A DEVELOPING COUNTRY PERSPECTIVE ON THE ADAPTIVE CAPACITY: FLOOD DEFENCE INSITUTIONS FOR CLIMATE CHANGE ADAPTATION IN INDONESIA

THESIS

A thesis submitted in partial fulfillment of the requirements for
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ABSTRACT

A DEVELOPING COUNTRY PERSPECTIVE ON THE ADAPTIVE CAPACITY: FLOOD DEFENCE INSITUTIONS FOR CLIMATE CHANGE ADAPTATION IN INDONESIA

Mitigation have not given any real results. Adaptation becomes more favorable approach. However, climate changes issue is not popular for the current institutions. Whilst many cities have already suffered from its impact, the concept literature is less from developing countries. International lessons learn revealed that: variety needs good coordination; institutions are difficult to change; flexibility requires control; Water manager and planner are important leader; there is significant gap of resources between two worlds; basic right protection is weak in developing countries.

The adaptive capacity dimensions are found insufficient in BPPP. No *variety* in problem frames and solutions. *Learning* is only one-direction, central/expert to community. *Room for autonomous change* is limited because of less information access, law enforcement, and high dependency. Central acts as entrepreneurial and collaborative leader, the advocacy leader is missing. Local contribution in financing and human *resource*s is low. *Fair governance* is forced by donor institutions.

Keywords: climate change, sea level rise, adaptation, adaptive capacity, adaptive capacity wheel, institutions, flood defence, developing countries, coastal city.

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PREFACE

This thesis is conducting during January to August 2010 at Environmental and Infrastructure Planning Programme, the Faculty of Spatial Science, Rijkuniversiteit Groningen. The subject of this thesis is about the adaptive capacity of flood defence institutions in Semarang City, Indonesia, to enable climate change adaptation. My aim is to assess the adaptive capacity of current institution by applying the Adaptive Capacity Wheel, and at the same time criticizing the adaptive capacity itself as the assessment tool to be implemented in developing country context. This will, hopefully, contribute in enriching the adaptive capacity concept from developing countries perspective.

I would like to express my gratitude to Dr. Margo van den Brink and Bapak Dr. Ir. Krishna Nur Pribadi, M.Sc., M.Phil. as my supervisors for their invaluable advices, assistances, support, and guidance, to Dr. Ir. Arie Setiadi Moerwanto, M.Sc., Iswari Paramesthi and other interviewees for their great cooperation and help in making the interview possible. Special thanks also to all my friends, especially group members of DD ITB-RUG 2008 for sharing great moments in Bandung and Groningen. The last but not the least, I wish to express my love and gratitude to my mother and sisters for their consistent support and prayer, to my fiancé for his understanding and endless love.

Ultimately, the increasing depth of knowledge demand of water resources management due to climate change challenge is one that fascinates me during eight years of working at Research Center for Water Resources. I owe my curiosity above all to my father, Dominikus Saridjo Dwiatmoko, who passed away in July 22th, 1999, who first introduced and inspired me on the charm of life and nature. I hope that it will keep me forever learning, questioning and searching for more answers.

Groningen, August 2010

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CHAPTER 1
INTRODUCTION

1.1. Background

Climate change issue is still a debatable topic regarding to both impacts and measures. Apart from the uncertainty of climate change, it is scientifically recorded that during the 20th century the average of inland temperature has been increasing approximately $0.6 \pm 0.2\ ^{0}$ C (IPCC Working Group 2, 2001) and the sea level continuously elevates for about 10-25 cm, and it is estimated that in the 21st century this phenomenon will still continue to experience or even accelerate (Nicholls and Klein, 2001). If this really occurs there will be a great loss of land in the coastal area, together with all the structure attached on it. Moreover, coastal areas are densely populated and highly productive regions (Small and Nicholls, 2003). It means that the impact of sea level rising will not only affect on biophysical system, such as ecosystem damages, erosion and flood but also impact on the socio-economic system since many aspect of human activities will be influenced by this changes (Nicholls and Klein, 2005) as the result of infrastructure damages, settlement displacement and loss of livelihood, water source contamination, groundwater intrusion, etc.

Regarding to the more frequent of extreme events and disasters occurs recently and the fact that mitigation actions have not given any real results, the adaptation option becomes more favorable and considers as realistic approach. The rational of adaptation action importance is that (Füssel, 2007): (1) the anthropogenic greenhouse gas and aerosol emissions are already affecting average climate conditions and climate extremes; (2) the climate will continue to change for the foreseeable future and even accelerate in frequent and intensity; (3) the result of adaptation measures can be seen in a much shorter time whereas mitigation measures can only be fully apparent after at least several decades; (4) adaptation can be implemented on a local or regional scale and less dependent on the other actions. It is obvious that the emerging of adaptation measures do not undermine the importance of mitigation but the efforts should be issued in parallel as the short term goal action to more local context problems to underpin the weakness of mitigation approach.

The increasing interest in adaptation to climate change is reflected in the development of the theory and practice of climate change assessments, and in increasing consideration by political organizations and funding bodies (Füssel, 2004; Carter et al., 2007). It is argued that since adaptation deals with the local and national social or institutional context then it becomes necessary to understand the inherent characteristics of institutions to stimulate the adaptive capacity of society to deal with continuous, uncertain and often unpredictable structural changes (IDGEC, 2005 in Gupta et al, 2008). Nevertheless, most of literature of adaptive capacity concept originates from developed countries which reflect a regional imbalance in scientific literature. A statistic analysis by Kiparsky M. et al (2006) on a database of global scientific references related to climate and water research published before year 2000 revealed that less researches on developing countries in this field and more researches on climate and hydrology than on human and natural system. Furthermore,

vulnerability and adaptation assessments in developing countries have usually been conducted in the context of bilateral or multilateral assistance schemes (Füssel, 2007) that are financed primarily through industrialized countries' programs or through international funding regimes (Ogunseitan, 2003) for examples the United States Country Studies Program (USCSP), Climate Change Vulnerability and Adaptation in Developing Country Regions (AIACC Project), the National Adaptation Programmes of Action (NAPA) process and the ADB technical assistance to the Pacific islands region. The priorities of these funding institutions do not accommodate development plans of recipient countries or local needs but mainly focuses on the broader or regional issues. The institutional politics and culture context of recipient countries should not undermine in the implementation of adaptation assistances and aids.

Meanwhile, many coastal cities in developing countries have already suffered from flood disaster climate change impact such as India, Bangladesh, China, Vietnam, and no exception in Indonesia (Nicholls et al, 2007). As an archipelago country, Indonesia has more than 17,000 islands with 80,000 km coastline; this condition makes Indonesia vulnerable to sea level rising. As an illustration, 1 meter sea level rising will result 405,000 Ha loss of coastal area and drown more than 2000 islands (UNDP, 2007). Cities like Jakarta, Surabaya and Semarang is very susceptible for flood and storm runoff. It has become worse in Jakarta due to the land subsidence caused by land overburden from multistory buildings development and increasing extraction of ground water. Flood in Jakarta is apparently a routine cyclic problem every year; early February 2007, the flood has killed 57 people and forced 422,300 inhabitants evacuated from their houses, and about 1,500 houses destroyed and flushed, total losses estimated 695 million dollar (UNDP, 2007). Almost typical problems also faced by Semarang, this capital city of Central Java Province has to struggle with flood problems since hundreds years ago, the oldest record of flood occurred in Semarang dated in 1800's. The results of the Research Institution for Water Resources (Puslitbang SDA, 2004) comparison study that was carried out based on 1939 and 1999 topography data of Kota Semarang shows that the area influenced by high-tide has expanded as far as 3-4 km to the land and 460 Ha area inundated.

Several adaptation efforts for controlling coastal flooding actually have been started by assistance of developed countries based on both structural and non-structural approaches for example Banger Polder Pilot Project (BPPP) community based participation in Semarang (2003-now), this project is a quite comprehensive approach since it implemented varies of approach such as dykes, drainage systems, pump stations, polder systems, coastal-land reclamations, coastal planning and management, public education, as well as the establishment of an institutional framework for flood control management. During the implementation of BPPP there are some conflicts emerged which derived from the multi-use of land in coastal area of Semarang such as settlement, tourism, harbor, railways, industries and agricultures. The lack of community awareness to climate change, the poor coordination between the state and local level government and among sectoral agencies and also the financial mechanism of operational and maintenance have hampered the adaptation efforts.

The community is still not fully participated but more similar as consultancy (Setyaningtyas, 2009). The effectiveness of this project in creating sustainable coastal city has not been proved yet and still needs to be evaluated continuously whether it is sufficiently adaptable to deal with future climate change impact.

As Kombaitan (2001) states that an adaptive capacity assessment method can be used, as the first step of adaptation actions for coastal city in Indonesia, to overview the levels and types of efforts because some necessary adjustments to the characteristics of "urban" and typical of our cities will be needed more and more frequent due to the uncertainty of climate change impact and the accumulation of green gas emission effects. It implicitly emphases the urgent need of adaptive capacity assessment due to the unpredictable condition in the future related to the sea level rising, especially for flood defence institutions as the vital element of coastal city in the future. Therefore, in this research I will evaluate the current adaptation effort of climate change in coastal city in Indonesia by assessing the adaptive capacity of flood defence institutions within Banger Polder Pilot Project in Semarang.

1.2. Problem Statement

Many coastal cities, mainly in developing countries, have already suffered from climate change impact. The rising of sea-level has affected not only biophysical system, such as erosion and flood, but also socio-economic system which is depending on the human exposure to these changes (Nicholls and Klein 2005). The coastal community of developing countries is relatively more susceptible to those impacts, compared to those in developed countries because of their strong dependence to resources that are sensitive to change in climate. A sufficient adaptation approach for Indonesia as an archipelago country in order to dealing with climate change impacts is a necessity, considering many of important cities such as Jakarta and Semarang are situated in coastal area and already exposed by the sea-level rise. However, the way to this approach is not easy because the related climate changes issue is apparently not popular for the current institutions (Termeer et al 2009). Institutions here means systems of rules, decision-making procedures, and programs that give rise to social practices, assign roles to the participants in these practices, and guide interactions among the occupants of the relevant roles (IDGEC Scientific Planning Committee 1999: 14). Thus, it is principal to firstly understand the inherent characteristics of institutions in developing countries to stimulate the adaptive capacity of society. Here a question arises: to what degree the current flood defence institutions are able to improve the adaptive capacity of coastal society specifically in Indonesia and generally in developing countries compared to developed countries.

1.3. Research Objective

The research is conducted to aim the following objectives:

1. To distinguish between the general institutional issues on adaptation strategy due to climate change in two side world-developed and developing countries and the unique issues in developing countries.

2. To understand the national institutional context of Indonesia as developing county and their implications to the flood defence institutions in enabling climate change adaptation.
3. To investigate the adaptive capacity of flood defence institutions in coastal city in Indonesia by assessing the institutional of Banger Polder Pilot Project in Semarang.
4. To give recommendation on the current flood defence institutions of coastal city in Indonesia to enable climate change adaptation and the Adaptive Capacity Wheel as a tool for assessment to be more applicable in developing country institutions context.

1.4. Research Question

To obtain the research objectives some research questions is revealed in order to identify the main problems and to guide the research flow. The research questions to be answered are listed in sequence as follows:

1. What distinguish the institutions of coastal city due to climate change between developed and developing countries?
    a. What are the implications of climate change, precisely sea level rising, to coastal city?
    b. What kind of adaptation efforts has been done in developed and developing countries in dealing with the current and future challenges?
    c. What are the specific institutional issues in developing countries that influence the capacity to enable climate change adaptation?
2. How does the national political context influence the implementation of Banger Polder Pilot Project?
    a. How is the recent political situation in Indonesia?
    b. How is the development planning system in Indonesia?
    c. How is the spatial planning system in Indonesia?
    d. What might the implication on coastal development and flood defence institutions?
3. To what degree the implementation of Banger Polder Pilot Project has improved the adaptive capacity of Semarang Society as a coastal city due to climate change?
    a. What is Banger Polder Pilot Project and why is it implemented?
    b. What is the implication of Banger Polder Pilot Project to adaptive capacity of Semarang City?
    c. What are the local context variables that interferes the adaptive capacity?
    d. What is adaptive capacity concept regarding to climate change in developing countries?
    e. How to assess the adaptive capacity of institutions in developing countries?
4. What kind of improvement can be done for the current flood defence institutions to enable climate change adaptation in coastal city?
    a. What are the institutional strengths and weaknesses?
    b. What possible actions can be taken to preserve the strength and to improve the weaknesses?

1.5. Methodology

1.5.1. The Research Analytical Framework

For the conceptual framework, I employ the Adaptive Capacity Wheel which is developed by Gupta et al (2010) to be used as the assessment tool. It consists of six dimentions: variety, learning, room for autonomous change, leadership, resources and fair governance. First, those variables are applied in two side world in general to distinguish institutional issues in both countries. Second, the assessment is conducted in detail on the flood defence institution in Indonesia through a case study, namely Banger Polder Pilot Project in Semarang. This framework helps in answering the research questions which is mentioned in the previous section. The framework is illustrated as scheme in Figure 1.1.

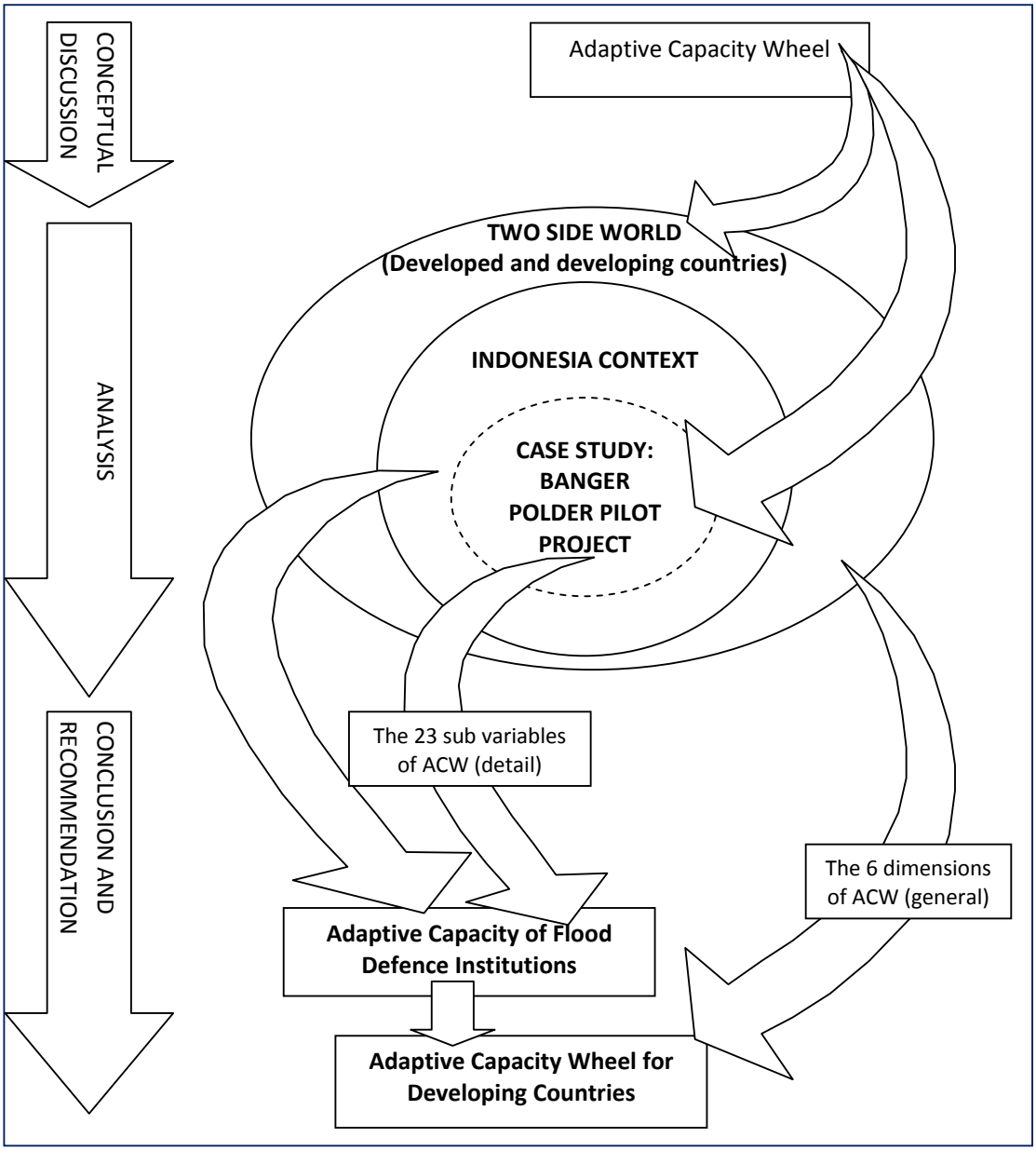


Figure 1.1. The Research Analytical Framework

1.5.2. Data, Sources, and Collecting Method

The data required in this study are:

1. Applied research literature of adaptation approaches and adaptive capacity assessment in developed and developing countries.
2. Law, regulations, manuals and guidelines in Indonesia from different level and sector governments.
3. Opinion, statement and perspective of actors involved in Banger Polder Pilot Project regarding to climate change.

Applied research literature is a collection of prior study articles which related to vulnerable assessment of climate change impact in particular coastal city and adaptation approaches that have been conducted both in developed and developing countries. This data are mostly attained from the literature (articles, journals, books) which is available in related RUG Library links.

Meanwhile, the law and regulations are needed to grasp the context of legal aspect about water resources development, spatial planning and local government. The law, regulation, manuals and guidelines are attained from the government institutions in national level to local level. In the national level, the institutions are BAPPENAS, Ministry of Environment, Ministry of Public Work, Ministry of Public Transportation and Ministry of Marine Affairs and Fisheries. The local institutions are BAPPEDA and Dinas Perencanaan of province and city. It is also possible to search these data from internet which can be accessed from www.pu.go.id and www.semarangkota.go.id.

The opinion, statement and perspective of actors involved in planning are obtained from project documents, newspaper archives, and interviews with involved stakeholders in Banger Polder Pilot Project. The project document used in this research belongs to Ministry of Public Work. Information from newspaper archives is collected through local and national electronic media. The informants to be interviewed are chosen by using snow ball method (Verschuren and Doorewaard, 1999). There are two key persons that become the starting point of interview, one key informant from government (Head of Research Center for Water Resources Development) and another one from non government (Representative of HHSK in Indonesia). The interview is conducted by telephone or internet messenger applications which depend on the available communication device of informants and it is recorded. To manage the substance of interview, a set of pre-structuring questions is arranged in advance to guide the conversation, see Interview Guide in Appendix 1. The statements quoted from the interview that is taken for the analysis of this research is approved by the related informants.

1.5.3. Analysis Method

The analyses employed to achieve the objective of this research are descriptive, comparative and Adaptive Capacity Wheel analysis. These analysis models are applied since all the data will be a qualitative data.

This research uses comparative analysis as an analysis tool for observing the similarity, difference, coincidence or intersects of research objects. Generally, both

descriptive and comparative analyses are applied all at the same time in the entire research process but comparative analysis is particularly implemented to distinguish the general issues of coastal city and the specific issues in developing countries related to adaptive capacity. In the mean time, the descriptive analysis is employed to explain the finding revealed from the comparative analysis.

The Adaptive Capacity Wheel is applied for assessing the adaptive capacity of flood defence institutions within Banger Polder Pilot Project in Semarang city based on the synthesis of opinion, statement and perspective of involved actors and non-involved actors. The Adaptive Capacity Wheel method illustrates the decree of adaptive capacity by giving values to variables and sub-variables. The level of adaptive capacity is visualied in five colors, in sequence from high to low there are dark green, light green, white, orange, and red.

1.6. Thesis Structure

To structure the discussion, analysis and result, this thesis is divided into seven chapters. Chapter 1 contains a general introduction about the research such as background, problem statement, objective, research question, methodology, feasibility and structure of thesis.

In Chapter 2, I discuss the conceptual basis of the research. Literature review on adaptation strategy, adaptive capacity, Adaptive Capacity Wheel and institutional is mentioned here in general and then reflecting them into developing countries context.

Chapter 3 provides the detail explanation about the methodology of this research. This chapter has two sections. First, it describes the research design and case study selection. Meanwhile, the second section is about the data collection and analytical method.

The general comparison of four adaptation strategy implemented in two side world is analysed in Chapter 4. Two countries representing developed countries are The Netherlands and England. Whilst, Bangladesh and Philippine are chosen as the representative of developed countries. The comparison is based on the six element of Adaptive Capacity Wheel: variety, learning, room for autonomous change, leadership, resources and fair governance.

In Chapter 5, the national context of Indonesia as developing country is discussed. It is starting with political situation in reformation era, then continuing into the development planning, and spatial planning system and water-related sectors. The discussion then flows into the implication of national context to coastal development, which further might influence the adaptive capacity of flood defence in case study area.

Chapter 6 mainly consists of the detail description about the Semarang city where the case study held. A brief about the Banger Polder Pilot Project also given before the adaptive capacity assessment on the project is applied and analysed.

Finally, Chapter 7 presents the conclusion of the research and some recommendations for strengthening the flood defence institutions to enable climate change adaptation. Additionally, I also propose several new variables for the Adaptive Capacity Wheel that might be more applicable and important in the context of developing countris.

CHAPTER 2
ADAPTATION, ADAPTIVE CAPACITY AND ADAPTIVE CAPACITY WHEEL FROM DEVELOPING COUNTRIES PERSPECTIVE

2.1. Introduction

The main objective of this study, as the first chapter stated, is to find out whether the implementation adaptation action presenting the adaptive capacity of society in the context of coastal city in developing country[1]. As the framework for further analysis, this chapter discusses the adaptation context in the climate change issue specially related to sea level rise and the variables that determine it (exposure, sensitivity and adaptive capacity). The adaptive capacity as one of the important variables is given in more detail in the next section. Specifically, it discusses what kind of society is actually more vulnerable and what quality is required to specifically enhancing adaptive capacity. Later, the discussion zooms on the importance of adaptive capacity to reduce society vulnerability considering the nature characteristics of institutions. At the end, the variables in the Adaptive Capacity Wheel refer to Gupta et al (2010) that might indicate whether the existing institutions stimulate the adaptive capacity of society are explained. Every discussion is reflected into developing country perspective.

2.2. Adaptation due to Sea Level Rise Risk

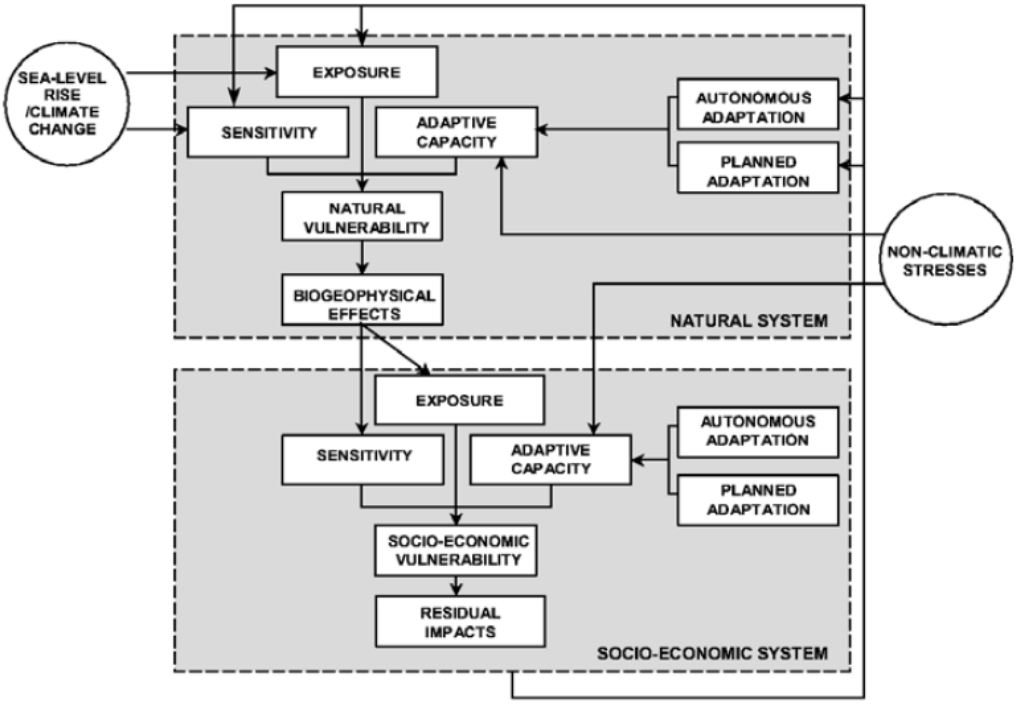
Several definitions of adaptation are available in the literature. Popular dictionary refers "adaptation" as the act or process of adapting and the state of being adapted and "Adapt" means to make more suitable, or to fit some purpose, by altering or modifying (Merriam-Webster Online Dictionary, 2010). In the climate change context, this process or condition is as a response at present or predicted climate impacts.

Earlier scientific discussion on climate change adaptation mostly focused on any adjustments related to socio-economical system. Burton (1992) defines adaptation as a process to minimize the risk of climate change effects on the health and well-being of people by employing the opportunities that their climate environment provides. Smit (1993) illustrates that adaptation is related to all adjustments due to enhancing the viability of social and economic activities in order to reduce their vulnerability. Smith et al. (1996) state adaptation as all adjustments in behavior or economic structure in reducing the vulnerability of society to changes in climate system.

More recent studies focused on the assessment of coastal vulnerability to climate change within the conceptual framework adapted from Klein and Nicholls (1999). According to Klein and Nicholls concept, the coastal system is defined in terms of interacting natural and

[1] The standard definition of ''developing country'' used by international agencies- the United Nations and the World Bank, is low- and middle-income countries in Asia, Africa, and Latin America as well as transitional economies in eastern and central Europe. Economies are divided according to 2008 GNI per capita, calculated using the World Bank Atlas method. The groups are: low income, $995 or less; lower middle income, $996 - $3,945; upper middle income, $3,946 - $12,195; and high income, $12,196 or more. (Source: World Bank, "Country Classifications", 2010).

socio-economy systems (see Figure 2.1). Relative sea level rise will affect directly to the natural system which will emerge as biogeophysical impacts such as intrusion, erosion, inundation, and ecosystem changing. In turn, these changes can also directly and/ or indirectly influence on the social-economy system, which is relied on the human exposure. In this perspective, adaptation considers as a broader interrelation between the nature and socio-economical system. Therefore, adaptation strategy must take into account not only socio-economical system but nature system as well, and put both within an integrated strategy, because both systems are interconnected with each other and no measures can be done without affecting the others (IPCC, 2001).



Source: Klein and Nicholls (1999)

Figure 2.1. The role of adaptation due to climate change/ sea-level rise

Further Klein and Nicholls (1999) stated that both systems may be distinguished by three characters regarding to their response to sea level rise: exposure, sensitivity and adaptive capacity to change. Exposure defines the nature and amount to which a system is exposed to climate change, for example population, water resources, variety species and ecosystem. Sensitivity indicates each system's potential to be affected by changes such as sea-level rise, which means to what degree the climate change potentially influence the exposed system. Meanwhile, adaptive capacity reflects each system's stability in the face of change.

The sensitivity and adaptive capacity greatly rely on the capacity and capability of a system to deal with the changes. Thus, both may distinguish two similar affected systems with the same exposure level, for instance similar number of population and geophysical condition. Adger et al. (2003) argue that all societies are fundamentally adaptive and there are many

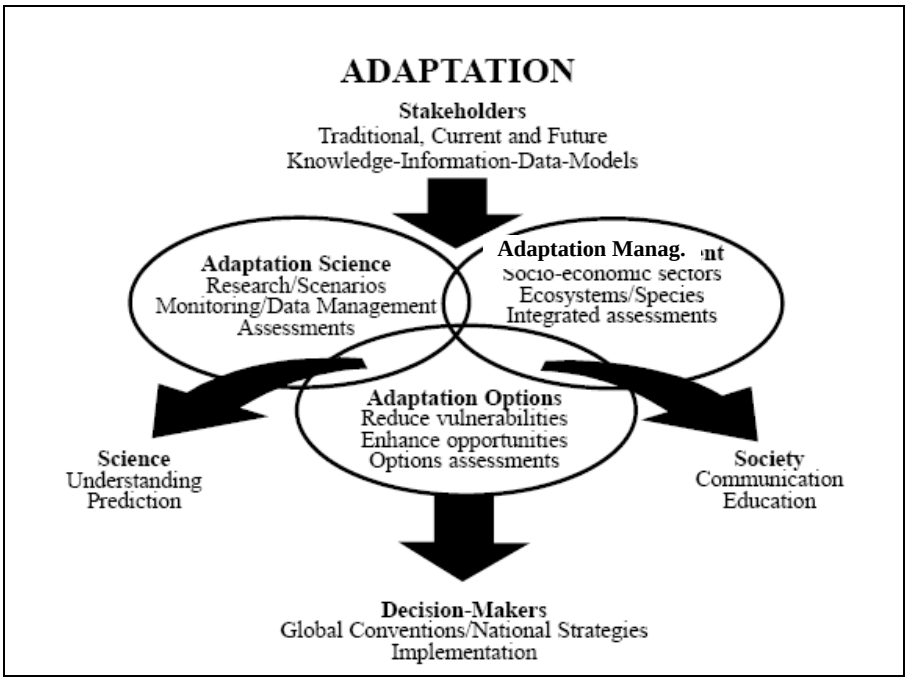
situations in the past where societies have adapted to changes in climate and to similar risks, but some groups of society are more sensitive (high sensitivity) and more vulnerable to the risks posed by climate change than others for instance the poor community in developing countries. The reason for this might be explained by the elements that determine the adaptive capacity which are insufficient found in developing countries. Because of the nature of climate change itself, real but highly uncertain, all societies need to enhance their adaptive capacity to face both, present and future climate change outside their experienced coping range to reduce their vulnerability. Societies need to improve their adaptive capacity to eliminate their sensitivity. It means that planned adaptation is about promoting adaptive capacity and encouraging autonomous capability of society in changes condition.

As mentioned previous, the climate change trend is a real phenomenon but in time and magnitude dimensions are full of uncertainty. Under this uncertainty and complex environment, decision makers have to make decision on adaptation options. However, adaptation options require theories to justify the decision taken before implementing the options. Afterward, these theories will become the basis of evaluating and assessing the implementation of options (practice). Wheaton and Maciver (1999) framed the relationship of those three adaptation components (theory, option, practice) in separated authorities but overlapping with each other in some conditions (see Figure 2.2). In this concept adaptation world is transformed into adaptation science (theory), management (practice) and option components plus their respective sub-division as illustrated in the Working Paper on Adaptation to Climate Variability and Change by Wheaton and Maciver. Further sub-divisions within Science include adaptation research, scenarios, monitoring/data management, and adaptation science assessments. Adaptive management subsections include socio-economic sectors, ecosystems/ species environments and integrated assessments; and within adaptation options subsections include reducing vulnerabilities, enhancing opportunities and options assessments. Actually, this framework explained by Wheaton and Maciver illustrates the ideal institutions to enable climate change adaptation.

As I mention before, the poor community in developing countries is less adaptive, moreover if it is compared to the ideal institutions for climate change adaptation illustrated by Wheaton and Maciver (1999). Actually, the reason is lying on the elements of adaptive capacity itself. Yohe and Toll (2002) define four principle elements which are crucial for the development of adaptive capacity: raise awareness of the risk; identify adaptation options; prioritise options; and remove barriers to adaptation. Since the climate monitoring and information about the risks of climate change impacts are less developed compared to developed countries, the potential danger is hard to understand by society. As the basic data of climate change variability is incomplete the decision on the adaptive option will be difficult to take, and so on.

UN-FCCC (2002) provides a guideline for National Adaptation Program of Actions (NAPA) for developing counties to ensure the implementation of ten elements in adaptation process which are participatory, multidisciplinary, complementary, sustainable, gender equity, country-driven, sound-environmental, cost effectiveness, simplicity, and flexibility of

procedures. The guideline consists of elements for the institutions improvement. Those elements are generally the weaknesses of institutions in developing countries. Therefore, it is important to identify at what degree the current institutions have promote their environment to enable climate change adaptation. However, it is better to firstly understand the nature of institutions in general to get a clear picture about the opportunities and threats for further institutions improvement.



Source: Wheaton, E.E et al (1999)

Figure 2.2. Adaptation Framework concept

2.3. Institutional Perspective

Previous sections discussion leads us to a possibility of approaching adaptation through institutions improvement for enhancing adaptive capacity of society. Actually, there are many definitions of institutions, a common thought will associate institutions with organizations, but institutions have a broader definition. O'Riordan and Jordan (1999) describe the role of institutions "as a means for holding society together, giving it sense and purpose and enabling it to adapt".

A consensus definition is given by the International Human Dimensions Programme's Institutions project where institutions are defined as: "systems of rules, decision-making procedures, and programs that give rise to social practices, assign roles to the participants in these practices, and guide interactions among the occupants of the relevant roles" (IDGEC Scientific Planning Committee 1999: 14). This meaning defines institutions as a mechanism of social behavior and interaction. Thus, according to this perspective, institutions are manifest in both objectively real, formal organizations and also in informal social order and organization, reflecting human psychology, culture, habits and customs. Therefore,

institutions *structure politics* because they define who is able to participate in the particular political arena, shape the various actors political strategies, and influence what these actors believe to be both possible and desirable (Steinmo, 2001). Considering that, the changing on institutions will essentially alter the social behavior and interaction, which might result a huge impacts on society.

However, one of the features underlines about institutions is that institutions do not change easily (Steinmo, 2001). Institutions are naturally *conservative*, which become the weakness and also the strength. People are afraid of changing the rules because it is difficult to know what will happen after the rules are changed. The more "contrary" the new change to the tradition custom is, the more resistance will be given to the change and vice versa. Berkhout et al (2006) argue that organisations face a number of obstacles in learning how to adapt to climate change impacts, especially in relation to the weakness and ambiguity of signals about climate change and the uncertainty about benefits flowing from adaptation measures. In the other hand, planning for adaptation can and should start before all uncertainties reduced to a minimum.

In contrast to the perspective of the "stiffness" of institutions, there are some believers that dramatic shocks to the system can raise massive changes. As the matter of fact human history is full with dramatic change and revolutions. They tend to understand outcomes at any one point in time as the product of the convergence of a number of factors (Orren and Skowronek, 1994). Thus, the answers to the question of system changes are discovered through careful historical analysis which examines the ways in which a number of factors have intersected and affected one another over time (Hudalah and Woltjer, 2009).

Implementing the adaptation options for climate change response is not easy due to all kind of institutional and social complexities (Termeer et al, 2009), especially in developing countries because of various constraints related to the nature of institutions itselft. Moreover, most adaptation strategies require a profound change of land use, water management, production methods or housing systems (Termeer et al, 2009), which is found still insufficient provided in developing countries. Moreover, the wider differentiation of transformation to be achieved, the more difficult it is to be realized. Since major options for climate change adaptation innovated from developed countries, the wide gap of biophysical and socioeconomic setting between developed and developing countries will also hamper the process. Is there still a chance for developing countries to catch up the lag in institutions transformation to enable climate change adaptation? Instead of the pessimistic perspective, still institutions change or transformation is possible but it takes time and accumulation of actions to create a meaningful result at the future. Additionally, it is essential to promote adaptation options that had already embedded within the society.

2.4. Adaptive capacity

Adaptation depends greatly on the adaptive capacity or adaptability of an affected system, region or community to be able to cope effectively with the impacts and risks of climate change (IPCC, 2001). Adaptive capacity began to emerge as a fundamental

organizing concept during a Workshop on Adaptation, Climate Variability, and Change organized by the Intergovernmental Panel on Climate Change (IPCC) in San Jose, Costa Rica, in April of 1998. Adaptive capacity is the property of a system to adjust its characteristics or behavior, in order to expand its coping range under existing climate variability, or future climate conditions.

In practical terms, adaptive capacity is the ability to design and implement effective adaptation strategies, or to react to evolving hazards and stresses so as to reduce the likelihood of the occurrence and/or the magnitude of harmful outcomes resulting from climate-related hazards (Brooks and Adger, 2005). Based on those characterizations above, adaptive capacity refers to a range of quality of an individual or system to change or modified itself or its environment in order to preserve its existence and reduce possible negative impacts due to climate change and the implication of chosen reaction. Hence, adaptive capacity is interesting because it focuses on the *changeable aspect* of which gives *opportunity for any intervention* to modify the characteristics of system (Gupta et al, 2008).

Since adaptive capacity reflects a level of performance or condition, there should be factors or variables that can be utilized to measure it. Yohe and Moss (2000) suggested in this Workshop that adaptive capacity depends upon a wide range of similarly specific characteristics:

- the range of available *technological* options for adaptation,
- the availability of *resources* and their distribution across the population,
- the structure of critical institutions and the derivative allocation of decision making *authority*,
- the stock of *human capital*, including education and personal security,
- the stock of *social capital* including the definition of property rights,
- the system's access to *risk spreading processes*,
- the ability of decision-makers to *manage information*, the processes by which these decision-makers determine which information is credible, and
- the *credibility* of the decision-makers, themselves, and
- *public perception* of attribution.

Yohe and Moss argue that adaptive capacity will be determined by variables such as technology, resources, authority, human capital, social capital, sensitivity, information, credibility and public perception. Smit and Burton et al (1999) defined adaptive capacity in more concrete terms, namely as a series of system characteristics relating to both physical elements (infrastructure, material wealth, technology) and social/institutional elements (human capital, political legitimacy, institutional strength). They have proposed these characteristics to evaluate of the degree to which different systems will adapt. According to the explanation above, this adaptive quality depends on the elements such as resources (e.g. technology, wealth, information/ knowledge), human capital (e.g. education, security), social capital (e.g. property rights), political legitimacy (e.g. credibility, accountability) and public perception (e.g. reflection, awareness, responsiveness).

However, the adaptive capacity variables presented above only cover the visible qualities. Interestingly, such an autonomous adaptation is not easy to assess because human reaction is uneasy to predict, they respond differently for different type of impacts (Barnett 2001). The adaptation process requires the capacity to learn from previous experiences to cope with current climate, and to apply these lessons to cope with future climate, including surprises. Therefore, the capability in *learning* from experiences is also factor that determines the adaptive capacity.

Furthermore, Eakin and Lemos (2005) argued that these adaptive qualities will emerge as a system identifies threats, the adaptive capacity is a *potential qualities* that will only be seen if there is a consciousness of threats that will endanger the system. The full adaptive capacity of a particular system may not be apparent until the system faces direct challenges to its continued existence. So it is difficult to identify indicators that directly measure adaptive capacity. A set of indicators of system may determine the way it behaves and react for unpredictable changes, but society itself is a complex system that is too difficult to be modeled. Analysis of human adaptation to climate change should be based on realistic models of adaptive behavior. For this reason Berkhout et al. (2006) state that it should be analysed at the level of organisations and individuals. They also argue that the factors that determine adaptation to climate change rely on the basis of what we know about the ways in which organisations learn, innovate and change in response to conservative regulatory and market pressures. Yet it is a challenge for adaptation research to develop indicators of adaptive capacity and to create a model that is sufficient to represent the society's capacity to adapt.

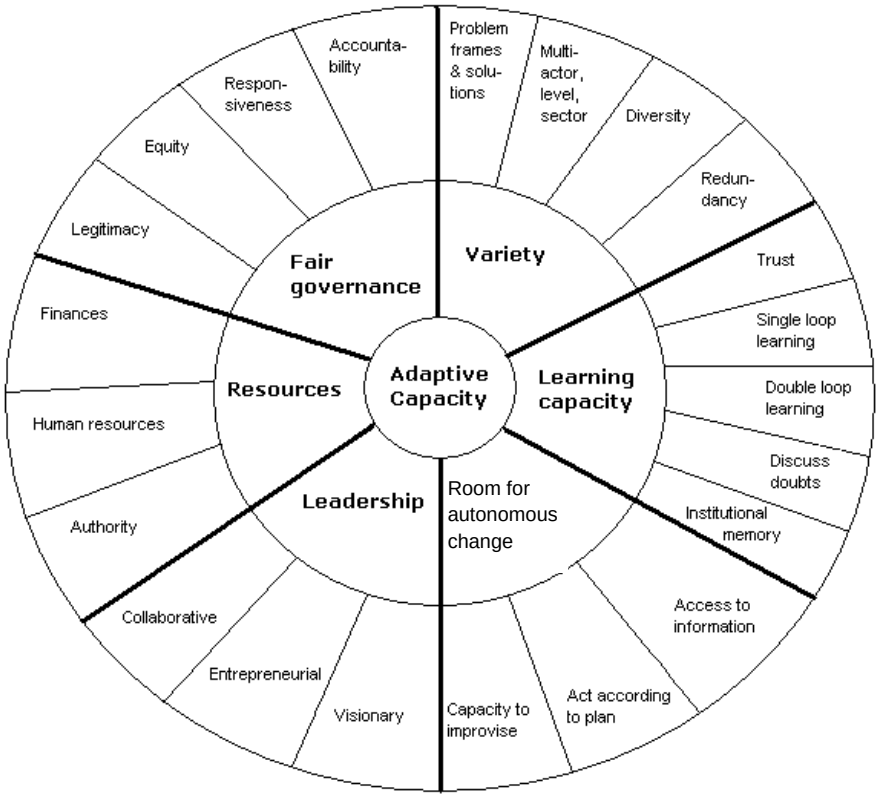
Regarding to this, the inadequate or weakness of one or some of those elements might result on the lower capacity of society to adapt, which is mentioned previously as particular groups with more sensitive and less adaptive society such as those in the developing countries. Ramamurti and Doh (2003) mention that developing countries have weaker institutions: their laws are not as well developed, nor are they enforced nearly as well by independent courts; property rights are usually weaker; governments are less accountable to their people and/or their parliaments; regulatory agencies are not as competent nor well insulated from politics; and the media is often not independent either. Those weaknesses may put the issues such as social justice, empowering human resource, protection of rights, and fair governance on the top of agenda in the context of developing countries.

2.5. The Adaptive Capacity Wheel

Recognising the difficultness to indentify indicators for assessing whether an institution can adapt to evolving climate hazards, UNDP-GEF introduce a score card approach for assessing changes in capacity attributable to a project (Brooks and Adger, 2005). However, the scale of the affected system should be considered because it will influence the internal and external factors. The scale of a system will relatively determine which factors classified as internal factors to which an intervention can directly address to enhancing adaptive capacity. At national level, adaptive capacity strongly related to economic development such as health, literacy and governance (Brooks et al, 2004). These parameters

are commonly used by UNDP, World Bank, ADB and other similar agencies in assessing national capacity development because those parameters can be quantitatively measured. However, adaptive capacity is generally broader defined than referring to the economic sector only. In social systems, the existence of institutions and networks that learn and store knowledge and experience, create flexibility in problem solving and balance power among interest groups play a vital role in enhancing adaptive capacity (Scheffer et al, 2000; Berkes et al, 2002).

A more comprehensive method is therefore proposed by Gupta et al (2010). According to Gupta et al (2010), the capacity of institution to adapt consists of six dimensions, which can be divided in two groups. Those two groups distinguish the central qualities and the external qualities of adaptive institutions. The central are variety, learning capacity, and room for autonomous change. The external or contextual qualities contribute to and support these former qualities; those are leadership, resources, and fair governance. The Adaptive Capacity Wheel is illustrated in Figure 2.3.



Source: Gupta et al, (2010)

Figure 2.3. The Adaptive Capacity Framework

2.5.1. Variety

Variety implies the capability of a system to provide a variety of problem frames, definitions and solutions that guarantee itself for further development in the future, "limiting lock-in into a development that precludes future adaptations" (Nooteboom, 2006: 2-3). Gupta

et al (2010) argue that an institution embeds variety when it allows for a: (a) variety of problem frames and solutions; (b) variety of actors (multi-actor), levels (multi-level) and stakeholders (multi-sector) during the policy formulation and implementation process; (c) promotes diversity and differentiation of policy to reach tailor-made policies; and (d) allows redundancy in the short-term in order to allow for the best solutions to emerge in the long-term.

2.5.2. Learning

According Gupta et al (2010), the learning of an institution reflects on how institutions stimulate and encourage social learning processes of the individual and also at the organisational level. The criteria to demonstrate this ability of an institution include: (a) to trust and mutually respect each other and to be willing to learn from each other; (b) to learn from the difference between expectances and outcomes in single loop learning; (c) to engage in double loop learning via learning across boundaries; (d) to explicitly consider doubts and uncertainties; (e) stimulates institutional memory.

2.5.3. Room for autonomous change

The third quality of adaptive institutions is the room for autonomous change. It is demonstrated by the ability of institutions to allow actors to improvise during crisis at all levels of society, and to act as accommodating to and experimenting with the everyday contingencies, breakdowns, exceptions, opportunities and unintended consequences (Termeer, 2009). Sub-criteria for evaluating by ensuring that within the institutions actors: (a) have access to information, (b) are capable of acting according to plan and (c) have the capability to improvise.

2.5.4. Leadership

The first external variable is leadership, which are people in the public domain that promote change actively, and who face challenges by seeing opportunities, arranging connections and by reinterpreting their own routines (Termeer, 2007). Regarding to that it is essential to have actors in the public domain that promote change actively, and who face challenges by seeing opportunities, arranging connections and by reinterpreting their own routines. There are three types of leadership that are particularly important. First, visionary leadership is important to link different time scales and to convince others to anticipate potential future threats (Young, 1991). Second, entrepreneurial leadership is necessary to gain access to the necessary resources for realising adaptation projects (Andersson & Mol, 2002; Termeer 2009). And third and finally, collaborative leadership is necessary to bridge gaps, span boundaries, and build coalitions (Huxham & Vangen 2005).

2.5.5. Resources

A second important external variable is the availability of resources, such as finances, technical knowledge and expertise, human capital and authority. Without those supports, it

will be very difficult to adapt our institutional framework to climate change. The availability of resources also supports the three core qualities of institutions. For adaptation efforts to succeed, it is crucial that actors are able to generate sufficient resources (Biermann 2007). First, financial resources are required to experiment with and implement adaptation strategies. Next, human resources – such as knowledge and expertise – are required to develop these adaptation strategies. Finally, authority is required to take and implement the necessary decisions.

2.5.6. Fair governance

The last external quality is the fair governance within a society, indicated by justice, equity, the rule of law and general social stability that are also important preconditions for the trust and mutual respect that are necessary for the three central qualities of adaptive institutions (Termeer, 2009). The sixth and final quality also supports the three core qualities of institutions. It is crucial that institutions meet fair governance criteria and can deal with social justice dilemmas (Paavola & Adger 2006). As we emphasise redundancy over cost-effectiveness, we prefer the phrase 'fair governance' rather than the dominant phrase of 'good governance' (e.g. Botchway 2001). Institutions should allow for and encourage responsive and accountable policy making and implementation. In addition, they should protect basic rights and equity and promote legitimate policy processes.

Some of the indicators, are apparently difficult to implemented in practice. Therefore, modification of those sub variables such as trust and capacity to improvise is required. Trust is something that is not easy to measure, since it cannot be explicitly expressed by individuals and agencies. However, this might be reflected by the degree of acceptance-rejection to interact or/ and to cooperate. The acceptance-rejection concept is described by Jeffrey and Seaton (2004) as receptivity that can be broken down into four components:

- Awareness – the capability to search and scan for knowledge which is new.
- Association – recognition of the potential benefit of this knowledge by associating it with needs and capabilities.
- Acquisition – the ability to acquire technologies or learn new models of behaviour which support exploitation of knowledge.
- Application – the ability to actually apply knowledge to achieve a benefit as judged by the recipient.

Thus, the variable of trust is replaced since the willingness in mutual learning and discussing doubts require a certain acceptance to interact so the process of learning is possible.

Meanwhile, the capacity to improvise is also difficult to measure because it is a potential capacity that only emerges if there is a crisis that forces individuals or agencies to take actions. Since the climate change implication especially on sea level rise is not yet seen and the tidal flood is still in the level of tolerable, it is impossible to apply the indicator. Therefore, to obtain the value, I use the dependency to higher level to represent it. The strong dependency means that there is a low capacity to improvise and vice versa. The dependency

will limit the freedom to take action differently from routines, in other words less capacity of self-organisation.

2.6. Concluding Remarks

Adaptation strategy must consider both nature and socio-economy system integrally because both systems are interconnected with each other and no measures can be done without affecting the others. Those systems are distinguished by three characters: exposure, sensitivity and adaptive capacity to change. Interestingly, the last one is a changeable quality that gives possibility to improve or modify. Adaptive capacity refers to a range of quality of an individual or system to change or modified itself or its environment in order to preserve its existence and reduce possible negative impacts due to climate change and the implication of chosen reaction. The inadequate or weakness of one or some of those elements might result on the lower capacity of society to adapt.

However, it is not easy to recognise the capacity since it is a potential quality and social behavior is so unpredictable and complex. There are many variables are defined to measures this capacity. It means that there are still wide possibilities to modify and formulate the established adaptive capacity tool assessment, such as trust and capability to improvise due to make the indicator more applicable in practice. Due to practical reason, trust is replaced by degree of acceptance to communicate and involve, while capability to improvise is modified into level of dependency to others. It is important to understand the background context that might result the condition to improve the institutional capacity. Therefore, this institutional context that might influence the adaptation implementation in developing countries will be analysed in Chapter 4, meanwhile the unique condition in Indonesia context will be discussed in Chapter 5.

Interestingly, in developing country context, the insufficient adaptive capacity is caused by weak institutions such as independent courts; property rights are usually weaker; governments are less accountable to their people and/or their parliaments; regulatory agencies are not as competent nor well insulated from politics; and the media is often not independent either. Those weaknesses may put the issues such as social justice, empowering human resource, protection of rights, and fair governance on the top of agenda in the context of developing countries. Moreover, the nature of institutions itself is difficult to change or transform. It takes time and accumulation of actions to create a meaningful change in the future. Therefore in Chapter 6, although the adaptive capacity will be employed to assess whether the institution in Indonesia has already promote and stimulate the adaption capacity of society, whether it is still possible to explore the possibilities of other variables might emerge due to the local and national context of Indonesia.

However before entering the analysis chapters, the research protocol of this study which described how this study conducted is explained in Chapter 3 including the case selection, data collecting and analyzing methods. It is given in detail as the legal scientific basis for this study.

CHAPTER 3
METHODOLOGY

3.1. Research Design and Case Study Selection

The methodology that I employ in this study is a single case study research. In a case study, one or several objects or processes within a restricted time and space is selected in advance to be observed in depth to identify important patterns and themes in the data (Verschuren and Doorewaard, 1999). The richness of case studies is related to the amount of detail and contextualization, that is possible when only one or a small number of focal cases and issues are analyzed. Accordingly, this is a powerful methodological approach for researching the capacity of institutional to enable climate change adaptation such as in Indonesia through a case study in Semarang.

Methodology is a set of methods that is utilised to achieve the research objectives, thus the methods that is chosen have to direct the research to its objectives. As having stated in Chapter 1, the objectives can be classified into three groups of discussion. The first objective is addressed to global issue on adaptation approach due to climate change in coastal city and the unique issues of institutional capacity in developing countries which illustrate the general context in global world. This general analysis is based on the six dimensions of the Adapative Capacity Wheel. However, understanding the specific context of coastal city planning in Indonesia can only be attained by looking through planning institution and culture, this is the next objective of this study. The unique context is expected as complement of the general context to obtain a comprehensive perspective that might influence institutions ability to adapt within this system; that can be different from elsewhere.

Both general and unique context finally gives understanding in the implication of institutional context that shapes the implementation of Banger Polder Pilot Project in Semarang, which become the background of the institution ability to adapt. To assess this ability, the Adaptive Capacity Wheel is employed in detail with 32 sub variables and the result is presented in colour gradation graph which is easy to understand and communicate.

All of these objectives try to link between empiric world which is represented by the project itself and the theoretical world as the variables that reflect the institutions ability to adapt. Finally by understanding this link, then I can provide recommendation for institutional adaptive strategy in the planning system of coastal city, especially in Indonesia. The overall methodological procedure is presented in Figure 3.1.

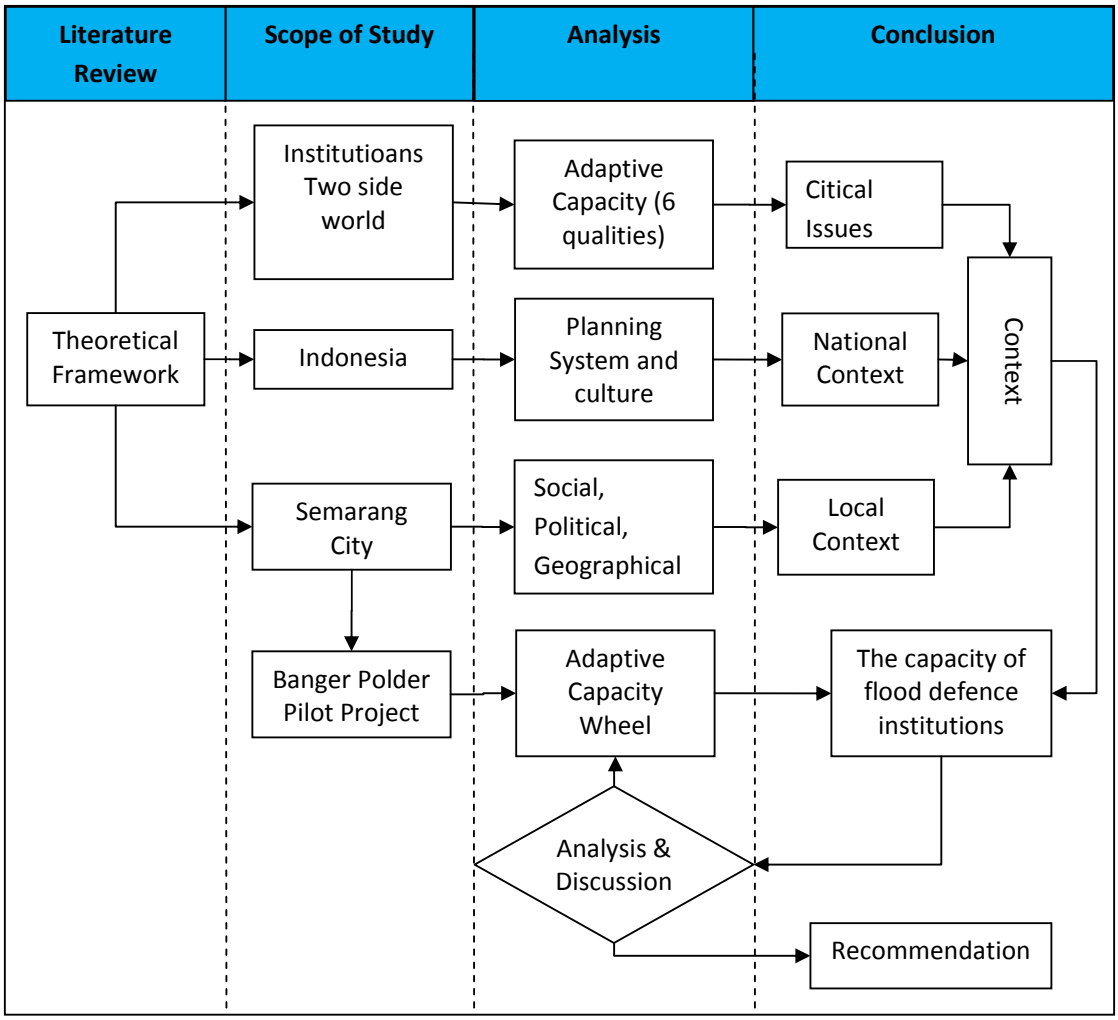


Figure 3.1. The Scheme of Methodological Procedure

3.1.1. Coastal Cities Issues

Identifying the similarities and differences in the assessment and implementation of adaptation due to climate change in some coastal cities and understanding the context behind it, can help to distinguish the general context from the local context. In reality, distinguishing those characteristics, which is common and unique aspects that do make the difference of coastal cities tension in developed and developing counties, is difficult by only one single case.

According to Christie and White (1997), the challenges (of water management) are similar in developing and developed countries. The differences lie in the prevalence of poverty and the pace of ecosystem change. In the developing countries, the decline of ecosystem qualities is much more rapid than in most developed nations. It means that the single case observation is still possible if it is covered by some general, not in detail, overview of several coastal city cases to understand the general and unique context before focusing on

the specific case in detail. So, it is easier to jump in the real case without mixing the unique of local context with its general characteristics as coastal city.

The selected countries to be compared and analysed:

1. the developed countries: the Netherlands and UK.
2. the developing countries: Bangladesh and Philippine.

From those countries, one case of coastal city for each is chosen to represent an adaptation strategy due to climate change. The basis of selection mainly is the similarity geographical context that is situated in the delta river area. Those cities also face common issue and dilemma such as cities growth and tidal flood problem, development versus environmental consequences. The availability of data in English is also considered next in the case selection of this coastal cities context study.

3.1.2. Coastal City Development in Indonesia

The collapse of the New Order of Suharto's regime in 1998 was the turning point of political change in Indonesia which inevitably has shifted the paradigm of the Indonesian national development from the centralization to decentralization, from the top-down approach decision-making process to bottom-up approach. This shifting is regulated by the law of 22 of 1998 about the political decentralization and the law of 25 of 1999 about the balance of finance between the center and local government. These paradigms are influenced by the mega-trend of globalization, the trend of postmodern, that is distinguished by the euphoria of democracy, participation and transparency, as the consequence of information and communication technology revolution (Soetomo, 2004).

Although officially the political power has moved from the central to local but the long historic of centralization system, from colonialism to New Order Era, had culturally already shaped the local community and government behavior. The central power currently still has strong intervention in local development but off course in a different way. Usually the central involvement is in initiation phase then gradually reduced by the greater of local capability and role.

The more strategic of a city for national interest, the greater is central influence on its development. Most of big cities in the world is situated in coastal line, it is irrefutable fact that coastal city must have an important role for economic development of its greater region. This attraction has become the reason of many huge sectors, local and national, to invest on coastal city. No exception for Semarang, from pre-colonialism this city had already played important role in goods distribution for Central Java Region through sea and river and remained so until now although the river way had inactive because of sedimentation and replaced by road and railway transportation.

It is inevitably that national political situation do influence the development strategy in the local level. Therefore, understanding the broader context of national political dynamic as the background of local context is important, especially for countries with long historic of central power role especially for countries in transition such as Indonesia.

3.1.3. Semarang City

Semarang City, a delta city that is situated on the north coast of Java Island, nationally has a vital role. In the National Spatial Planning, Semarang City is determined as Pusat Kegiatan Nasional (National Activities Node) which means that this city serves at national level activities. Therefore, Semarang has important role in economic development of Central Java as one of cities called "the Golden Triangle" namely JOGLOSEMAR (Jogjakarta, Solo/ Surakarta, Semarang). Those three cities create a socio-economic network in central region of Java Island that connects the north, middle and south regions. Semarang city is the north entrance (gate way) of those regions. As the consequences of its strategic position, Semarang has potencies to encourage the economic growth of surrounding areas related to its functions as transportation nodes in national or provincial network and the central of government administration and public services. In addition, its position on the North Coast Line (Daendels Road) also connects two big cities on the North Coast of Java, Jakarta in the west and Surabaya in the east. It becomes one of the factors that trigger urbanization in this city. Nowadays, Semarang city is growing into a metropolitan city.

Meanwhile, Semarang coastal and low-lying areas are very dynamic areas with multi-use purposes. The major industrial estate and economic activities of Semarang City are situated in the low-lying and coastal areas. Population and coastal urban developments are also growing rapidly and therefore coastal-land reclamation has been developed for residential, recreational, and industrial purposes. In addition, coastal areas of Semarang have also been used for fishing activities and fishpond areas.

However, this city suffers from yearly tidal flood problems particularly in the lower region. The flood inundates a quite large area, according to Anggraini (2007) the flood prone-area is about 15,000 Ha or 40% of the total area. Actually, this tidal flood is a natural phenomenon since Semarang, as other particular cities built on river delta, is frequently being flooded every year. Nevertheless, the problem emerged as the city growth which is followed by the expansion of development area to the flood plain near the water body so the space for water rapidly decreases as the consequences of development. But this condition becomes worst as the affected inundation area increase each year because of land subsidence. Tidal flood in Semarang City results a great loss to the community derived the damages to property and live hoods, and from the impacts of flood on community health and social interaction. Moreover, this flood also affects to some vital infrastructure such as airport and railways station in Semarang.

Measures have been attempted by various institutions, whether local or national agencies, but mostly implementing structural temporary measures, such as normalization of canal, construction of drainage canal, retarding ponds and pump stations to lower the inundated areas. During the flood event, several institutions also distribute a temporary social welfare support for people who are living in the inundated area. Since the attempted measures are mostly temporary and sectoral measures, hence their performances are far from optimum, not reliable even nor sustainable.

Actually, the first concept of sustainable in Semarang Development Strategy has been started since 2002, but it has not fully realized in the implementation because the old paradigm that still embeds in the institution and strongly rooted in daily actions of individuals is not easy to be reformed. Thus, understanding the socio-political and geographical context at local level is required for institutional arrangement to enable integrated flood management implementation such as Banger Polder Pilot Project.

3.1.4. Banger Polder Pilot Project

Banger Polde Pilot (BPP) Project is a flood control project implemented at the west area of Banger river in Semarang City using polder technology. This polder is not a new knowledge in Indonesia, it has already implemented in some of exclusive residential built by private developer in North Jakarta such as Pantai Indah Kapuk and Kelapa Gading Permai. Those residential have been succeeding protect the area from flood, unfortunately only few people can afford the housing in this exclusive residential. The BPP Project is interesting since the polder system is initiated by government and applied on the area that belongs to middle-low income occupiers, and designed to be managed by those people with assistance of local government. Thus, the issue is very sensitive since the majority of population in the selected project area is low income people, who used to be the "victim" of urban development.

The conflict also emerges from other parties whose authorities or areas are possibly affected by the implementation of the project. The proposed Banger Polder Area includes lands owned by individuals (community), PT. Pelindo (state owned port operation and management), Pertamina (state owned oil company) and PT. KAI (state owned railway company). Moreover, the construction of supporting infrastructure for polder system will change the existing infrastructure within this area that belongs to different agencies.

The process of establishing BPP Project shows that there are many interests and powers frictions within discussion, agreement and decision making. This is related to the nature of Semarang as coastal city itself that has multi-functions and multi-land uses. Thus, coastal city management requires an adaptive approach that is designed to encourage and accommodate learning process and flexibility among governmental institutions at any level to cope with this various conflicts.

Additionally, the BPP Project is conducted in the beginning period of political change from centralization to decentralisation. On the other hand, adaptive capacity is potential characteristics, which is difficult to measure directly, if there is no real threat. The ability of institution to adapt may be identified best in a situation when a system experiences an extreme change within its body. In the establishment of BPP Project, especially in the political transition period, this capacity may be best tested and evaluated.

3.2. Data Collection and Analytical Methods

This study is based on qualitative method; the data collected includes relevant past studies, documents, observation and interviews. To mitigate bias and enhance validity, the

triangulation of resources and methods is employed. Triangulation compares information to determine corroboration; in other words, it is a process of qualitative cross-validation (Wiersma, 2000). From this definition, I interpret the triangulation method into this study method as seen in Figure 3.2.

As shown in the triangulation scheme, there are three types of study: document reviews, interview and observation. The document review study is conducted to reveal the context of the chosen case regarding to the previous studies, which completes to the first and the second objectives. Meanwhile, the last objective is accomplished by enrolling the interview and observation study in the case of BPP Project.

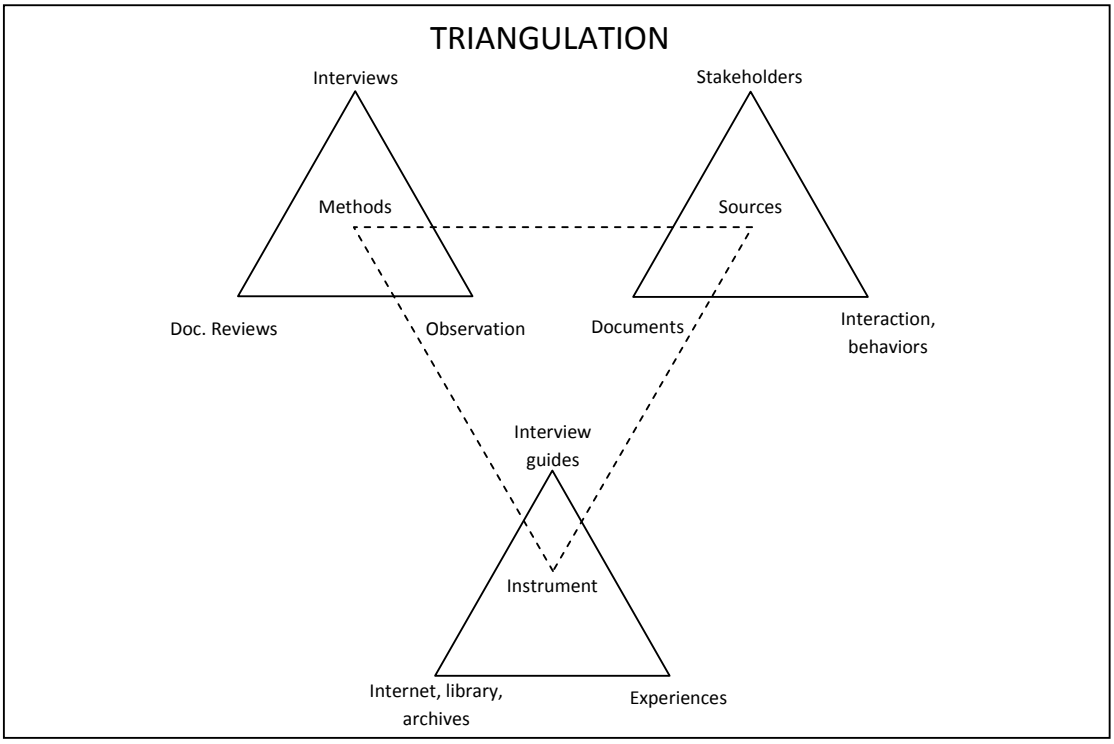


Figure 3.2. Triangulation of Sources and Methods

3.2.1. Document Reviews Study

As mentioned in the previous section that the context of institutional adaptive capacity is influenced by general and local factors. The general factors are context that can be grabbed from past studies about institutional response due to climate change in developed and developing countries. Those adaptation responses are translated into the six variables of adaptive capacity: variety, learning, room for autonomous change, leadership, resources and fair governance.

Meanwhile, the local context within Indonesia as developing country is focused on the characteristics of planning system which might be related to institutions condition in coastal city. The information for this purpose is obtained by investigating at national level. First, it describes the political situation in reformation period and implication to national system. Then

the political change the development planning and spatial planning system are also reviewed as the consequences of political changes. Finally, all those changes shaped the coastal development today.

The qualitative content analysis is employed to grasp the relevant information defined above. It is a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding, including summarizing, explicating, and structuring the textual material (Flick, 2006).

3.2.2. Interview Study

In the answering the third objectives, an assessment on institution adaptive capacity is conducted by using six variables: variety, learning to adapt, autonomous capability to adjust, leadership, resources and fair governance. The method for obtaining the data for the assessment is by conducting interview. Thus, the value of adaptive capacity is given to each variables based on comparing and interpreting opinion, statement and perspective of interviewees. The interview is using these three ways:

1. Direct interview: the interviewee directly answers the given questions via telephone (audio) or internet connection (audio visual).
2. Indirect Interview: the interviewee answers the open questions by filling the interview form for those that cannot be reached by phone or internet connection.
3. Combination interview: The interviewee is filling the interview form first and then following by direct interview for further explanation.

The interviewees are selected using snowball method, which the next interviewees are determined by the previous one. There are two key persons as the starting point:

- Head of Research Center for Water Resources (Government)
- Representative of HHSK (Non-government)

However, interview for the citizen involved in the project cannot be conducted since the major community in Banger area are low income people which difficult to reach by phone or incternet communication. The Semaang Citizens interviewed here are not involved in the project, however they live and work in Semarang and experience the flood problems in their daily life. The list of interviewees by categories is presented in Table 3.1 below, while the list of interviews is given in Appendix 2.

Table 3.1. Interviewees by categories

Categories	**Involvement in BPPP**	
	Involved	**Not Involved**
Government	2	
Expertise	1	
Citizen		3
NGO	1	
Private		1

As Verschuren and Doorewaard (1999) describes, the case study is characterised by its depth which is realized by using various labour-intensive data generation. In this study, I utilise the semi-structured interview with open questions, the questions that are formulated and sent in advance to the interviewees is flexible to develop into deeper conversation. Therefore, the questions for each individual are different according to their knowledge and authority during the interviewing. Furthermore, to get a depth and comprehensive perspective, the interviewees are varies, not only involved actors but also actors from affected sides that are not yet involved.

Interview is documented saved as audio record and transcript. Audio record is only for direct interview which later be transformed into transcript, while indirect interview has only transcript from interview form. Both audio and transcript data are in Bahasa Indonesia, thus before they is used, the information is selected and translated into English.

The success of the interview process is also influenced by the local culture. It takes patience and personal approach to get an appointment from the interviewees. The more personal the relationship is, the easier it is to get trust and willingness to be interviewed. Using the some polite words of local language, Javanese language, can also use as a technique to build the personal feeling to the interviewees. The proper time also determines the interaction between the interviewer and interviewees, the preferable time is usually on Saturday or during weekday in the evening but after work. The interviewing schedule was started on April 2010 and during that period, the time difference between the interviewer in The Netherlands and the interviewees in Indonesia was 5 hours. Thus, it is important to ensure the exactly time and remind the interviewees a day before to avoid misunderstanding about the appointment time.

Effect of institutions on adaptive capacity	Score	Aggregated scores for the six qualities and the adaptive capacity as a whole
Positive effect	+2	+1.01 to +2.00
Slightly positive effect	+1	+0.01 to +1.00
Neutral or no effect	0	0.00
Slightly negative effect	-1	-0.01 to -1.00
Negative effect	-2	-1.01 to -2.00

Source: Brink et al (2010)

Figure 3.3. The Colour and Score Scheme for The Qualities of The Adaptive Capacity Wheel

The information obtained from the interviews is analysed through the processes of structurisation and interpretation on the basis of the Adaptive Capacity Wheel. The result of assessment is analysed deeper then and discussed regarding to its consistency to reality and context. Additionally, a colour scheme (from green to red – see Figure 3.3) is adopt from Brink et al (2010) to visualise the results of our analysis. Numbers are used to aggregate the scores of the various criteria. It is important to remind the 'numbers' are used not to reduce

the meaning of the variables as a simple mathematic calculation. It is only a tool to help in the visualization and identification of the strong and weak elements.

3.2.3. Participant Observation Study

Observation study was conducted during 2008 when I was involved in the BPP Project as one of researcher that support the feasibility study related to the engineering aspect. At that time, I work at Puslitbang Sumber Daya Air (Research Center for Water Resources) which is a research institution under Ministry of Public Works. Therefore, in this study I act not as a participant observer which is not out of the object being observed but part of the system itself.

The observation focused on the internal interaction in Puslitbang SDA within the scope of this project and the external interaction which is between involved actors in this project during this stage which is reflected from the interaction in meeting and daily communication. The data from this study is only as an additional support for the assessment of institutional adaptive capacity. This data is based on my personal interpretation as one of involved actors in this case, which is a researcher from central government agency, that experience the real situation in the initiation of BPP Project.

At that time the stage of this project is in engineering design of Banger Polder, however during this process there also interaction with other institutions in order to communicate the design, the possibility of implementation and consideration of different alternatives. Even though the feasibility had done and the community of Banger is eager to get involved, the project still can be rejected if there is no approval and cooperation from other affected agencies. Meanwhile, the reaction of affected agencies influences in the work of design. There is also a dialogue between researchers from different specializations since they try to adjust the design itself with the different requirements. The experience of negotiation and adjustment processes can help to understand the political intrigues, the fight of interests, within this project.

CHAPTER 4
COASTAL DEFENCE DUE TO SEA LEVEL RISE IN TWO SIDE WORLD

4.1. Introduction

Understanding coastal dynamics and natural history is important in developing a better understanding of natural systems and human impacts in coastal zones (Saito, 2008). Understanding both natural and human system impact in coastal zone leads to a better understanding the pressure and dilemma in this area that may contribute on its sensitivity and vulnerability due to climate change impacts. Therefore, this chapter discusses the climate impact to coastal city, emerging problems due to sea level rising and the role of institutions in stimulating adaptive capacity in dealing with it in practice. The content of the chapter is a description of vulnerabilities and adaptation strategies in four selected countries from the two worlds. The Netherlands and United Kingdom are the representatives of the developed countries, while from the developing countries Bangladesh and Philippine are chosen. The information is obtained from recent articles and reports of related countries. Finally, it leads to reveal the question about what are the general issues on adaptation approach due to climate change in coastal city and the unique issues in developing countries, which might reflects their institutional adaptive capacity condition, how those two worlds can be distinguished by their strength and weakness related to the six adaptive capacity variables in general, and whether there are others important variables influence the capacity.

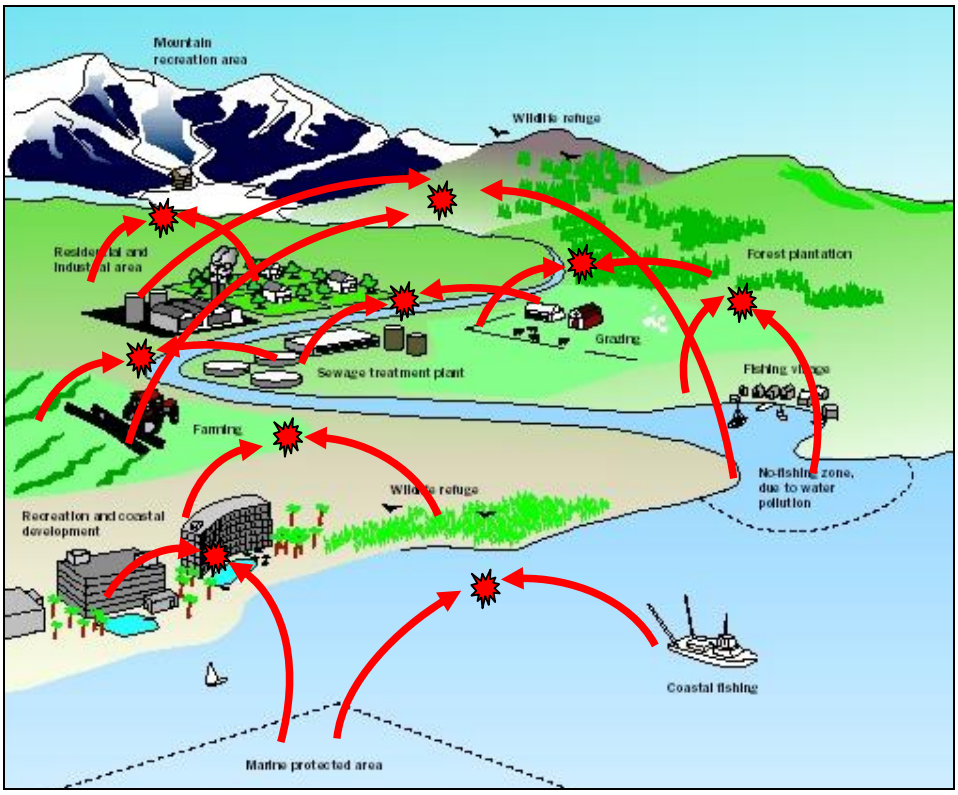
4.2. Coastal System and Vulnerability

Traditionally, coastal cities especially in the estuary or delta river have the unique characteristic that may not be found in other places. The landscape is formed by the alluvial deposit of rivers and shaped as low-lying marshland which is influenced by tidal wave. Because of the nature of this area which is situated in which land and sea, fresh and salt water meet, it has a certain chemical characteristics of water, such as temperature and salination, it becomes habitat for particular migratory fish, birds and amphibians, and also special vegetation. Another important function of this ecosystem is that this area becomes nursery ground for fishery. Any changes of water characteristic may result on the consequence of species losses. For example temperature and salination which depend upon the coastal dynamic for example the flow of fresh water from river, periodical of washed tidal wave, and sediment transport.

Coastal area is a dynamic system since the ancient time because of the nature of its geographic position. Most of urbanized area throughout the world is situated in these low-lying areas of river delta, as the consequence of rapid growth of economic sector, which magnetise employees from surrounding cities and villages. The strategic of coastal, especially in estuary, gives beneficiary to distribution of resources and commodities. Coastal cities become the important nodes of water transportation system that connect difference islands across sea and other inland cities through river. Because of this geographic competitiveness, these areas are more attractive for various socioeconomic activities than others. Many

economic base activities can be found such as trading, agriculture, fisheries, tourism, and service sectors.

Interestingly, a key factor affecting ecosystem and human health is due to socioeconomic changes (Smith, J.B and Lazo, J.K, 2001). Together with the urbanization growth, the needs to support that growth also give high tension on landuse. It is identified by the extensive conversion of landuse from nature system into human system, giving less room for nature. For example landuse conversion for agriculture area as food supplies for coastal city, groundwater exploitation for fresh water supplies, and reclamation for new settlement and economic development site. Environmental degradation is marked by pollution, sea intrusion, land subsidence, flooding, and loss of ecosystem and biodiversity, which in the end affects on human system itself. There are landuses conflicts and dilemmas regarding to environmental conservation efforts and the need for urban development, as shown in Figure 4.1.



Source: modified from Water Encyclopedia, “Land-Use Planning” (2010)

Figure 4.1. The conflicting landuses in coastal area

In addition to all the stresses that coastal cities are facing now, implications of intensive pressures from the predictions of sea level rise due to climate change will be a serious concern in future. In the Third Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) issued that over the next 100 years, a rise of between 1.4 ^{o}C and 5.8 ^{o}C might be expected in average near-surface temperatures, bringing a range of associated changes including increase in sea level and alterations in patterns of precipitation and storm

events. In the context of coastal cities in general, the impacts of sea-level rise that threatened environmental systems are increased risk of flooding and impeded drainage, seepage pressure and salinization of freshwater supplies, higher water tables, accelerated beach erosion, redistribution of wetlands, destruction of coral reefs and reduction in biological diversity and loss of wildlife (Houghton et al., 1996; Watson et al., 1996; Church et al., 2001; Cubasch et al., 2001). These impacts have already been seen present day in coastal cities all over the world. The extant to these threats also result in a set of socio-economic impacts on the coastal cities due to loss of properties, infrastructure, tourism and recreation functions, even dislocation of population and change of livelihood.

Climate change has created a new challenge for coastal management strategy, although the pressures and conflicts still remain the same but the impact of this will accelerate the existing threats to become worst. In these last decades, Integrated Coastal Management (ICM) has become important agendas for international donor community, many national governments, NGOs, and universities since in 1992 United Nations Conferences on the Environment and Development (UNCED) promoted the concept of sustainable development through Agenda 21, the protection of the oceans, seas and coastal area (Allmendinger et al, 2002). Coastal management develops recently emphasize aspects of integration across scales of time and space, the active participation of stakeholders, and an incremental iterative approach to problem solving (Olsen and Christie, 2000), as can be recognized in the developing strategy from those four countries that will be overviewed in the next section. Those strategies reflect the effort of related countries to adapt with the climate change challenges, thus from the process of its implantation, there is an opportunity to reveal the adaptive capacity of institution within those countries.

4.3. The Delta Plan Project, The Netherlands

Global climate change could have a dramatic impact on The Netherlands, due to a multiply effects in the multi sectors (MNP, 2005) since about 60 to 70% of the Netherlands' population and economic value is concentrated in areas that are at risk from flooding from the sea and/or rivers (Kabat et al., 2005). Being a country with one of the most densely populated deltas, one of the threats of climate change is sea level rise. Thus, for over this previous millennium the Netherlands has focused on 'fighting the water', traditionally by reclaimed land, particularly peat areas and transformed those into agriculture land. Over this last century, the Netherlands had experienced 20 cm sea level rise, also caused by the subduction of the delta systems (Butzengeiger and Horstmann, 2004). However, predictions on the future rise for the next century are varies in wide range, from 35 to 150 centimeters (KNMI, 2006; Delta Committee, 2008). The wide margin in prediction derives from the uncertainties of climate variability (size, distribution, frequency) itself and also socio-political variability (e.g.: global emission reduction consensus and achievement).

The most engineering achievement of flood protection is by executing Delta Plan Project in 1957, after the big flood in 1953 (Saeijs et al, 2006). The core of the project is to maintain a safe coastline by building a large, solid and inflexible 'wall against the sea'. The

commission in charge of the project demanded to construct dykes to protect the Southwest coast with flood design for 1/10,000 years, and almost 5 billion Euros were spent only on the "Delta Plan" (Butzengeiger and Horstmann, 2004). Today water safety in the Netherlands is transforming from technical rationality approach into collaborative approach. This is reflected from the second generation Delta Plan, namely the Second Delta Plan Project, entitled 'Working together with water: A land that lives is building its future' (Delta Committee, 2008). The collaboration in The Netherlands adaptation strategy in dealing with the future challenge due to sea level rise also looks not only within the national level but also beyond the borders of their country in co-operation with other EU Member States (Butzengeiger and Horstmann, 2004).

Additionally, the concept of flood management in The Netherlands is also shifting from 'fighting the water' to more 'accommodate the room for water', which is reflected in the implementation of the Room for the River Project. Oosterberg et al (2005) stated that there used to be fewer dialogs between water managers and spatial planners in Dutch urban development, not until the occurrence of two instances of near-floods of Rhine (1993) and Meuse (1995). The main concept of the Room for the River Project is to enlarge the discharge capacity of the main Dutch rivers by increasing the amount of space for the rivers (Wiering and Driessen, 2001). However, Dutch water managers still generally belief that only by separating tasks and responsibilities of water management and spatial planning, water safety norms can be realized. When the safety norms are made part of integrated, interactive and decentralised planning processes, water safety could come off worst.

Although within the last years variety of problem frames and potential solutions and measures has been developed, in actual implementation these measures remain problematic. The Dutch government still explicitly and primarily focuses on flood prevention by reducing the flood probability (Deltacommissie 2008: 41). According to the report of "Flood protection in the Netherlands: framing long-term challenges and options for a climate-resilient" (PBL, 2009), the Netherlands will be able to cope with sea level rise for many centuries to come, even in a worst-case scenario (1.5 meters sea level rise per century), by focusing on the further differentiation of protection levels and increasing flood resilience of the area surrounding the major rivers. Butzengeiger and Horstmann (2004, p4) also stated:

> ""The feeling of safety is so strong in the Netherlands that this seems to be no subject for discussion at all," said Frank van der Meulen, an expert working with the Coastal Zone Management Centre based in the Netherlands. "People regard it as natural that they are protected by dykes and other flood control measures.""

Not so optimistic perspective derived from Smits et al (2006), they stated that the safety feeling by the heightening dyke is blinding people who live in the prone area from the possible greater disaster that may occur. According to Smits et al (2006) this strategy is not sustainable because only relying on the dyke will end up living behind enormous dyke with a large pump, meanwhile there is still potential for catastrophic flood. The overconfidence on

high standard set by the Act Defence against Flooding of 1996 has given the false sense of safety and reduced the awareness and preparedness of people.

Further, the construction of the Delta Dams rigorously block the hydrologic and ecologic river continuum, both at the seaside and at the river side as well, this thought actually had already issued in the 1960s but the provision of safety after 1953 disaster was the main social interest at that time (Niehuis, 2006). On the other hand, opening the dams using sluice to bring back the tidal rhythm into the coast would be difficult because the intensive urban infrastructure and harbor developments in the area. The profit and loss consideration often leads to the decision to continue the previous water safety tradition.

Three sources finance the water safety in the Netherlands: the general budget for 30%, the profit principle for 18%, and the polluter-pays rule for 52% (Huisman, 2002). The financial budget for the development and implementation of adaptation strategies, are highly dependent on the political and public climate (den Brink et al, 2010). In 1998, the costs of public water management by the three governing levels in The Netherlands amounted to EUR 3,173,000,000 in total or 1% of the national income (Huisman, 2002). The allocation arrangement is 15% for flood protection, 20% for quantitative water management and 65% for water quality issues. According to the Adviescommissie Financiering Waterkeringen (Adviescommissie Financiering Primaire Waterkeringen, 2006), maintenance of the dykes and dunes would require considerably a doubling in the annual cost. Since current costs of flood protection each inhabitant is about 40 to 45 euros/year or 0.15% of national income, thus the effect on Dutch expenditure could remain limited. Whilst the knowledge and expertise of Dutch water sector is known for its advance from the members of the Delta Committee which are a well known economist, civil engineer, climate system expert, landscape architect, and the director of a large dredging company (Brink et al, 2010). Meanwhile, the organisational implementation of flood protection and water-related measures is clearly regulated: water authorities, elected and financed by local inhabitants, are supported by the Ministries of Transport, Infrastructure and Water Management (Butzengeiger and Horstmann, 2004).

The Dutch policy making system generally is marked by a very high degree of ministerial or sectoral autonomy. As Kortmann and Bovend'Eert (1993, 249) state in their standard text:

> "In Dutch constitutional law powers and responsibilities are shared among all ministers individually and administration takes a collegiate form through the Council of Ministers. There is no place for power concentrated in an individual in this system."

The water safety sector institutions with its authority seem to allow for and encourage a legitimate policy and implementation process. As it is found in the Room for the River project that local and regional parties are also involved actively in the development and implementation of the various measures that are part of the Second Delta Plan. To make such a focused and integrated spatial development possible in the long term, more cohesion is introduced into the conception and implementation of the various sectoral policy dossiers

(MNP, 2007 in PBL, 2009). However, a strategic and cohesive long-term vision is not simple under current governmental structure and culture, the continuing globalisation and individualisation and the associated fragmentation of interests and resources indicate that the core of the social decision process today has shifted from the national to the regional level (PBL, 2009). Meanwhile the protection of basic rights and equity in the Netherlands is guaranteed since every Dutch citizen will equally be protected against flooding and the legal safety standards will not be further differentiated as well (den Brink et al, 2010).

4.4. The Themes River Tidal Defense, United Kingdom

As The Netherlands, UK also has long history of water management. The record about the Thames flooding had been started since 1099, firstly written by the Anglo Saxon Chronicle (Lavery and Donovan, 2005). The accepted solution to flooding at that time was to build higher and stronger river walls and embankments that were following the Thames Flood Act of 1879 (Lavery and Donovan, 2005), marked by such a large-scale reclamation of marshes and mudflats. These flood-plains were immediately occupied by industrial and agricultural purposes and, more recently, by the expansion of London and Thames-side towns into the Thames Estuary (Lavery and Donovan, 2005).

Actually, the increasing frequency of extreme high water levels has been recorded over the past 350 years as a convincing evidence of the rising sea levels (Lavery and Donovan, 2005). But it was also the North Sea flood of 1953 which has leaded to a dramatic rethink on the reliability and sustainability of the current approach. Based on The Bondi Report made by government scientist in 1966, it was decided that the best solution was bank raising and a flood barrier with movable gates built across the Thames, namely the Thames Barrier, which is supported with a flood warning system. It was legitimated through the Thames Barrier and Flood Prevention Act in 1972 and started to operate 10 years later. The current extreme sea levels could occur between 10 and 20 times more frequently, ever more extreme and vary in levels and distribution from a few centimetres in the northwest of England to up to 90 cm around London under the highest emission scenario (Hulme et al, 2002). Considering that the climate change and related effects, the Environment Agency decided to develop long-term flood risk management strategies for the areas at risk through 'Thames Estuary 2100' project.

The establishment of partnerships and liaison with varies stakeholders became the starting point of the development of the Thames Estuary. The Agency is a partner in the Thames Estuary Partnership-a neutral body which brings together over 100 different stakeholder groups to work towards common aims and sustainable development of the Thames Estuary. The principal Thames Estuary stakeholders are the Port of London Authority and the Thames Gateway partnerships because of the interrelation of their plans with the Environment Agency's flood defence interests and vice versa.

The Thames Estuary was design under the influence of EU policies frameworks the EU directives including the Habitats and Birds Directive, the Water Framework Directive (WFD) and the Strategic Environmental Assessment/ Environmental Impact Assessment

(SEA/EIA) Directive. The plan decisions made concerning the nature and location of new building in the tidal flood-plain in the future. The estuary also provides an important nursery ground for the southern North Sea fishery. The decisions for this plan made were highly under pressure since whatever long-term option is chosen, this must be preceded by a period of collaboration with the Thames Gateway developments to ensure appropriate and sustainable flood defences are incorporated in new riverside construction which means many influence from the economy sector interests. In addition, there are around four million jobs in the rest of the UK that are dependent on London's demand for goods and services (FHRC, 2002).

The project requires a great amount of resources, the burden on its expenses and responsibility is shared by the Thames, Anglian and Southern Region Flood Defence Committees under the sponsorship of the Department for Environment, Food and Rural Affairs (Defra) (Lavery and Donovan, 2005). The Environment Agency is responsible for maintaining and operating the barrier, which is estimated to cost £6m per year, employing 80 staff in operating and maintaining the barrier and the associated flood defences including the Barking and Dartford Creek Barriers. The decision to close the barrier is taken by the Barrier Controller, and the incoming tide is predicted using data from the barrier's advanced computer analysis and Storm Tide Forecasting Service provided by the Met Office. Additional support has been obtained from the European Union Interreg 3B funding programme and the Office of the Deputy Prime Minister to fund two subprojects: 'Floodscape' public and institutional attitude for creative flood-plain management with partners from Germany, Belgium and the Netherlands, and 'ESPACE' which is dealing with the adaptation of spatial planning to climate change (Lavery and Donovan, 2005).

Regarding to the Freedom of Information Act 2000, which came into force on 1 January 2005, anyone may request information from a public authority to promote a culture of openness and accountability across the public sector (Environment Agency, "Access to Information", 2010). However, certain information may be withheld if releasing it might present a risk to national security or public safety or it would breach the Data Protection Act. The Planning and Compulsory Purchase Act 2004, introduced changes to the planning system in England and Wales, especially the emphasis placed on sustainable development, and moves towards - spatial planning, increased community involvement and quality outcomes. Today, from Teddington in west London to Sheerness and Shoeburyness in the east, tidal defence is provided by the Thames Barrier at Woolwich, eight other major barriers owned and operated by the Environment Agency, 36 major industrial floodgates, 400 minor moveable structures in private ownership and 337 km of tidal walls and embankments protect an estimated 1.25 million people living and working in the tidal flood-plain (Environment Agency, 2003).

4.5. Dhaka Flood Protection Strategy, Bangladesh

Bangladesh is likely to be one of the most vulnerable countries in the world to climate change through tropical cyclones, storm surges, coastal erosion and back water effect. The southern part of Bangladesh is a delta formed by the alluvial deposits of the Ganges and Brahmaputra rivers. Historical Dhaka is located on the southernmost point at which

topography renders it relatively flood-free. The city is located on an area of slight elevations intersected by natural channels that drain towards the rivers surrounding the city. Outside the city are extensive areas of fertile floodplains and wetlands that are used for rice production.

Dhaka is a city with a very high population growth. Whereas the population in 2005 was 12 million, it is expected to increase to 23 million by 2015 according UNDP projection. A large part of this growth is caused by migration from rural areas. At present 30% of the city population are below the poverty level and live in slum areas (JICA, 1992). At such high growth rates, and given the uncontrollability of slum development, urbanization is to a large degree unplanned and creates the Greater Dhaka.

Dhaka has faced a number of severe floods since its early days and its vulnerability to these resulted in the building of the Buriganga River flood embankment in 1864. Severe flooding in Greater Dhaka is mainly the result of spillover from surrounding rivers that flow to and from the major rivers of the country. In recent history, Dhaka has experienced major floods due to overflowing of surrounding rivers. The river flood in 1988 had swamped most of the city for approximately 1 month. Concerning on the wicked problem caused by flood, the national planners and decision-makers promoted large-scale engineering measures as a solution for flood problem to the government and ensured the adequate technology. In the wake of catastrophic floods of 1987 and 1988, then the government of Bangladesh commenced 'Greater Dhaka Flood Protection Project' (GDFPP) as a measure to ensure flood-free life for people in Greater Dhaka which was divided into two phases based on the area protected, Phase I (1989) the most of the urbanized area of the western part of Dhaka City and Phase II (1992) the eastern floodplain agricultural perimeter of Dhaka City. Since the project is a multipurpose project, it comprised a variety of activities, for which various national agencies would have specific responsibilities various requirements of the different sectors in the planning process such as spatial and urbanization control, solid waste disposal, agricultural, drainage, water quality and transportation, etc. However, the core responsibility and project coordination is carried out by the Bangladesh Water Development Board (BWDB). In Oosterberg et al (2005) it is also mentioned about the establishment of early-warning system. With this GDFPP embankment, the problem of river floods has receded, but a yearly flood still affected the settlement outside the embanked city, which are the slump areas, and caused material and personal damage.

Discussions on the project performance do not have a great impact on the improvement of the project implementation. Actually, after the construction of Phase I, various post-evaluation studies revealed that this project has stimulated a significant landuse conversion from agricultural into residential landuses (Muhit, 1993) in the eastern part of Dhaka City influenced by both the constructed and proposed embankments. Once a certain level of safety is provided by embankment, it is almost impossible to prevent a process of rapid and spontaneous urbanization. A good example of this phenomenon can be seen in an area to the south of central Dhaka. This area of some 60 km^2 was embanked in 1968 with the aim of irrigated rice production, but has since then been rapidly urbanized and at present has all but lost its original function.

Another research also found the negative impact of the project on agriculture activities and fish migration because of the waterlogging. Waterlogging becomes a yearly problem, and was exceptionally serious in 1998 and 2004, leaving large parts of the city inundated for two month. According to Alam and Rabbani (2007), the main reason for the 1998 flood was excessive rainfall over the catchment area of three different flood waves, Ganges–Brahmaputra–Meghna river basin and the impact of the lunar cycle which resulted high tide and the slow recession of the floodwaters. Another source said that the main causes of flooding inside the protected area were hydraulic leakage, a failure to operate the regulators (sluice gates) and a lack of timely pumping of accumulated water upstream from the Rampura regulator. Further, it is mentioned that there was an apparent lack of coordination between the Bangladesh Water Development Board (BWDB) and the Dhaka Water Supply and Sewerage Authority (DWASA) to prevent the flooding. Although the authority is responsible for ensuring proper drainage, the Bangladesh Water Development Board is in charge of operating the regulators and gates. In fact, there was neither operating policy nor assigned person to operate the Rampura regulator that controls the drainage of 40 % of the protected area under Phase I of GDFPP. Moreover, according to Chowdhury (2003) the GDFPP has also worsened flooding outside the embankment and created a serious problem for solid waste disposal, agricultural residues, drainage, surface and ground water quality, fisheries, public health and water transport etc. These, in turn, severely affected the local living environment in Areas of Outstanding Natural Beauty (AONB).

In response to the recent flood in 2004, at the political level, the preference has been stated to continue the implementation of Phase II, the embankment of the area to the east of present Dhaka (Dhaka East), although there are still pro and contra about this project. For the financing of project costs an appeal is made to international donors. Many doubt that the negative consequences of the first phase can be avoided in Dhaka East. Meanwhile, the proponents believe the worth benefits from the reduction of water flushing and deterioration of water quality in an embanked urban area, and the embankment as a ring road around the city. Although this is a priority project but it is slow in progress, the proposal of the Eastern Bypass Road which is part of the project has already been abandoned. The main issue for non-implementation of the project has been the absence of a land use plan (Detailed Area Plan) by the Dhaka city development authority (RAJUK). It is the general belief that if the eastern embankment is constructed without a proper approved land use plan then the city will grow in an unplanned manner and proper drainage provision will be absent which in the long run will make the life more miserable in those areas due to water logging and drainage congestion (Khan, 2009).

Some local water experts and authorities propose an alternative strategy: the creation of large mounds to serve as a safe basis for urbanization, while maintaining the natural drainage system intact. Another option is the development of satellite cities on the higher grounds north of Dhaka which is likely offering a natural solution whilst preventing the daunting prospect of an uninterrupted city of 23 million inhabitants. In this option, the provision of good infrastructure links with central Dhaka is probably a crucial element. It is

uncertain whether the migrants from the countryside will be tempted to choose for the satellite cities, rather than the proximity of the city center where they attempt to earn a living in the informal sector.

4.6. Adaptation Measure Initiatives in Philippine

The vulnerability of Philippine due to the acceleration of sea level rise, as one of the most certain outcomes of global warming, has already been stated by the National Research Council since 1987. It considered that the Philippine, as archipelago with a coastline of 34,000 km, inevitably might face a serious problem from the potential effects and possible responses to sea level rise (Perez et al, 1999). The first reason is because the Philippine coastal has vital ecological and economic contribution to local community and national income. For example, the Mangrove systems with total area of 1,200 km^2 provide valuable resources and serve as buffer systems for coastal hydrodynamic sediment balance and also protect from wave surges (Mazda, 2000). Meanwhile, coastal sectors contribute the annually national income from tourism and fishery sectors (Tacio and Tacio, 1999). The second reason is that Philippine, because of its location in tropical oceans, will be significantly affected by greater of solar heat input attributed to earth's physical intrinsic properties (Smith, 2001), which result on increasing evaporation and precipitation and also the El Niño Southern Oscillation (ENSO) (Grove and Chappell, 2000). The physical, socio-economic and ecological impact of sea level rise on Philippine's coastal zone have already been identified recently. Flooding caused by high tide normally occurs from June to September, but it also happens in December and January with less frequency and adverse effects. This problem of flooding is also abetted by high sediment loading and siltation in Manila Bay and the lack or clogging of drainage systems within the city. Starting in the 1990s, at least 7 out of the 11 case study barangays reported a certain level of saltwater intrusion into the underground water (through their shallow wells) and infrastructure (such as the water district's pipelines) due to sea-level rise and flooding, which made the drinking water salty and rusty, thus many coastal families prefer to buy purified or mineral water for drinking. In fact, the City Engineer's Office noted that there is now a need to raise the existing level of these pipelines to prevent further saltwater intrusion into the system.

Undoubtedly, the climate change impacts are not confined to the natural environment and ecosystems alone but are now being felt by the human communities of the coastal city. These impacts will worsen in current circumstance of the continuing coastal resource and habitat degradation. Among the various socioeconomic groups in these communities, the poor coastal families, specifically, the small fishers and shellfish gatherers are the most vulnerable to these impacts, followed by the enterprising poor and the self-employed. The women of these socioeconomic groups are likewise vulnerable to such impacts. The vulnerability of coastal households and ecosystems to current and future climate risks is underpinned by several causes and dimensions.

There are numerous efforts on addressing the issue of climate change have been implemented, but only a few concentrate on the impacts of climate change in the coastal

system, an example of current initiative is the Integrated Coastal Zone Management (ICZM) applied in Lingayen Gulf, Davao Gulf, Cebu and Batangas Bay (Capili et al 2005). Most of the adaptation strategies identified by the local stakeholders involve capacity-enhancing measures, which are nonstructural and basically involve the formulation, enhancement and strict implementation of relevant national laws with fines and penalties, regulations in local ordinances and programs. Some of those national laws are the Fisheries Code (Republic Act (RA) 8550)); fund allocation (RA 8185); issuance of building permits (Presidential Decree 1096-building code); settlement integration into land use plans and zoning ordinances (RA 7279-Urban Development and Housing Act). Regulations which contained in local ordinances are land use and zoning. Menwhile, climate change adaptation programs can be found in relief and disaster risk reduction, alternative livelihood and ecological waste management.

However, in the implementation at the local level, the variety of legal frameworks and solutions are apparently not fully implemented, or even violated. Recent studies have indicated the shoreline changes along the coast of Manila Bay during the past few years accused by extensive human activities. Human-induced progradation of as much as 100 m was observed between Can˜acao and Sangley Point in Cavite City due to the reclamation of the Sangley Point airstrip. The net shoreline change in the Cavite coastline was in the seaward direction, comprising an additional land area of approximately 78.1 m^2 (PEMSEA, 2004). Varying changes in depth in the areas within Manila Bay could also be attributed to human activities, which include the massive reclamation within the bay in the 1970s for the construction of the Cultural Center of the Philippines (CCP) and its adjoining structures and the siltation and erosion of terrestrial ecosystems (PEMSEA, 2004).

In dealing with climate change problem, the local stakeholders from the local government and communities have identified a range of proposed adaptive strategies and actions to address the impacts of coastal hazards (retreat, accommodate, protect). There are informal measures done by households' initiatives e.g., accommodating sea-level rise, reinforcing the existing house structure, moving to safer places (houses of relatives and neighbors), storing and sharing food, borrowing money from relatives, social networks and government agencies, and seeking alternative livelihoods, among others. Actually, the autonomous and planned adaptation measures adopted by local communities and the Local Government Units (LGU), respectively, have contributed positively to reducing the vulnerability of the coastal communities, however these are still inadequate and costly for such climate risks.

Addressing climate change issues in Philippine seems to be insufficient to cope with future climate projections. Although several initiatives are currently implemented, integration is missing. Also, they do not solely focus on the issue but rather serve other purpose (Capili et al, 2005). The issue of climate variability events is not high in the development agenda compared to more pressing development concerns such as poverty alleviation, economic growth and environmental degradation. Current responses to extreme climatic events are considered more as disaster preparedness and mitigation opportunities rather than as requisites for much needed, longer-term adaptation (Berdin et al, 2000). Enhancing the capacity of

coastal communities and multi-stakeholder participation to reduce the impacts of climate change is relised as the most appropriate strategy for increasing their resilience to the drastic impacts of long-term climate change. However, there is a long lead time required to transform a policy to reality. Take example on the Presidential Decree on Fishpond Leasing/Developments, this decree is in existence but seemingly not being put into practice.

4.7. Institutional Adaptive Capacity in Two Side World

Every country has developed their own strategies in coping with the flood problems. The strategies chosen are varies based on the several consideration that influenced by local, national and even regional context, such as EU community. From the overview, there are some important facts related to institutional adaptive capacity found. Those strength and weakness are summarised in Table 4.1 below.

Table 4.1. The Adaptive Capacity (AC) of Flood Defence Institutions in Two Side World

AC	NL	UK	Bangladesh	Philippine
Variety	Diversity of policy frameworks under EU Directives. Increasing in variety of ideas and policy measures. Limited actors involved.	Diversity of policy frameworks under EU Directives. Multi-actors and sectors. Decisions on flood resilient construction, backed up by a flood warning system.	Various requirements of the different sectors in the planning process. Focus mainly on engineering solution (in implementation.	Variety in strategy/ policy but loss in implementation. Impact assessment less consideration on the human dimension.
Learning	On the traditional path of reducing flood probability. Advance in climate change data monitoring and predicting.	Flood protection priority on avoiding flood occurance. Advance in climate change data monitoring and predicting.	Discussions only within the scientist community. Weak in the evaluation and improvement process.	Lack of assessment in the adaptive capacity of communities and the country to deal with climate risk
Room for autonomous change	Overconfidence on false sense of water safety. High dependency on "free flood" measures.	Access to information such as flood risk and climate (Freedom of Information Act 2000). Socio-politic-economic function of Thames Estuary makes the less degree of flexibliltiy in options.	Uncontrolled development, illegal settlement (dwellers, slump). Law enforcement is weak.	Extensive human activities, land reclamation and development on coastal area. Law enforcement is weak.
Leadership	Strong visionary and entrepreneurial leadership by central (Ministry of Transport, Public Works and Water Management). Limited in collaborative.	Sharing responsibility in leaderships (visionary, collaborative, entrepreneurial) between central – local (Environmental Agency).	Lack of coordination. Climate change issue is not high in political agenda.	Integration is missing. Climate change issue is not high in political agenda. Main issus: poverty alleviation, economic growth and environmental degradation.
Resources	Supported by strong water management knowledge and human resources. Financed by taxes and highly dependent on the political and public climate.	Supported by high technology, engineering structure knowledge, financial and human resources.	Financial support from international donors. Sharing responsibility and authority is not clear.	Knowledge on current and future vulnerability is inadequate. Natural resource management is lacking in central focus and authority.
Fair governance	Flood protection is guaranteed for all citizens.	Planning and Compulsory Purchase Act 2004 emphasis on sustainable development, and moves towards - spatial planning, increased community involvement and quality outcomes.	The most vulnerable is poor people in slump area that are still living outside embank city. Phase II which is supposed to improve the agriculture area is slow in progress.	Long lead time required to transform a policy to reality. Lack of empowering the weakest groups such as poor families, women and children.

4.7.1. Variety

Recent challenge in coastal management is no longer for domination of nature but for achieving harmonious integration between socio-economic development and natural order. As recognized easily from the current solution framework in developed countries which is more comprehensive and variety, from hard structure measures to soft measures. Actually integrated concept had already been popular in developing countries but only touch on the level of policy and still hard to be implemented. Taken as an example in Philippine, although the Presidential Decree on Fishpond Leasing/Developments has already been issued, but apparently it has not being put into practice. Further, it is found in Bangladesh that at planning process there are variety sectors involved however the design result was likely still far from riches problem definitions and solutions. There are two possibilities, first the forum is not mutually a discussion forum but only formality of bureaucracy to meet the requirement of donor organizations; second the capacity of human resources is inadequate to contributing in the discussion process. It is difficult to figure out what is actually happened since there is no deep observation for international case study.

It is also identified that in the establishing of coastal defense strategy, there are four important involved actors from those different cases: government, scientist, community and private sectors. The role of actor in supporting coastal defence is influenced by the political system and the important degree of water issues in the relevant countries. Government usually becomes the initiator that establishes the project at first place as found in all observed cases. At the national or regional level the decision on the general strategy options and related legal framework is made by the central government for example national adaptation strategy, presidential decree, and relevant acts. Since this issues involved many parties and interests, the central government also plays role as coordinator that ensures no conflicts between sectors and the lower level implementing the strategy in practice. At the lower level, the local government interprets the general frameworks into practical strategy that is suitable with the local context and shares tasks and responsibilities between units within its organization, for instance water management and urban planning unit. The second group in coastal defense strategy is scientist which is independently monitoring and revealing the uncertainty in climate change variability, evaluating and criticizing the current strategy, and promoting alternative solutions. Actually this group is also possible embedded in the government organization but ethically their works should not be intervening by any political interests, because the opinions of this group will be used by decision makers as scientific basis in selecting adaptation options. The world of scientist also has power in influencing the public perception and opinion.

The community role, as the third involved actor, in developing and developed countries is quite different. In developed countries, the community finances the flood protection through taxes or paying flood insurance for property loss risks in case flooding. This scheme is difficult to be implemented in developing countries since the community that lives in the hazard area already poor people which cannot afford for additional protection expenses such as taxes or insurance. Even though not mentioned explicitly in those four cases,

however the influence of community opinions about the flood risks are also important things that have to be considered in the decision making process.

The last one is private sector, developed countries have tried to seek the opportunity to involved the private sectors (investors) in financing the operation and maintenance of the flood management infrastructures, and only UK that has started to offer this sector to take part in the coastal defense effort. There are two roles identified from those cases, the first one is the owner who operates and maintains the flood protection infrastructure in this case floodgates. The second one is insurance company which contributes in soft measure by giving financial secure through insurance scheme. This is also still difficult applied in developing countries since as mentioned before that flood protection is categorized as public goods that may not much attract profits.

4.7.2. Learning

The Netherland and UK has long history of 'fighting against water' thus coastal defense is part of the coastal community culture. Water management of both culture is about constructing the safety boundary between the area for water and the development area in which the area is controlled not to intervene the protected area. The water management has been embedded in the society way of life, such as Polder System and Water Board which has been established in Dutch Water Management since hundreds years ago started by agriculture community. In the development of recent water management, the idea of 'managing water away from people' by increasing sea wall or dyke is being questioned and considered not sustainable. However the long experience of observing coastal behavior has inherited the current generation with plenty of time series data, instruments and methods which can be very useful for future water management. Unfortunately this 'water safety' path has deeply rooted in the institutions that make difficult the possibility of taking a different institutional path.

Meanwhile in Bangladesh and Philippine, the climate change issues appear not high in political agenda rather than poverty and environmental degradation issues. The discussions on climate change variability as a form of learning is apparently only recognized within the scientist groups, however the assessment on the adaptive capacity of community and country to deal with climate risk is still inadequate. Learning here means not only improving the established path but also questioning it, which might consequence on the change of fundamental assumption. Yet, this kind of learning have not found in both developed and developing countries.

4.7.3. Room for autonomous change

In a different way, community in developing countries response the nature behavior as given conditions that have to accept and live with it. As in Dhaka, 'flood is part of daily life' of people who live near the river and coastal. Rationality on this decision of living under threats of flood is based on the trade-off between the tolerable risks and the benefits of being close to work. Thus, the people live in that live in hazard area are low income groups who have limited options in deciding where to live. Protecting this area from flood will stimulate

more people from this group occupied the area, as what happened in Dhaka. The extensive landuse change occurred after the construction of embankment, therefore if it is difficult to control the urbanization then the strategy has to consider its multiply effects after the implementation and the requirements that follows the effects such as adequate affordable housing, low cost transportation, and legal framework for landuse control.

Looking from the water management history, a dramatic reform of related strategy is always marked by occurrence of or close to disaster. As the Netherlands implemented the Delta Plan after a big flood in 1953, UK determined to build The Thames Barrier after that flood too. A near-flood of 1993 and 1995 had triggered the shifting of the flood defense approach from pure engineering measures to more comprehensive measures in the Netherlands. Meanwhile, the GDFPP in Bangladesh started after a catastrophic flood of 1987 and 1988. Since the investment of flood defense absorbs a lot of resources, the decision made has to be based on certainty to ensure the options will be useful in the future. However, the decision made is not determined by the size of disaster but the perception of people towards the dangers itself. For example a near-flood in The Netherlands made a change in water management strategy, while the similar kind event in Dhaka may not be responded in the same way. The reason is because the water issues in the Netherland are high political agenda, people are very sensitive with the issues and tend to be reactive to any related events. Meanwhile, in developing countries, the climate issue is not high on the political agenda, mostly political leaders concerns only on poverty alleviation and economic growth. The flood occurrence will become political agenda if it affects the property of important investment that may influence the regional or national economy.

4.7.4. Leadership

Generally, coastal city has important function not only locally but also in greater level interest such as regional, national, or even international such as the Thames Corridor, thus mostly there is more intervene of central government in decision making and implementation because flood defense is related to sensitive area and can be classified as public good which may result externalities since there is no rivalry and no exclusion in using the benefit. Such as Delta Area, Thames Corridor, Dhaka and Manila Bay, nationally or internationally have vocal functions, thus, the decision made is usually not easy and determined by political power. Differently in Cavite City, the role of Local Government Units with local community here is mentioned as initiator of autonomous adaptation measures. Actually the role of government is similar in developed or developed countries, nevertheless in developing countries sometimes the authority of different agencies within the government apparently are not ensured yet which may result misunderstanding and confusing in implementation, as mentioned in the failure of GDFPP in countering the 1998 flood in Bangladesh.

Although the power in decision of adaptation strategy is on the hand of government, the decision might be influence by political power since the arena is very sensitive to conflict of interests. Avoiding that, the decision has to be based on a scientific basis and community

preference, so far the influence of those two actors within the decision making process in developing countries is still inadequate.

4.7.5. Resources

The decision, on adaptation options due to climate change, is not easy because of the uncertainty and variability in the nature of climate change itself, thus many countries, especially ones that had limited financial and technology, prefer to wait and see for the certainty to come.

The works of researches depend on the availability of data, knowledge, and finance, at which the developing countries are generally inadequate. Therefore, some research or evaluation is done not in local detail but in broader regions, the purpose is to minimize the research budget. Join research also may become another solution, especially those areas that close each other but under different management. The involvement of private sectors can also be seen as an opportunity to look for another financial source for coastal defense, so that not solely burdened by the government and society. The trend of coastal defense networks related to sea level rise and tidal flood problems in developed countries (UK and the Netherlands) showed the track to these networks scheme of actors, while this is not yet found in developing countries.

4.7.6. Fair Governance

In The Netherlands and England, this last variable seems automatically protected by a good system of project assessment, monitoring and evaluation and the protection of basic rights and equity since there is no wide economic gap among citizen. In Bangladesh and Philippine, the poverty is high in the coastal cities where those poor people are usually found in slump area as a marginal part of the city development. In Bangladesh, they are still living outside embank city which is not protected by flood. The interest of those weak groups are slow in response by government, as indentified in Dhaka flood protection project-Phase 2, which is supposed to improve the agriculture area.

It is also recognized that even there are variety legal frameworks issued, there is a long lead time required to transform a policy to reality. In practice the laws and regulations are often being violated, even by the authorities because the environmental issues are less interesting rather than regional economic development. Although there are some initiatives programs have been established in the issues of climate change, those programs are not successfully improve the most vulnerable groups. It is found in Philippine that the problem lays on the lack of empowering the weakest groups such as poor families, women and children.

4.8. Concluding Remarks

The coastal area is complex and dynamic system which inherits from its biogeophysical condition. This area is marked by the unique ecosystem and by its geographic competitiveness values in which both conflicting each other. This is reflected by the emerging

of landuses conflicts in this area. However, these characteristics develop coastal cities into important areas as the connecting nodes between regions. Therefore, the coastal cities generally have vital role in regional and national level. As consequence, the development of coastal cities will be influenced by broader political context.

In addition to all those stresses caused by its nature physical condition, the implications of the predictions of sea level rise due to climate change will be a serious concern in future. The present seeable impacts had threatened environmental systems, which possible extent to a set of socio-economic impacts. Especially in developing countries, the most vulnerable groups affected by the implications are the poor coastal families and also women and children within these groups. These groups apparently has a weak political power in the society, therefore fair governance such as social justice and equity will be important issues in developing countries.

The main different context that influence the coastal management strategy between developed and developing countries are the water culture and political interests. The long tradition of dealing with water management has a significant role in the development of advance adaptation strategy as found in The Netherlands and England. The continuity of observing, monitoring, evaluating and improving process through time has strengthened the water institutions.

Meanwhile, since the development of coastal cities will be colored by political tensions and interests, the decision on the adaptation strategy might be influence by political power. To avoid some dominant power steering the decision, variety stakeholders, such as scientists, private sectors, and community, should be mutually involved from the earliest stage of decision making process, not only become the background of the process.

Overviewing the future challenges of coastal defense strategy, the problems are related to the nature of the institutional itself that is difficult to change. As the older tradition already established the shifting from old tradition to new one will be difficult and time consuming. On the other hand, the socio-political changes in a faster period than institutional evolution, thus this is actually the main challenge for future strategy, how can the institutional follows the society dynamic changes. This capability related to the ability of institution to adapt with changes, thus the solution is by stimulating the adaptive capacity of institutional to be a more dynamic system regarding to the social needs.

From the two side world, it is revealed that, *first* variety has to be harmonized by a good coordination. *Second,* institutions are difficult to change, especially for fundamental change, because fundamental change will disrupt stability. *Third*, flexibility room for autonomous change requires basis control (knowledge, law, authority). *Fourth*, the important role of water sector agency as the water manager and planner as visionary leader. *Fifth*, there is the significant gap of resources between developed and developing countries. *Finally*, the protection of basic right for all citizen is guaranted no exception for the weakest group such as poor families, women and children.

CHAPTER 5
INDONESIA PLANNING SYSTEM, COASTAL DEVELOPMENT AND THE IMPLICATIONS ON INSTITUTIONAL ADAPTIVE CAPACITY

5.1. Introduction

This chapter mainly illustrates the condition of planning system and culture in Indonesia. In the previous chapter, I argue that the coastal cities generally has vital role in regional and national level. So the flood defence strategy implemented may also be influenced by the national context. Moreover, it is also revealed that mostly in developing countries the climate change issue is not high on the political agenda and there is a gap in strategy and implementation between the national and local level and across sectors. In my opinion, it is because of the fail in establishing the legal frameworks and landuse control (spatial measures) to support the flood defence strategy.

Regarding to that, in this chapter I discuss the water management related to climate change issues at the national context in Indonesia. First, I explain about the Indonesia political situation in transitional period from the as the context arena of discussion. Second, it is about Indonesia planning system in the Reformation Period. Third, the implication of both to development and flood defence institutions in coastal city. Finally, I connect all of national context to the capacity of flood defence institutions to enable climate change.

5.2. Indonesia Planning System in Reformation Period

5.2.1. Indonesia Political Situation

Indonesia entered a transitional period after being hit by the 1997 financial and economic crisis. The transitional period is the changing era from the New Order which is under repressive-military of Soeharto Regime to the Reformation Era. There are two dramatical changes recognize in the new era, democratisation and decentralisation of the political system. It was marked by massif institutional changes in major policy fields which were thought more relevant with the new institutional setting. There are including laws on regional administration (Law No. 32/ 2004), regional fiscal balancing (Law No. 33/ 2004), water resources (Law No. 7/ 2004), development planning system (Law No. 25/2004) and spatial planning (Law No. 26/ 2007).

The reformation era is a contrast to the long period of the New Order rule, which was known for its particularly forms of authoritarianism, strict controls over political party and societal life, not to mention, widespread and systematic corruption (Hadiz, 2002). Indonesia's democracy is characterised by free elections (Laws 3/1999 and 12/2003), political party competition (Laws 2/1999 and 31/2002), national and local-level parliaments, and a lively free press. The most dramatically, decentralisation policy carried out in such a rapid fashion – to shift authority and responsibility away from Jakarta and into the regions (Laws 22/1999 and 25/1999).

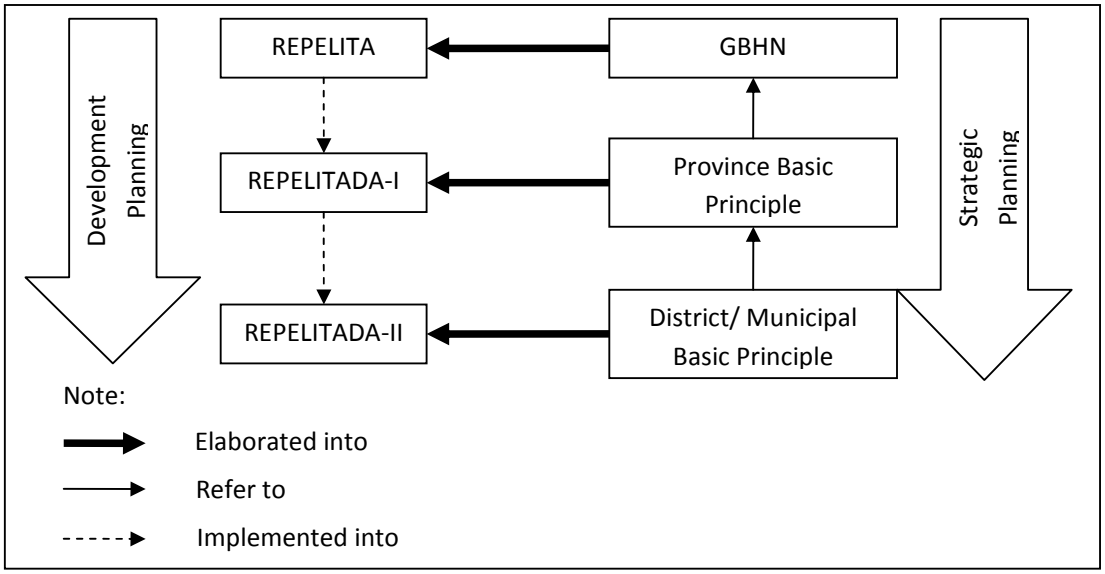
The spirit of reformation offered the prospect that Indonesia would be able to manage its natural resources better, and achieve a long-term development path that embraced both

resources sustainability and equity (Resudarmono 2004). Thus, the reformation is not merely related to the shifting of power from central government to local power including local government and community, but also at the same time issued new ideas such as sustainable development and social justice. However, the radical changes have create an environment of political uncertainty, inconsistent laws and regulations, weak law enforcement, a weak governmental system and insecurity of land tenure. As the consequences, those may increase the conflicts between different level of government, local communities and companies in carrying out natural resources extraction activities and corruption at local level.

To understand the positive and negative implications of the reformation process to coastal area development, in the next sub section I discuss the national development system in Indonesia during the reformation era which further may also influence the current spatial planning and water management of coastal area in Indonesia.

5.2.2. The Changes in the Development Planning Process

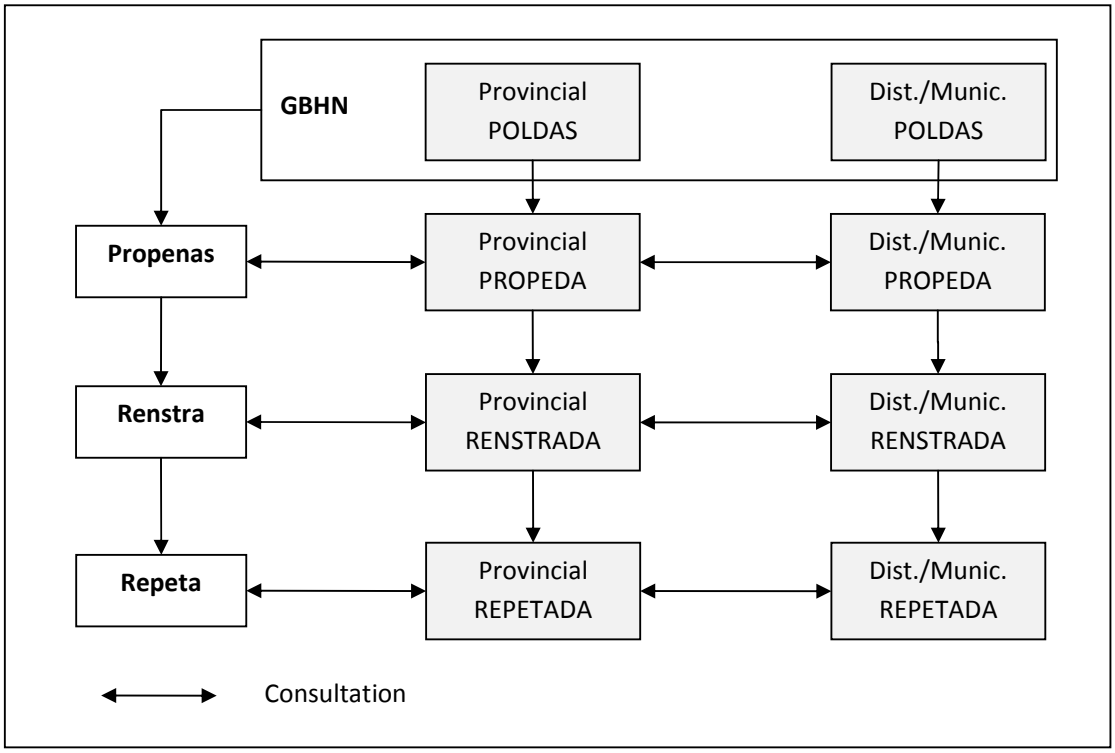
Before 2001 the development planning was derived from the GBHN as the national guidance for development in Indonesia. GBHN was elaborated into the Five-Year National Development Plan (Repelita) which was translated into the Five-Year Provincial Development Plan (Repelitada-I) and the Five-Year District/Municipality Development Plan (Repelitada-II) by to the local government (province and municipal). The Repelitada-I and Repelitada-II was elaborated from the Local Basic Principle as its strategic planning which also referred to GBHN. The strong intervention central by hierarchy top-down model development planning was shaped the regional development into a uniform format and content of development since the central interfered the detail development in the regional level (Matsui 2007). The Development Planning System in Indonesia before 2001 is illustrated in Figure 5.1.



Source: Author, modified from Matsui (2007)

Figure 5.1. Indonesia Development Planning System before 2001

At the beginning of the reformation era (2001 – 2004), the GBHN no longer took strict control on the regional development planning process. This is the first main difference of the new system that the regions were allowed to take part in dealing with the uniqueness and the characteristic of each region, which the central government could not do in detail. However, the unity concept within the nation was still appeared in the Basic Pattern Development (Province and District/ Municipal POLDAS) since it was positioned within the framework of the GBHN. GBHN was then elaborated in the National Development Program (PROPENAS), Strategic Plan (RENSTRA) and the Annual Development Plan (REPETA). The changing is also shown in the difference of PROPENAS and Repelita in the previous system. PROPENAS gives more flexibility to the local government and the ministries/ sector institutions in making their own development plan because the development used the term "program" instead of "plan" which seems more general (Matsui 2007). Another change that is also important is marked by the 2-direction of consultation arrows between levels of government. It means that the lower level of government was allowed to also determine the higher level program or strategy. However, since the programs written in PROPENAS may be too abstract, the evaluation on the government's performance became difficult. Therefore, under Yudhoyono's administration, the elected President (2004 - 2009), the term "plan" was used again with various economic targets and concrete figures. Figure 6.2 illustrates the schematic of the development planning system during 2001 - 2004.



Source: Author, interpreted from Matsui (2007)

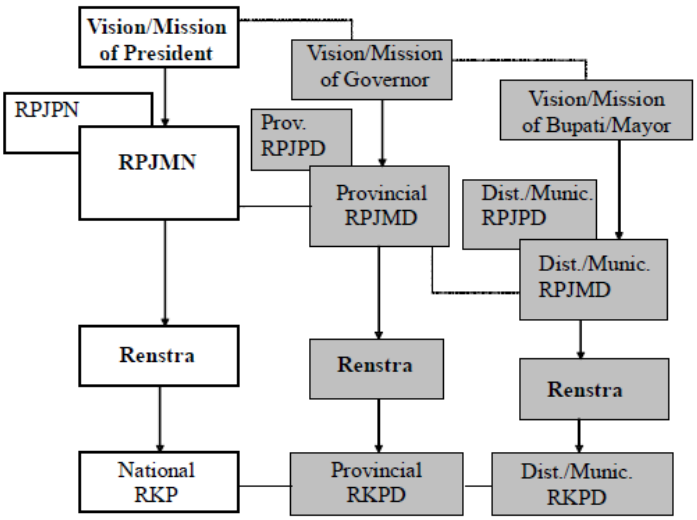
Figure 5.2. Indonesia Development Planning System during 2001 – 2004

Based on Law No. 25/2004 on Development Planning System, the GBHN - that had been the development guideline - was no longer used. It is replaced by the vision/mission of the elected president which automatically became the vision/mission of the national development. Although this is not literally mentioned since the people directly voted for the president/vice-president, then the vision/mission of the elected president are assumed to be highly legitimized by the people. However, in reality the vision/mission have not been discussed extensively amongst various stakeholders and were only drafted by the campaign team of the elected president and vice-president (Matsui 2007).

Based on this vision/mission, the National Medium-term Development Plan (RPJMN) for a period of five years is determined and this is elaborated in the Strategic Plan (RENSTRA) and the Annual Government Working Plan (RKP). These processes follow the NPM (New Public Management) method. In addition to the RPJMN, the government must also draft the National Long-term Development Plan (RPJPN) which falls under the authority of the National Development Planning Board (BAPPENAS).

The Provinces and the Districts/Cities follow the same framework ever since the application of the local-head elections in 2005. The Regional Basic Principle is replaced by the vision/mission of the elected local-head. The same logic applies as in the central government process. The vision/mission that was drafted by the campaign team of the local-head candidate becomes the benchmark in the regional development policy. Figure 6.3 illustrates the schematic of the current development planning system.

Instead of top-down process from central government to local government, there is a bottom-up process in the current development planning process. The bottom-up process is the constitution process in which every single government level attempt to arrange the annual development proposal draft based on the project proposal proposed by the lower level of the government. The process starts from the lowest authority, it is the village development meeting (Musbangdes) led by the chairman of the village and presented by Local representative Body (BPD), Non-government organizations, and the regency representative. The purpose for this meeting is to arrange project proposal that will be proposed to higher level of governance (regency/ kecamatan). Further, project proposal from the village meeting will be analyzed in the regency meeting held by Development Working Local Unit (UDKP/ Unit Daerah Kerja Pembangunan). In this meeting, all the project proposals from villages will be selected, which one might be not effective to implement, overlapping or not priority and also possible add more project emereged from the meeting. Later, those project proposals will be discussed in the development coordination meeting (RAKORBANG) in the local level until the province level.



RPJPN: National Long-term Development Plan
RPJPD: Regional Long-term Development Plan
RPJMN: National Medium-term Development Plan
RPJMD: Regional Medium-term Development Plan
RKP: Annual Government Working Plan, RKPD: Annual Local Government Working Plan

Source: Matsui (2007)

Figure 5.3. The Current Indonesia Development Planning System

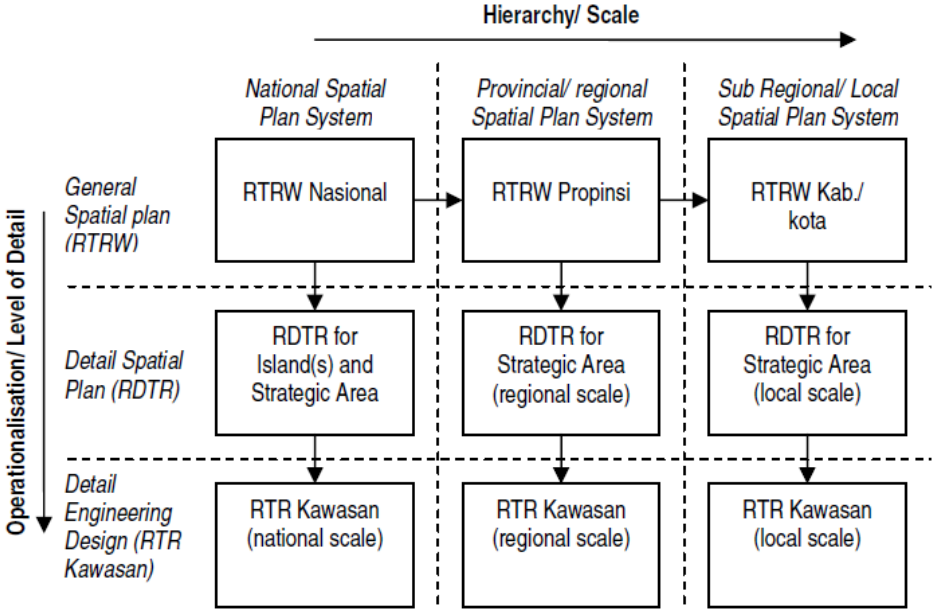
The development mentioned in this subsection is related to the socioeconomic development. Although the development itself is not only about the physical development, but the socioeconomic development might result on the physical development which will be identified on the spatial changes. The spatial changes will also reflect the tension and dilemma between the development interest and environmental conservation. Therefore, the next important subject to understand is the current spatial planning system, its relation to the development planning system and other water-related sectors planning.

5.2.3. The Spatial Planning System and Water-related Sectors Policy

There are some legal frameworks, related to spatial and water affairs, underlying the form and structure of government in Indonesia. These legal frameworks include the 1945 Constitution, regional administration law, spatial planning law and water resources law. As mentioned in the 1945 Constitution, which is the basis for the management and utilisation of resources in Indonesia, the state has the role to control the utilisation of land, water, space, and natural resources for the greatest benefit of its citizens ("The Constitution of the Republic of Indonesia of 1945", 1945, Art. 33, par. 3). This statement gives the rationale for the state's strong control over the exploitation of land, waters, space, and natural resources. At the same time, it mentions that "…for the greatest benefit of its citizen.", which also justifies the government's ambition to promote comprehensive goals of spatial planning comprising spatial quality, sustainable development, environmental protection, and national security.

However, to achieve a good spatial quality is not easy in the absence of such pervasive government.

The regulatory framework of Indonesia planning system in the reformation era was enacted in 2007 through the promulgation of Law 26/ 2007 on Spatial Planning. To accommodate the strong role of government in spatial planning, an integrated-comprehensive approach has been adopted with hierarchy system of three government levels (national, province, local). It consists of 33 provinces including provinces/regions with special status, 92 cities (urban local authorities), and 359 regencies (rural local authorities). Based on the European Commission definition (The EU Compendium of Spatial Planning Systems and Policies, 1997), the integrated-comprehensive approach in Indonesia is distinguished by a very systematic and formal hierarchy of spatial plans created at the national, provincial and local government levels, which spatially synchronise public sector activity across sectors. Each level within this system has to prepare three plans in different scale of detail, namely general spatial plan (RTRW), detailed spatial plan (RDTR) and detailed engineering design (RTR Kawasan), as illustrated in Figure 5.4. The spatial planning law requires all government tiers to prepare spatial plans in order to direct spatial development in their regions.



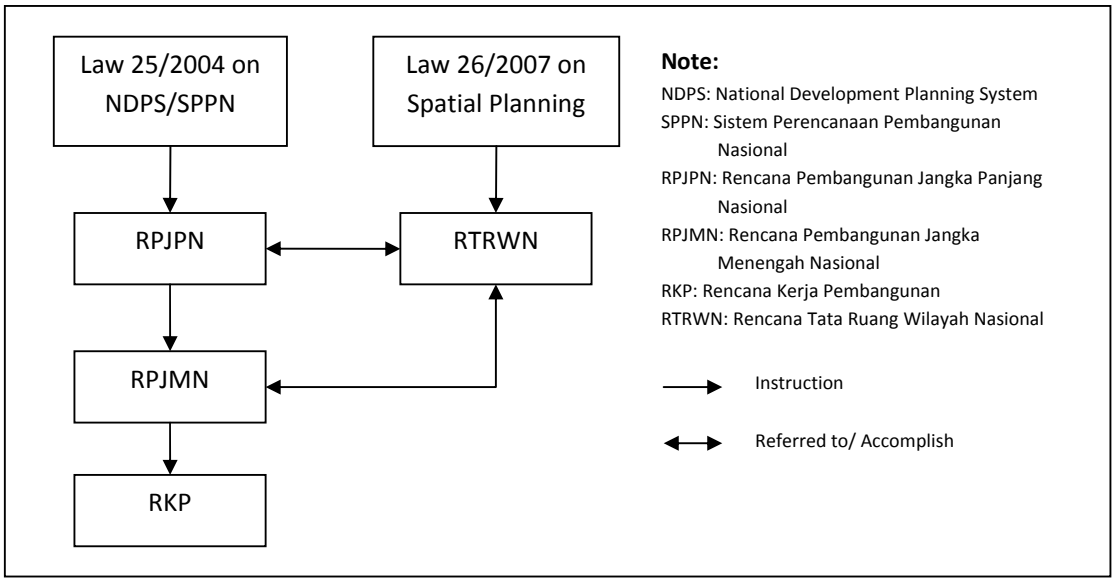
Source: Hudalah (2010)

Figure 5.4. Spatial planning system in Indonesia

The scope of the planning system has also been developed comprehensively, it can be seen in the integration of three planning policy aspects, which are the plan-making process (perencanaan ruang), land utilisation (pemanfaatan ruang), and land utilisation control (pengendalian pemanfaatan ruang) (Government of Indonesia, “Law No. 26 on Spatial Planning," 2007). The strong role of government is especially recognisable in the aspects of plan-making and land utilisation control.

Meanwhile, the comprehensive scope of the system is followed by its centralised approach. According to Hudala (2010), these are a manifestation of the unitary form of government, in which the central government is the only tier authorised to make laws to be applied throughout the whole country, such as universal, top-down planning approaches and standards promoted by government. Geographical diversity among regions and islands is still poorly accommodated. Pragmatic variations are merely designed when it is considered necessary to prevent technical problems on the ground. The uniqueness of local cultural systems is given limited consideration in spite of the prevalence of such systems in the country.

The current national spatial plan, which was enacted with Law No. 26/2007 on Spatial Planning, covers a 20-year period, but is to be reviewed every five years. The organization responsible for drafting the plan was the National Spatial Planning Coordination Board, which was chaired by the Coordinating Minister for the Economy. The board's offices were set up in the National Development Planning Agency (BAPPENAS) and headed by BAPPENAS's director. The Directorate General of Spatial Planning of the Ministry of Public Works was charged with handling the practical implementation of the board's plan. The plan includes guidelines for effective and efficient planning processes to achieve the stated objectives of the plan. There is a strategic development framework for the purposes of creating a national land strategy. The framework seeks to achieve security, economic viability, and sustainability in the use of land in this archipelagic country, in addition to national cohesiveness and stability. The laws require that the national development and spatial planning must each be formulated with consideration of the other, as illustrated in Figure 5.5. Coordinating the two types of plans is becoming increasingly important in the minds of many.



Source: MLIT Japan, "An Overview of Spatial Policy in Asia and European Countries" (2010)

Figure 5.5. The relationship between development planning and spatial planning

Whilst there is a strong role of government in the Indonesian planning system, the role of the public sector in the realisation of planning frameworks and plans is not clearly spelt out. By contrast, related sectoral policy systems such as housing and water management tend to encourage privatisation rather than government participation (Siregar, 2005). An obvious retreat of government through privatisation is evident in the water management system through the enactment of Law No. 7 on Water Resources (Government of Indonesia, "Law No. 7 on Water Resources," 2004). Replacing the former law on irrigation, this law effectively legalises privatisation in water management, whose implementation is financially supported by major influential international funding organisations including the World Bank (WALHI, "Campaign to Reject the Water Resource Privatization and Commercialization," 2009). According to Siregar (2005), the law might lead towards an uncontrolled participation of the private sector, replacing the role of the state. Meanwhile, since water is one of people's basic needs and vital for the country, full privatisation in water management is actually undesirable according to the 1945 Constitution. However, the international financial organizations strongly promote the commodification of water possibly in order to foster global capitalism (WALHI, "Campaign to Reject the Water Resource Privatization and Commercialization," 2009).

On the other hand, over the years people believe water as public property, this means the water does not belong to individuals, but this understanding does not necessarily be equated with collective ownership. This rationality arises because as nobody can produce water, no one can claim as their own water. Water is a social good for everyone and water does not belong to anybody. However in many households, people consume water from private wells. Whereas ownership of wells may be claimed, water ownership cannot. The perspective of these people on water resources is totally restructured by the Water Resources Law by giving the economic value on water. It was considered based on arguments about the scarcity of water. It implicitly invokes the right to lease in spite of the right to use.

Interestingly, the water resources law does not contain any information about the potential implications of climate change and neither does the spatial planning law. However, the climate trend is close related to water variability and to a certain extent may influence the use of land. The effort of promoting climate change issue as national agenda, especially related to adaptation strategy, is accommodated by the newer law, the Environmental Management and Conservation Law No. 32/ 2009. In article 57 (4), adaptation to climate change is defined as:

> "the effort made to improve the capability of adapting to climate change, including climate variability and extreme climate events so that the potential damage from climate change is reduced, the opportunities posed by climate change can be utilized, and the consequences of climate change can be overcome."

In Chapter 2, article 14, spatial panning and other related laws are mentioned as instruments for the prevention of environmental damages. Furthermore, article 15 explicitly states that spatial planning and relevant policies, plans and programmes must contain a vulnerability and adaptive capacity assessment both at the national and the local level. There

is disintegration between the water resources, spatial planning and environmental laws, which can hamper to achieve sustainable development. Those laws are supposed to be instrument to promote the climate change issues in local level.

Unfortunately, the massive changes in major national policies in the reformation era have not been responded immediately by supporting regulations, thus the impact of policies in implementation is sluggish as well. Generally, after the law issued by central government, the relevant regulations to guide the local government in interpreting it into local regulations will also be released. However, this process is slow in progress, the administration problems related to long bureaucratic procedure is pointed as the cause. Actually, the local government with its authority may take actions even the detail regulations have not been released at national level. The local government is allowed to prepare any appropriate local regulations as the follow-up of the law issued by central even the detail description of new law have not been enacted yet. It is possible through consulting the concept of proposed regulation to central. It shows there is still a strong dependency of local to central government as the past institutions used to be. Although the legally the system has changed, the individuals and institutions within it still worked on the old ways.

5.3. Coastal Development - Reflection of Indonesia Planning System

For three reasons, the coastal system in Indonesia is important according to (Kusumastanto, 1998 in Nandi, 2009). The first is the physical fact that Indonesia is the world's largest archipelago consisting of 17,508 small islands, with a coastline along the 81,000 km. As a consequence, most of the Indonesian territory consists of sea which is about 5.8 million km^2 or 75% of the total area of Indonesia. With such a natural conditions, coastal areas and oceans are a part of the integral dimension of the island nation. Those have huge and diverse potential of natural resources, both renewable and un-renewable resources. Second, another reason is the increasing development activities and the growth of the population and the decrease of the natural resources in the county (upland). The oceans and coastal areas will become the center of economic growth as well as new potency commodities for national development in the future. The third and final reason concerns the global economic activity which is shifty the European-Atlantic Axis into Africa-Asia Axis. These changes will have consequences for the economic growth and activities in the coastal and sea areas of Indonesia.

As mentioned in the previous chapter, traditionally the coastal area is unavoidably complex and a dynamic system which is reflected by the extensive development and the emerging of landuse conflicts in this area. Therefore, there should be an effective policy to harmonise the development and the environmental pressures in this area. The birth of Law No.27 in 2007 on the Management of Coastal Areas and Small Islands was supposed to be a sign of appreciation of all parties who live or have certain interest on the coastal areas and small islands, especially the legislative and executive since they have the power to steering the policy. This law expected to be a legal umbrella for all stakeholders who use the waters of coastal areas and small islands to avoid the conflicts that linger. However, similar to other

product of laws pasca-reformation, the law mentions that the rights of the coastal in all provinces and districts of the city in Indonesia can be given to individuals, agencies or business communities. The law fundamentally changes the status of coastal water and its natural resources. Before the law was issued, as common property it could be used by everyone (open access), now the status of coastal resources becomes private property.

It should be realized that the waters of the coastal areas are unique, both from a biophysics-chemical perspective and from a socioeconomic development perspective. The region's which are rich of biological diversity and biological resources are susceptible to external factors such as excessive exploitation pressure, the privatization of coastal resources might trigger on over-exploitation of this system. While the physical area of coastal and its natural resources is vulnerable to human activities, such as destructive fishing, coral mining and sand, which will cause degradation and decreasing quality of the coastal environment.

The consequence of decentralisation can be understood as the empowering the local. According to Almendinger (2002), landuse planning might provide a mechanism for overcoming some of the limitations fragmentation by asserting the role of planning authorities as the lead agency. The development and management of coastal areas in Indonesia are not only the responsibility of central government authority, but has to be the local government based on the Law. 22 of 1999 which gives authority to the regions in managing coastal and marine far as 12 miles to the province and 1/3 for the district (Law No. 22 of 1999). It means the managing of conflicts is actually on the hand of local government which supposed to be the agent to do coordination at upper levels or across sectors by using landuse planning and land development permit as the instruments.

The important role of political leaders who have an environmental vision and are capable of creating a good communication among parties, also determines the integration of different sector development in coastal area. The fact that most of current leaders only focus on economy stability, environmental issues such as ecology, pollution or climate change are not so popular. Flood protection in several coastal cities, such as Jakarta, Surabaya, and Semarang, might be important matters but the actions taken are generally not sustainable and only contain a vision for the short term (five years of politic cycle) due to political campaign needs. This also results fragmented development not only in spatial but in time as well, the changes of policies and programs follow the political changes. There have to be legal mechanism to force the commitment of current political leader to continue the policies or programs from previous period if there is no evident that the related policies or programs are in effective.

However, the privatization of coastal areas and oceans can be seen as the opportunity to attain the financial support from private sectors by involving them to contribute in the responsibility of conserving the resources at the same time. This financial scheme has to consider the environmental cost by converting the environmental impact into monetary units. This scheme also requires a set of evaluation and monitoring tools to support the system.

5.4. Concluding Remarks

Due to national political context of Indonesia, there are four interesting points that might influence the flood defence institutions at the local level. *First* is decentralization, it has changed the political power orientation in Indonesia from central government to local government. It means the local government has more authority to manage its territory. As the central started to release many new policies and laws to maintain the transition process, there is an indication that local government not yet ready for this institutional reform. The local government has slow respond and less initiative to produce the local regulations to anticipate the consequences of the new policies. The long history of centralization has caused strong dependency of local government to the central, one of the reasons is the concentration of resources in central power, including human, technology and financial resources. The role of central is still needed to assist and promote the capacity building of local government.

Second is the trend of privatization in Indonesia as the other product of reformation. It might stimulate extensive development of coastal area and the increasing of local conflicts, over exploitation and urbanization growth, to avoid that it has to be backed up with strict regulations at local level to ensure the user's responsibility to recover the implication of consuming the resources. The privatization of coastal areas and oceans can be seen as the opportunity to attain the financial support from private sectors by involving them to contribute in the responsibility of conserving the resources and maintaining the implication of the activities to the environment and society by considering the equity.

Third is disintegration (fragmentation) between the water resources, spatial planning and environmental laws, which can hamper to achieve sustainable development. Climate change adaptation is not yet highly political agenda in spatial and water affairs. Those laws are supposed to be instrument to promote the climate change issues in local level. The role of landuse planning might provide a mechanism for overcoming some of the limitations fragmentation by asserting the role of planning authorities as the lead agency to coordinate the use of land among sectors its authority.

The last is the role of political leader in directing and determining the development. During the reformation period, the development planning program will be determined by the vision of political leader elected from the national and local election. Therefore, the vision and interest of political leader will shape the next 5 year development plan. However, most of politic leader has no interest on environmental issues.

The national context of Indonesia has significant similarity with the general problems faced by other developing countries which are analyzed in Chapter 4, there is indication of lack of coordination mainly across sectors, especially spatial, water and environmental affairs, which might result disintegration development in coastal cities. Additionally, the political transition in Indonesia gives the unique context to the problematic of the coastal cities, such privatization and the shifting power from central to local level.

Those general and unique contexts together will contribute in shaping the condition of current institutional adaptive capacity in coastal city. As the analysis result, it is expected that the national context will influence the flood defence institutions at the local level. Thus, there

will be weakness in some variables such as less responsiveness and legitimacy, limited resources at local and concentrated resources in central, less awareness of climate change issues and lack of entrepreneurial and visionary leadership at local level. However it might be more positive in some variables with the indications of involvement wider actors, broader legal frameworks at national level, increasing in vertical and horizontal collaboration, increasing in authorities, information and knowledge transfers from central to local. These indications will be proved and analyzed in Chapter 6 by examining an actual case study of the implementation of Banger Polder Pilot Project in Semarang City.

CHAPTER 6
SEMARANG CITY, BANGER POLDER PILOT PROJECT AND THE ADAPTIVE CAPACITY ASSESSMENT

6.1. Introduction

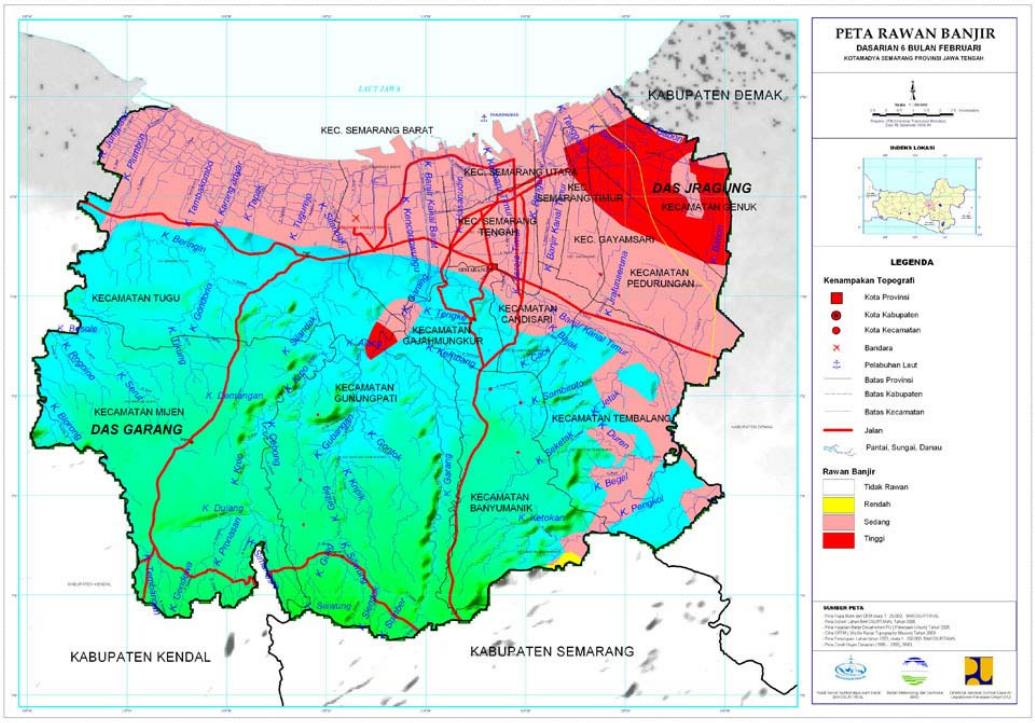
This chapter mainly discusses the Banger Polder Pilot Project (BPPP) and analyses thorough the project. At the beginning a short description of Semarang City as a coastal city in general is given to build the understanding about the local context that also influences the project. The description contents of geophysical, socio-economic and politic and city development related to tidal flood defense strategy. Then specifically, I focus on 'to what degree the current flood defense institutional has improved the adaptive capacity of Semarang Society' using the Adaptive Capacity Wheel. At the same time, the Adaptive Capacity Wheel is also tested to be implemented at Indonesia as developing country. Finally, the result illustrates the adaptive capacity of flood defence institutions in Semarang City. It also reflects the differences and difficulties on applying the variables of the Adaptive Capacity in developing country.

6.2. The Delta City of Semarang

6.2.1. Geophysical Condition

Semarang city is the capital of Central Java Province, situated on the north coast of Java Island approximately at 6^0 50'- 7^0 10' S and 109^0 35' - 110^0 50' E (Semarang in Numbers, 2006). Regarding to its geophysical appearance, this city is divided into two parts, known as the Lower Semarang and the Upper Semarang. Lower Semarang City is located on a thick sedimentary layer with its typical soft-soil conditions and a high potential of land subsidence (Puslitbang SDA, 2004). This area has slope between 0-2% with range of elevation in up to 35 meter (Puslitbang SDA, 2004; Anggraini, 2007). Meanwhile in the South, the Upper Semarang is hilly areas (plateau), syncline and anti-cline dominate the geological conditions of the mentioned highland (Puslitbang SDA, 2004). The syncline and anti-cline slopes are very mild with its strike direction is of North West – East South (Puslitbang SDA, 2004).

Semarang city is passed by many rivers, two of the largest are the Garang and Baboon River which is under the management of Balai Jratun Seluna (Directorate General of Water Resource). Both of these rivers flow from Mount Ungaran, where their springs are originated, with a very steep slope and short distance to the Java Sea of about 40 km. As a city built on river delta, Semarang suffers from yearly tidal flood problems particularly in the lower region. The flood prone-area is about 15,000 Ha or 40% of the total area (Anggraini, 2007). The map below which is published by Ministry of Public Works, shows the flood prone area in Semarang as the soft and dark red areas along the coastal where many small and long rivers flow through. The regular flood caused by tidal wave from Java Sea is usually called "*banjir rob*" by the local people.



Source: Ministry of Public Works (2000)

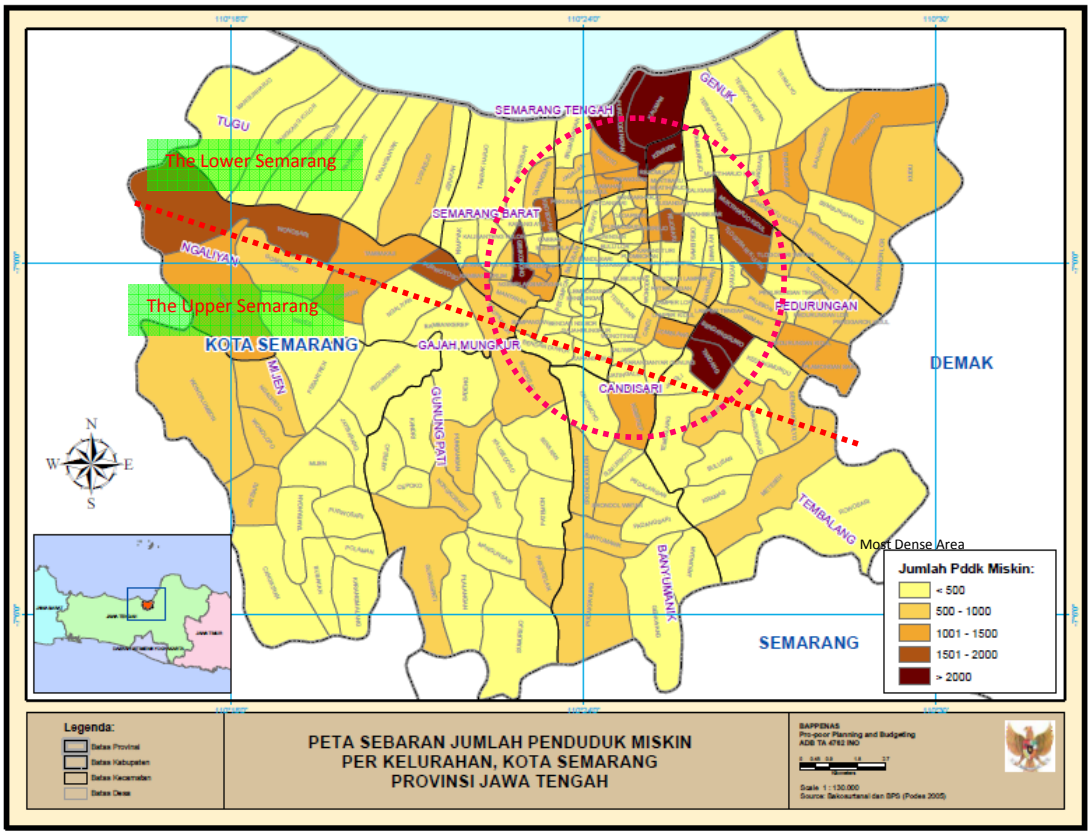
Figue 6.1. Map of Flood Prone Area in Semarang City

6.2.2. Socio-economy Condition

Administratively, Semarang is capital city of Central Java Province, lead by elected major every 5 years. It consists of 16 districts: Semarang Tengah, Semarang Utara, Semarang Timur, Gayamsari, Genuk, Pedurungan, Semarang Selatan, Candisari, Gajahmungkur, Tembalang, Banyumanik, Gunungpati, Semarang Barat, Ngaliyan, Mijen, and Tugu. From July 2010, the new Major, Soemarmo Hadi Saputro from Partai Demokrasi Indonesia Perjuangan (PDIP), started to role for the period of 2010 – 2015 to replace the previous Major, Sukawi Sutarip from Partai Demokrat (PD). Both PD and PDIP are the two biggest parties in Semarang regions, which dominate the election votes.

Nowadays, Semarang city is growing into a metropolitan city. As the fifth biggest city in Indonesia, Semarang has area of 37,360 Ha with population about 1.5 million (Semarang in Number, 2006). More than 90% of total population Semarang citizen are dominated by Javanese, they communicate using Java language. The majority religion is Islam. As other important coastal cities such as Jakarta and Surabaya, Semarang also has substantial Chinese community which has an important role in economy sector. They live in the central of the city along Semarang River since the earliest of modern city Semarang, namely *Pecinan*, a typical of Chinese residential area, traditionally also function as market area. Other citizen is varied such as Sunda, Batak, Madura, Betawi, Melayu and Arab (Semarang in Numbers, 2006). Population is not equally distributed, the central north area which is the area affected by *banjir rob* is the most dense population, especially Semarang Utara, Semarang Tengah,

Gayam Sari and Candisari. On the other hand, the poverty rate is relatively high, the distribution of low income people is shown in Figure 6.2. They are mostly concentrated in Semarang peripheral. In 2005 the numbers of people that lives below the poverty line (Rp. 162,723/capita/month) is about 4.22%, and increasing in 2007 into 5.26% with poverty line on Rp. 171,870/capita/month (BPS Semarang, 2008).

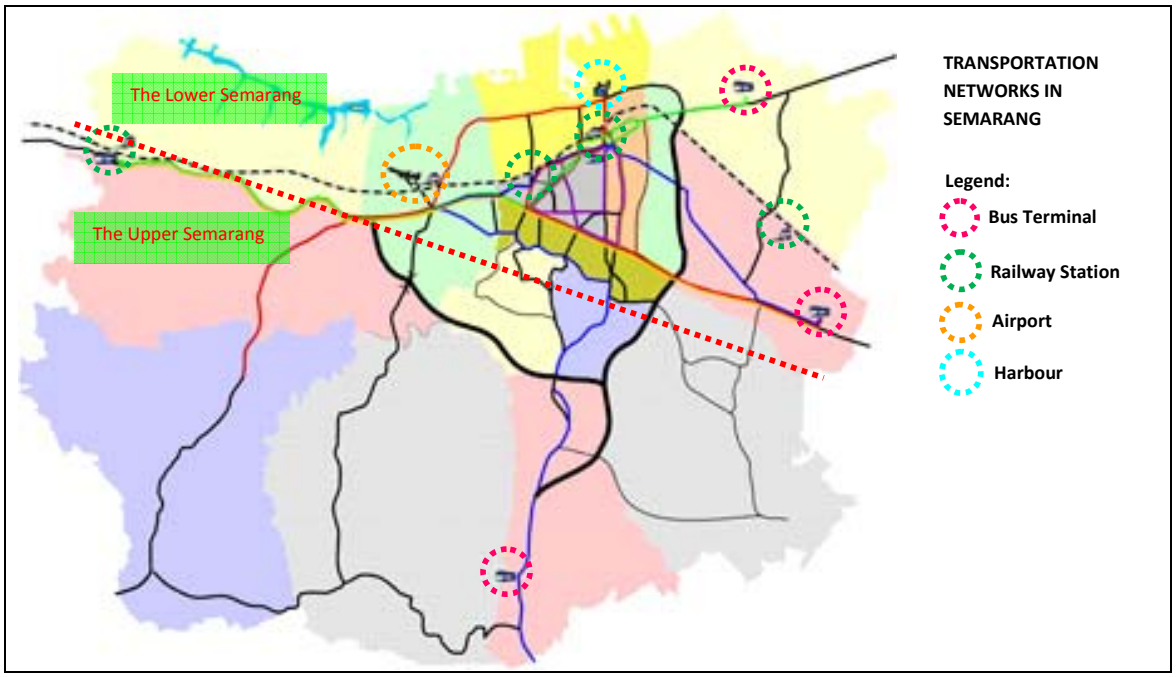


Source: Semarang Statistic Agency (2005)

Figure 6.2. Map of Low Income People Distribution in Semarang City

Semarang is one of vital cities for economic growth in the middle region of Java. According to Government Regulation No. 48/2008 about National Spatial Planning (PP No.48/ 2008), Semarang is determined as Pusat Kegiatan Nasional/ PKN (National Activities Center). PKN is urban area that functions as a node or potentially major import-export activities or a center of industrial activity and services or the national and international gateway to the region. Therefore, Semarang city has two functions, as the north entrance (gate way) of the central region of Java Island and as the connector between the east region and the west region of Java Island. Semarang is one of "the Golden Triangle" cities namely JOGLOSEMAR (Jogjakarta, Solo/ Surakarta, Semarang) that creates a socio-economic network that links the area in the central region of Java Island nationally and internationally. Related to its functions as the national and international transportation node, there some important transportation facilities and infrastructures exist in this city: terminal, railway

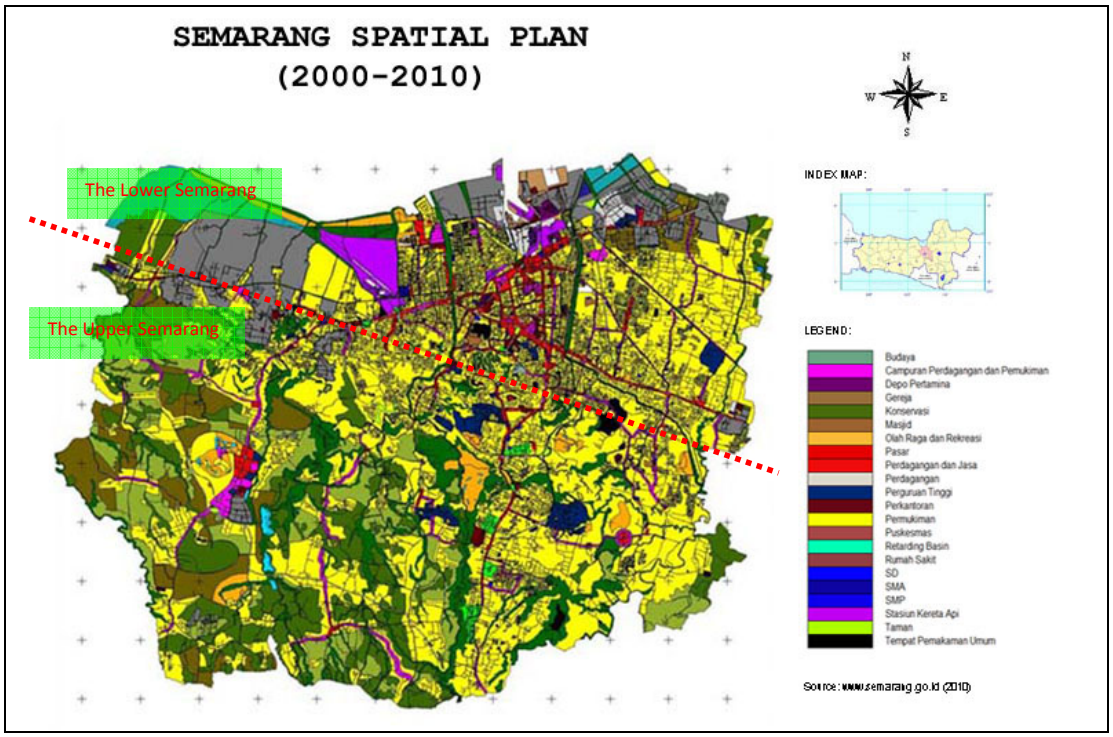
station, harbor and airport. Most of those infrastructure and facilities are located in the lower Semarang, which is prone area for flooding as showed in Figure 6.3.



Source: modified from Municipal of Semarang (2010)

Figure 6.3. Map of Transportation Network in Semarang City

The Semarang development is following the transportation networks such as roads and railway and topography pattern. As shown in the Spatial Planning Map (Figure 6.4), the north (along coastal, national road and railway). The west and the south west area are dominated by the conservation area with steeper topography, meanwhile the east and the south east are dominated by settlement. Especially the north coast of Semarang which is coastal and low-lying areas are very dense development area with multi-use purposes. The major industrial estate and economic activities of Semarang City are situated in those areas. As the consequence of population growth, the urban developments are also growing rapidly and therefore coastal-land reclamation has been developed for residential, recreational, and industrial purposes.



Source: modified from Municipal of Semarang (2010)

Figure 6.4. Map of Semarang City Spatial Plan 2000-2010

Banjir rob is common phenomena in Semarang even there is an old Javanese song describe it well "Semarang kaline banjir, ojo sumelang ojo dipikir…" which says that "Semarang River is flooded, don't be sad and worried…". The song reflects how flood in Semarang has become part of daily life. However, more problems emerged as the city growth which is followed by the expansion of development area to the flood plain near the water body so the space for water rapidly decreases as the consequences of development. But this condition becomes worst as the affected inundation area increase each year because of land subsidence.

Measures have been attempted by various institutions, whether local or national agencies, but mostly implementing physical structure or temporary measures, such as normalization of canal, construction of drainage canal, retarding ponds and pump stations to lower the inundated areas. During the flood event, some parties from government or non-government also distribute a temporary social welfare support for people who are living in the inundated area. Since the attempted measures are mostly temporary and sectoral measures, hence their performances are far from optimum, not reliable even nor sustainable. Tidal flood in Semarang City results a great loss to the community derived the damages to property and live hoods, and from the impacts of flood on community health and social interaction. Moreover, this flood also affects to some vital infrastructure such as airport and railways station in Semarang.

The latest flood defence strategy is Banger Polder Pilot Project, which is emerged as the concept of waterfront city for delta cities in Indonesia became the big issues in public

discussions whether this project will be succeed to solve the flood problems in Semarang City. Since tidal flood and sea level rise is continues to occur and has become part of Semarang life. Therefore, next section will explain about the detail description about the project itself to get in depth understanding the aim, the actors involved and the process of development.

6.3. Banger Polder Pilot Project

The Banger Polder Pilot Project (BPPP) is a twinning project in which Indonesian authorities and Dutch parties work together to realize a polder system and an organization to operate and maintain this system in the Banger area in Semarang, Indonesia. The aim of the project is to overcome the floods caused by both heavy rain-fall (banjir) and by tidal influence (rob) in Semarang starting from Banger area as a pilot project.

The parties directly or indirectly involved are shown below:

1. Banger Community is the Semarang citizen within the project area which is under the administrative of East Semarang Sub District.
2. *Pemerintah Daerah* (*PEMDA*)/ The Local Government is the legal authority in Semarang city, including the Municipal of Semarang City (*PEMDA Semarang*) and the Provincial of Central Java Province (*PEMDA Jawa Tengah*).
3. *Menteri Pekerjaan Umum* (*PU*)/ Ministry of Public Works (Indonesia) is ministry that responsible for the provision and development of regional housing and infrastructure. It consists of Policy and Support Services directorates and four agencies: the Directorate-General of Spatial Planning, the Directorate-General of Water Resources, the Directorate-General of Roads and Bridges and the Directorate-General of Housing www.pu.go.id).
4. Universities in Indonesia, including Parahyangan University (*UNPAR*), Soegijapranata Catholic University (*UNIKA*), Diponegoro University (*UNDIP*) and Sultan Agung University (*UNISULA*). Those scientist communities provide the scientific legal basis for the implementation of Polder System in Semarang.
5. *Ministerie van Verkeer en Waterstaat* (MVW)/ Ministry of Transport, Public Works and Water Management (The Netherlands) is one of the thirteen ministries that together form the national government. It consists of Policy and Support Services directorates and three agencies: the Directorate-General of Public Works and Water Management (Rijkswaterstaat, RWS), the Inspectorate for Transport, Public Works and Water Management and The Netherlands Royal Meteorological Institute (KNMI). The aim is to ensure the physical bases are solid so people can quickly and easily move, live and work in safety, and further to contributes to a dynamic and sustainable society. (www.verkeerenwaterstaat.nl).
6. *Hoodheemraadschap Schieland en de Krimpenerwaard* is a District Water Board. It's mission is to ensure dry feet and clean water in its control area. The Schieland en Krimpenerwaard control area stretches from Rotterdam, Zoetermeer to Schoonhoven. Within that area, the Water Board is responsible for flood control (maintenance of the dikes), water quantity (correct water levels), the water quality of the surface water and the

treatment of urban wastewater. (www.schielandendekrimpenerwaard.nl)

7. *Partners voor Water* is a programme that aims to strengthen the international position of the Dutch water sector by uniting forces (private sector, public sector, non-profit sector and knowledge institutes). (www.partnersvoorwater.nl).
8. VNG International is the International Cooperation Agency of the Association of Netherlands Municipalities (VNG is the Association of Netherlands Municipalities). We support decentralisation processes and facilitate decentralised cooperation. We strengthen local governments, their associations, training institutes and decentralisation task forces both in developing countries and in countries in transition. (www.vng-international.nl).
9. *NWB Fonds* aims to contribute to an improved decentralized management and administration of water systems in the world, improved flood protection and improved management of wastewater. Moreover, it is intended to contribute to the Millennium Development Goals (MDGs) as set forth by the United Nations. (www.nwbfonds.nl).
10. Aqua for All is to promote the poorest in the world with safe drinking water and adequate sanitation, as is defined in MDG 7. Aqua for All does this through knowledge, expertise and financial resources obtained from the Dutch water sector and are available to development programs focused on water and sanitation. (www.aquaforall.nl).
11. UNESCO-IHE contributes on the arrangement of the polder implementation guidelines together with Research Center for Water Resources (Ministry of Public Works) and Witteveen + Bos.
12. Witteveen + Bos is a consultant that worked on the technical design of Bange Polder System and also the arrangement of the polder implementation guidelines together with Research Center for Water Resources (Ministry of Public Works) and UNESCO-IHE.

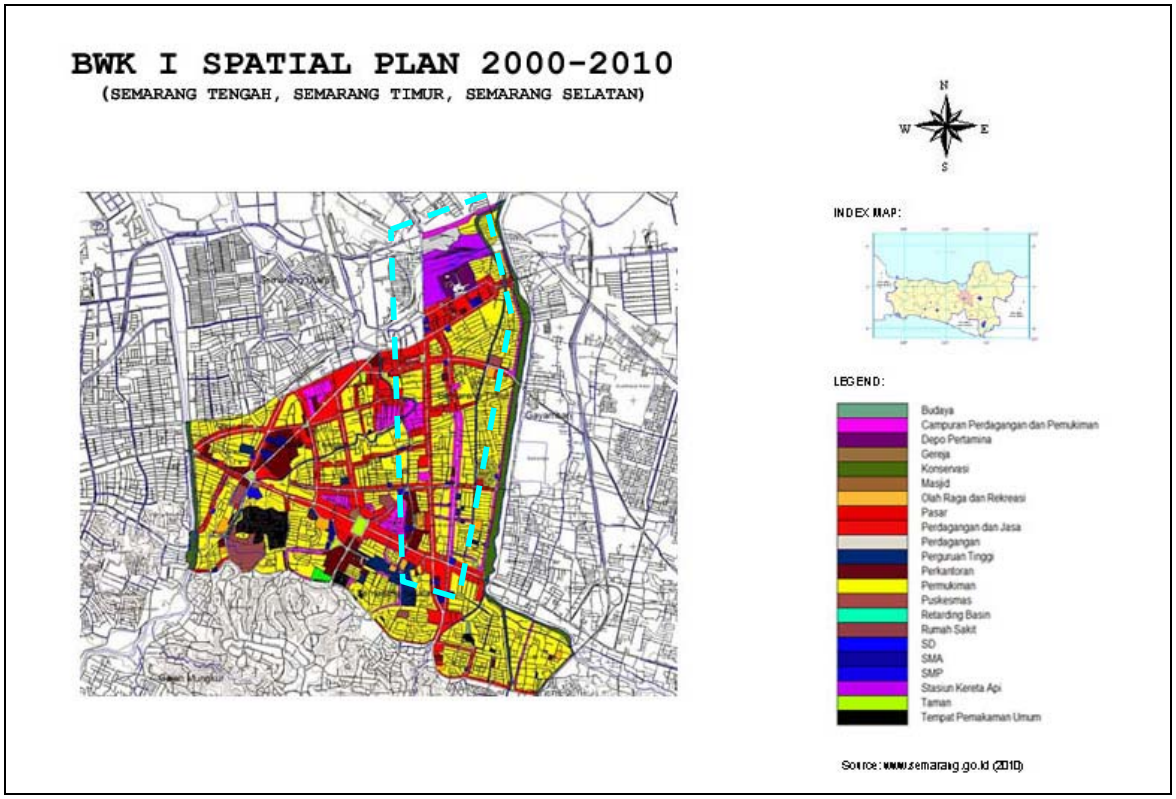
6.3.1. Location of Project

The selected Banger Pilot Polder is derived from the major drainage channel/river that traverses the area: the Banger river. The area of the Banger Polder comprises an area of 527 ha, located in the North-Eastern part of Semarang. The pilot area encloses the Kecamatan Timur (Sub-district East), which is densely populated with approximately 84,000 inhabitants. As presented in Figure 6.6, the boundaries of the drainage system that flows to Kali Banger are:

- north Boundary : Jl. Arteri/Jl. Peta;
- south Boundary : Jl. Brigjend. Katamso;
- west Boundary : Jl. M.T. Haryono - Jl. Ronggowarsito;
- east Boundary : Tanggul Banjir Kanal Timur.

The area of the Banger Pilot Polder is subdivided into the following administrative units: *Kecamatan* (Sub-District), Kelurahan (Village), Rukun Warga (RW), Rukun Tangga (RT). A *Kecamatan* is subdivided into several *Kelurahan* of which *Kecamatan Semarang Timur* has 10. A *Kelurahan* is the lowest official administrative unit with an official head called *Lurah*. Each *Kelurahan* is subdivided into Rukun Warga or RWs and Rukun Tetangga or group of several neighborhoods or RTs. In the Banger Pilot Polder area there are a total of

77 RWs and 568 RTs. RT is a cohesive group of households, forming one neighbourhood. These households have a somewhat close relationship which each other. The RT heads fall under the Lurah, but have no official title. An RW is a group of several RTs together, but is generally of less importance in the administrative structure. The total number of households in *Kecamatan Semarang Timu*r, thus in the Banger Pilot Polder area is approximately 17,000.



Source: Puslitbang SDA (2008)

Figure 6.5. Map of Banger Area Master Plan 2000 – 2010

The Master plan 2000-2010 (Figure 6.5) visualises the functions of landuse in Banger Area as follows:

- Kemijen and Rejomulyo Village: The function of this area is trading supported by particular facilities, residential area and industry. Development towards grocery trading and warehouses;
- Mlatibaru and Mlatiharjo Village: Dominant function of this area is housing, supported by trading area and home industry area;
- Kebonagung and Bugangan Village: Dominant land use is trading and services, residential area and industrial area;
- Sarirejo and Rejosari Village: Land use in this area is trading, services and residential area supported by home industry. Development towards into non-grocery trading and home industry;
- Karangturi and karang Tempel Village: Land use is trading and service with residential area; development directed to non grocery trading.

It shows that at south Banger area, the land use is dominated by settlement. There is only a small area for trading and service industry, and for industry. While at the north Banger area, the land use is divided by facility (railway), water pond and empty field. There is no official settlement use in this area. The updated condition of the land use in the polder area can be seen on the aerial photos. Settlers have occupied some of the area of railway facility as well. It is because of the increase of population in Semarang.

6.3.2. Overview of Project Development Process

The first formal agreement was made in 1996 as a Memorandum of Understanding (MoU) for five years until 2001. It was signed between the Ministry of Public Works (PU) of the Republic of Indonesia and the Ministry of Transport, Public Works and Water Management (MVW) of the Kingdom of the Netherlands. It was in general dealing with knowledge development and knowledge transfer on area development and construction in low lying areas. In June 2001, an extended MoU for period of 2002 - 2005 was again signed which expanded its concern onto Polder Systems and Seawater Barriers in waterfront cities. This time, it is not only between the MPW of Indonesia and the MTPWWM of The Netherlands, but also the Ministry of Environment (ME) of the Republic of Indonesia and the Ministry of Housing, Spatial Planning and Environment (MHSPE) of the Netherlands. The second MoU was renewed then in 2006, which specifically focused on partnerships between Indonesia and The Netherlands in the seeking of solutions for the regular flooding in several of the Indonesian water front cities. At first there are several delta cities with flood problems such as Jakarta, Semarang, Palembang, reviewed and Semarang was chosen then as pilot project area. The selection was considering: (1) the existing water management system of the selected area had to be able modified with minimum changes of the infrastructure and organization; (2) according to sea level record database of Badan Meteorologi, Klimatologi dan Geofisika (BMKG[2]), Semarang experiences the most significant sea level rise, which is resulted not only by the tide increase but also by the land subsidence. Research Center for Water Resources (RCWR[3]) was given the authority by MPW to do the necessary research task for pilot project needs. However, the area of this city is quite large and handling the whole area is impossible, then Banger Area as the small system that represents dense area and low income community was chosen as the starting point.

However, the discussion on the alternative solutions to where it came to the proposed solution was a seminar and workshop that were organized in November 2001 on the subject of 'Polder Systems in Waterfront Cities, a polder system as a sustainable solution for flooding'. Indonesian participants in this seminar were represented by the Ministry of Public Works, the Faculty of Social Affairs and faculty of Civil Engineering of the Parahyangan Catholic

[2] BMKG is a Non-Departmental Government Institutions that carry out government duties in the field of Meteorology, Climatology, Air Quality and Geophysics in Indonesia (www.bmg.go.id).

[3] RCWR is an agency under Ministry of Public Works of Republic of Indonesia with primary task to do researches that can support the water resources development and management in Indonesia (www.pusair-pu.go.id).

University (UNPAR), Soegijapranata University (UNIKA), IRE, and the Municipality of Semarang. Two Water-boards represented Dutch participants, i.e. Principle Water-board of Rijnland and Water-board Groot Salland, Rijkswaterstaat, Road and Hydraulic Engineering Division (DWW) of the Ministry of Transport, Public Works and Water Management, and the consulting firm Witteveen+Bos. At the end of the seminar, conclusions, recommendations and a 'resolution' were presented. The Indonesian attendants of the seminar submitted the ideas to the national authorities as well as to the authorities of Semarang city, which approved them.

As the follow up, Semarang municipality and the RCWR as the representative of MPW, together with the other involved parties in Indonesia, assessed the statements from the seminar. In 2002 a Plan of Approach was presented to the Municipality of Semarang. During this presentation the involvement of the Dutch expertise with respect to institutional strengthening was requested which is later responded by the involvement of Hoogeemraadschap van Schieland en de Krimpenerwaard[4] (HHSK). The need and the interest for cooperation between the Indonesian and the Netherlands teams in order to establish a Polder Authority within the city of Semarang was stated explicitly. It was concluded that the ideas as mentioned before would have to be elaborated and described in a project plan, which consist of the following phases:

- Phase 1. Feasibility study;
- Phase 2. Foundation of the Polder Authority;
- Phase 3. Implementation of the Polder Authority;
- Phase 4. Transfer of knowledge and capacity building;
- Phase 5. Construction of the infrastructure of the pilot polder (turning over of one of the existing sub systems (approximately 500 ha) to a closed artificial drainage system, that is called the pilot area).

In the first phase, the subject of the feasibility study was the 'Institutional strengthening of water management in an urban polder system as a sustainable solution for flooding problems', which was held during 2003 – 2004 in cooperation with RCWR, Municipal Government of Semarang City, MTPWWM of The Netherlands, and Universities (UNPAD and UNIKA). It was investigated whether there is sufficient social basis within the city, the people and the involved politicians to proceed with the proposed approach: self-financing local water management, based on community participation. The conclusion could be drawn that there was a great social basis and ambition among the people involved to proceed with the establishment of the polder. Interviews were held with varies stakeholders (shop owners, building owners, industry, municipality, representatives from the inhabitants), meetings were organised, open hearings, and even the new imbedding to establish Polder

[4] 'Hoogeemraaadschap van Schieland en de Krimpenerwaard' is a District Water Board. It's mission is to ensure dry feet and clean water in its control area. The Schieland en Krimpenerwaard control area stretches from Rotterdam, Zoetermeer to Schoonhoven. Within that area, the Water Board is responsible for flood control (maintenance of the dikes), water quantity (correct water levels), the water quality of the surface water and the treatment of urban wastewater. Moreover 'Schieland en de Krimpenerwaard' is also responsible for the maintenance of local roads in the Krimpenerwaard. (www.schielandendekrimpenerwaard.)

Authority in the existing organisations was presented. From the Report of Feasibility Study, it is stated that the Mayor of the city (2004) was enthusiastic and very willing to proceed with the process to establish a polder institutions which planned embedded in the existing local organizations and turn a one sub-drainage area into a so called closed system, to prove that a 'polder principle' approach is a solution against flooding.

Since the project is still ongoing, those phases is have not yet been fully completed and somehow not always worked smooth. Until 2010 there are some agendas that have already achieved as the institutions foundation of the implementation of BPPP:

- Commitment of local government (Semarang City and Central Java Province), central government and to solve the flood problem Semarang by starting from the Banger Polder as the pilot project.
- Semarang City Government understands the technical aspects and the institutional of polders system.
- Semarang City Government understands the importance of decentralized public services in the operational and maintenance of flood protection infrastructure.
- Communities, particularly in the area of East Kali Banger Semarang District, realize the importance of their involvement in the operation and maintenance of polder systems infrastructure as part of an effort to overcome the problem of flooding and *rob*.
- Commitment of cost sharing in financing the physical construction of pilot project in period of 2010 – 2012 between the Municipal of Semarang (32,5%), the Province of Central Java(32,5%) and grant from the Government of the Netherlands through ORIO[5] (35%) by signing the latest MoU on 7 April 2010.
- Semarang City Government delegates some of its authority in the operational and maintenance of flood protection infrastructure to the multi-stakeholder management of Badan Pengelola Polder Banger, namely SIMA, which has just established on 8 April 2010.
- The official inauguration of Banger Polder physical construction for period of 2010 – 2012, including:
  - Pump Station in Kemijen Village
  - Banger River Weir (dam) located below the northern arterial road.
  - Banger northern polder dike system whose location coincides with the northern arterial road.
  - Banger eastern polder dike system whose location coincides with the East Canal Flood embankments
  - Retention pond which proposed land is owned by PT. KAI in Kemijen Village

[5] ORIO is a grant facility funded by the Dutch Ministry of Foreign Affairs under the responsibility of the Minister of Development Cooperation to encourage public private partnerships in infrastructure development in developing countries, adapted from ORET programme, which focuses on at a smaller number of countries and at a limited number of priority sectors in each country and supports the entire infrastructure development process: the preparation of a project, its implementation, operation and maintenance (http://www.nlembassy.org.mk/news_archive/the_first_orio_call, www.dutchembassy.ge/contents/library/76/orioenglish9jun.pdf).

- Dredging Banger River
- Improvement of secondary channels in Banger Regions.

The future agendas that still need to be worked on:

- Strengthening the capacity of the government and SIMA in the field of institutional, operational and maintenance of polder system through O&M polder system trainings.
- Embracing the private sectors to get involved and committed in the scheme of contribution from being protected against floods.
- Best practices documentation and dissemination of ideas about the integrated implementation of polder system.
- Encourage governments to do the replication and put an umbrella policy in a broader scale.

As coastal city, Semarang requires a flood defence strategy that is designed to face the possibility sea level rising due to climate change. However, the process of establishing Banger Polder Pilot Project is not easy since there are many interests and powers frictions within discussion, agreement and decision making. This is related to the nature of Semarang as coastal city itself that has multi-functions and multi-land uses. Moreover, the political situation after 1998-1999 monetary crises has changed social and political system in Indonesia. In other words, the flood defence implemented has to be adaptive enough to counter those tensions. Therefore, to know whether the existing flood defence institutions is adaptive enough, the assessment on the adaptive capacity of the implementation of Banger Polder Pilot Project as the flood defence strategy has to be done.

6.4. Assessing the Adaptive Capacity of Flood Defence Institutions

As mentioned in Chapter 2, the adaptive capacity is potential characteristics, which is difficult to measure directly. To answer the challenges, this study tries to assess the implementation of Banger Polder Pilot Project (BPPP), whether the existing flood defence institutions had provides those requirements. Regarding to the challenges of assessing the adaptive capacity in real case, the Adaptive Capacity Wheel is employed on this assessment. The variables consist of 3 basic qualities – variety, learning to adapt, room for autonomous changes – and 3 contextual variables – leadership, resources, fair governance.

6.4.1. Variety

It is obvious from the development process of BPPP that variety is a crucial criterion. According to Gupta et al (2008), this variable is showed in the system by the variety of involved actors in different levels and sectors, variety of problem frames and solutions, diversity of policy, and the possibility of redundancy in the short term.

Multi actor, level, sector

Regarding to the variety of involved actors, there are two things that is notice as the indication of the important of variety in dealing the flood problems in Semarang City. The

first is that the approach employed in the seeking of solution is shifting from technical to collaborative approach and the second is the growth of actors involved which follows the need of collaborative approach. The actors involved in this project grow during the process of implementation following the development of solution frameworks. At first, the research apparently used the single-sector approach which is engineering-oriented. As admitted by the Head of RCWR:

> 'At first, it is only about soft soil construction technology to dealing with the bad condition of soil. We (RCWR) was conducting this research with help of Faculty of Civil Engineering of Parahyangan University and Soegijapranata Catholic University. During the research we noticed that this flood problem cannot be handled solely by pure engineering since there are some social and political problems revealed which is more complicated than engineering matters.' (Interview 1)

As the result, a research on the improvement of water system through community based in Semarang conducted by the Faculty of Social Affairs of UNPAR, with assistance of HHSK (NGO). This is the beginning of community involvement in the project.

Meanwhile during the design of polder system inevitably, the actors within the government agencies also developed. Since Semarang was chosen, the idea was communicated with the Local Government of Semarang (municipal and province) and other relevant authorities. The construction of supporting infrastructure for polder system will change the existing infrastructure within this area that belongs to different agencies. The Banger River Basin management which is under authority of JRATUNSELUNA River Basin Management, the change of water system in this area will also affect this river basin. A representative of Dinas PDSA dan ESDM states the need of integrated management of Banger Polder with other nearby systems:

> 'Banger Polder System must be handled integrally with the handling sub system polder Kali Semarang, Asin and Baru. Instead of the four sub-systems cannot be managed individually, the water from other sub-systems will leak or enter the sub-system that is already built (Banger System), thus the water will only be circled within those four sub-system. ' (Interview 3)

The boundaries of dykes along the artery roads will also discuss with Bina Marga (Agency for roads and highways) so that the solution to accommodate the implication of dykes to the roads can be communicated between agencies. The government agencies involved so far are mentioned by a representative of Dinas PSDA dan ESDM:

> 'Actors from government involved in BPPP from Central Government such as Ditjend PSDA, Kimtaru, Binamarga, Balai Besar Pemali-Juwana, from Provincial are Bappeda, PSDA, Kimtaru, and Binamarga, meanwhile in the level of Municipal Bappeda and PSDA&ESDM.' (Interview 3)

However, there are some relevant stakeholders that still out of reach, especially from the private sectors as stated by the representative of HHSK:

> ‘Many stakeholders are involved such as government, community, universities, and NGO, across sectors and structural/ hierarchical, but there are no private sectors involved yet, this is our next target for 2010…’ (Interview 2)

The conflict might emerge from those private parties whose authorities or areas are possibly affected by the implementation of the project. The proposed Banger Polder Area includes lands owned by individuals (community), PT. Pelindo (state owned port operation and management), Pertamina (state owned oil company) and PT. KAI (state owned railway company). For instance the rejection of PT. KAI (Railway Company) to allow the using of its abandon land as retention pond in Kemijen which was explicitly reject the plan in the Minutes of Meeting between PT. KAI and RCWR on 18 June 2008:

> ‘PT. KAI expressed objections about the use of land in its area in Kemijen as retention pond for Banger Polder System …’

This problem has not been solved yet and still there is no agreement until the latest progress:

> ‘There are still problems relating to the retention pond land area of 13 hectares owned by PT. KAI must be completed at the central level. (Interview 3)

According to the head of RCWR which has already made several contact and discussion with PT. KAI, one of the reasons is caused by a traumatic experience from the unsuccessful story of flood defence project in the past:

> ‘.... bad experiences in the past associated with the construction of retention ponds in Tawang railway station where the results do not match those offered by the government of Semarang in the beginning. This failure still lingered in the minds of PT. KAI.’ (Interview 1)

Although there are some relevant stakeholders that have not involved yet, the effort to build the cooperation with them keeps continue as part of BPPP agenda. Thus, it gives the positive value to its adaptive capacity from the variety of stakeholder side.

Problem frames and solutions

The involvement of many stakeholders from different levels and sectors supposed to lead to variety perspectives of solution and framework which is also important indicators in the variety. As reflected in the membership of SIMA which is component of three worlds: community, government, and university, actually there is opportunity to explore variety solutions from those groups. It is stated the importance of university that bridging the other two groups:

> ‘University involvement in SIMA will provide an objective basis (scientific view) that mediate between society and the government in institutional dynamics.’ (Interview 2)

However, this opportunity is still not appeared in the implementation of BPPP. For example from women perspective, there is an interesting opinion mentioned about the importance of woman role in the water management:

> ‘I also hope there will be more women actively involved in this project.’ (Interview 2)

Actually, there is no lack of variety in terms of "gender" since there are men and women involved in the project process, however their opportunity to contribute is ignored. There is no program related to community improvement that addressed specifically to women although women are the majority in the community. It is true that women are often not included when it comes to water-related projects even though women in Indonesia cultural context are close to water in their every-day lives. This characteristic is also showed in the BPPP, for example the training program about operation and maintenance polder system such as pump, dyke and retention basin which is more familiar to men than women in the context of Indonesia. There is no training related to the management of water in domestic use which might be more "friendly" to women.

It is reported in A Policy Brief of UN-Water (2006) that in most societies, women have primary responsibility for management of household water supply, sanitation and health. Further it is stated that '*…water projects work better when women are involved*'. Because of their dependence on water resources, women have accumulated considerable knowledge about water resources, including location, quality and storage methods. It means that the variety of stakeholders is important but it also has to consider 'the right man on the right place'. Since each stakeholder has their own interests and skills, the alternative programs in the solution have to accommodate those aspects too.

Furthermore, it is expressed by two of those involved that there are more strategies should be implemented such as mitigation and accommodating flood (spatial) measures:

> '…still there is an absence of mitigation strategies.' (Interview 2)
>
> 'Semarang fate is to be flooded since the area is shaped as 'breaking bowl' with the Mount of Ungaran in the south and the encircle mountains from the southwest to the southeast as the top of the bowl, the area of Semarang city as the bottom of the bowl, and the sea in the north of the city as the broken part of the bowl. The morphology of this area causes all the runoff flows down into this city. Therefore, it is also important to consider a strategy that accommodates flood which means giving more room for water, instead of fighting it by making this area free-flooded with polder system' (Interview 5)

The solution given in the implementation of BPPP still reflects the strong role of central (Ministry of Public Works) in deciding which is the best solution for flood defence. The other actors were not involved from the beginning of decision making. They were joining as the BPPP established and asked to contribute in the implementation of the project. Thus, there is only single engineering approach in the implementation of flood defence.

Redundancy

There is still lack of redundancy in BPPP strategy. Redundancy is functioned as a backup plan in case when the main protection system is failed. When the representative of local government (Dinas PSDA and ESDM) asked in this case if there is a flood that exceeds the capacity of Banger Polder to maintain, he said that there is no such a back up strategy:

> ‘If the big floods exceeding the capacity of the region Banger there has been no specific planning strategies…there have been no massive flood events…’ (Inteview 3)

The main reason is because there is no experience of big flood occurs in Semarang. The typical of ‘*rob*’ occurs not in a sudden but increasing slowly. Thus, it is interpreted as less dangerous event since as usually people still have times to prepare but mostly the initiative is from individuals that affected, not coordinated by government, as confessed by a representative of Semarang community:

> ‘…we put wood plate in the door floor to avoid water flow into our house, some of my neighbors increase their floor elevation or build walls to protect their house. But if the flood is really high, I usually move to my relative’s house which is not flooded.’ (Interview 4)

As it is stated as low probability occurrence of big disaster, they believe that redundancy is not vital and only results on inefficiency in the flood defence strategy. Moreover redundancy will require more resources that are already limited. The routine measures that implied before the BPPP finished is only normalization of the existing canals and rivers. The purpose is to add the capacity to retain water during peak flow.

Diversity of policies

Additionally, the diversity of policy from different sectors is also required. As mentioned in the previous chapter, recently there are massive changes in major national policies in Indonesia. There are still some policies needs to be issued to support the sustainability of flood defence strategy, especially at the local level. For example the legal frameworks related to the readiness of local regulation in controlling the urban development in Banger system is not mentioned in the project agenda. It is important because learning form others developing countries that a free flood area will attract people to come and settle in that area. The increasing of population will result the decreasing of room for water, especially if those who come stay and build houses along the canals or rivers as common found in some big cities in developing countries. Instead of the diversity in policy, the linkage between those policies is also required to reach tailor-made policies. The linkages in policy related to flood defence and climate change are still insufficient. The policies produced are fragmented by sectors interest for example between policy in water resource sector and environmental sector, policy in coastal development and coastal conservation.

Actually, there is another variety needed to stimulate the possibilities of capturing sort of variety problem definition, frameworks and solution, despite of multi-actors involvement. It is the variety of media to express opinions. As not all groups of society are customs with expressing directly agreement or disagreement in discussion forum. They, such as women, children, less income and less educated groups, are the most vulnerable groups especially in developing countries. They require other media to accommodate their potencies and needs to contribute.

6.4.2. Learning

According to Brink et al (2009), since the climate issue is new and full of uncertainties, an institutional setting that stimulates and supports learning process will be required. The degree of institution to learn is for instance indicated by: mutual trust that gives the possibility and willingness to learn from each other; listening and discussing doubts; able and willing to improve the current values and routines in single loop learning and to challenge the norms and basic assumption in double loop learning; and institutional memory that preserves routines and current problem solution.

Discuss doubts, single and double loop learning

That institutional setting in BPPP facilitates actors to exchange their problem frames, determines the issues at stake, and discussing doubts. As mentioned in the project description that there is a seminar and workshop in November 2001 that attended by different parties which might possibly accommodate that process. Lately, there was also another public seminar on 8 April 2010 about 'Polder System for Low-lying Cities in Indonesia'. Since both seminars are public forum, those events supposed to be a good opportunity to discuss current measures, advantages-disadvantages and new innovations from other parties that is out of the BPPP system.

Meanwhile, within the BPPP itself, there are some programs that give the actors involved to improve their knowledge through capacity building in technical and institutional aspects. A representative of HHSK mentioned:

> 'Capacity building of local government and community representative by Witteveen en boss about technical aspect of polder system by involving them in the design process and conducting short course during implementation process. Meanwhile the institutional knowledge in system polder operation is given to government and community by HHSK through short course, discussion and seminar.' (Interview 2)

The capacity building mentioned above is more as one-way learning from the 'experts' to the local government and community. There is no exchange of knowledge between those society groups (experts, government, community). The local government and community passively act as object that accept the new knowledge from the expert group.

However, there is also found sort of learning process in two-way direction. For example discussion among the RCWR researchers during the process of planning and design of BPPP, such as illustrated below by the Head of RCWC:

> '…from the beginning, the capacity building in process of planning and design is done as well within the RCWC colleagues, although not smooth, in the sense of different opinions, especially related to social aspect…' (Interview 1)

It is implicitly illustrated that there are pros and contras in social aspect discussion about BPPP since the core business of the RCWR not in that area. The RCRW as a research agency under Ministry of Public Works, was originated to deal only with engineering problem solving. However, those researchers start to look problems beyond the engineering aspect by

inviting environmental and social activist. The purpose is to have second opinions about the design and plan of BPPP from different perspective.

There are also other learning processes that cannot be learned from the 'expert' that might only be captured from the community, as it is also mentioned by the Head of RCWR:

> 'At the community level, there are existing embryos of community activities in villages sort of waste management activities and maintenance of (local) canals, from there we recruited the important leaders and asked them to think macro…' (Interview 1)

It implies that there is potency of local knowledge that might be adopted to contribute at macro level. Therefore, SIMA then was established based on those existing informal organizations, to capture the aspiration of local potency.

Trust (degree of acceptance)

Another important aspect of learning process is trust. It is difficult to measure the degree of trust among the society groups. However, it might be indicated by the acceptance to take part in discussion and actions. Such an acceptance from society can be obtained for example by adopting the local leaders in the SIMA body. It will be easier for the community to accept the concept and cooperate rather than the organization consist of experts and government officers only. Another way is by adopting the traditional symbols that reflects the local way of life (ideology) such as wayang in Javanese society:

> '... an interesting thing too, we formally just inaugurated Polder SIMA-Management Agency. The name comes from the abbreviation Schieland -Semarang and also a figure of righteous preacher in the wayang, so his name was taken from something good…' (Interview 1)

There is formal trust that based on accountably credibility and performance. But interestingly in the context of Indonesia "personal trust" plays important role as acceptance factor in making the cooperation possible. It is showed by the importance of informal leaders in community and cultural symbols.

The community's acceptance to involve is giving a positive trend thorough time. The development of community's acceptance to the project is explained by the representative of HHSK below:

> 'In 2007, the community is pessimistic and resistant to the project because of bad experiences in the past associated with the failure of similar projects in the past and poor government performance in the same field over the years. During the project in 2008 – 2009, they are very enthusiastically involved in the formation of institutions and in providing advice on technical and institutional design, but pessimistic about the realization of physical development. Finally this year with the proclamation of physical development, there are more positive respond from the community, but also concerned about the fit between the qualities of existing buildings in design to its realization.' (Interview 2)

However, the most important action that needs to be taken to deal with the lack of trust is by applied the law enforcement that protected the rights of all stakeholders as the guaranties. The problem related to PT. KAI is mainly caused by this kind of 'trust', since it is rooted from the bad experience in the past. The central and local government needs to issue rules and regulations on Spatial Zoning and Water Regulations the implementation of master plan to provide assurance of compliance/ consistency /uniformity in the relevant area due to sustainable development.

Institutional memory

Furthermore, in order to ensure the continuity of the strategy and to make possible the replication of this strategy in other systems, in the implementation of BPPP the knowledge, experiences and concept is recorded:

> 'Knowledge, experiences, concepts obtained in this project was recorded with a specific mechanism to be used in the replication of Semarang Institutional polder system and can be used in other polder system both in Semarang and other cities in Indonesia.' (Interview 3)

Besides the written record in many media such as guidelines, books, papers, and brochures, there are also films to visualize the process of BPPP implementation:

> '...the arrangement of guidelines about the implementation of polders system in Indonesian, by UNESCO-IHE, as well as the writing of Good Practice (book) that is currently being made (completed by the end of 2010). Various other documents such as films, papers, brochures on various project activities are also available.' (Interview 2)

The guidelines instead of standards are chosen as the most appropriate form in documented the BPPP:

> 'It is inappropriate to make this polder (experience) as a standard because every place is different, Indonesia and the Netherlands is also different, the people of Semarang is also different from the people in South of Bandung as example, so I think the more important is guidelines…' (Interview 1)

The reason in the decision is based on the consideration that guidelines have more degree of flexibility and not too binding. The standard is only suitable for the technical engineering problems in which the existing standards are already sufficient:

> 'It is more likely in the form of guideline, because the existing standards seem sufficient enough such as dykes, sluice operation standards, the more important for the system of polders is not all that, but how do we make a collective agreement, how the system of the authority polder established.' (Interview 1)

Those forms of record tools are also employed as media to knowing, understanding, evaluating and improving the current flood defence strategy which is sort of learning process itself.

The opposite of learning process there is not-learning process which preserves the current routines and norms. To a certain degree this quality will have a positive impact on the learning process since the resistance will challenge the new knowledge to be proved better than the current one. However, too strong resistance will hamper the learning process such as resistance of actors from showing doubts and inducing the avoidance of risks which lead to the overprotection of current problem solutions. In this project, the negative tendency is recognised since the environmental and climate change issues are subjects that are difficult to address in public discussion since it is dominated by economic and water management issues. Those topics only emerge in scientific and academic forum such as seminar in universities and research organization.

6.4.3. Room for autonomous change

According to Brink et al (2008), the degree to which institutions allow for and encourage the room for autonomous change is recognised by for instance: the access to information about potential climate change impacts, the capacity of actors to improvise, and their ability to act according to plan. Those indicators determine the third variable since the accessible of information about potential climate change impacts will help actors to make a decision whether following the existing plans or improvising.

Access to Information

The information about climate change potential implication can be accessed by all stakeholders directly and indirectly from its sources: decision makers, researchers and experts which are involved in BPPP. The direct sources are through focus group discussion, seminar, course or training. Meanwhile, indirect sources are sort of publication in media such as books, brochures or even films which is including the risks and implication of the flood to the community within the project.

The information for the community outside the project derived from mass media such as new papers, radio, and television. Another media that is official website of the SIMA Polder Board can be accessed through website www.bpp-sima.org, which is specifically published SIMA vision, mission and activities. However, the information from those sources is generally not clear and only about the publication of government activities related to flood defence strategy but less information about the impacts of climate change. Below statements of Semarang citizens outside Banger community about the BPPP, flood defence implications and what they will do in the uncertainty condition (big flood):

> ‘I know Tawang Polder which is government project in the area near Tawang Station, but the impact on flood is not significant. The heightening of road for dyke causes my house floor and the road elevation at the same elevation. Never heard about Banger Polder.’ (Interview 4)
>
> ‘If there is a big flood I don’t know what to do, maybe I can move to relative’s house for a while.’ (Interview 4)

Those facts imply three conditions. First, the implication of past flood defence project (in Tawang Station) to the community was not well-explained before the implementation. Second, the information of BPPP as pilot project that will be the solution for Semarang in the future has not been well-communicated with stakeholders outside the project. Third, there is lack information about what actions should be taken during big flood.

Actually, other source such as local government website (www.semarangkota.go.id) is providing the thematic map such as spatial plan, flood prone, inundation area, etc, and also law and regulations in Semarang. This information can be used by others to follow and continuously update their plans according to those data. However, it is only accessible for certain groups while many such as low income groups as the most vulnerable community cannot access that. Meanwhile, the information flow among formal agencies is still limited for example among the agencies within the government itself. It is not easy to exchange data or information, even for government researchers some of data must be bought from other agencies such as climatology and soil condition.

Act according to plan and capacity to improvise (dependency)

The citizen seems not ready to deal with changing situation, and relying on the government to compensate the losses caused by the flood as stated by interviewees from a representative of local government and citizen of Semarang:

> 'There is no specific institution that is responsible for flood risk losses.' (Interview 3)
>
> '… I hope the government will act immediately (if there is flood occurred) and give compensation' (Interview 7)

Actually at national level, the law on disaster management (Law No. 24/2007) has already been released. There are some significant changes and improvement of disaster management from national to local level. Not mentioned about emergency response only as its previous one, further the law also consists of mitigation (preparedness and awareness) and recovery after-disaster process. However, at the local this law has not been fully implemented yet because of lack of supporting regulations that describe the implementation in detail. Although there is an early warning system developed by local government but still limited in particular area in the East Flood Canal:

> '...Only in case of major flooding caused by the East Flood Canal burst its banks, there will be an early warning to residents in the area to immediately evacuate to Banger. This system is strengthened with the Early Warning System has been installed in the East Flood Canal.' (Inteview 3)

The standard operational and procedure of emergency response which supposed to be the guidance for government officers in case the big flood is not available:

> '…there are no SOP (Standard Operational Procedure) in there, because they were too familiar (with the flood) .... except when the embankment of Kali Garang collapsed, a sudden and large floods occurred, but more often it is slowly flooding (flood tides), we try to handle (the excess water) with the pump, but sometimes the pump operation (is

> not optimum), you know ... but the SOP and early warning system such as where to run (when flood occurs) are not available.' (Interview 1)

It is also implicitly mentioned that the existing pump operation is not sufficient which related to limited resources.

> 'There is a system developed by the Municipal Government, but still minimal.' (Interview 2)

The role of central government is still strong, nevertheless the capacity of actors to improvise in this project cannot be measured by this judgment since the decentralization is still new and the local government seems not ready to bear the responsibility. This is related to the political situation, all the decision makers act carefully, they will not make any hurry decisions and stick to the formal regulations. However, the role of central tends to reduce step by step by the increase of local government capacity:

> '…with the progress of this activity, the enthusiasm is increasing, currently they are more active even visited us to discuss issues, they are bound because they had already allocated the funds that must be absorbed. Our task (central government) is now somewhat reduced and related to more global aspect.' (Inteview 1)

Over all the problem is that there is still a sectoral-minded within the government agencies that limited the flow of information, as the consequence the decision making process becomes sluggish because the decision requires data and information as the scientific basis.

6.4.4. Leadership

Crucial are people in the public domain that promote change actively, and who face challenges by seeing opportunities, arranging connections and by reinterpreting their own routines (Brink et al, 2008). Those criteria point at three types of leadership that are particularly important: visionary, entrepreneur, and collaborative leader. Visionary leadership is the ability to link the short term and the long term and to convince others to anticipate potential future threats. Entrepreneurial leadership reflects the ability to gain resources in order to make things happen. Collaborative leadership refers to the ability to connect levels and to create networks and alliances.

Visionary and entrepreneurial

The central government, in particular Ministry of Public Works, was used to take the role as the leadership, which is as the initiator and coordinator. Initiator means as entrepreneurial leader which creates and makes programs or plans established, while coordinator leader grasps stakeholders to work together. Nevertheless, since the decetralisation the local leaders should have more roles in determining the development policy. Those formal local leaders such as major and governor, both selected through 5 years periodic of election. The changes in the political leaders do influence the project continuity as mentioned by a representative of HHSK:

> ‘The change of local leadership (mayor) and the possibility of implementing a new policy that against the sustainability of the project, e.g. personnel changes in the PIU (Project Implementation Unit), the stagnant of Drainage Masterplan discussions planned legislation that will provide a legal foundation in deeper levels for the formation of a management of polders institutional commitment to subsidies and BPP SIMA O&M.’ (Interview 2)

According to the Head of RCWR, to preserve the commitment, a formal agreement takes form as MoU binding the stakeholders:

> ‘For the sustainability of this project we make a MoU in which the MoU was signed by the Ministry of Public Works, the municipal government of Semarang, the Governor of Central Java Province, we make a quite long period of three years and endorse as well as by representatives of each council area…’ (Interview 1)

However, it is only binding the formal agencies, meanwhile the decisions made in the arrangement of personnel within the institution cannot be interfered and the period of agreement is only 3 years. On the other hand, according to a representative of local government, the changes in team personnel give some effects that might influence in the operational of the projects:

> ‘…transfer of personnel to the department of other agencies will be some effects on the composition of team personnel because the personnel have to adapt and learn the new tasks in his/ her new position.’ (Interview 3)

In a democracy system, the power is actually on the hand of citizen since theirself elect their leaders. Therefore, they have to be selective and choose the right person that really has commitment to solve flood problems in semarang, for example those who concern in environmental issues and have a good-will to continue the established commitment. Unfortunately, there is still limited leader that addressed the environmental issues in their vision, the reason is because this related issues are less popular compared to economic improvement issues.

Collaborative

Additionally, there is still lack of collaborative leaders that capable in coordinating the different institutions and agency to work together in the local level.

> ‘It was not easy to bring a lot of parties to sit at one table and discuss together. There is an opinion "I have enough headaches with daily activities, just build whatever needed, but do disturb my property", this is very typical opinion in Semarang… that’s why in some cases we (RCWR) still has to interfere the process as the mediator or lobbying to the higher level to solve local problems, which is actually unnecessary.’ (Interview 1)

The sectoral-minded is very obvious expressed during the meeting and discussion. The central government still holds the control power to force those institutions to cooperate meanwhile the province governance seems do not have much power in controlling different agencies

within its authorities, therefore the municipal government prefers to ask the central to solve the coordination problem rather than discussing with the provincial.

The interest of elite groups becomes the main agenda, thus the flood defence decision becomes campaign tool by political leader. Meanwhile, community in flood area is dominated by the low income community which does not have power to fight for their rights. Therefore, the marginal groups always become the victim of development in many cases. There is a need of advocacy to promote the right of poor people in the implementation of flood defence project. Therefore, there is another leadership that as important as the three others, advocacy leadership.

6.4.5. Resources

For adaptation efforts to succeed, it is crucial that actors are able to generate sufficient resources. According to Brink et al (2008), such a criteria include whether institutions have authority (mandate), involvement actors with decision power, human resources and financial/ economic resources.

Financial

Since the local government cannot effort for fully financing the BPPP, the financial resources in BPPP are temporary obtained with a cost sharing mechanism as explained as follows:

> ‘Physical development funding will be done by sharing between central, provincial, and municipal (as well as grants from ORIO-The Netherlands). SIMA has the transition period to be fully self-finance for 10 years, while the finance mechanism within these 10 years is 35% of the O&M cost will be funded by a grant ORIO and it is expected during the transition period the contribution from the community can be gradually increased. (Interview 2)

It means that within those 10 years SIMA has to learn how to be able to create resources to finance its activities.

> ‘The construction of polders infrastructure will enhance the market value of local community’s assets (land, buildings) and improve the local economic condition so that public welfare will also increase and the willingness to pay for being protected thus will rise as well.’ (Interview 2)

Based on the above assumption, there will be a fee collecting from the community to finance the operational and maintenance of polder system. However to finance the BPPP activities that are highly expenses, the government has commitment to give the subsidy:

> ‘The government's commitment to keep giving subsidy for the O&M or bearing the O&M that are highly cost (e.g., rehabilitation of the dike) will be ensured by the representation of related agencies that involved in the management of SIMA.’ (Interview 2)

The limited financial always become a classic problem in operational and maintenance of infrastructure as mentioned by the representative of PT. KAI:

> ‘Semarang has already have 5 pumps installed in Asin River, it is supposed to protect Semarang from flood if it is operated. The reason is always because they don’t have enough budget for solar cost ’ (Interview 8)

The scheme of ‘pay to protect’ also can be implied to private sectors in Banger Area. There is opportunity to embrace those actors since there are many industries and stated owned companies in this area. However, it is important to approve the approach is worked-well to attain the trust of community and the private sectors, thus the success of the project will determine the financial viability.

Human

Another important resource is human resources, which is including knowledge and expertise, are required to develop these adaptation strategies. Semarang city has many good universities which can be a great source of expertise, as stated:

> ‘Communities involved in the management of polders is sufficient given the institutional base of knowledge about the management of polders. In fact there are professors of water resources (UNDIP) in charge of institutional Polder SIMA.’ (Interview 3)

Meanwhile the community’s knowledge and skill will be improved by the capacity building program that is given to some representatives:

> ‘Community representatives who are members of SIMA has now got the capacity building during project implementation (since mid 2007), both in the form of knowledge transfer, skills training and civic organizations conducted in learning by doing.’ (Interview 2)

Authority

The last is authority, it is required to take and implement the necessary decisions. Therefore, the legal frameworks that define the authorities of each agency is important. SIMA was established under the Regulation of Major No. 060/89/2010 as the Organization and Work Management Agency of Banger Polder "Schieland en de Krimpenerwaard - Semarang (SIMA). It is legally mentioned the authority of this institution:

> ‘…a medium of stakeholder participation, both in determining policy regarding the handling of floods and tides in the area of Banger as well as in operational and maintenance funding of Banger Polder System.’

Another situation that caused the sluggish in the implementation of project is too much burden task on the hand of personnel:

> ‘Lack of flexibility and rewards given by the Government to the staff involved in project implementation made the process of knowledge transfer and project implementation do not maximal. For example, the daily task of providing relief to the staffs involved in the project so that they can be optimized doing activities in project implementation.’ (Interview 2)

Tasks and rewards should be a clear and in balance proportion so there will be no overburden personnel responsibility on the implementation. This might happen because there are limited human resources at the local government.

There is also sharing authority of decision making between the strategic and implementation level. Decision making in the strategic level is taken by the Steering Committee Meeting which is held once a year, meanwhile in day by day decision is under the responsible of Project Implementation Unit.

Social capital

However, there is another resource quality that might also important in the context of local culture, namely social capital. There are some qualities within the community that also determines the success of adaptation strategy. Social capital can be defined as anything that facilitates individual or collective action, generated by networks of relationships, reciprocity, trust, and social norms (Portes 1998). The social capital that is found in Semarang community is voluntary willingness to working together in the community, as mentioned below:

> ‘Community representatives who are members of the board of SIMA has a strong motivation, showed by those who have already involved in the process of implementation of the project long enough without getting paid.’ (Interview 2)

Another important social capital is the informal social organizations (gemeenschap) such as *pengajian*, *PKK*, *arisan* and *kebersihan*:

> ‘Community representatives who are members of the board of BPP Sima, each have a strong background in social activities so it is quite influential in the local community.’ (Interview 2)

The existing of informal organizations gives positive impact to the project because it structurises the community and distinguishes the informal leaders within the community that might play important role in the collective decision making. The potential social capitals mentioned above would give positive impact to flood defence institutions if the informal leaders are accommodated and recruited through a professional manner in water board (SIMA). However, there is a threat for democracy process in placing the informal leader in SIMA, since they generally have a strong influence in the community that might block the opportunity of others community members in having a change to also sit in the water board (SIMA).

6.4.6. Fair Governance

It is crucial that institutions can deal with social justice dilemmas (Paavola & Adger 2006 in Brink et al 2008). Therefore, institutions should allow for and encourage responsive and accountable policy making and implementation. In addition, they should protect basic rights and equity and promote legitimate policy processes. It means adaptive institutions emerge from and promote systems of fair governance. Fair governance implies that institutions should promote: legitimate policy processes, the protection of basic rights and equity, responsiveness and transparency, and accountability.

Equity and accountability

As mentioned peviously, there was also resistant from the community at the beginning of the project. It was derived from the unsuccessful experience in the past with the similar project (flood measure project). There is a negative perception of government performance related to mentality of human resources within government agencies such as corruption, injustice, and laziness. This issue is very sensitive since the majority of population in the selected project area is low income people, who used to be the "victim" of urban development. The fair governance of institutions is indeed important to protect the basic rights and equity, especially those from the vulnerable groups, especially in Indonesia context.

In the implementation of BPPP, the protection to basic rights and equity and the accountability is reflected in SIMA's vision "*dry feet for all'* and its basic principles. In pursuing the vision, SIMA will apply 3 basic principles: transparency, efficiency, and collectivity. Transparency means that every decision taken in SIMA's should be transparent to every stakeholder, thus fulfilling the right to know of the stakeholders. The efficiency principle emphasizing that every activities including the decision making - should be carried efficiently, thus the available resources will be used wisely for maximum result. In short, it can be defined as keep it simple. This principle means that SIMA will prioritize policy and activities which brings positive impact for the majority of the people. The collectivity principle is a principle to put the participation of all of the stakeholders in any kind of SIMA's activities in accordance with their position and authorities. This principle is also emphasizing to the importance accommodate the minor groups who does not have strong bargain position and tend to be neglected in the development policies as stated:

> '… this project will solve the problem of flooding and sea tides which have become one of the major causes of poverty in the area of Banger River, it is to be noticed that 38% of Banger population classified as poor'. (Interview 2)

Furthermore, SIMA also promotes justice in its activities as expressed by a representative of HHSK:

> '…fees for being protected will be applied based on individual economic capability, e.g., not asking a contribution from poor families in the first two years and will be reviewed again by taking into account subsequent developments after the second year.' (Interview 2)

Legitimacy and responsiveness

The scientific legitimacy of the solution is given by research groups from universities and state research agencies. As mentioned previously that the solution of polder for flood defence strategy was proposed to the Government of Semarang by those groups after they conducted seminar in November 2001. Meanwhile the implementation legitimacy was given by the Local Government of Semarang (provincial and municipal). However, as the consequence of the transition political process as mentioned previously, it tends to slow down legitimate policy process:

> '…at this time in Indonesia all are afraid, afraid of being accused of corruption, fear of alleged abuse of authority, so they (the lower level) is always asking (the higher level) for just to be safe'. (Interview 1)

It also implies on the lack of responsiveness as illustrated also by a representative of HHSK below:

> 'The resistance from the City Government team in the idea of forming a management of polders in the early period of the project, which actually can be mitigated by binding commitments and agreements with City Government officials (top level) in the early stages of project implementation, so that processes can run faster and more effectively.' (Interview 2)

After the fall of New Order Regime, there is a huge changes in the government administration. Accountability is guaranteed because there is a strict monitoring of corruption-watch done by independent organization-Komisi Pemberantas Korupsi (KPK). KPK, is a commission in Indonesia which was formed in 2003 to deal with, handle and eradicate corruption in Indonesia. The Commission is established under the Law of the Republic of Indonesia Number 30 Year 2002 on Corruption Eradication Commission. Thus, every big project has to make a record and report in every step and every decision making process, so the process and the result of the project can be evaluated and justified in the future.

6.5. The Adaptive Capacity Wheel of Banger Polder Pilot Project

The assessment of adaptive capacity of the flood defence institutions involved in the development and implementation of the Banger Polder Pilot Project (BPPP) results as shown in Figure 6.6 below. From the assessment of the BPPP, it is founded that the adaptive capacity within the project is still weak. The weaknesses are especially in the core qualities such as variety and room for autonomous change.

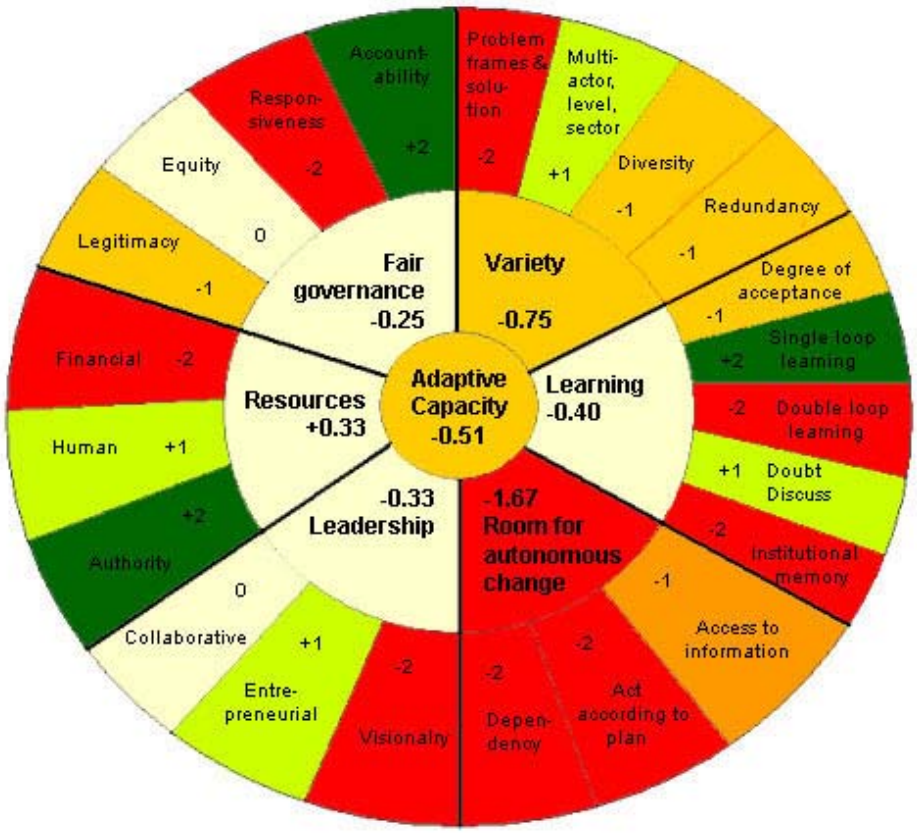


Figure 6.6. The Adaptive Capacity Wheel applied to the Banger Polder Pilot Project

Related to variety, the problem frameworks and alternative solutions were mainly dominated by technical engineering measures since at the first place, this project was initiated by central government (Ministry of Public Works/ MPW) as flood defence pilot project for coastal city. Therefore, at the beginning the actors involved were limited within the agencies of MPW and Semarang Municipal, with technical support from the Netherlands as the donor. However, there is a growing involved of actors at different sectors and levels during the implementation of the project because at the field it is found that some flood problems are not solely related to bad drainage and water system. Yet there are some relevant parties still unreachable. It is not easy to invite other sectors to sit together and have a discussion, especially those agencies that are under the central authority because of the long history of centralization period, even though administratively they are located in Semarang authority. This situation also results a fragmented policies across sectors since there is no limited coordination between sectors. Interestingly during the reformation period, there are many new policies and laws actually enacted at national level but at local level the regulations for practical guidance are still limited, thus it causes the lack of policies linkage between central and local. Additionally, variety in problem frames and solutions are not automatically guaranteed by the variety of parties involved. Especially in developing countries, there are some vulnerable groups that need to be facilitated with appropriate forum to express their opinions, therefore variety in forum to accommodate the community aspirations is also

important. Meanwhile, redundancy is considered as unnecessary since the limitation of resources.

Learning is a way to improve capability, therefore this variable is vital for the adaptive capacity. The source of learning can be from new experience or knowledge, therefore it requires institutions setting that promote the process of identifying, understanding, evaluating, criticizing the new experience in order to extracting the new knowledge to finally improving the current condition based on it. In BPPP, it is found that the learning process is mostly in one-direction through capacity building and knowledge. One-direction of learning here means the one direction flow of knowledge from central government or foreign experts to local people including both local government and community. More crucial is a two-direction of learning such as discussions on doubts and uncertainty of climate change implications. These processes are recognized in BPPP but only between research agencies, academics and experts in workshop and seminar forum. However, the discussion on adaptation strategies during planning and design process is mainly still on the traditional path of improving flood protection by reducing flood probability. The strong influence of engineering experts in MPW as the initiator is the reason of the current chosen path. Interestingly, two-direction of learning process is only possible if there is trust to share knowledge between actors. Unfortunately, trust is a quality that is difficult to measure in practice especially in local context (Javanese community) when “frankly speaking” is impolite. Therefore, for this study trust is identified by the degree of acceptance to interact is employed. In BPPP, there is a positive respond from community within the Banger area which reflects on the willingness to involve and take actions. Meanwhile, from community outside the Banger area or across sectors that possible affected by BPPP, there are still doubts and rejection to support.

Another core quality of adaptive capacity is room for autonomous change due to unpredictable of climate change effects. This quality is determined on the capability of actors to make a decision whether following the existing plans or improvising. Therefore the information related to climate change impact is essential in this quality to be the basis of decision making process. In BPPP the access to information related to the flood risk and management is limited within the involved actors or selected groups. Information about thematic maps such as spatial plan, flood prone, inundation area, etc, and also law and regulations in Semarang are available for public in the Semarang City official website. Even though such as information available, the enforcement of those plans, regulations and laws are still weak, for example the actual development not always follows the city spatial planning. Further, the political situation also results on the high dependency of local government to central government which also means the low capacity to improvise. However, the central role in the project is reducing by the increasing capacity of local authority as the result of capacity building programs.

Instead of the core qualities of adaptive capacity, there are also supporting qualities, mentioned leadership, resources and fair governance. The central government, in particular Ministry of Public Works, was used to take the role as the initiator and coordinator in infrastructure provision project. Since the decetralisation, the local leaders are supposed to

have more initiative actions. Although in BPPP the initiator is MPW, the Semarang role as the entrepreneurial leadership is shown the greater role during the implementation. However, the collaborative leadership is still dominated by central (MPW), especially related to the coordination across sectors. There is a weak role of provincial level in the coordination. However, yet there is lack of leader that has a long term vision. Regarding to the new system the development direction is interpreted from political leader's vision, therefore those political local leaders such as major and governor will determine the next 5 years development in the local level. Unequal distribution of wealth becomes major tension in BPPP since the Banger area is dominated by low income groups. The social justice is apparently forced by donor institutions because there is a lack of local leader that has concern in protecting the rights of poor people.

As mentioned before, the availability of resources also supports the three core qualities of institutions because it is crucial that actors are able to generate sufficient resources to enable adaptation efforts. There is still small portion of local contribution in financing the BPPP, mostly from central and foreign funds, especially for the physical construction. However there will be a scheme for self-financing in the operation and maintenance of the flood protection system in the future which is still under further study. The local potency of human resource has not been optimally explored yet, while there are many universities in Semarang City as the center of local knowledge and experts, especially related to local wisdom and socio-economic context. Another important resource is authority which is required to take and implement the necessary decisions. Sharing authority and responsiblility is defined clear and legitimated however there are some difficulties in the implementation regarding to the dual-task in project and government. Another resource that is also important in adaptive capacity is social capital. Social capital takes form as sort of shared norms or values that promote social cooperation, instantiated in actual social relationships. For example in BPPP, there is a strong bond of trust between individuals in community of Banger makes possible a collective action for the goodness of the community itself.

Crucial is dealing with social justice dilemmas which is in Adaptive Capacity Wheel presented as fair governance, since the majority of population in the Banger area is low income people, who used to be the "victim" of urban development. The fair governance of institutions is indeed important to protect the basic rights and equity, especially those from the vulnerable groups, especially in Indonesia context. It is reflected in SIMA's vision "*dry feet for all'* and its 3 basic principles: transparency, efficiency, and collectivity. Meanwhile, the scientific legitimacy of the solution is given by research groups from universities and state research agencies. Furthermore, after the fall of New Order Regime, there is a huge change in the government administration in which accountability is guaranteed because there is a independent organization for corruption-watch. Thus, every big project has to make a record and report in every step and every decision making process, so the process and the result of the project can be evaluated and justified in the future. However, as the consequence of the transition political process as mentioned previously, it tends to slow down legitimate policy process which results on less responsiveness at the local level.

6.6. Concluding Remarks

The adaptive capacity of the BPPP results show there are many aspects that are still insufficient enough which is already indicated in previous chapter as consequences of national political context. In variety, the bad scores are given to the variety of problem frames and solutions and redundancy. As mentioned before that the solutions offer is limited only based on technical engineering which is polder system such as dyke, pump and retention pond. There is no backup plan mentioned to support or to replace the main plan if it is failed. There is a requirement for other solutions such as early warning system, spatial measures, or women empowerment in water management.

Meanwhile, room for autonomous reflects the lack of plan in crisis condition. The plan related to climate change strategy fragmented. Every sector has their own plan without considering others. Moreover, the high dependency of central is clearly recognized, specially related with finance and expertise. This also influences on the responsiveness in reacting and the freedom to take action without instruction from higher level.

Those are such as less responsiveness and legitimacy, limited resources at local and concentrated resources in central, less awareness of climate change issues and lack of entrepreneurial and visionary leadership at local level. However, it is true that positive consequences are also found with the indications of involvement wider actors, broader legal frameworks at national level, increasing in vertical and horizontal collaboration, increasing in authorities, information and knowledge transfers from central to local.

Additionally, during the study it is found that there are some qualities that play important role in determining the adaptive capacity of society in Semarang has not been represented yet by the Adaptive Capacity Wheel. *First*, variety in room for aspirations, it is found that although there were some meeting conducted which invited variety of actors, there are some groups that were not actively involved. This indicate that might be the forum is not suitable for some of those groups. Moreover, the meering always dominated and attended by men as the head of family, women are excluded. *Second*, advocacy leadership is also required instead of visionary, entrepreneur and collaborative because the weak groups are powerless. *The last but not the least*, social capital as one of essential resources that also influence the adaptive capacity of society since it makes possible a collective action for the goodness of the community itself. Finally, in the next chapter this result of the BPPP assessment will be linked to others previous chapters to fulfill the objectives of this research as mentioned in the beginning to obtain a broader and general perspective of the adaptive capacity in developing countries.

CONCLUSION AND RECOMMENDATION

Many coastal cities, mainly in developing countries, have already experienced climate change impact such as the increasing of sea level. Therefore, the coastal community of developing countries is relatively more susceptible to those impacts, compared to those in developed countries. Adaptation is a “must” action considering mitigation option is still far from real. However, implementing this approach is not easy because the related climate changes issue is apparently not popular for the current institutions. This condition is exacerbated because there is an imbalance scientific literature between two side world, developed and developing countries. Therefore, as mentioned in the beginning this study tries to expose and criticize adaptation effort implemented in Indonesia specifically and the two side world generally using the Adaptive Capacity Wheel.

This final chapter wraps and summaries the concluding remarks from the previous chapters including the results of the adaptive capacity assessment on the study case which answer to problem statement and research questions in Chapter 1. In addition, there are also some recommendations for the flood defence institutions to enable climate change and finally the reflection on the Adaptive Capacity Wheel as a tool for doing institutions assessment in developing countries.

7.1. Conclusion

Climate change implication has brought new tension to coastal system that is already complex and full of conflicts. The tension is related to the nature of the coastal area itself that has already become the central of social and economic activities in all over the world. High density population and development are two factors that make this area the most vulnerable place in the climate change scenario especially related to sea level rise. Looking back to society history, human inherently has the capability to adapt with environment changes, namely adaptive capacity. However, this capacity is unequal between individual and community. There are some coastal cities that have already prepared adaptation strategy to cope with unseen climate change impacts, whilst others still struggle to solve the present flood problems such as found in developing countries.

Adaptive capacity refers to a range of quality of an individual or system to change or modified itself or its environment in order to preserve its existence and reduce possible negative impacts due to climate change and chosen option risks. The inadequate or weakness of one or some of those qualities might result on the lower capacity of society to adapt. Therefore, it is important to understand the factors that influence this capacity in order to find out to what degree the current institutions have prepared to enable climate change adaptation. However, it is not easy to assess the capacity since it is a potential quality and social behavior is so unpredictable and complex. Further, it is important to understand the background context that might result the condition to improve the institutions adaptive capacity.

Interestingly, there are some differences of issues between developed and developing country context. The insufficient adaptive capacity is apparently caused by institutions

weakness. Lessons learn from the two side world revealed that, *first* variety has to be harmonized by a good coordination. *Second*, institutions are difficult to change, especially for fundamental change, because fundamental change will disrupt stability. *Third*, flexibility room for autonomous change requires basis control (knowledge, law, authority). *Fourth*, the important role of water sector agency as the water manager and planner as visionary leader. *Fifth*, there is the significant gap of resources between developed and developing countries. *Finally*, the protection of basic right for all citizen is guaranted no exception for the weakest group such as poor families, women and children.

Meanwhile, Indonesia as an archipelago country is under high risk due to climate change implications especially related to sea level rise since most of big cities in Indonesa such as Jakarta, Surabaya and Semarang, situated at the coastal area. Banger Polder Pilot Project (BPPP) case is a twinning project in which Indonesian authorities and Dutch parties work together to realize a polder system as flood defence strategy for Semarang City. The project was initiated by Ministry of Public Works and The Semarang Municipal, with technical and financial support from the Netherlands government. For day today implementation there is Project Implementation Unit, this unit is obtained annual assistance from Steering Commintee. This project has established the first local water board in Indonesia called SIMA which is still on continue capacity learning to take responsibility in operating and maintaining the flood defence system in the future.

From BPPP case study, the flood defence institutions within this project shows that the six variables of adaptive capacity are still insufficient. *Variety* in the problem frameworks and alternative solutions is mainly dominated by technical engineering measures since at the first place, this project was initiated by central government. At the beginning the actors involved were limited only the agencies of MPW and Semarang Municipal, with the Netherlands as the technical support. However, there is a growing involved of actors at different sectors and levels during the implementation of the project. Yet there are some relevant parties still unreachable because of the long history of centralization period results distrust among the agencies. This situation is indicated by fragmented policies and lack of coordination between sectors and levels. Additionally, there are some vulnerable groups that need to be facilitated with appropriate forum to express their opinions. Meanwhile, redundancy is considered as unnecessary since the limitation of resources.

Learning is a way to improve capability, it can be from new experience or knowledge. In BPPP, it is found that the learning process is mostly in one-direction through capacity building and knowledge, the flow of knowledge is top-down from central government or foreign experts to local people including both local government and community. Discussions on doubts and uncertainty of climate change implications are recognized in BPPP but only between research agencies, academics and experts in workshop and seminar forum. Meanwhile, the discussion on adaptation strategies during planning and design process is mainly still on the traditional path of improving flood protection by reducing flood probability. The strong influence of engineering experts in MPW as the initiator is the reason of the current chosen path. However, there is a positive respond from community within the

Banger area which reflects on the willingness to involve and take actions. Meanwhile, from community outside the Banger area or across sectors that possible affected by BPPP, there are still doubts and rejection to support.

Room for autonomous change due to unpredictable of climate change effects is determined on the capability of actors to make a decision whether following the existing plans or improvising. Therefore the information related to climate change impact is essential in this quality to be the basis of decision making process. In BPPP the access to information related to the flood risk and management is limited within the involved actors or selected groups. Information about thematic maps, laws and regulations are available for public in the Semarang City official website. Nevetheless, the enforcement of those plans, regulations and laws are still weak. Further, the political situation also results on the high dependency of local government to central government which also means the low capacity to improvise. However, the central role in the project is reducing by the increasing capacity of local authority as the result of capacity building programs.

Instead of the core qualities of adaptive capacity above, there are also supporting qualities, mentioned leadership, resources and fair governance. Related to *leadership*, the central government, in particular Ministry of Public Works, was used to take the role as the initiator and coordinator in infrastructure provision project but since the decetralisation, the local leaders are supposed to have more initiative actions. Therefore, although the initiator of BPPP is MPW, the Semarang Municipal role as the entrepreneurial leadership is shown the greater role during the implementation. However, the collaborative leadership is still dominated by central, there is a weak role of provincial level in the coordination. The visionary leadership is apparently weak. Actually, it depends on the elected local leaders such as major and governor who will determine the local development within the next 5 years. Unequal distribution of wealth becomes major tension in BPPP, the social justice is apparently forced by donor institutions because there is a lack of local leader that has concern in protecting the rights of poor people.

The availability of *resources* also supports the three core qualities of institutions. It is crucial that actors are able to generate sufficient resources to enable adaptation efforts. There is still small portion of local contribution in financing the BPPP, mostly from central and foreign funds, especially for the physical construction. However there will be a scheme for self-financing in the operation and maintenance of the flood protection system in the future which is still under further study. The local potency of human resource has not been optimally explored yet, while there are many universities in Semarang City as the center of local knowledge and experts, especially related to local wisdom and socio-economic context. Another important resource is authority which is required to take and implement the necessary decisions. Sharing authority and responsiblility is defined clear and legitimated however there are some difficulties in the implementation regarding to the dual-tasks as the project implementation unit and government officer. Another resource that is also important in adaptive capacity is social capital. Social capital takes form as sort of shared norms or values that promote social cooperation, instantiated in actual social relationships.

In dealing with social justice dilemmas, *fair governance* is crucial since the majority of population in the Banger area is low income people. Those groups are used to be the "victim" of urban development. The fair governance of institutions is indeed important to protect the basic rights and equity, especially those from the vulnerable groups, especially in Indonesia context. The effort to create it reflected in SIMA's vision "*dry feet for all'* and its 3 basic principles: transparency, efficiency, and collectivity. The scientific legitimacy of the solution is given by research groups from universities and state research agencies. Furthermore, a huge change in the government administration during reformation period has ensured the accountability of the implementation of projects, programs and plans in Indonesia since there is an independent organization for corruption-watch. However, the transition political process tends to slow down legitimate policy process which results on less responsiveness at the local level. However, the overall assessment there indicates there are some strong points that need to be preserved and weak points that have to be improved. The detail description about the institutional strengths and weaknesses of Semarang Flood Defence Institutions that influence its adaptive capacity is presented in Table 7.1.

Table 7.1. The Institutional strength and weakness of Semarang Flood Defence Institutions.

Adaptive Capacity	**Institutional Strengths**	**Institutional Weaknesses**
Variety	Variety in stakeholders continues to develop.	Single-engineering domination in problem frameworks and solutions. Lack of policies linkage between central and local, and also between sectors. Limited variety forums for accommodate community aspirations.
Learning	Positive respond from community that reflects on the willingness to involve. Capacity building and knowledge transfer from central to local.	Still on the traditional path of improving flood protection, reducing flood probability. Doubt discussion is only between agencies and experts.
Room for autonomous change	Reducing domination of central in the local authority.	Limited access to information, actors within the project or particular groups. Less public information about the implications of sea level rise. Inadequate laws and regulations enforcement in practice. High dependency of local government to central government.
Leadership	A good will from local government to take actions.	Lack of leader that has a long term vision. Lack of collaborative leadership at local level. Lack of leader that promote social justice.
Resources	Gemenschap potency as social capital for making collective action possible. Authority is defined clear and legitimated.	Local potency of human resource (knowledge and expert) has not been explored. High dependency of financial support from outsource.
Fair governance	The protection of basic rights and equity for poor society forced by funding organization. Improvement in performance and accountability.	Less responsive of local governments for legitimate policy process.

Some of the situations above are the consequences of national political context of Indonesia as developing county that has just experienced a dramatic political change. Others result from the local context of Semarang as coastal city as consequences of its geophysical condition and social-economical culture. Those are such as less responsiveness and legitimacy, limited resources at local and concentrated resources in central, less awareness of climate change issues and lack of entrepreneurial and visionary leadership at local level. However, it is true that positive consequences are also found with the indications of involvement wider actors, broader legal frameworks at national level, increasing in vertical and horizontal collaboration, increasing in authorities, information and knowledge transfers from central to local.

7.2. Reflection

There still some weaknesses in this research regarding to the limitation data and the assessment method. As mentioned in the methodology that in this study the data is obtained from the interview is interpreted and assessed only by author perspective. Further, since the author is involved in the project as one of the agency representing within the BPPP project, there might be doubt on the objectivity of this analysis. However, this also becomes the strong point since conducting participant observation gave the opportunity to the author to know deeply the interaction among actors and context problems that might not be understood by observer from the outsiders.

In applying the variables in the BPPP case, there are some indicators that are found also important, howeve those have not been presented in the Adaptive Capacity Wheel. Those indicators might only be important in the context of developing countries and determine the . There are three indicators: room for aspiration (variety), advocacy (leadership) and social capital (resources).

The variety of room for aspiration needs to be accommodated. In Indonesia social and cultural context there are some groups that might be difficult to involve in open public discussion. They are not custom with the tradition of arguing and debating especially those from low income group. As mentioned in chapter 4, those poor communities with slump area near the river and flood plain area is common phenomena in almost every developing countries. It is also stated that women and children are the most vulnerable groups within those societies. However, their opportunity to contribute in the flood defence plan is limited because of cultural and social context. For instance the reason of less involvement of women in BPPP is because most of Indonesia Javanese people have paternalistic perspective, which considers women not involved in public activities but more in domestic function. However, actually women themselves have social organization (gemenschap) which is close related with their function such as *PKK, arisan, pengajian*. Those informal organizations actually can be a forum where issues such as flood problems can be discuss from the perspective of women. This would be easier rather than create a new forum where they are not familiar with the environment. Another weak group is children, children are always excluded in the discussion of development. Their opinions are also important to be considered in the seeking of solutions

related to climate change since the future belongs to them and they have the right to determine what kind of future their want.

Considering the right of the weak groups, institutions need to encourage leadership that promotes the opportunity for those groups to also be involved in the development process of flood defence strategy and protects their right. Therefore, it is a kind of advocacy since the purpose of this leadership is to help those groups to secure their right. So that, those marginal groups not always become the victim of development. Therefore, it is also important to question whether institutions encourage the rise of advocacy leadership to promote social justice.

Social capital refers to connections within and between social networks. Although there are a variety of related definitions and there is still no general agreement about what it is (Fukuyama 2002), many have been described as "something of a cure-all" (Portes 1998) for the problems of modern society, they tend to share the core idea that social networks have value. Similar as physical capital or human capital, social capital can increase productivity, both individual and collective. Here I adopt the definition of social capital according to Fukuyama (2002). It explains social capital as “shared norms or values that promote social cooperation, instantiated in actual social relationships”. He also argues that social capital is a necessary precondition for successful development. As also found in the BPPP, a strong bond of trust between individuals in community of Banger makes possible a collective action for the goodness of the community itself. The community is dominated by Javanese people with family-relationship characteristics such as trust and aware to each other and willing to co-operate voluntary for their own goodness. This quality is important since collective action will give more impact rather than individual action. Thus, this is also a resource or modal for promoting an adaptive capacity in society, similar as human or financial resources.

7.3. Recommendation

7.3.1. Recommendation for the Flood Defence Institutions in Indonesia

Sustainable development is a difficult word with multi-interpretation. In 1987, the United Nations-mandated World Commission on Environment and Development (also known as the Brundtland Commission) defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Yet the current strategy has some weakness especially in developing countries that may still far from the meaning of sustainable development. Thus, future challenges in coastal adaptation strategy related to sustainability are to give more room for environmental interests. The selected strategy should consider the balancing between economic, social and environmental interest in dealing with coastal problems to ensure the future generation still has sufficient resources to meet their own preferences.

As mentioned in conclusion, the adaptive capacity of BPPP is still inadequate to enable climate change adaptation, there should be more efforts to improve those six qualities. The efforts in enhancing the adaptive capacity of the current flood defence in Semarang should be started by eliminating and improving the institutional weaknesses found in BPPP

implementation. However, traditionally institutions is difficult to change therefore, to improve the flood defence institutions there should be a continuous integrated and systematic scheme for institutions reform which is conducted from national to local level. There are some concrete actions required due to the flood defence institutional strengthening to enable climate change adaptation. It is presented hierarchical from the strategic into implementation level as shown in Table 7.2.

Table 7.2. The Flood Defence Institutional Strengthening

National Level	- Addressing climate change and environmental issues in socio-economic and sectoral plans to mainstream the adaptation into broader national development. - Improving strategic disaster management platform for local government as a package of mitigation, emergency response, and recovery process especially related to definition, classifications and authority - Creating adaptation (to sea level rise) policy network system in every level of government (central to local) and across sectors, especially related to authority, responsibility and financing scheme anticipation plans in environmental, disaster management, water resources management, spatial planning, coastal and small islands planning sectors. - Allocation budget on monitoring and research activities to reduce climate change uncertainty and create innovative and creative adaptation strategy. - Assisting the local government in translating national policies and law related to climate change adaptation into local policy and regulations by workshops and consultations. - Creating a systematic database about international and national climate change information and providing accessible relevant information for national and local policy makers such as potential disaster area, prediction on climate change (sea level rise) implications, international and national agreement and cooperation on climate change.
Provincial Level	- Detailing climate change issues in national development planning into province development planning by considering the local potencies climate change implications (bridging national strategy and local needs). - Interpreting disaster management platform into regulations by adjusting to local disaster potencies in provincial. - Accommodating communication between different sectors such as transportations, industries, water supply, water system (river and drainage) authorities within its administration to develop problem definitions due to climate change implications on sectors in order to syncronise policies and plans between sectors at provincial level. - Allocating budget for flood defence strategy implementation in the regions that have flood high risk and strategic function in province level. - Promoting cooperation between local government and sectors to conduct and finance adaptation action scheme at provincial level. - Evaluating and improving regulations that support the flood defence implementation such as solid waste management, water system and drainage management, development and spatial planning. - Communicating the new policies and regulations during the arrangement to central government. - Providing accessible information for sectors about climate change regional implications and provincial adaptation strategies and relevant regulations.
Municipal Level	- Implementing disaster management platform into flood defence measures by considering not only reducing flood probability but also promoting policy for flood risk management (reducing vulnerability) and spatial measures as a parallel actions to flood protection. - Allocating budget for supporting flood defence operational and maintenance. - Evaluating and improving existing flood defence measures that support the flood

	defence implementation such as solid waste management, water system and drainage management, water quality, sanitation and society health, development and spatial planning. - Accommodating local discussion using existing formal and informal local forum/ organisations (meeting RT/RW, *pengajian, PKK, karang taruna, arisan*) to grasp community aspiration related to flood problems and perceptions. - Law and regulation enforcement in implementation and practice by applying rewards to one who gives significant contribution to flood defence actions, and vice versa strict punishment to those who break the law. - Empowering the marginal groups such as women and children by capacity building and creating rooms for more opportunity for them to be participated in flood defence activities based on their capacity. - Providing accessible information for public about flood risk management and flood defence measures.
Water Board (SIMA) and Community Level	- Conducting daily operation and maintenance of flood defence facilities and infrastructure and making reports as a tool to monitor and evaluate the daily implementation and problems to improve the operational and maintenance method and procedure. - Improving and broadening the informal local organization activities as also rooms for sharing flood problems and promoting genuine solutions to government. - Preserving the local values and norms (social capital) that support the flood defence strategy for example *gotongroyong*, family-bounded, tolerance among individuals that make possible collective actions. - Participating in self financing mechanism design process for flood defence maintenance and operation. - Empowering the marginal groups such as women and children by informal education and allowing them to be participated in the flood defence activities based on their capacity. - Disseminating information on flood defence activities and knowledge to community.
Local academic societies, NGO	- Monitoring and predicting the climate change implications especially related to sea level rise to reduce uncertainty. - Evaluating and criticizing flood defence strategy, policies and regulations from national to local level. - Learning from the community experience in dealing with flood to develop innovative and creative solutions for flood problems. - Proposing climate change adaptation innovation to government. - Supporting local government with expertise and knowledge to empower the marginal groups.
Privates/ industries and stale-own companies	- Respecting the laws and regulations that support the flood defence measures such as solid waste management, water system and drainage management, water quality, sanitation and society health, development and spatial planning. - Syncronising the master plan of physic and non-physic development with local spatial planning and environmental requirement. - Participating in financing scheme of flood defence measures.

7.3.2. **Recommendation for the Adaptive Capacity Wheel**

The Adaptive Capacity Wheel is a very applicative tool for conducting assessment, however as mentioned before that the adaptive capacity itself is a potential characteristics, thus the result might not reflect exactly the condition of object being assessed. Therefore, while applying this tool in practice, users must keep exploring for the possibility of other variables to emerge, not stick to the given variables only. Based on this study, I proposedThose indicators might only be found important in the context of developing

countries. There are three indicators: room for aspiration (variety), advocacy (leadership) and social capital (resources).

Variety of room for aspiration means to accommodate the weak group aspiration through providing the suitable forum for them to express their needs and desires. As a consequence of that, the advocacy leadership is required to ensure that the aspirations of the weak groups are considered and accommodated in the decision making process. Meanwhile the social capital in the forms of norms or values that promote social cooperation, instantiated in actual social relationships is also essential for successful development in developing countries. The modified Adaptive Capacity Wheel is presented in Figure 7.1 below.

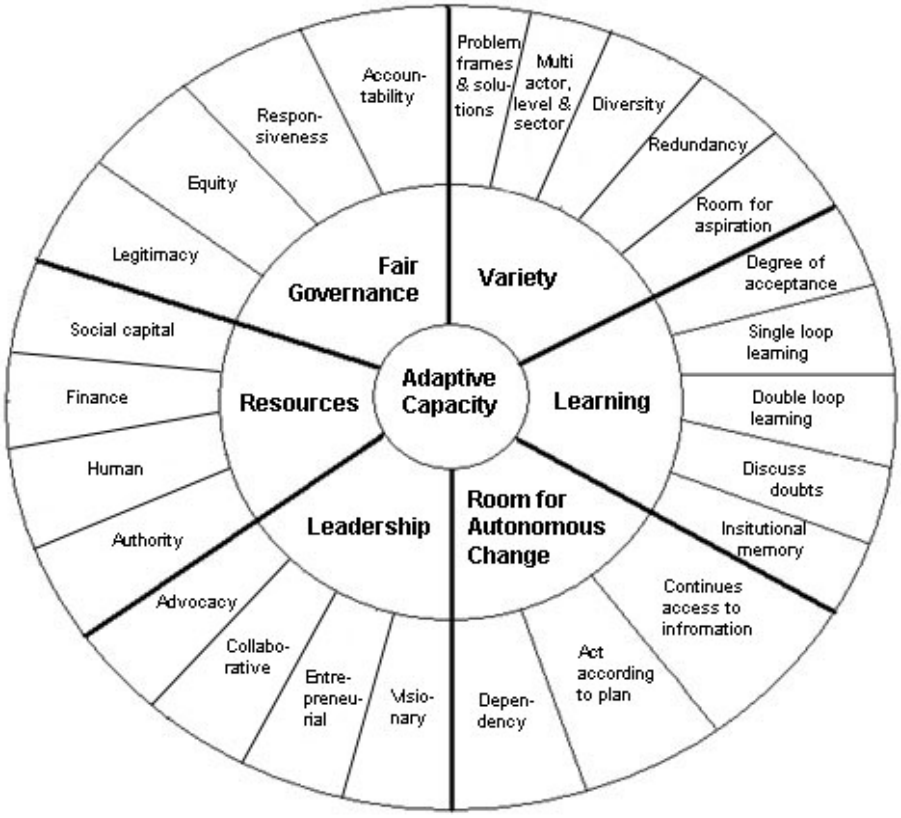


Figure 7.1. The Modified Adaptive Capacity Wheel

Finally, this study needs further research for assessing the current flood defence institutions to compare and enrich the perspective so that the assessment not based on single perception only. Especially for scoring the qualities and criteria, it is suggested to conduct the assessment by a project team which consists of those who are familiar with the water sector, to judge and improve the analysis. Another possible way is by organizing several workshop with key stakeholder from different sectors within the flood defence domain, during which the result of the analysis are critically discussed and reflected upon. In this way, room to discuss differences of opinion will be created, which might give a more precisely reflection about the actual condition of the flood defence institutions.

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Appendix

Appendix 1: Interview Guide

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Interview

Prolog	- Gambaran lembaga/ institusi Anda secara umum, seperti visi, misi, dan aktivitas? Posisi Anda dalam organisasi? - *Tell me about your organization/ agency in general, what are the vision, mission and activities? What is your position?* - Bagaimana proses organisasi Anda terlibatan dalam Banger Polder Pilot Project? Peran dan aktivitasnya, spesifik untuk kasus ini? Apa yang ingin dicapai? - *How did your organization/ agency involved in Banger Polder Pilot Project? What are the role and responsibility in this project?* - Perkembangan terakhir dari Banger Polder Pilot Project? Apa yang sudah dicapai dan yang belum tercapai? - *What is the latest progress in Banger Polde Pilot Project? What has been done and not yet done* - Bagaimana tanggapan masyarakat terhadap kegiatan ini? Di awal dan sampai saat ini? - *How is the community response the project at the beginning and until now?*
Variety (keragaman)	- Apakah ada alternatif strategi solusi lain yang juga dipertimbangkan dalam proses pengambilan keputusan? Di level apa solusi ini dipilih dan mengapa? - *Are there any alternative strategies or sulutions considered in decision making process? At which level the decision is taken?* - Siapa saja pihak-pihak yang terlibat dan bagaimana pembagian tanggung jawabnya? - *Who are the actors and how is the responsibility sharing?* - Pihak-pihak yang terlibat sudah cukup mewakili berbagai kepentingan? Kalau belum pihak mana yang seharusnya ikut terlibat dan mengapa?

	- *Whether those actors have already represented various interests or not? If not, which actors that is supposed to be involved and why?*
Learning (kemampuan belajar)	- Pihak-pihak yang terlibat dengan latar belakang/ bidang yang bebeda, apakah cukup saling mendukung? Adakah yang masih berbenturan kepentingan, contohnya kalau ada? - *Whether the involved actors are supporting each others or not? Explain more?* - Apakah ada proses transfer ilmu pengetahuan/ informasi antara pihak-pihak terkait dalam kegiatan ini? Kalau ada, bisa seperti apa bentuknya? - *Is there any knowledge transfer among the involved actors? If yes, what kind of transfer is it?* - Apakah pengetahuan, pengalaman, konsep yang diperoleh dalam proyek ini direkam dengan mekanisme tertentu untuk dapat digunakan dalam kegiatan serupa di masa mendatang? Contohnya? - *Whether the knowledge, experience, concepts obtained in this project are recorded with a specific mechanism to be used in similar activities in the future? Examples?*
Room for autonomous change (ruang terhadap perubahan)	- Apakah sudah ada strategi/ mekanisme yang mengatur apa yang harus dilakukan pada saat krisis (contoh banjir besar)? - *Is there a strategy/ mechanisms that regulate what should be done in times of crisis (e.g. big flood)?* - Pengalaman di masa lalu yang terkait dengan akibat adanya situasi krisis dan penanganannya? Seperti apa penanganannya? Inisiatif pemerintah, kolektif/ grup atau individual sendiri? - *Are there any experiences in the past associated with the effect of the crisis and its handling of a situation? What kind of handling? Government initiatives, collective / group or individual own?* - Adakah spesifik organisasi/ institusi yang bertanggungjawab atas resiko kerugian? - *Are there specific organizations / institutions responsible for risk of loss?*
Leaderships (kepemimpinan)	- Bagaimana kegiatan Banger Polder Pilot Project ini terorganisir/ terkoordinasi? siapa / apa organisasi yang memimpin di dalamnya dan bagaimana? - *How are Banger Polder Pilot Project activities organized / coordinated? Who / what is the lead actor?* - Apakah siklus perubahan kepemimpinan politik berpengaruh dalam realisasi rencana, seperti apa bentuk pengaruhnya? Jangka pendek/ jangka panjang? - Whether the cycle of political leader changes affect the realization of the

	project? Short term / long term?
Resources (sumber daya)	- Bagaimana dengan potensi sumber daya yang ada (SDM, finansial, pengetahuan, etc) yang bisa mendukung kelangsungan dari kegiatan ini (internal organisasi)? - *What about the potential of existing resources (human, financial, knowledge, etc) that can support the sustainability of these activities (internal organization)?* - Gambaran kondisi masyarakat yang terlibat dalam kegiatan ini? Karakter/ sifat masyarakat (pengetahuan, budaya, nilai/norma, organisasi kemasyarakatan, dll) yang mungkin mendukung proyek ini kedepan? - *Describe the condition of the communities involved in this activity? Character / nature of society (knowledge, culture, values / norms, community organizations, etc.) which may support this project forward?* - Bagaimana dengan pemerintah (lokal/ pusat)? Kapasitas SDM, finansial, pengetahuan, dan perannya? - *What about the government (local / central)? Human resource capacity, financial, knowledge, and his role?*
Fair Governance	- Tingkat kepercayaan masyarakat terhadap kesungguhan pemerintah dalam penanggulangan masalah ini? Sejak awal hingga saat ini? - *The level of public confidence in the sincerity of the government in overcoming this problem? From the beginning until now?* - Apa bentuk keseriusan pemerintah dalam menangani masalah ini? - *What indicates the government's seriousness in addressing this issue?* - Apakah program ini cukup berpihak kepada kaum marginal? - *Whether this project considers the marginal groups or not?*
Refleksi	- Menurut pandangan Anda dalam proses ini apakah hal yang berjalan baik, mungkin bisa dijadikan sebagai model untuk kegiatan serupa? - *What are the good things in the project implementation that may be used as a model for similar activities?* - Adakah yang berjalan kurang sesuai dengan harapan? Menurut Anda mengapa hal tersebut terjadi? - What are things within this project that is out of the expectations? In your opinion, why is this happening? - Menurut Anda bagaimana kelangsungan kedepan dari Pilot Project ini? Dilema, tantangan, peluang?

	- *What do you think about the future viability of this Pilot Project? Dilemmas, challenges, opportunities?* - Menurut Anda adakah dari variabel-variabel di atas yang tidak relevan dengan konteks Indonesia? - *In your opinion is there any variables mentioned above are not relevant to the context of Indonesia?* - Menurut Anda adakah variabel-variabel lain, selain yang disebutkan di atas, yang penting untuk diperhatikan dalam menumbuhkan kemampuan institusi/ masyarakat untuk beradaptasi khususnya yang sesuai dengan konteks Indonesia? - *In your opinion is there any other variables, other than those mentioned above, which is important to note growing ability of the institution / community to adapt particularly in accordance with the Indonesian context?*

Appendix 2: The List of Interviews

No.	Interviewee(s)	Group	Position	Date of Interview
1.	Dr. Ir. Arie Setiadi Moerwanto, M.Sc.	Central Government, expert	Head of Research Center for Water Resources Steering Committee of BPPP	17 April 2010
2.	Iswari Paramesthi	NGO activist	Representative of HHSK in Indonesia Local Coordinator for Banger Pilot Polder Institutional Project	6 May 2010
3.	Ir. Suhardjono, M.Sc.	Local Government	Representative of Dinas PSDA & ESDM Manager of local North and South Banger drainage system (O&M)	26 May 2010
4.	Sebrina Suseno Putri	Community	Citizen living in flood area	30 May 2010
5.	Ir. Fadjar Hari Mardiansjah MT, MDP, PhD Candidate	Expert	Lecturer at Diponegoro University (UNDIP)	6 June 2010
6.	Yuni Ekawati	Community	Citizen working in the flood area	3 June 2010
7.	Nur Cahyo Dwi Nugroho	Community	Citizen working in the flood area	4 June 2010
8.	Sapto Hartoyo	Private	Head of Public Relation-PT. KAI Daop IV Semarang	15 Juni 2010