Please describe what happened and how you experienced it?

Dealing with the problems
What do you do to protect your home, household and belongings before, during and after flooding?

- In what way does this help to protect your home, household and belongings?
- Do you think you have enough abilities to protect yourself?
- Did you work together with other people from your neighbourhood in this?

What are you doing now to prepare for the next flooding?
- Do you think you have enough information on how to prepare?

Are you participating in any formal organizations that are dealing with the waterproblems?

Relationships
Now we want to talk about relationships, with this we mean ties or bonds between you and another person or group.

Could you please tell us something about ties that are important for you?
- Family, friends, neighbours, colleagues
- Why do you have a relationship with them? Do you have common purposes?
- Are any of these ties with people with a different religion or ethnicity?
- Where do these people live in general?

Working together

What do Gotong Royong, Ronda, Dasa Wisma and Posyandu mean to you?

- Do you have any examples of these practices in your neighbourhood?
- What are the differences between these practices before and after the increase of the waterproblems?
- Do you think that these practices contribute to the protection of your neighbourhood against the waterproblems?

When a household gets in trouble because of the waterproblems, do other members of the neighbourhood help them?

- Can you give any examples?
- Does this happen on a voluntary basis?

## Appendix 3: List of codes

Code-Filter: All

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HU:  Bachelorthesis analyse
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Edited by: Super
Date/Time: 2013-06-25 12:32:10

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Acquiring of knowledge about major causes
Action of collective social capital
Adaptation strategies
Age
Assistence of specific household
Bonding capital
Bridging capital
Close ties to people who can provide necessary information
Collective social capital
Communal interest
Community behaviour
Community member's participation in formal organizations
Consequence of the water problems
Contribution of social practices to protection of neighbourhood
Dasa Wisma
Differences between time before increase of water problems and now
Differences social practices
Drive behind adaptation strategy
Economic adaptation strategies
Example dasa wisma
Example gotong royong
Example posyandu
Example ronda
Flooding
Formal networks
Formal organizations serving the communal interest
Gender
General information
General norms in a community
Generalized reciprocity
Gotong royong
Household
Informal networks
Information channels
Information obtained via social relations for other purposes
Information on how to prepare
Job
Kind of water problems in the area
Knowledge out of experience
Land subsidence
Last flooding, how experienced
Last flooding, what happened

Last time resp. experienced a flooding
Level of being informed
Link collectie social capital - Adaptation strategies
Local knowledge
Major causes
Name
Networks of colleagues
Networks of family
Networks of friends
Networks of neighbours
Norms & effective sanctions
Norms & sanctions by institutions
Obligations, expectations and trustworthiness of structures
Personal meaning of social practices
Posyandu
Potential of collective social capital
Preparing now / Daily live
Reason for relationship
Ronda
RT
RW
Sense of common identity
Social / organizational adaptation strategies
Social practices
Technological / structural adaptation strategies
Ties crossing class
Ties crossing ethnicity
Ties crossing gender
Ties crossing religion
Ties crossing socio economics
Time before increase of water problems
Voluntary basis
Working together as adaptation strategy first time asked
Worst flooding experienced by respondent