

**THE INFLUENCE OF COMMUNITY CAPACITY
TO THE EFFECTIVENESS OF
COMMUNITY-BASED WATER TREATMENT**

(Case of the City of Yogyakarta, Indonesia)

MASTER THESIS

A thesis submitted in partial fulfillment of the requirements for
the Master Degree from the Bandung Institute of Technology and
the Master Degree from the University of Groningen

by

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Double Master Degree Program

**Development Planning and Infrastructure Management
School of Architecture, Planning, and Policy Development
Institut Teknologi Bandung**



and



**Environmental and Infrastructure Planning
Faculty of Spatial Sciences
University of Groningen**

2012

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ABSTRACT

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Water quality is a major problem for urban communities, especially in high density areas. This is compounded by low levels of income, so the ability to get better water quality is limited. The Government has made efforts to provide clean water and drinking water by establishing Water Treatment Plants (WTP) that are handed over to community in management and maintenance.

The main problem is the unpreparedness of the people to handle their responsibility in the maintenance and management. This is closely related to the capacity owned by the community. Therefore, it is necessary to study more deeply in terms of what people have been tried to do to realize the sustainability of water treatment plant, what the elements of community capacity that have influence, and what the real problems faced.

In this thesis, a field survey in Yogyakarta was conducted to find the facts of how the relationship between community capacity for effective water treatment plant. The results of field survey shows that leadership and management factors have the greatest role in realizing the effectiveness of water treatment plant that have been built. Strong leadership also led to other parameters such as capability, organization, participation, and the relationship have a limited contribution. It also indicates the interrelationship between the elements of institutional capacity itself.

Key words: *Water Treatment Plant, Community Capacity, Effectiveness*

Guideline for Using Thesis

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Preface

All praise is only for Allah. This master thesis has been completed as a partial fulfillment of the requirements for the Master Degree Program from Institut Teknologi Bandung and University of Groningen. In master thesis, I am interested in water infrastructure management and maintenance in Yogyakarta.

The development of water infrastructure built by the government for community has not been matched by their readiness in the maintenance and management. Therefore, this research has the objective to determine the contribution of each element of community capacity in realizing the effectiveness of water infrastructure. In the end, is expected to provide recommendations to policy makers in terms of water infrastructure.

I am grateful to God, Allah SWT for blessings so that I can finish my thesis. In addition, I also would like to thank all those who provide support and assistance in the preparation of this thesis. I would like to address my special thanks to my supervisors, Prof. Johan Woltjer (RuG) and Ir. Miming Mihardja, M.Eng.Sc., Ph.D. (ITB) in my thesis work. Respectively, I also would like to address my thanks to all my lecturers and faculty staff members in ITB and RuG. I also would like to appreciate for National Development and Planning Board (Bappenas) and the Netherland Education Support Office (NESO) through StuNed program for giving me institutional and financial support.

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Groningen, August 2012

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Abbreviation

BPS	<i>Badan Pusat Statistik</i> (Central Statistical Agency)
DAK	<i>Dana Alokasi Khusus</i> (Specific Grant)
DED	Detail Engineering Design
EPA	Environment Protection Agency
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
GDP	Gross Domestic Product
Juklak	<i>Petunjuk Pelaksanaan</i> (Implementation Guidance)
Juknis	<i>Petunjuk Teknis</i> (Technical Guidance)
KAK	<i>Kerangka Acuan Kerja</i> (Terms of Reference)
MDGs	Millenium Development Goals
NKLD	<i>Neraca Kependudukan dan Lingkungan Hidup</i> (The Scale of Population and Environment)
OMS-AM	<i>Organisasi Masyarakat Setempat – Air Minum</i> (Organization for Local Community of Drinking-Water)
PDAM	<i>Perusahaan Daerah Air Minum</i> (Regional Water Company)
RO	Reverse Osmosis
RT	<i>Rukun Tetangga</i> (Community Organization/Neighborhood)
RW	<i>Rukun Warga</i> (Broader Community Organization)
UF	Ultra Filtration
UNDP	United Nations Development Program
WTP	Water Treatment Plant

Chapter I

Introduction

I.1. Background

Water is a basic human need that must be fulfilled. Based on Committee on Economic, Social, and Cultural Rights (2002), humans have the right to availability of water that should be sufficient, safe, and easily available and affordable. However, the compliance of water need is not evenly distributed in all places and not enough in terms of quantity and quality. Generally, this happens in the cities that have high population and density. Some efforts to meet the water needs for the community have been done in several ways; by providing clean water with piping and non-piping system.

Recently, community is more and more involved in the provision of water infrastructure. The community involvement is embodied in community based water infrastructure. In this form, government utilizes existing water sources and builds water treatment plants (WTPs) and then the managements will be handed over to community as user.

The transfer of infrastructure management from government to the community, according to the Indonesian Department of Public Works (2008), has some advantages. First, the communities can feel the direct benefits obtained from the water infrastructure provided. Second, more people will feel free to manage the infrastructure. Last, it can save government expenditure on maintenance so it can be used to finance the construction of other infrastructures in other places.

However, the management handover to the community faces several problems. The problems that occurred are generally associated with motivational issues and cooperation with municipalities, as well as issues of financial problems (Anschutz, 1996). In Addition, the infrastructures that some of them are a kind of new technology for communities generally has the lack of clarity about the meeting point between the types of projects built with the ability of communities

to accept it. The new technology offered makes communities, who have the diversity of capacities, difficult to operate and maintain them. It becomes a test of the capacity of a society, how they can deal with these difficulties. According to Alegre et.al (2008), community capacity is an arrangement of concepts that include potential of every member of community to deal with problems in order to improve the welfare of individuals and entire community.

The successful in achievement of targets or goals can be a parameter to determine the effectiveness of a project. As UNDP (2001) stated that the effectiveness of a development is an assessment of how far the effects, consequences, and outputs the resulting development. There are several factors considered to affect the effectiveness, namely individual choices and opportunities, participation, and policy strategy (UNDP, 2001). In the provision of infrastructure to community, government expects that this will effectively give good effect and beneficial output for community, but this will be influenced by the capacity of community who receives the infrastructure.

Basically, WTPs are built to meet basic needs of communities in urban areas. However, many projects are only based on the availability of budget and not based on community needs. Moreover, those were built without taking into account the ability of the community in accepting the infrastructure. Increased community role in decision-making should be balanced with the capacity to carry out these responsibilities (Robin, 2008).

Capacity is the ability contained in an individual or group, which is the potential to perform an action. (Chaskin, 1999). A person or community cannot achieve something to be desired if there is no potential to go that direction. While connected to the effectiveness of the infrastructure, it is difficult to achieve if the capacity to do so is not sufficient. It proves that the capacity is crucial and cannot be separated from an infrastructure planning. Therefore, this suggests that research on community capacity and the correlation to effectiveness of the infrastructure is a very important thing.

I. 2. Research Problem

According to the National Policy of Indonesian Water Supply Infrastructure Development and Environmental Sanitation Based on Institutions 2003, development can be said effective and meet the targets if the infrastructure and facilities are in accordance with the expected goals and objectives, and proper use viewed from several aspects, such as technical, health, institutional, community capacity in management, and change people's behaviour influenced by the existence of such infrastructure. This is influenced by 2 (two) main things: ease of use and equality. The former relates to the level of ease of use of infrastructure. The latter means that the infrastructure built gives the benefit for every element of society, regardless of differences. An ideal clean water infrastructure in developing countries should be able to meet the needs of the population and in accordance with the local community capacity in implementing, operating, and maintenance (Thanh and Hettiaratchi, 1982).

The successful achievement of the water supply depends on the capacity of communities, particularly in terms of institutional capacity reflected on how the organization and management work. Jooste (2008) indicates the weakness of institutional capacity to be an important obstacle in the successful achievement of the program. It is characterized by a lack of resources and specific expertise in the construction, operation, and management infrastructure in order to be more effective. Many countries can build the infrastructure to cope with the problems of water availability, but the institutional capacity to optimize the subsequent use is still not adequate (Grey and Sadoff, 2005). Thus, there is a close relationship between institutional capacity and effectiveness of water infrastructure has been built and this needs to be further studied.

I. 3. Research Objectives

The intention of this research is to know the effectiveness of the strategy in compliance the need of urban communities on clean water, especially in relationship with institutional capacity. For that, this study has the first objective to find a picture of community efforts in realizing the goals of the strategy to meet

water needs through the development of WTP. The success of the effort is determined by the capacity of community. Therefore, the second objective of this study is to determine the role of each element of the community capacity on the effectiveness of the WTP. Finally, to contribute to the more effective WTP, this study also has the objective to provide guidance in the next planning, based on the problems faced.

I. 4. Research Questions

Based on the background exposure, problems identified and research objectives outlined above, it can be underlined some of the following research questions:

1. To what extent community efforts in achieving sustainable community based water treatment plants.
2. To what extent the elements of community capacity contribute to the sustainability of community based water treatment plants.
3. What the problems and possible solution related to community capacity that affect the sustainability of water infrastructures provision.

I. 5. Research Significance

The provision of clean water infrastructures to urban communities embodied in community-based water treatment plants needs careful planning in terms of the kind of infrastructure will be developed and the preparation in the management and maintenance. It should be suitable for urban communities in terms of their capacities. Practically, this research can be used as consideration in determining the appropriate clean water infrastructure will be applied to the communities. Moreover, it can also be used as a reference in an effort to increase institutional capacity in the community. It is important in order that the water treatment plants built will be sustainable. Theoretically, this research will explore more about the community capacity in relation with the effectiveness. The results of the research are expected to contribute to the development of the existing theories about community capacity.

I. 6. Research Methodology

I. 6. 1. Research scope Area

The research will be conducted by case study. The case study area will be taken in the city of Yogyakarta, Indonesia. The city has a high population density, reaching 15,197 people / km² (BPS, 2000). With the density, the availability of good quality water is a crucial issue, especially in dense and low income population. Because of the low income, the ability to get good quality water with pipe system from local water company is limited.

Therefore, local government of Yogyakarta has strategy to provide clean water for people, especially for low income households, by building clean water supply infrastructures. The infrastructures were built in the form of water treatment plant (WTPs) that consist of water purifier and water tank, and rehabilitation of toilets. The developments are located in public toilets that serve several households. In this project, local government just builds the infrastructures. Management and maintenance of WTPs are handed over to local communities as users. They are expected to form a management group consisting of institutional management and financial management in every WTP. With this system, communities are expected to have a sense of responsibility that is expected to be more effective in the maintenance of infrastructures.

The number of water treatment plants developed by Yogyakarta Municipality with Dana *Alokasi Khusus* (DAK) or specific grant from 2007 to 2009 is 203 units spread over 14 districts in this city. These development projects will continue to be held on the following years with a target water treatment plants installed in all public toilets in low-income settlements. It is expected to provide solutions to water problems in the city.

From the description, the selection of Yogyakarta as the study area is appropriate because:

- The limitation in getting good quality water in Yogyakarta makes the WTP is very important in community.

- The involvement of community in the management of WTP allows the capacity of the community can be studied.
- The development of WTP that will continue to do in the future requires a good planning so that the results of this study are expected to provide advice for better planning.

I. 6. 2. Data required

The data required consists of primary data and secondary data that are grouped according to the research objectives.

1) Primary Data

Primary data will be sought in the form of opinion and perception of households around the WTPs as the parties concerned and directly related to the water infrastructure projects. In addition, the primary data also will be taken from the government as the provider of the infrastructure. Data will be obtained through interviews to the informants. The respondents selected are households obtained with the sample selection based on the representation of the various administrative areas and site conditions.

2) Secondary Data

Secondary data will be obtained from government institution such as Regional Development Planning Board (*Bappeda*), Department of Settlement and Regional Infrastructure (*Dinas Kimpraswil*), and Development Control Division (*Bagian Pengendalian Pembangunan*). The collected data will be the location of the projects, development plan documents, and other documents related to WTP projects.

I. 6. 3. Data Analysis

Data obtained will be analyzed using descriptive-qualitative analysis. This describes in detail of specific situation known from data obtained from interviews, observations, and reviews of documents. To achieve the first objective, namely to

know the extent to which the community's efforts in achieving sustainable infrastructure, the analysis is carried out through the comparison between the facts on the actual condition and that expected condition in the planning documents. The second analysis is to review the contribution of each element of community capacity to achieve sustainability of water treatment plant. Of the interview, it will be known the capacity of the community in accepting the existence of water treatment plant. The third analysis is to identify problems encountered in achieving the effectiveness of water treatment plant. This, in addition to the interview, is also identified from the first and second analysis. The following table shows the types and the sources of data will be searched.

Table.I .1. Data Required

No	Objectives	Data Required	Source of Data	Data Collection	Data Analysis
1	To know the extent of community efforts in achieving sustainable community based water treatment plant	Master plan, feasibility study, DED	Bappeda (Planning Agency)	Planning Documents	Descriptive with confirmation and comparison between the facts and literatures
		Procedure of planning, implementation, and maintenance	Bappeda (Planning Agency)/Dinas Kimpraswil (Dept of Settlement & Regional Infrastructure)	Technical and Implementation Guidance (Juklak/Juknis)	
		Responsibilities and duties of parties involved in the projects	Dinas Kimpraswil (Dept of Settlement & Regional Infrastructure)	Terms of Reference (KAK)	
				Contract Documents	
Opinion, Perception, Additional Information	Project leader, Bappeda, Development Control Division, Households	Interview			
2	To know the extent of each elements of community capacity contributes to the sustainability of community based water treatment plant	Procedure of planning, implementation, and maintenance	Dinas Kimpraswil	Technical and Implementation Guidance (Juklak/Juknis) and Interview	Correlation
		Opinion, Perception, Additional Information	Households	Interview	
3	To identify the problems related to community capacity that affect the effectiveness of community based water treatment plant	Procedure of planning, implementation, and maintenance	Dinas Kimpraswil	Technical and Implementation Guidance (Juklak/Juknis) and Interview	Descriptive with confirmation and comparison between the facts and literatures
		Opinion, Perception, Additional Information	Households	Interview	

(Source : Data required analysis, 2011)

I. 7. Outline of Report

The content of the study report is divided into 5 chapters.

Chapter I. Introduction

This chapter consists of background, research problems, research objectives, research question, research significance, research methodology, outline of report, and research framework.

Chapter II. Theoretical Review

This chapter contains literature review that explores some theories related to the topic observed. This will provide the concept of water infrastructure and community capacity related to it. In addition, the principal criteria of effectiveness are explained in this chapter. Common sense obtained from literatures will be embodied in a theoretical framework.

Chapter III. General Overview of Water Infrastructure in Yogyakarta

This chapter contains general review of study area and programs used for case study. This also exposes data obtained from survey and discusses appropriate variables and methods will be used in analysis according to case study area.

Chapter IV. Analysis

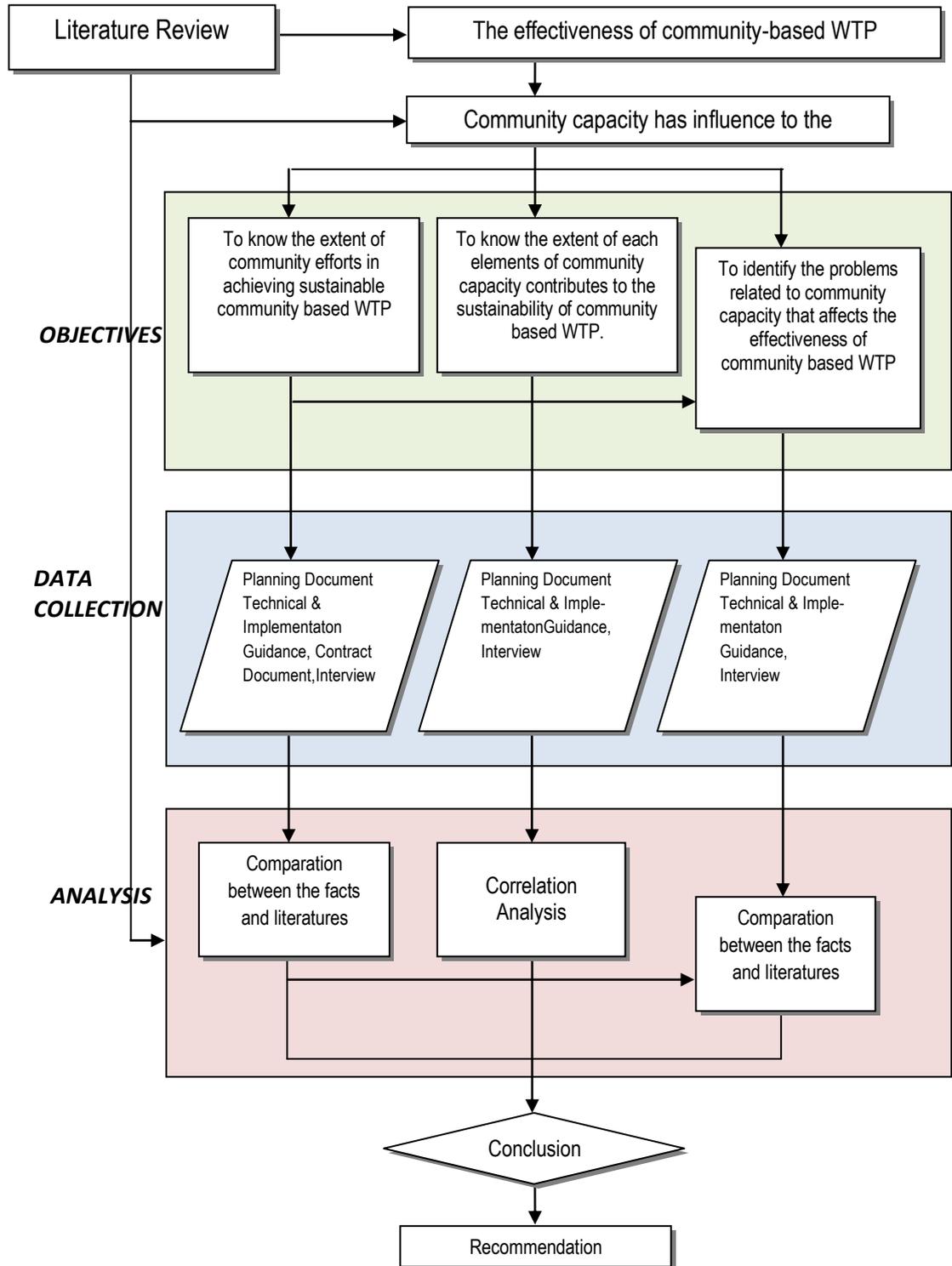
In this chapter, it will analyse the components of institutional capacity in community in terms of the contribution to the effectiveness of community based water treatment plants.

Chapter V. Conclusion and Recommendation

Based on the understanding from the analysis, it will produce some conclusions and recommendations related to the case study.

I. 8. Research Framework

Figure. I. 1. Research Framework



Research will be begun with an issue of the effectiveness of the provision of water treatment plants and it is enriched with literature studies related to it. Based on this background, research problem is identified in terms of the relationship between community capacity and effectiveness. The next phase is to determine the research objectives in order to observe the research problems. Each objective requires data, such as secondary and primary data obtained from several sources. After that, an analysis which is associated with the research objectives will be conducted to get the conclusions. Based on the formulation of conclusions, the recommendations are issued to parties involved in community capacity to contribute to the effectiveness of community based WTP.

I. 9. Concluding Remarks

Water quality is a major problem for urban communities, especially in high density areas. This is compounded by low levels of income, so the ability to get better water quality is limited. The Government has made efforts to provide clean water and drinking water in several ways, one with a mechanism to empower the community in water infrastructure development process.

Community-based WTP is a form of community empowerment in development. This thesis is more emphasis on the management and maintenance stage. In the projects which are studied, the dominant responsibility and role in the planning and construction is on the government side. After construction is completed, the responsibility will be handed over to the community to manage and maintain it.

The main problem in this mechanism is the unpreparedness of the people to handle their responsibility in the maintenance and management. This is closely related to the capacity owned by the community. Therefore, it is necessary to study more deeply about it, in terms of what people have been tried to do, what the parameters that influence, and what the real problems faced.

From this study, it is expected to be known more clearly the elements affecting community capacity. It is important to determine the priority measures to build community capacities which have contribution to the effectiveness of the WTPs.

Chapter II

Theoretical Review

This study has the intention to know the effectiveness of the provision of WTP in relation with the community capacity. Three objectives have been set in this study. First is to know the community efforts to meet water needs in relation with the development of WTP. Second is to determine the influence of each element of community capacity on the effectiveness of the WTP built. Third is to know the problems faced and possible solutions as guidance in the next planning.

Accordingly, this chapter will discuss more deeply the literatures related to the objectives of the study, which are about community capacity and effectiveness as well as parameters to analyze. At the end, the conceptual framework related to the parameters is organized in such a way.

II. 1. Literature Review

II.1.1. Community Capacity

There is no exact definition of community capacity. It is mainly related to the indicators or elements involved in measuring the capacity of communities. Mayer (1995) defined community capacity as mix effect of commitment, resources, and skills of community that are used to strengthen and overcome problems of community. Mayer used only three elements to measure community capacity. Different number of variables used was shown by Goodman et.al (1998) that assessed community capacity by ten elements, namely citizen participation, leadership, skills, resources, networks, sense of community, understanding community history, community power, community value, and critical reflection.

Another definition was stated by Chaskin, et al (2001:7) that

“Community capacity is the interaction of human capital, organizational resources, and social capital existing within a given community that can be leveraged to solve collective problems and improve or maintain the well-

being of a given community. It may operate through informal social processes and/or organized effort by individuals, organizations, and social networks that exist among them and between them and the larger systems of which the community is a part”.

It can be said that community capacity is the ability of groups to exploit all the potential to achieve what they want (Beckely et al, 2008). It is competency to use the existing potential in order to achieve the planned objectives. Different community has different competency, so this will influence the success of achieving their desired goals of development.

Recently, there are many developments of water infrastructure by the government that are followed by the delegation of management authority to the community. The infrastructure built and operated by this system is called community-based infrastructure. This system is a manifestation of community involvement optimization, particularly in terms of management and maintenance, and this is the reflection of capacity utilization. Management and maintenance is closely related to the organization or institution. Thus, the capacity needed in the management and maintenance is the institutional capacity within the community, which is the object of this research study.

Institutional capacity is the ability of an organization to perform its functions and roles. Institutional capacity is a crucial factor for an organization or community and this is determined by the competence and ability to continue to learn and grow (Sotarauta and Kosonen, 2003). Institutional capacity or institutional capital, according to Khakee (2002), consists of three main components: intellectual capital, social capital and political capital.

1. Intellectual Capital

Intellectual capital is obtained from the knowledge based on experience, research, and understanding of community, as well as a new perspective in looking at problems and developing themselves in order to make decisions (Khakee, 2002). In community, this can be identified by knowing the range of knowledge to use

various alternatives, ideas and creativity in addressing the problem, foresight in linking the various origins of knowledge, and openness to accept and learn new things.

Intellectual capital is reflected in the extent of public knowledge in choosing various alternative options in decision making. Number of alternative methods used shows extensive insight and knowledge of a society. It describes a wide range of their knowledge and not tied to anything that makes it narrower.

In the process, it is inevitable often face problems. Intellectual capacity is shown by how a society releases ideas and makes a difference from the ordinary to deal with the limitations. They do not run out of ideas to solve problems and they are creative in finding a way out of their difficulties.

Intellectual capital is also indicated by the ability to connect a wide range of science, knowledge, skill, and experience that exist in society. Many sources having good quality would be futile if they do not connect and support each other. All of those will become forces and it requires foresight of community. Finally, the openness of community to accept the information and technologies is the formation of intellectual capacity terms. This openness will enrich the knowledge that can be used to develop and realize the ideas and make higher quality decisions.

2. Social Capital

Social capital is capital that is created by the thinking process built from the relationship of social network resources between activities, human, and place (Healey et al., 1997 in Khakee, 2002). According to Willems and Baumert (2003), interaction between individuals and organizations has important role to the level of capacity. The improvement of institutional capacity derived from social capital will be indicated by the efficiency in it.

“Social capital.....refers to features of social organization, such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions.” (Putnam, 1993:167)

There are three criteria to identify and evaluate social capital (Khakee, 2002), such as the range of social relationship, the relationship between networks, and power relations. The range of social relationships here has the intent to the extent and nature of the involvement of stakeholder, as well as how the network functions and values play a role in the network. The link between the networks looks at the intensity of the relationship, the quality of the relationship between the core and surrounding, and integration between networks. In addition, power relations reviews the power of relationships held jointly, access to the network, ideological and arrangement of connecting networks.

3. Political Capital

Political capital is a vital requirement in sustainability community because participatory development is not recognized in the absence of a political framework (Baumann, 2000). Political capital is realized from the commitment and willingness of various parties relating to the agenda formation and action for thinking policy and mobilizing resources (Khakee, 2002). This initiative is made up of politicians, governments, citizen's movements, and stakeholder groups based on mutual trust and respect.

Khakee (2002) added, political capital can be identified and evaluated in three ways. First, the "mobilization of the existing structure by selecting the issue and identifies the issues, access to the stakeholders and the approach used". Second, "mobilizing the method by adapting techniques, build consensus, and organize focus groups". Third, the "change agent" with "key persons in the mobilization effort, the agent to maintain the character of the network and connecting networks, competitive or supporting agency."

II.1.2. Institutional Capacity in Community-Based Water Treatment Plant

Water infrastructure can be defined as facilities and installations provided for the development and management of water resources (ESCAP, 2006). Water infrastructure becomes a part of community that cannot be marginalized because it is functioned as means to meet the needs of water. As a vital need for human, the

lack of the water availability leads to several problems. The direct effect of lack of water infrastructure, particularly safe water and good sanitation is the increased morbidity and mortality, while the indirect is decreased education levels, nutrition and economy (Schuster-Wallace et al, 2008). The provision of water infrastructure is a key to break the cycle of poverty. Although in the macro economy level, the provision of water infrastructure does not affect significantly, in the meso and micro level this has a major contribution, especially in poverty reduction (Kraehenbueh and Johner, 2004).

Due to the importance of water, problem of the availability still remains a major issue in the world. This is why water becomes a crucial topic in the achievement of the Millennium Development Goals (MDGs), which is expected to have decreased to 50% of the population who have difficulty to get sustainable access to safe drinking water and basic sanitation by 2015.

Then, can the availability of water infrastructure realize these goals? It depends on several factors. Government policies and investments that continue to ensure the provision of water and an apparent attempt at implementing the policy will support the existence of water infrastructure. Another thing that cannot be overlooked is the role of community support as infrastructure user, as this will affect the sustainability of water infrastructure.

“.....water infrastructure can only be sustainable if the communities it serves are sustainable, and if local decision makers and citizens understand the value of water infrastructure and the services provided” (EPA, 2010: 1)

In this case, that should be highlighted is the need for public understanding to the value of water infrastructure. This will influence the attitudes and actions to be taken in order to fulfil the water needs. What is the next decision will be made to the water infrastructure will be different after they can catch the value of the infrastructure. Understanding of these values will ultimately affect on their capacity levels associated with the management and maintenance of water infrastructure.

Water infrastructure includes the supply, treatment, delivery and distribution of water to users. Water treatment plant is one type of water infrastructure as installation for treating water from the sources to produce water that is proper for consumption by people. If it consists of a system that includes facilities, programs and networks with community involvement, is referred to as community-based water treatment plant.

In addition to the fulfillment of water needs, water treatment infrastructure also has contribution to the improvement of health quality. Although this needs to be proved further, water treatment at the level of households is believed to be effective to reduce the possibility of diarrhea in the slums (Schmidt and Cairncross, 2009). Handling water problems with water quality improvement at the household level is more effective than the improvement of environmental sanitation, health campaigns, and improvement of water supply (Clasen, et.al, 2006). This is because the development of water treatment at household level is more cost-effective compared with other efforts. Thus, community participation in financing infrastructure in terms of management and maintenance will be greater, and this will affect the sustainable of water treatment.

The sustainability of community based water treatment plant can also be determined by the relationship of elements within the community in planning and development. Clutterbuck and Novick's (2003) suggest infrastructure will be stronger if the physical and social elements are integrated, and it will be weak if they are separated. The planning and development of infrastructure should consider not only the physical aspect but also in terms of social aspect in society. This integration, according to Zizys et al. (2004), is essential to create a "sense of place" around the infrastructure built to support the community as social capital. Community-based infrastructure will be effective if there is active involvement and partnership of people in the surrounding area (Rothman, 2005).

The sustainability of water treatment plant requires community capacity building. Gasteyer and Taylor (2009) offer the concept of community capacity building in water infrastructure by "listing assets" on the community, such as natural capital, built capital, financial capital, human capital, cultural capital, social capital, and

political capital. They added that the water infrastructure itself is a form of built capital, while human capital is obtained from the knowledge, education, and public health. Moreover, social capital consists of social networks, trust and relationship.

Many elements in the institutional capacity have been described by some authors. In this study, these components are simplified according to Khakee (2002) which include intellectual capital, social capital and political capital. These elements will be used as criteria of community capacity in relation with the effectiveness of community based water treatment plants. Intellectual capacity is the elements simplification of the skills, assessment problems, critical reflection, and implementation. This is related to the ability of people to deal with the issues seen from the intellect. Social capacity is from resources, participation, networks, sense of community, community history, power, and value, and program management. It reflects human relationships in society. Meanwhile, organizational, leadership, and the role of the outside agents show the political capacity of community.

Table.II.1. Components of Institutional Capacity

elements	Meyer (1995)	Goodman et.al (1998)	Gibbon et.al (1999)	Laverack (1999)	Cavaye (2000)	Chaskin (2001)	Khakee (2002)	elements
Skills	✓	✓			✓	✓	✓	Intellectual
Problem assessment			✓	✓				
Critical reflection		✓	✓					
Implementation				✓				
Resources	✓	✓	✓	✓		✓	✓	Social
Paticipation	✓	✓	✓	✓	✓	✓		
Networks		✓	✓	✓				
Sense of Community		✓			✓	✓		
Community history		✓						
Community power		✓						
Community value		✓						
Program management			✓	✓			✓	Political
Organizational			✓	✓	✓			
Leadership		✓	✓	✓	✓			
Roles of the outside agents				✓				

(Source : Analysis based on some sources, 2012)

II.1.3. Effectiveness

According UNDP (2001), the effects, consequences, and output of the development are the indicators to assess the level of effectiveness. In other words, effectiveness is a kind of criteria to analyze the successful of a development through measurement how far the suitability of what is to be achieved and the facts obtained.

UNDP (2001) also mentioned the most appropriate measurement of effectiveness in development is the success and it is translated into the following criteria:

1. Impact

It is the embodiment of all the changes arising from the development process in social, economic, and environment sectors.

2. Sustainability

This means how the results of development that have been implemented, can continue to function for future.

3. Contribution to capacity building or institution building

This is a manifestation of how development can be undertaken to increase confidence and add to the experience for all parties involved.

The effectiveness is not only seen from the results of what has been accomplished, but what has been gained during the process of achieving it. Faludi (2000) stated that evaluation of a plan does not prioritize the outcomes to be achieved, but the extent to which this affects all parties involved.

It is “not primarily in the light of their material outcomes, but for how they improve the understanding of decision makers of present and future problems they face” (Faludi, 2000:300)

Implementation of a plan is seen as a social interaction between the actors involved so there is the learning process. This learning process will improve the ability to make decisions. A good decision is not necessarily the same as the results based on the plan, but how will the decision be in accordance with the circumstances faced (Faludi, 1986, 1989)

“It follows that the effectiveness of plans must be assessed primarily in the light of whether they can give that awareness whether they actually do provide guidance to operational decision makers” (Faludi, 1986:255).

From that, it is known that effectiveness can be measured from the ultimate goal to be achieved and the process carried out. Effectiveness based on the ultimate goal is a form of long-term evaluation, which evaluates the long term goals. Gained influence in the implementation process can be considered as “in between goal”, so that effectiveness is measured with short-term goals.

Looking at the criteria for measuring the effectiveness of UNDP (2001), the criteria of "impact" and "sustainability" are long-term goals of a development. Meanwhile, "contribution to capacity building or institution building" is the intermediate or short term goal of development.

Effectiveness is the criterion used in an evaluation activity. The result of evaluation can describe the effectiveness of the development. Hockings et.al (2006) mentioned the importance of the evaluation results for the various parties:

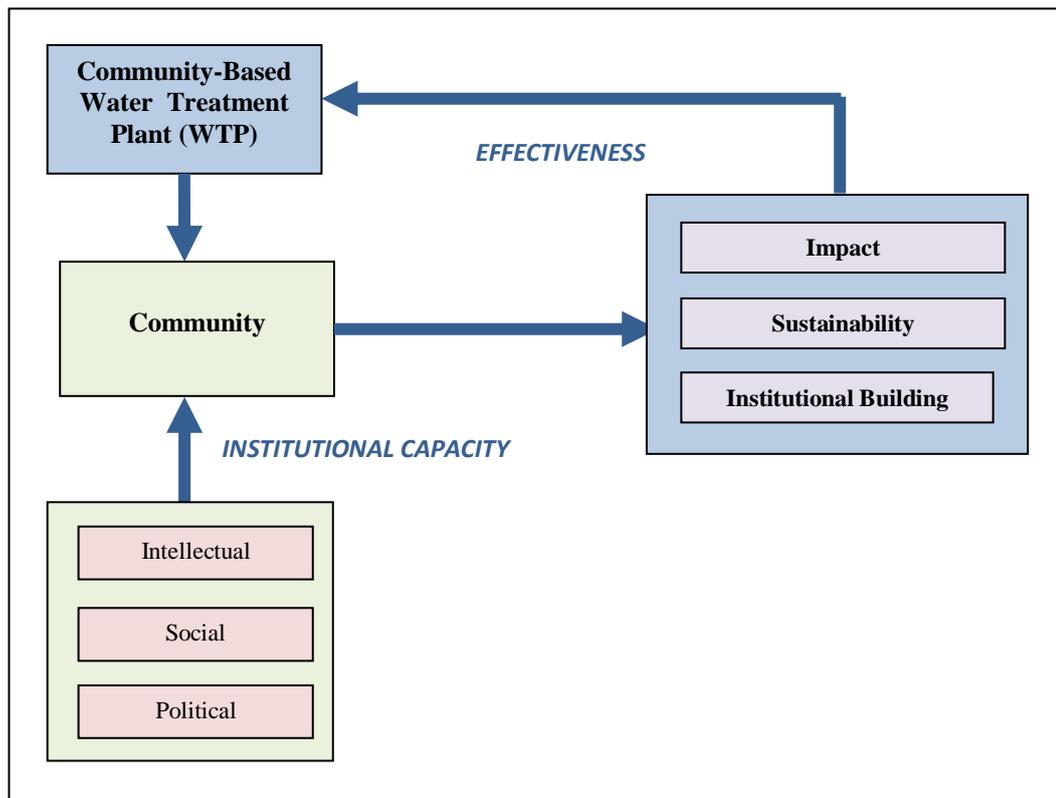
- Funding bodies, policy makers and conservation lobbyists use it to underline problems, set priorities, promote better, and management policies and practices.
- Managers use it to improve performance and to report on progress of goals to higher level government or external stakeholders.
- Local communities and other stakeholders use it to know how far their interests are being considered.

The success of community-based water treatment plant is reflected in the implementation of the management and maintenance of the infrastructure that brings benefits to the community. Management effectiveness evaluation is performed to determine the extent to which community-based WTP is well managed, especially the functioning of the system management and maintenance and achievement goals.

II.2. Theoretical Framework

Based on some of the literature related to this research, this describes the interrelationships within a theoretical framework. Furthermore, this also describes how to determine the influence of community capacity based on literature by Khakee (2002) to the effectiveness based on UNDP (2001) on the provision of water treatment plants as community based infrastructure.

Figure II.1. Theoretical Framework



(Source: Analysis, 2011)

II.2.1. The Parameter of Institutional Capital

To investigate the extent to which institutional capital contribution, it will be described each component of institutional capital in Khakee (2002) and perceptual indicators to analyze it. The three components of institutional capital are described according to several criteria to measure it. Of these criteria, the parameters of what the indicators mean and how to assess are determined based on the perceptions of researcher.

Table II.2. The Criteria of Institutional Capital

Institutional Capital (Khakee, 2002)		Perception	
Capital	Criteria	Parameter	Indicator
Intellectual	the extent of public knowledge in choosing various alternative options in decision making and how a society releases ideas and makes a difference from the ordinary to deal with the limitations	capability	Are the knowledge, skills, and ideas of community used in the management and maintenance of the infrastructure built?
	the ability to connect a wide range of science, knowledge, skill, and experience that exist in society	insight	Are the science, knowledge, skill, and experience used as the basic of management of infrastructure?
	the openness of community to accept the information and technologies	motivation	Are the communities interested to learn how the management and maintenance of technology infrastructure built?
Social	the range of social relationship	participation	To what extent people participate in the management and maintenance of infrastructure?
	the relationship between networks	networks	Does the community institution of infrastructure management often coordinate with the government or policy entrepreneur?
	the power of relationships held jointly, access to the network, ideological and arrangement of connecting networks	management	Does infrastructure management institution in community function properly? Does the manager work well?
Political	mobilization of the existing structure by selecting the issue and identifies the issues, access to the stakeholders and the approach used	relationship	Are the institution managers active in agenda building to the relevant government agencies or the politicians?
	mobilizing by adapting techniques, build consensus, and organize focus groups	organization	Do managers coordinate with the other people in delivering programs related to infrastructure?
	the "change agent" with "key persons in the mobilization effort	leadership	Is there anyone among the people who is active in efforts to infrastructure management ?

(Adapted from Khakee, 2002)

Based on the criteria of intellectual capital, there are four parameters used to assess, such as the capability, ideas, insight, and motivation of the community. This is closely related to knowledge, expertise, ideas, science, and society experience that are used as capitals. Capability is known by the extent of knowledge and skills of the people used in the management and maintenance of WTP in their territory. So is the idea, whether the ideas that emerged from community are facilitated and delivered within the framework of the management and maintenance. Moreover, insight is closely related to the use of science as the basis for the management and maintenance so that it can be justified scientifically. Last assessment is related to the motivation of people to learn the science and technology of WTP.

In terms of social capital, the parameters used are participation, network, and management. Participation, it is clear, is demonstrated by how much the public willingness to participate in the management and maintenance of WTP. It could also be said the extent to which they concern to achieve sustainability of WTP in their neighbourhood. Network is indicated by the intensity of the interaction between community and government institutions and policy entrepreneurs. The last parameter is the management performance of the community institution, whether it can function properly or not.

Three parameters are also used to test the political capital, namely the relationship, organization, and leadership. Relationship is reflected in the activity of manager in agenda building with government and politicians. In addition, the active manager in coordination with other parties in delivering the program is an indicator of organization. No less important is leadership, because this could be generating initiatives in the management and maintenance of WTP.

II.2.2. The Parameter of Effectiveness

Based on UNDP (2001), effectiveness is measured by using criteria which include the impact, sustainability, and contribution to institutional building. The impact is criterion based on long term goals that are expected after the development is done. The second criterion, sustainability, tends to technical measurement. The last

criterion is based on short term goals. Contribution to the institutional building is the form of intermediate goal that can be reached by the influence of process in the development.

In terms of the impact, effectiveness is valued from the effects of WTP built to the social changes, economic improvement, and the effects on the surrounding environment. It will be valued to what extent the providing water infrastructure in a community influences the daily live. In terms of sustainability, effectiveness is measured based on performance and endurance of the WTP has been built. This will be seen whether the WTP is functioning properly and how community efforts to create this long lasting. While viewed from the contribution to the institutional building, the effectiveness is assessed based on the influence of WTP to the development of confidence and experience enrichment in community. It is the formation of character which is influenced by the experience after the WTP is built and run by them.

Effectiveness is not just seen from the comparison conformity of planning or policy but also in the implementation (Alexander and Faludi, 1989) as a process of mutual learning involving interaction between the parties involved (Faludi, 2000). The study more looks at the effectiveness based on the sustainability of the WTP and the influence of institutional building. By using the criteria of the UNDP (2001), effectiveness is measured in the second and third criteria.

Table II.3. The Criteria of Effectiveness

Effectiveness (UNDP, 2001)		Perception	
Criteria	Indicator	Criteria	Indicator
Sustainability	The results of development that have been implemented can continue to function for future	performance	Is the use of water infrastructure is still in line with the goals and objectives to be achieved?
		endurance	What is the effort of community to make water infrastructures last long?
Institution building	The contribution to increase confidence and add to the experience for all parties involved.	confidence building	Does the water infrastructure built strengthen the confidence in community to face other problems faced?
		experience enrichment	Does the water infrastructure built enrich the experience of community that is useful to handle other affairs?

(Adapted from UNDP, 2001)

II.3. Conceptual Framework

Based on the theoretical framework of institutional capacity and effectiveness, the correlations will be sought to determine the extent of contribution of each element of the institutional capacity to the effectiveness of water supply infrastructure, which each element is also analyzed. Field data is needed to determine this correlation. More clearly, the concept of it is presented in the following table.

Table II.4. Concept of Correlation between Elements

No	INSTITUTIONAL CAPACITY				DATA			
	Parameter	Indicator	EFFECTIVENESS		Sustainability of Water Infrastructure		Contribution to Institution Building	
			Sustainability	Institution Building	Performance	Endurance	Confidence	Experience
1	capability	How are the knowledge, skills, and ideas of community used in the management and maintenance of the infrastructure built?	How the capability of community used influences the sustainability of the infrastructure built?	To what extent the capability of community gives contribution to institution building?	How the capability of community influences the performance of WTP ?	How the capability of community influences the endurance of WTP ?	To what extent the capability gives contribution to increase confidence of the community after the WTP is built?	To what extent the capability influences to the addition of experience to community in relation with the existence of WTP ?
2	insight	How are the science, knowledge, skill, and experience used as the basic of management of infrastructure?	How the insight of community used influences the sustainability of the infrastructure built?	To what extent the insight of community gives contribution to institution building?	How the insight of community influences the performance of WTP?	How the insight of community influences the endurance of WTP ?	To what extent the insight gives contribution to increase confidence of the community after the WTP is built?	To what extent the insight influences to the addition of experience to community in relation with the existence of WTP?
3	motivation	To what extent the communities are interested to learn how the management and maintenance of technology infrastructure built?	How the motivation of community influences the sustainability of the infrastructure built?	To what extent the motivation of community gives contribution to institution building?	How the motivation of community influences the performance of WTP ?	How the motivation of community influences the endurance of WTP ?	To what extent the motivation of community influences to increase confidence after the WTP is built?	To what extent the motivation influences to the addition of experience to community in relation with the existence of WTP?
4	participation	To what extent people participate in the management and maintenance of infrastructure?	How the participation of community influences the sustainability of the infrastructure built?	To what extent the participation of community gives contribution to institution building?	How the participation of community influences the performance of WTP?	How the participation of community influences the endurance of WTP ?	To what extent the participation of community influences to increase confidence after the WTP is built?	To what extent the participation influences to the addition of experience to community in relation with the existence of WTP?
5	networks	How does the community institution of infrastructure management coordinate with the government or policy entrepreneur?	How the networks in community influences the sustainability of the infrastructure built?	To what extent the networks in community gives contribution to institution building?	How the networks in community influence the performance of WTP ?	How the networks in community and others influence the endurance of WTP?	To what extent the networks influence to increase confidence after the WTP is built?	To what extent the networks influence to the addition of experience to community in relation with the existence of WTP?
6	management	To what extent infrastructure management institution in community function? How is the quality of the manager work ?	How the quality of management influences the sustainability of the infrastructure built?	To what extent the quality of management gives contribution to institution building?	How the quality of management influences the performance of WTP ?	How the quality of management influences the endurance of WTP ?	To what extent the management of infrastructure influences to increase confidence after the WTP is built?	To what extent the management of infrastructure influences to the addition of experience to community in relation with the existence of WTP?
7	relationship	To what extent the institution managers are active in agenda building to the relevant government agencies or the politicians?	How the relationship to relevant parties influences the sustainability of the infrastructure built?	To what extent the relationship to relevant parties gives contribution to institution building?	How the relationship to relevant parties in management influences the performance of WTP?	How the relationship to relevant parties in management influences the endurance of WTP?	To what extent the relationship influences to increase confidence after the WTP is built?	To what extent the relationship influences to the addition of experience to community in relation with the existence of WTP?
8	organization	How does managers coordinate with the other people in delivering programs related to infrastructure?	How the coordination in the organization influences the sustainability of the infrastructure built?	To what extent the coordination in the organization gives contribution to institution building?	How the coordination in management influences the performance of WTP?	How the coordination in management influences the endurance of WTP?	To what extent the coordination influences to increase confidence after the WTP is built?	To what extent the coordination influences to the addition of experience to community in relation with the existence of WTP?
9	leadership	To what extent a key person in community is active in efforts to infrastructure management ?	How the leadership influences the sustainability of the infrastructure built?	To what extent the leadership gives contribution to institution building?	How the leadership in management influences the performance of WTP ?	How the leadership in management influences the endurance of WTP ?	To what extent the leadership influences to increase confidence after the WTP is built?	To what extent the leadership influences to the addition of experience to community in relation with the existence of WTP?

The concept used in this research is connecting each parameter of institutional capacity to each parameter of effectiveness. Firstly, the elaboration of all parameters of institutional capacity and effectiveness has to be clearly presented together at the table. This is to provide a clearer picture of what relationships are to be searched later. The next step is determining what will be sought as the basic data about their relationship. This will be obtained through making the question about how or to what extent the parameter of institutional capacity influences the parameter of effectiveness. These questions are the basic questions and they should be more clearly explained in the field survey.

To get the data as expected, the questions to the interviewees are made more practical. This was done because of the ability of the interviewee to answer the questions are different. In this study, it is conducted with open question method, where the basic questions are made to determine the points to be searched. Questions in the table are developed into a direct question, dialogue, or discussion with the respondents. The answers to these questions will be obtained from several ways:

- The clear direct answers
- The answers that are implied in the words made by respondents
- Field observations on the conditions and circumstances around the study site

From the interview, it will be observed the picture of how the capacity of communities gives influence to the WTP has been built. It is known of how people respond to the WTP and the extent of the efforts they have taken related to it. Meanwhile, the effectiveness of the WTP category will be known from field observations and information from the respondent based on its parameters. These parameters are described in more practical, through the performance of WTP and how the produced water is used. In addition, it also investigated whether the WTP built has an influence on public decision-making in dealing with a problem.

The relationship between institutional capacity and effectiveness, based on observations and the answers of respondents, will be grouped into three levels, namely:

- Big influence, if the elements of capacity of interviewed people have a large contribution or are a determinant of the effectiveness of the WTP.
- Moderate influence, if the elements of the capacity of the interviewed people have contribution, but not as a major determinant because of the other parameters as a determinant of the effectiveness of WTP
- Little influence, if the elements of community capacity have almost no contribution to the effectiveness of the WTP built.

In the field survey, in addition to knowing the contribution of each element of institutional capacity, it also will be sought the current level of each element of institutional capacity in the community. An element that has a great contribution on the effectiveness of the WTP is not necessarily present in the community. Conversely, an element which is less effect, possibly in the community has reached a high level. From this, it will be known the current level should be improved to achieve the ideal conditions. The level of institutional capacity of each element is divided into three levels, namely:

- High level, if the element of institutional capacity is already there and become embedded in society.
- Medium level, if the element is already there but has not reached optimal conditions,
- Low level, if the element is still low and needs to be improved.

II.4. Concluding Remarks

This chapter reviews some literatures related to thesis topic. This is explained more in depth in order to know the nature of things that will be discussed and the thought patterns captured by the author in the subsequent discussion. There are some important things that are elaborated, namely the community capacity and effectiveness, related to WTP.

In terms of community capacity, in general, it is the ability of groups in achieving what they want. Many references define it, but this is basically focused on three things, as said by Khakee (2002), the intellectual, social, and political capacity.

Meanwhile, the effectiveness is defined as a measure of success in achieving the desired goal. One point to note is that the goal is not just the final objective, but also in the process, how this process can build the institutions of community. In this thesis, the parameters of effectiveness used are the two parameters are taken from UNDP (2001), namely sustainability and institution building.

To find out the correlation of both parameters mentioned above, those are more clearly defined and linked to each other. The contribution rate of the parameter of the effectiveness to the community capacity is divided into 3 categories, the big contribution, moderate contribution, and little contribution. In addition, the levels of elements of institutional capacity in the community are divided into high, medium, and low level.

Chapter III

The Provision of Water Treatment Plants in the City of Yogyakarta

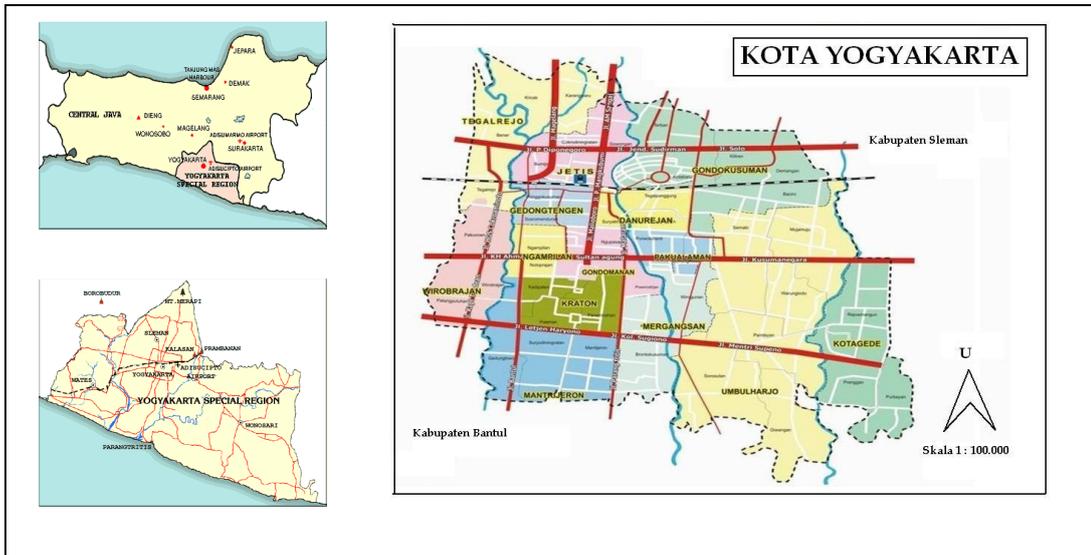
This chapter discusses about the provision of water treatment plants (WTPs) in the city of Yogyakarta. Previously, it will be described overview about the condition of the city as the location for the study. This overview is important to be described to know the condition of the city of Yogyakarta in some ways that affect the implementation of the provision of WTP. Meanwhile, the explanation of the provision of WTP will give the description of the program implemented as the case taken in this study. The exposure of those topics will greatly assist in the analysis in the next chapter.

III.1. Overview of the City of Yogyakarta

III.1.1. Geography

Yogyakarta is a municipality as part of the province of Yogyakarta Special Region. The city has an area of 32 km² and is located in the southern part of central Java, Indonesia, precisely between 07^o49'26" - 07^o15'24" south latitude and between 110^o24'19" - 110^o28'53" east longitude. The city is located on average 114 m above sea level with a fairly fertile soil with a slope of 0-2%. The fertility in the area around Yogyakarta is caused by its location on the slopes of Mount Merapi plains. It is situated about 28 km from the peak of Merapi. The land is fluvial volcanic foot plain that contains young volcano soil. Moreover, there are three main rivers that cross the city: the Gajah Wong, Code, and Winongo River where the water comes from Merapi.

Figure III.1. The Map of Yogyakarta



(Source : BPS Kota Yogyakarta)

Dwelling dominates land use in the city of Yogyakarta. Based on the composition, the use of land in the Yogyakarta is for the dwelling (64.8%), establishment, service, and industry (19%), agriculture (3.6%), unproductive (0.6%), and others (11.9 %).

The existence of three major rivers in Yogyakarta affects the distribution of the population. Areas along the river are established many settlements as the population growth in the past. Densely populated areas are often found in areas along the main rivers in Yogyakarta.

III.1.2. Demography

Population of the city of Yogyakarta, in accordance with the 2010 population census, reaches 388.627 people consisting of 48.95% males and 51.05% females. With this amount, the city has high population density about 11,958 people /km². The population growth in Yogyakarta varies from year to year and recent years show a decrease in population due to migration to other areas of education centres that are able to provide a wider field.

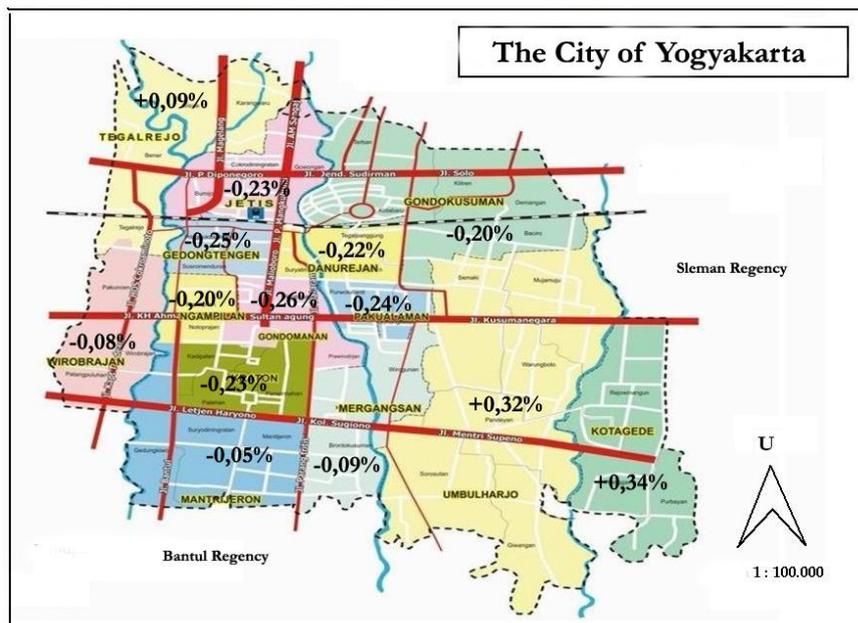
Table III.1. The changes in population in Yogyakarta

	1961	1971	1980	1990	2000	2010
Population number (000)	312.7	340.9	398.2	412.1	397.4	388.6
Population growth (%/year)	-	0.87	1.72	0.35	-0,37	-0,22

(Source: BPS Kota Yogyakarta)

From 1990 until 2010, of the 14 districts in Yogyakarta, 11 districts experienced population decline between -0.05% and -0.26%. There are three districts that experienced an increase in the population, namely Tegalreio (0.09%), Umbulharjo (0.32%) and Kotagede (0.34%). That increase population occurs in the area located in the suburban area of Yogyakarta, where still have vacant land and rice fields, so it is still possible to be converted into new settlements. The decline occurred in some districts has most likely in affecting the existence of the WTP built. Decline in population will affect the availability of human resources in management and maintenance of the WTP. This occurs when people who go out are those who have the necessary capacity for the sustainability of the WTP. Percentage of population growth per district can be seen in the following figure.

Figure III.2. The Population Growth in Yogyakarta 1990-2010 per district



(Source: BPS Kota Yogyakarta)

Based on age, the population is dominated by productive age with the largest age composition is between the ages of 20-29 years. Meanwhile, the elderly population (over 60 years) is quite large and reaches almost 10%.

Table III.2. The Proportion of People in Yogyakarta by Age in 2010 (%)

Age	Male	Female	Total
0 - 9	13,81	12,31	13,04
10 - 19	16,76	16,67	16,71
20 - 29	22,71	21,40	22,04
30 - 39	15,10	14,44	14,77
40 - 49	13,25	14,00	13,63
50 - 59	10,19	10,42	10,30
60 - 69	4,67	5,51	5,10
70+	3,52	5,24	4,41
Total	48,95	51,05	100

(Source: BPS Kota Yogyakarta)

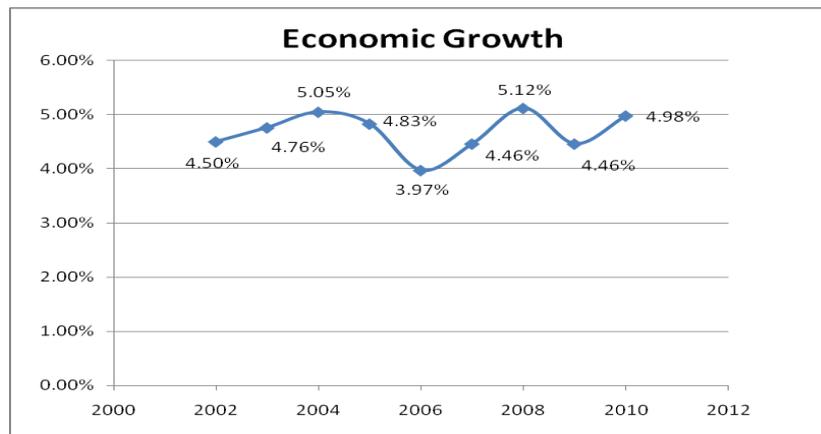
The percentage of productive age suggests that human resources can actually be relied as a potential in development, especially in relation to the management and maintenance of the WTP. This potential is considered to be advantageous because it is the power of capital in the context of maintenance and management of the WTP.

Yogyakarta is dominated by Java tribe and this is the center of Javanese culture in the presence of the Sultan's Palace. The Javanese, especially in Yogyakarta still maintain strongly the customs and it is still used in a variety of community activities. A distinctive feature is the nature of the Mutual cooperation (*gotong-royong*) among people in their environment. In addition, the Javanese also have the attitude to accept what is there so they do not too ambitious. These characteristics will certainly affect the capacity of the community, including the relation to the management and maintenance of the WTP.

III.1.3. Socio-Economic

Economic growth in the city of Yogyakarta between 2002 and 2010 shows the fluctuation with the range of about 3.97 to 5.12% per year. The lowest growth is in 2006 when an earthquake occurred in this city, but after that the rate of economic growth is likely to increase.

Figure III.3. The rate of Economic Growth of Yogyakarta



(source : BPS Kota Yogyakarta)

Economic growth is mainly influenced by the growth in trade, hotels, and restaurants and transport and communications sectors, as well as the service sector, which is the most dominant sector in the economy of the city.

Table III.3. The Contribution of GDP Based on Sector

Sector	2008	2009	2010
Agriculture	0,36	0,33	0,32
Mining and quarrying	0,01	0,01	0,00
Manufacturing industries	10,82	10,48	10,80
Electricity, gas, and water supply	1,30	1,28	1,25
Construction	8,22	7,89	7,75
Trade, hotel, and restaurant	24,95	25,40	25,30
Transportation and communication	19,61	20,12	19,95
Finance, rent of building and business service	13,88	13,96	14,00
Services	20,84	20,54	20,63
Total	100	100	100

(source : BPS Kota Yogyakarta)

Composition of the trade, hotel, and restaurant sector, and also the service sector is influenced by the Yogyakarta as a tourist and education destination. In the field of tourism, Yogyakarta has many cultural attractions and this triggers economic activities that support tourism, such as hotel and restaurant. In addition, it also sparked the emergence of other work related to tourists, such tour guides and souvenir sellers. For the education, Yogyakarta has many schools and universities, which has triggered the emergence of economic activity associated with the presence of many students, such as photocopying, printing, food vendors, and the student accommodation business. It also sparked the emergence of informal sector jobs, the jobs that are not legally registered and rely on their own efforts, such as rickshaw drivers, small traders, laborers, and others.

Based on those factors, Yogyakarta attracts people from outside the area to work and live. Limited land for housing led to the emergence of many densely populated neighbourhoods. Settlements with a dense population typically cause many problems of limited facilities for daily living, such as clean water and sanitation. This can affect the quality of housing in Yogyakarta. Based on Dewi (2008), settlements with good quality reaches 36.57%, with medium quality reaches 58.12%, and poor quality is 5.31%. Slum in Yogyakarta, in general, is high-density settlement along the Code and Winongo rivers by following the pattern of river flow (Dewi, 2008).

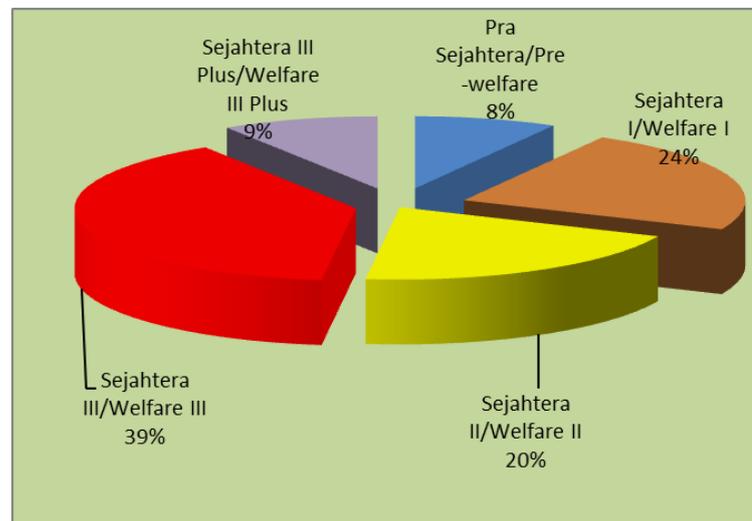
The composition is also a reflection of the condition of the settlements where WTP is built. In the areas, which have high density, usually people work in the informal sector with a relatively low and not fixed. Even though the economy still has limitations, the social relation is relative still pretty good. This is reflected in the still functioning neighborhood, with routine activities, such as monthly meetings and mutual help. This fact will also affect the sustainability of the WTP because the maintenance and management of the WTP requires sufficient time, effort, and funds.

As a clearer picture about the welfare of the population, from the classification of family's welfare based on Law no. 10 of 1992, there is still 8% of the population who are in the pre-welfare group, while others are categorized into the welfare

group with different levels (Welfare I, II, III, and III plus). Pre-welfare family is a family who cannot meet one of the five basic needs, such as shelter, clothing, food, health, and spirituality.

Level of welfare will certainly affect how the financial allocation they are used in to finance the management and maintenance of WTP. Although water is a basic need, the allocations for other basic needs, in this case food is suspected to be more concerned.

Figure III.4. The Composition of the Welfare of Family in Yogyakarta in 2010



(source : BPS Kota Yogyakarta)

III.2. Water Problem in Yogyakarta

The problem of water in Yogyakarta is basically in the quantity and quality that do not qualify. The problem is caused by increasing population and the contamination of water sources. This is normally experienced by low-income or poor people. They usually live in unplanned settlement areas that do not have access to feasible and affordable clean water supply. Poor sanitation is the cause of the problem. Density in these areas makes the distance between water sources and septic tank very close and makes the water sources are contaminated by bacteria. Meanwhile, the water services in the form of a guaranteed quality of

water (*PDAM*) through a piping system are still far from expectations to meet the needs of all citizens.

In such conditions, many people of low-income groups use non-water piping like wells and rivers to meet the needs of water although the quality do not meet health requirements. Based on data from the Sub Department PKL of Health Office of Yogyakarta Province in 2000, of 131,840 families living in the city of Yogyakarta, just 25,562 households use piped water (*PDAM*), while the 2,723 use the well pump, 102,739 use the well/spring water, and 816 families use river water or rain water collection tanks. From these data, it is clearly seen that the majority of the residents of Yogyakarta use well water / spring water to meet water needs.

III.3. Clean and Drinking Water Infrastructures in the city of Yogyakarta

As stated above, the relationship between the physical and social elements of infrastructure will determine the sustainability. Infrastructure will be stronger if those elements are integrated (Clutterbuck and Novick's, 2003). Community-based infrastructure is the way to realize the integration of these elements. In the city of Yogyakarta, water treatment plants were built and directed to community-based WTP in terms of management, where communities are empowered to manage and maintain the infrastructures built by the government.

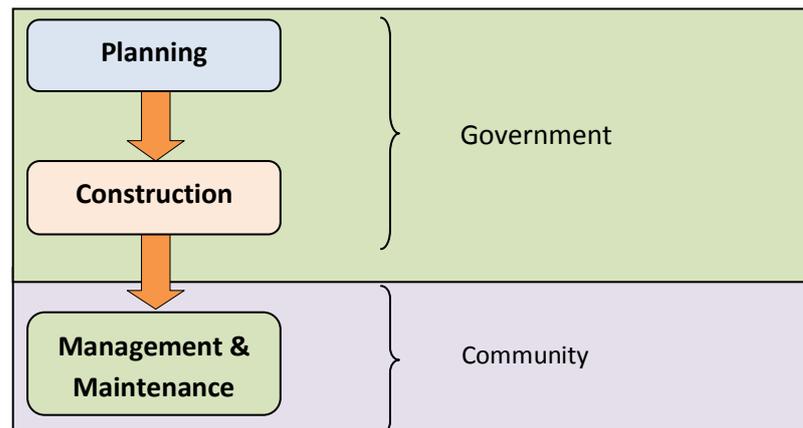
Community involvement in the management of this infrastructure is the implementation of Indonesian Government Regulation No. 16/2005, which stated that the development of systems to the public water supply system is intended to improve the physical and non physical matters. Physically, the development is carried out a technical water infrastructure while the non-physical matter is aimed at enhancing the institutional, management, finance, the role of society, and law.

Prior to construction, water infrastructure development plans should be disseminated to the public to get input and feedback. As mentioned in the Regulation of Minister of Public Works No.18/PRT/M/2007 on the Implementation of Development of Drinking Water Systems, dissemination

should also be followed by a feasibility study of technological, environmental, social, cultural, economic, institutional, and financial aspects.

The Provision of clean water infrastructure in Yogyakarta is realized by using the Special Allocation Fund (DAK) or specific grant sourced from the national budget. This is allocated to finance the infrastructure needs of basic public services in order to achieve a certain standard as well as to accelerate regional development. The program was started in 2007 with the goal of providing Water Treatment Plants (WTP) and physical rehabilitation of public toilets at the settlements. In accordance with the “Technical Instructions Use of Specific Grant for Infrastructure”, especially for urban areas, this fund is used for the construction and improvement of water supply in urban slums or low income communities, with a range of community-managed communal scale. Management of drinking water infrastructure, based on that technical instruction, is conducted by the Organization for Local Community of Drinking-Water (*OMS-AM*), which is a legislative or the democratic institution of a water service area. This organization consists of people who are around the water infrastructure that uses water from the infrastructure

Figure III. 5. The Division of Role in Water Treatment Plant in Yogyakarta



The involvement of community is an effort to empower the community to achieve the sustainable of WTP. In Yogyakarta, WTPs were built in the slums and low income areas that are not covered with water piping system. Generally the people

in area provided the water infrastructures have a relatively low level of education and work in the informal sector with limited income. The WTP built between 2007 and 2009 using specific grant consist of installation of one unit water treatment plant at the well and the renovation of public toilets at that point.

Table III.4. Water Treatment Plants in the city of Yogyakarta built 2007-2009

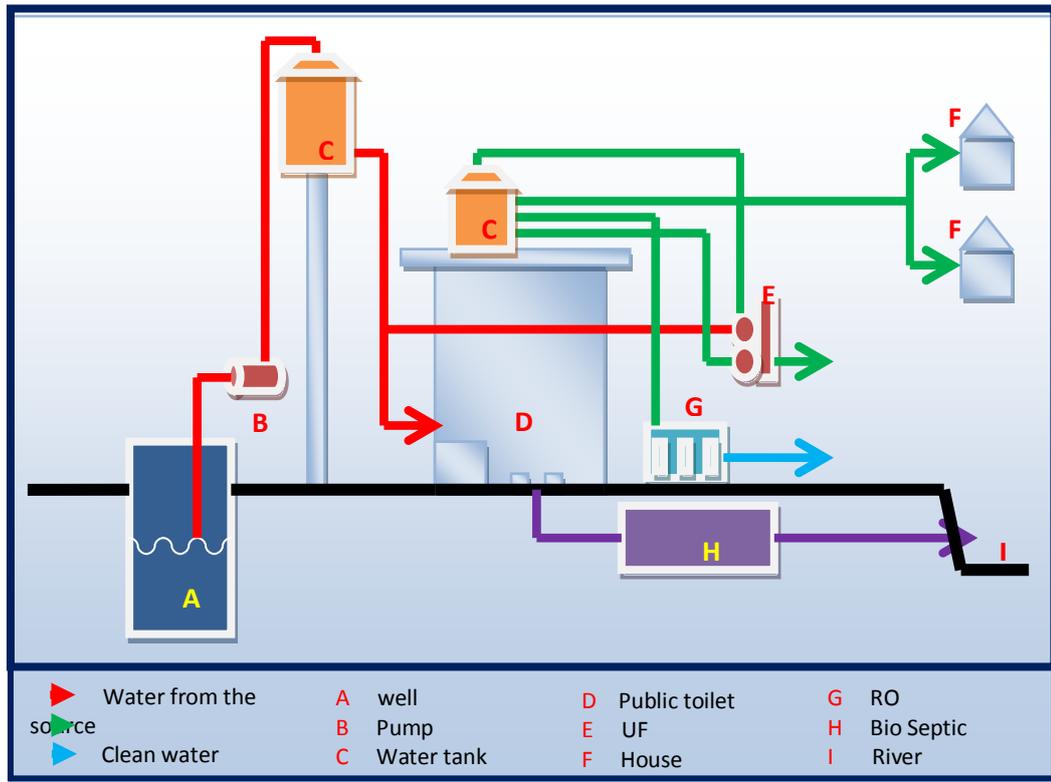
year	unit	infrastructure
2007	90	Water purifier that produces clean water
2008	40	Water purifier and 4 tubes filter that produce clean water
2009	72	Water purifier and 4 tubes filter with Reverse Osmosis (RO) that produce drinking water

(Source: Development Control Division, 2010)

The case taken in this study is WTP projects built in 2009, where it produces drinking water. Installations built are a set of water purifier consisting of water tanks, water pumps, ultra filtration, and Reverse Osmosis (RO). In addition, it is also equipped with bio septic tank for sanitation, pipelines, and electricity network as well as renovation of public toilet.

The principle of WTP provision in Yogyakarta is improving the quality of existing water sources in the public toilets. Water is taken from wells by pumping it and then collected in the first water tank. Water from this tank is divided into two pipes. The first pipe drains water directly to bathrooms and toilets. Another pipe carries water to UF (ultra filtration) and then to be collected into the second tank. Of the second tank, water is subdivided into two pipes supplied to houses for daily purposes and distributed to the RO to produce drinking water. The result is water that is free of colloids, viruses, bacteria, and all of the solids that cause turbidity, but the minerals remain in the water.

Figure III.6. The Installation of Water Treatment Plant Built in 2009



(Source: Department of Settlement and Regional Infrastructure, 2011)

Other work items in this installation are the improvement of sanitation by providing bio septic tank so that waste water does not contaminate the surrounding groundwater and river. In addition, it is also conducted the renovation of public toilets to familiarize the clean and healthy living in community.

III.4. Community Agency in the Management of Water Treatment Plant

Management and maintenance of WTP is the responsibility of the infrastructure users. Local people are expected to form the infrastructure management agencies in order that infrastructures can be more durable and function properly. There are two managements should be formed, namely the physical infrastructure and financial management. Manager of the physical has a duty to maintain physical performance of the WTP in order to keep functioning with periodic checks and repairs in the event of damage. Financial manager is responsible for managing finances, especially for monthly electricity costs. Water infrastructure was built by

the government including the electrical installation for WTP operations, while the monthly cost of electricity charged to water users of the infrastructure.

III.5. Concluding Remarks

The government effort to provide clean water is done by establishment of water treatment plants (WTPs), which produce clean water and drinking water. WTP constructed have elements that need careful maintenance and management and this needs coaching. This requires skilled personnel who have sufficient capacity to handle the technology.

WTPs are built on the sites that have water quality problems and limitations of the population in terms of economic to meet their water needs. This is usually in dense residential areas, mostly located in areas along the river on three major rivers that passes through the city of Yogyakarta. Socioeconomic condition in the area is usually classified as lower middle level. Generally, people work in informal sectors with no fixed income. This situation may undermine the sustainability of the infrastructure if the maintenance and management need costs.

It is worth noting that the relation between communities in Yogyakarta is still quite good. Culture of mutual help and routine discussions are still maintained in community. This relationship can be beneficial for capital infrastructure. Something which was considered difficult and heavy, if supported and done together, the probability of success is greater.

However, the trend of population decline could be a threat to the sustainability of infrastructure. This trend occurred in the downtown that has a high density. The population moves to other places that still have a larger area for comfort. The treat can occur if the move people are those who have capacity as important determinant for the maintenance and management of WTP built.

Chapter IV

Institutional Capacity in the Management of Water Treatment Plants

This chapter discusses the extent to which or how the institutional capacity contributes to the effectiveness of the provision of water treatment plant for the community. As explained in the previous chapter, the institutional capacity is adapted from Khakee, 2002 by dividing it into 9 (nine) parameters, namely capability, insight, motivation, participation, networks, management, relationship, organisation, and leadership. Those parameters are analyzed one by one to find out its influence on the effectiveness which the parameters are adapted from UNDP, 2001 consisting of four parameters, namely performance, endurance, confidence, and experience.

In this study, the method is performed by the field survey through interviews to several respondents. Survey is carried out by taking the case in the city of Yogyakarta, on the “Provision of Clean Water and Drinking Water Infrastructure Project” in 2009, mainly on how the management and maintenance. Respondents interviewed are those who knew about the water infrastructure, such as users, managers, community leaders, and the government. Interviews was conducted in May and June 2012 to 18 respondents, consisting of 15 respondents from the community and the rest are from the government who understand about WTP, from planning to maintenance.

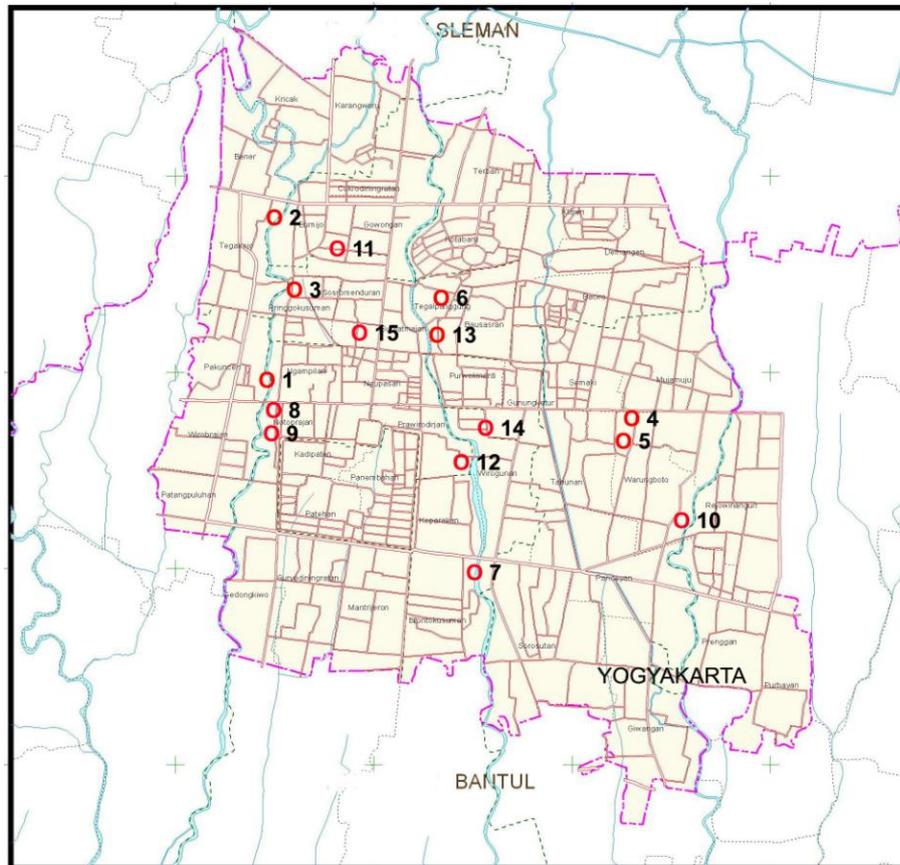
Table IV.1. Respondents of Field Survey

No.	Name	Position	Location
1	Yanti	user	Pakuncen, Wirobrajan
2	Ari	manager	Tegalrejo, Tegalrejo
3	Eko	user	Pringgokusuman, Gedongtengen
4	Hadi	user	Semaki, Umbulharjo
5	Haryati	user	Semaki, Umbulharjo
6	Anto	manager	Tegalpanggung, Danurejan
7	Kris	manager	Karanganyar, Mergangsan
8	Heri	manager	Notoprajan, Ngampilan
9	Yadi	former chairman of RT (neighborhood)	Notoprajan, Ngampilan
10	Saliman	manager	Warungboto, Umbulharjo
11	Yanto	manager, chairman of RT (neighborhood)	Bumijo, Jetis
12	Teguh	user	Prawirodirjan, Gondomanan
13	Saleh	manager	Tegalpanggung, Danurejan
14	Tugiman	manager	Wirogunan, Mergangsan
15	Hasan	manager	Sosromenduran, Gedongtengen
16	Hendra	Department of Settlement and Regional Infrastructure	Yogyakarta Municipality
17	Lina	Health Agency	Yogyakarta Municipality
18	Edy M	Development Control Division	Yogyakarta Municipality

(Source: Field Survey, 2012)

Respondents from the community were taken from the data of the WTP project from government agencies associated with WTP project. First, study sites were selected based on the balance in terms of the WTP conditions according to technical monitoring and Infrastructure. Data obtained from Settlements and Regional Infrastructure Department (Dinas Kimpraswil) and Development Control Division shows the technical condition of WTP that divided into good, moderate, and damaged. Furthermore, the selection of respondents from the community is also based on the representation of the three riverbanks: Winongo, Code, and Gajah Wong Rivers, as well as areas that are not located on the riverbanks. In addition, respondents were also taken from position, such as water users, water user group manager, as well as some who represent the neighbourhood.

Figure IV.1. The WTP Site under Study



(Source: Settlement and Regional Infrastructure Department, 2011)

From the government side, the respondents were determined based on the interrelationships between the duties and authority with the presence of WTP that have been built. The Settlements and Regional Development Department is a representation of the planning and building WTP project. From this office, it will be known the intent and purpose of the construction of the WTP and the real conditions and problems encountered in implementation. Development Control Division has a link from the results of monitoring and evaluation in the field related to WTP project. Here are known problems that exist in the field in terms of maintenance and management of infrastructure. Health Agency concerns with the task of examining the quality of water at the WTP site. Field knowledge related to the use of water from the WTP and behavior of community will be a useful as sources of data for analysis.

IV.1. Community Efforts in Achieving Sustainability of Water Treatment Plant

Water is a vital need to be met. In fulfillment of water for daily needs, people in Yogyakarta are generally obtained in several ways: be customers of pipe water on the water company (PDAM), buy water, and use water from existing sources: well water, springs, and rivers. The determination of water sources to be used is influenced by several things, such as the economic condition of people, habit, and belief in the quality of water they consume.

Most of the people of Yogyakarta are still using well water as their main source of water for compliance. Nearly 80% of the population of water sources from wells, 19.38% of pipe water, and 0.62% of the population still use river water for daily water needs (NKLD DIY Province, 2001).

Water supply becomes a serious problem in dense and low income settlements. As the primary water source, the quantity of water from wells relative does not face problems, but in quality, the problem is quite serious. Of research by the Environment Agency, about 85% of well water sources contain e-coli bacteria and 49.51% contain harmful substances, such as Fe (iron) (Koran Tempo, 2008). The poor water quality is caused by the dense population that does not allow the water safe from the polluters, such as dirty water infiltration wells. In addition, poor sanitation also causes waste water is absorbed back into the water.

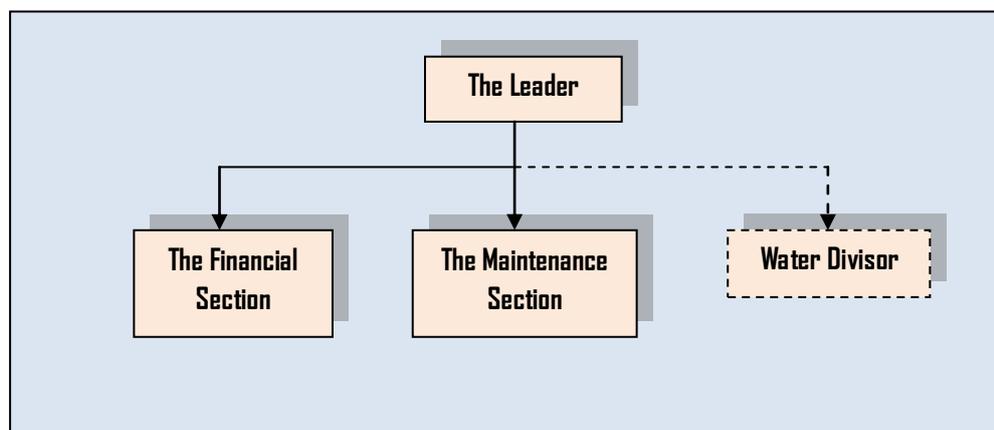
Government, a few years ago, has built public toilets in densely populated settlements, which are generally located along the riverside. The development of public toilets is an effort to change the habits of the population not to use river water for daily use. The existence of public toilets in the middle of densely populated settlements is also expected to reduce the risk of pollution of water sources. This is because it will reduce the large number of pollutants, although the changing times, the pollution to the water wells is still relatively high.

The public toilet is the infrastructure that is used jointly by the community. The use of these can have a good influence on the new infrastructure associated with

the existing public toilets. Community relations that have been created because of them would be a capital for the creation of an institution in society. This opportunity is exploited by the government in infrastructure development to provide water for the community, because the management is directed involve the local community. Yogyakarta Municipality Water built WTPs in locations where the public toilets exist. The determination is based on the location of water source wells which are used a lot of people together.

In determining the location of the WTPs will be constructed, the Settlement and Regional Infrastructure Department (Dinas Kimpraswil) requires that the site has already had a responsible person. This is to facilitate the establishment of management organizations. After the project is finished and handed over to the community to manage it, the local community forms water user groups, with the structure as needed. Usually the group consists of financial managers and maintenance managers. Financial manager has responsibility in collecting the monthly fee and set monthly spending on electricity costs and for the allocation of maintenance tools. Maintenance manager has responsibility in maintaining equipment regularly and repair if any damage. In some groups with greater user, there is a divisor of the water. It is created to avoid problems caused by the imbalance between water productions generated by the source and the number of water users, so that all users obtain water evenly.

Figure IV.2. The Scheme of Water User Group



(Source : Field Survey, 2012)

The willingness of community to manage the WTPs that were built through the water user organization is one proof that there are efforts from the community to make the infrastructure built is sustainable. The organization is supported by the presence of other community agencies in a wider range, namely RT (neighborhood). In several interviews, it is revealed the existence of synergy between RT and the organization of water users, there is even a concurrent position as leader of both. To note here is the relationship between society in the form of regular meetings and mutual help are still strong. Regular meetings to discuss all things, both in the scope of the RT and group of water users, most are still running good. Participation of the community to do mutual help for an activity is also still relatively good.

The livelihoods of the people where the infrastructure is built are mostly self-employed and informal sector, such as small traders, laborers, rickshaw drivers, and others. The relatively low income causes many of them are still considering on what they will be gained economically on everything. As revealed by an interviewee, a water user group manager:

"We are glad that there is the construction of project to provide clean water, as long as this profitable for us and our business, we are all willing to use it and treat it well." (Interview, manager of a WTP, 29 May 2012)

This can be a profitable capital and also as a threat to the sustainability of the water infrastructure. The orientation of the economy is thing that can weaken the power of community participation. If the water infrastructure was built has no effect on their lives, they are reluctant to maintain it. But conversely, if the benefits of this infrastructure are clearly they feel, it can be used as a trigger in order that the community is motivated to maintain infrastructure built.

IV.2. Effectiveness Categorization on the Water Treatment Plants (WTPs)

Effectiveness, as stated by the UNDP (2001), is not only measured by the sustainability of water infrastructure, but also the extent to which the infrastructure gives effect to the community in the institution building. In the

implementation, sustainability of water infrastructure in the field can be seen from several things:

- Performance of the pump
- Performance WTP (which consists of the RO and Ultra Filtration)
- The use of clean water produced
- The use of drinking water produced

Meanwhile, for institution building, it can be seen from the improvement of WTP along with the increase in demands and needs. In addition, it can also be accompanied by an expansion through the construction of a new installation inspired by the existing WTP.

From the observations in the field, only partially of WTPs are effective in the category. At almost all WTPs that are categorized as ineffective, the drinking water is not utilized by the community. In addition, all of which are considered ineffective, have no effect on the institution building for the community around it. Those WTPs may work; but they are considered to be sufficient. Observation in the field related to WTP category can be seen in the following table

Table IV.2. Effectiveness Categorization on the WTP

No	Location	Sustainability				Institution building	Category
		WTP still functions	Pumps still work	Clean water is used	Drinking water is used	There is improvement and/or expansion	
1	RT51 RW11 Pakuncen, Wirobrajan	√	√	√	√	√	effective
2	RT40 RW11 Tegalrejo, Tegalrejo	√	√	√			ineffective
3	RT11 RW03 Pringgokusuman, Gedongtengen	√	√	√			ineffective
4	RT19 RW 06 Semaki, Umbulharjo	√	√	√			ineffective
5	RT24 RW07 Semaki, Umbulharjo		√				ineffective
6	RT16 RW04 Tegalpanggung, Danurejan	√	√	√	√	√	effective
7	RT84 RW19 Karanganyar, Mergangsan	√	√	√			ineffective
8	RT12 RW02 Notoprajan, Ngampilan	√	√	√			ineffective
9	RT14 RW02Notoprajan, Ngampilan	√	√	√			ineffective
10	RT39 RW09 Warungboto, Umbulharjo	√	√	√	√		ineffective
11	RT31 RW07 Bumijo, Jetis	√	√	√	√	√	effective
12	RT18 RW06 Prawirodirjan, Gondomanan	√	√	√			ineffective
13	RT06 RW 02 Tegalpanggung, Danurejan		√	√			ineffective
14	RT14 RW04 Wirogunan, Mergangsan	√	√	√	√	√	effective
15	RT47 RW13 Sosromenduran, Gedongtengen	√	√	√	√	√	effective

(Source: Field Survey, 2012)

Water Treatment Plant is considered effective if all the parameters that appear in a field are fulfilled. From the results of field surveys at 15 locations, there are only 5 WTPs are considered effective, namely at locations 1, 6, 11, 14, and 15. Although all parameters are met, the five effective WTPs have relatively different characteristics.

At location 1 in Pakuncen, WTP is located in a dense residential location and even blends with the house of a resident and a mosque. The great number of users in this location makes the WTP to be vital infrastructure. This is because WTP is at the sole source of water and public toilets around the area. The importance of WTP make people seek to maintain and manage it properly. Clean water is used for bathing, washing, and other daily necessities. Drinking water is also used by residents. The interesting thing is the initiative to take advantage of WTP products

for the maintenance. People who will take the drinking water produced will be charged a fee. Not only the locals, but also the traditional market traders nearby buy drinking water from the WTP. The money got from the sale is used as the maintenance cost.

At locations 6, 11, 14, and 15, people would use their own money to finance the installation of clean water pipes to the houses. This is done in order to enable them to get clean water. Another fact in the field is that the benefits from the WTP trigger the desire of others to use the products from the WTP. This makes the burden of WTP becomes larger with increasing demand. From this, the initiative appears to increase the capacity of water produced to meet the demand. Water user groups have initiative to add pumps and replace water tank with a larger capacity. At the location 6, 14, and 15, besides to increase the capacity of pump, there is also an expansion with the construction of new water infrastructure projects inspired by the existing WTP. In addition to utilizing the government funding, the community is also willing to self-financing in order to realize the new WTP.

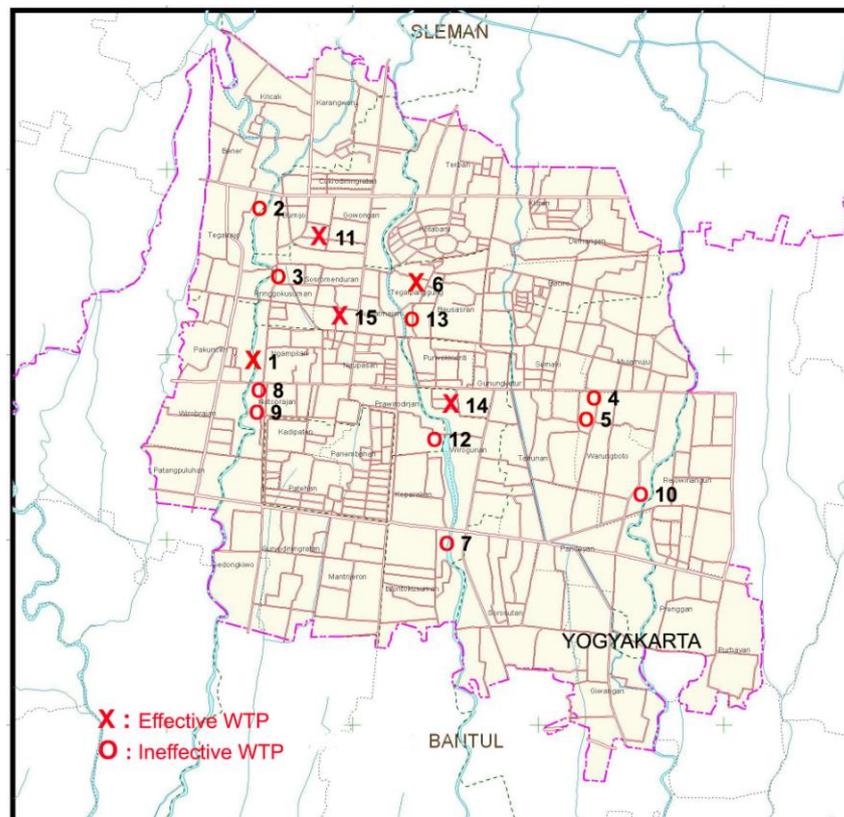
Different case occurs at location 10; although drinking water is widely used, there is no initiative to develop further. This is because the number of users is not too large. This location is not situated in a dense area, so the water still has enough capacity. From interviews and observations in the field, WTP at this location is not the only alternative source of water. There is still another source of good water used by people around the place.

The WTPs that are categorized relatively ineffective are largely because the drinking water is not used by community although WTP is still functioning well and producing good drinking water. Based on the interview, they are reluctant to directly use the drinking water because of their habit. Although the test results indicate the quality of drinking water produced are safe, and even they are better than the bottled water sold, people are not used to consuming uncooked water.

One of the ineffective WTPs is in locations 13 located in a dense settlement in Code Riverbank. Unlike the others, in this place the WTP is damaged. According

to the group manager, this is because the maintenance is bad and no one can fix it properly. In addition, they object to the relatively high cost of spare parts after trying to fix in several times. Economic factor is the main constraint in this place, where their income is considered too small to be allocated for WTP maintenance. However, the water pump is enabled to take water from the well, so that there is still a monthly fee for the cost of electricity.

Figure IV.3. The Distribution of the Effectiveness of WTP in Yogyakarta



(Source : Field Survey, 2012)

There is a decline trend in the population of the city of Yogyakarta in recent years. Judging from the data, the decline occurred in the area in the densely populated areas in the middle city. This may be due to migration to other areas or districts of the city. Population movement to other areas can threaten the sustainability of WTP. This can reduce the human resources in terms of maintenance and management of WTP. It could be a serious problem when it has correlation to the status of land they left behind. As in location 5, the WTP does not work because the users go elsewhere and the worse is that the ownership of land where the WTP is installed

has already changed. The WTP was moved to the public hall and still waiting for the certainty of a new place. Nevertheless, the WTP equipment is still functioning properly. Almost the same thing happened at the location 11, where most users moved to another place and resulted in reduced the staff to maintain. However, the initiative of manager to reorganize management and improve the capacity WTP allows it to serve more people. With that many users, the staff to maintain and manage WTP becomes larger and makes the maintenance and management easier to do.

Overall, the effectiveness of the infrastructure already built is affected by many factors from several parties involved. This will be discussed thoroughly one by one in the next section.

IV.3. The Contribution of Institutional Capacity to the Effectiveness of WTPs: Findings

IV.3.1. Capability

This parameter can be measured by the extent of community knowledge in choosing various alternative options in decision making (Khakee 2002). In addition, it is also can be viewed from how community releases ideas and makes a difference from the ordinary to deal with the limitations. Capability demonstrates the ability of community to apply knowledge, skills, and ideas relating to how to manage and maintain the WTPs that have been built. Furthermore, it is also demonstrated by how the initiatives arising in the community to overcome their limitations in knowledge, skills or ideas to make the WTP can be managed and maintained properly.

From interviews with community who use WTP, only some people have enough capability. It also shows that adequate capability increases the chances of the success of the projects in terms of the proper functioning of installation and ensuring the endurance. Of field observation and interviews with people in multiple locations, the adequacy of capability will be followed by sustainable water infrastructure has been built.

"Prior to construction, there was guidance from the government about drinking water and this tool so that it can be useful for the management of this water infrastructure" (interview, manager of a WTP, 29 May 2012)

"Yeah, we had been informed by the builders and consultants that any given time the tools must be cleaned and replaced parts. This is expected that we can maintain the installation well" (interview, user of a WTP, 4 June 2012)

From this statement, this proves that the skills and knowledge about how to maintain the infrastructure cannot be neglected. Capability can also be reflected in community initiatives to find a way out if no one has the expertise to maintain a water installation. In some WTP, if no one knows the matter of water installation, they are still trying to make WTP function by using the services of more expert person.

Associated with institution building, the capability in the community does not have much effect. From the results of investigations in the field, although some locations have the same capabilities, the influence to the institution building is not the same. Although they are capable of installation maintenance and solving other problems, this has no effect on increasing self-confidence and enriching experience to do something more on WTP that already exists. They prefer to follow what is being offered throughout the program is profitable. The initiative is not determined by the capabilities that are owned, but rather on the influence of the leader who move them.

IV.3.2. Insight

Insight is the ability to connect a wide range of science, knowledge, skill, and experience that exist in society (khakee, 2002). Insight has a great influence on the sustainability of the WTP built. This relates to insights about the importance of clean water and drinking water, and how the mechanism related to water supply. From the interviews, people who already know the test results of water quality and know that it is safe to drink, then most of them are willing to consume. This will make WTP still works because it brings benefits to them.

"We always maintain this tool because we all know from the results of testing the quality of drinking water from the plant, where the result is better than bottled water." (Interview, user of a WTP, 22 May 2012)

Insight into the mechanism of filtration of water into drinking water is also a determinant of the sustainability of a WTP. At a WTP that drinking water is not used, the people are not satisfied with a small flow of drinking water from the Reverse Osmosis (RO). They prefer to use other sources even if they have to boil it. Conversely, if the insight is owned by the community, the sustainability of WTP will be more guaranteed. Interviews demonstrate this.

"Indeed, the drinking water flow is small, but it's because the water must pass through a filter so that the result will be good" (Interview, manager of a WTP, 31 May 2012)

In terms of institution building, insight also makes it easier to propose development of WTP. They will follow and support the other programs offered by the leader because it is supported by the presence of sufficient insight in the community. This is because they will be more confident for having had the success of the existing WTP. This is indicated in the answer of people interviewed.

"They often use drinking water and clean water because they know it has been tested and the result is safe water. So they have always believed and agreed that if any development of this program". (Interview, manager of a WTP, 31 May 2012)

IV.3.3. Motivation

To know the motivation of community, it can be seen from the openness of community to accept the information and technologies about the management and maintenance of WTP. Motivation to learn how to manage and maintain the WTP is the capital for the sustainability of infrastructure. This openness will allow them to know and better understand the new thing, in this case is WTP as a new

technology. This will open up opportunities for increasing the capability and knowledge society, which in itself will affect both the sustainability of WTP.

Motivation is also an opportunity for the WTPs that are still not functioning effectively to become effective. This is revealed in an interview with a manager of water user group of WTP that is not functioning optimally.

"People actually want to have mentors who are brought here to explain how to maintain this equipment." (Interview, manager of a WTP, 29 May 2012)

Motivation also considerably influences on institution building in the community. Openness for new technologies and information related on the success of the WTP will trigger a desire to utilize them more easily. Because the water user community knows about the advantages of this WTP, they agree if the monthly fee is also used to finance the installation of pipe into their houses. This enables them to gain access to clean water produced by the WTP.

At some study sites, the success of WTP triggers a desire in the people outside water user groups to have such infrastructure. Along with the decline in aid of development costs in other programs, they are developing a proposal and plan to build the WTP, although not identical.

"People in the south are very enthusiastic in supporting the construction of a new water tank after seeing the success of this." (Interview, manager of a WTP, 31 May 2012)

IV.3.4. Participation

Participation is the manifestation of the range of social relationship that can be seen from to what extent community involve in the maintenance and management. Participation is reflected in how the actualization of the community to realize the WTP functions and sustains. On location researched, participation is shown by the willingness to pay a monthly fee that is used to reserve for the payment of electricity and maintenance. Although based on the economic condition, they do not have fixed income, at all WTP people do not mind to pay monthly fee. Getting

benefits derived from the WTP in terms of ease to get water is the reasons they think participation is important. In addition, participation is also indicated by their willingness to clean and maintain the WTP. At some locations, this duty has been scheduled well and this can be implemented well too.

IV.3.5. Networks

Network is the embodiment of the existence of links between parties in community and the mechanism of link function properly. This is demonstrated in the presence and the readiness of all parties in accordance with their roles in society. Within the water user organization itself, it has divided the responsibilities. The success depends on the relationship between the parts, whether they have been synergistic according to the authority and responsibility.

From the observations in the field, well-functioning WTP is determined also by the existence of a good network. However, the good network does not necessarily result in a successful WTP. Some WTPs have a good network, but other factors can cause the failure of the WTP. Other factors that influence are the habit of people and the limited insight.

"To manage the installation of water there are organization and regular meetings with RT to discuss several things including the use of drinking water. Here the organization is good enough, mutual cooperation is good, but for the drinking water, it was their choice." (Interview, manager of a WTP, 22 May 2012)

IV.3.6. Management

Khakee (2002) stated that management can be measured by the power of relationships held jointly, access to the network, ideological and arrangement of connecting networks. Basically, it can be shown by the extent to which potency of existing network resources in community can be directed synergistically to achieve sustainability of water infrastructure built. Based on interviews at the WTP site, good management has big influence on the success of a WTP.

Good management is reflected in the way of stewardship in the water user groups in accordance with the duties and responsibilities. If all the responsibilities carried out, no chance that allows chaotic organization. In the field, management is reflected on how to regulate financial administration, and technical responsibilities. In the financial division, recording a monthly fee, allocating budget, and reporting to the organization members will determine whether the management is good or not. This has an impact on technical division, where maintenance of the installation requires an adequate budget for routine maintenance and spare parts replacement if any. In addition, it also affects the trust of people as members of water user groups. Good financial and technical management will increase their trust in the management so that if the manager has a plan or program to increase the performance of WTP, it will easily get the support from members. This fact is reflected in some statements of the interviewees.

"Here, there is a group of water users, the name is "Tirta Aji", so all can be arranged, and the managers take manage each field according to their responsibilities. In this group, there are people who organize the distribution of water, electricity payments every month, and maintenance the tools." (Interview, manager of a WTP, 29 July 2012)

"Of the regular monthly meetings, it often appears the input or suggestions how to make it better. From that meeting, the people support it because the results are already there." (Interview, manager of a WTP, 6 June 2012)

Good management does not only affect the sustainability and institution building in community where WTP is located, but it also triggers the construction of a new WTP in another location. In some WTP with good management, people who do not get water from the WTP is moved to participate by connecting pipe from the existing WTP or propose to build a new WTP. Base on interview, at a WTP, they even want the management of existing WTP handles the management of the new WTP.

"Communities in the south even entrust us to manage the construction of the project after seeing our success. They also want to be like us. With a self-financing, they are willing to build a new WTP with the system and management like ours. " (Interview, manager of a WTP, 29 May 2012)

IV.3.7. Relationship

Relationship is the mobilization of the existing structure by selecting the issue and identifies the issues, access to the stakeholders and the approach used (Khakee, 2002). This is realized by how people use stakeholders in achieving the effectiveness of WTP. Community relation with related parties, such as governments, consultants, and building contractors is actually important to facilitate the achievement of improvements in other parameters, such as capability, insight, management, and leadership. However, based on the interviews, the relationship is not so influential on the sustainability of WTP at several locations. Moreover, for institution building, in fact, it does not have an important role.

Indeed, there is a good WTP realized after establishing a good relationship with the government, in terms of repairing the installation, but it is realized after repeated efforts of the leaders of the organization and management of water users to contact them. The success in terms of maintenance is more supported by the capabilities of people than the relationship. If people are able to repair or maintain the installations with their own abilities, they no longer need others to it. This is reflected in the results of interviews with several managers WTP.

"We never report to the agencies if there is damage, if small we can handle by ourselves." (Interview, manager of a WTP, 24 May 2012)

"This project is only the provision of pumps and equipment or filter, the provision of pipes to the houses cannot be expected from this project." (Interview, manager of a WTP, 29 May 2012)

"We had no contact with outsiders because we can handle it ourselves if there is a problem."(Interview, manager of a WTP, 4 June 2012)

IV.3.8. Organization

This means how to mobilize people by adapting techniques, build consensus, and organize focus groups. This parameter is manifested in how to mobilize people through the coordination undertaken by the management of water user groups. Based on the information in the field, almost all water user organizations coordinate regularly every month. In coordination, in addition to the financial and activities report, this also discusses some issues, such as the problems faced, the new plan or program to be implemented, as well as discussions of proposals related to the sustainability of the WTP.

The contribution of organization to the sustainability and institution building is relatively great, but this can happen only if there is good management and a capable leader. Coordination will be done well if the leader is able to facilitate the proposal and opinions from all members fairly and wise in making decisions.

IV.3.9. Leadership

This can be seen by the existence of the "change agent" with "key persons in the mobilization effort in community. Leadership has a very strong influence in the realization of sustainability WTP. The strong leadership can support other parameters, such as good management, good coordination between the people and networks, as well as establish relationships with other parties. The influence of a strong leader will make what he does will be followed by members of water user organizations. Based on the observations and interviews in the field, although have good insight about the safety of water produced from RO, the willingness of people to use drinking water depends on how leaders can convince them. If a leader lacks the clout to convince the community, they are reluctant to consume drinking water, and this will determine the sustainability of WTP built.

"At the beginning, people are still hesitant to use the water from here, but after we used, they follow." (Interview, manager of a WTP, 30 May 2012)

Leadership is also needed to mobilize the community to maintain the WTPs. A good leader can convince the public of the importance of good maintenance for WTP to be sustainable.

"As the manager of the group, in a meeting, I also explained the importance of maintenance, so that the instrument will be durable." (Interview, manager of a WTP, 5 June 2012)

Leader has also important influence on institution building. A good leader has the initiative in improving the water infrastructure has been built so that all people can enjoy them more easily.

"If the water is flowed through the pipeline, the cost should of their own. I invite them to buy the pipes by using monthly fees and additional costs from them." (Interview, manager of a WTP, 6 June 2012)

It's different if the leader lacks the initiative to develop and has been satisfied with the results of the existing infrastructure. Consequently, there is no development of the existing WTP to meet the water needs or even the existing WTP is not functioned optimally. This is shown in the results of interviews with managers at several WTP.

"I think people here have had enough with the existence of this installation. They can take drink water at any time. For clean water, they have already had their own sources." (Interview, manager of a WTP, 30 May 2012)

"The test result of water quality is good, but many do not want to use. Indeed, it is difficult to change habits here. Although drinking water is not used, clean water will still be used. I think it is satisfactory." (Interview, manager of a WTP, 24 May 2012)

From the results of interviews and observations in the field at 15 locations, it can be seen the diversity of parameters of institutional capacity that are owned by each WTP. The results of the interview demonstrate the capacity held by the public at each WTP. The observation of WTP conditions are the basis of the effectiveness

categorization of WTP. Both can be combined in a following table. The combination of parameters will be able to give an idea of the trend of effect relationship between each parameter the institutional capacity and the effectiveness WTP at each location.

Table IV.3. The Relation between Institutional Capacity and Effectiveness

Location	Category	Capability	Insight	Motivation	Participation	Networks	Management	Relationship	Organization	Leadership
1	effective	√	√	√	√	√	√	√	√	√
2	ineffective	√			√	√	√		√	
3	ineffective				√				√	
4	ineffective			√	√				√	
5	ineffective									
6	effective	√	√	√	√	√	√		√	√
7	ineffective	√			√				√	
8	ineffective		√	√	√	√		√	√	
9	ineffective		√	√	√	√		√	√	
10	ineffective	√	√	√	√	√			√	
11	effective	√	√	√	√	√	√		√	√
12	ineffective	√			√	√		√	√	
13	ineffective		√		√				√	
14	effective	√	√	√	√	√	√		√	√
15	effective	√	√	√	√	√	√		√	√

(Source: Field Survey and Analysis, 2012)

IV.4. The Contribution of Institutional Capacity to the Effectiveness of WTP: Analysis

Looking at the table of the relationship between the institutional capacity and effectiveness, it can be seen that almost all sites have the parameters of participation and organization. It can be said that people still have high levels of participation in the provision of this infrastructure. Participation is realized in community involvement in activities aimed at the common good. Indeed, traditionally, mutual help is a habit that exists in society in Indonesia, especially in Yogyakarta, where mostly people are Javanese. This tradition is still carried to the present in terms of maintenance and management of WTP.

In addition, regularly meeting is also a habit that still exists. This is still reflected in the management and maintenance of the WTP, in the presence of regular coordination on water user's organizations. The existence of this parameter at all sites shows these parameters do not significantly affect the effectiveness of a WTP. Although community participation and coordination are going well, there is still a lot of WTP that are ineffective.

From the survey results, the capability is also not a parameter that gives a major contribution to the effectiveness. It does have an influence on the sustainability performance in terms of WTP, but in terms of institution building, there is no difference between effective and ineffective. This is because the larger role of other parameters, such as the leadership role in mobilizing the people. Influence of leaders who will defeat the capability level differences.

Back to the table above, it appears that the leadership and management is always there at the effective WTP, and if both parameters are missing, the WTP would be ineffective. From there, it can be concluded that the leadership and management is a critical factor that has big contribution in realizing the effectiveness of the WTP. Strong Leadership and good management will make WTP more sustainable and provide good influence on institution building in which the WTP is built.

Strong leadership will affect the increase of other parameters. An influential leader will be easier to mobilize communities to increase participation and motivation, make management more organized and easily connect between networks, and create a good coordination within the organization. In addition, a leader who has influence has a greater potential to create a relationship with other parties such as governments and politicians, which could be used to enhance the capabilities and insights of people. In other words, the leadership will affect all the other parameters in institutional capacity. A good leader will bring inspirational ideas to overcome the limitations. These ideas, with the influence of leader, will be easier to implement. In the maintenance and management WTP, it is important because the other parameters are still relatively low and depends on the leadership.

Leadership in the maintenance and management of WTP can be measured by the extent to which leaders of water user groups sought to realize the desired goals. In implementation, the leader sets organizational structure as needed, appoint people who are believed to support in the organization, and hold regular coordination with its members to discuss emerging ideas and problems faced. The leader comes from the water user group members and is selected by agreement of all members based on the ability and willingness to carry out the duty. This is an informal leader and elected not based on the educational background and occupation. From observations in the field, leaders of water user groups have varying backgrounds, from laborers, traders, chairman of neighborhood, and retirement. Leaders are also not based on wealth and family influence. It is more the time he could give in the management and maintenance of WTP. People choose the leader is more based on what he can do to manage the organization well.

The leader elected is according to the willingness of someone to take responsibility. The real proof of a person in doing everything to run the management well is the reason why people trust his or her leadership. From the interview, effective leaders have the will to allocate energy, thoughts, and time to make the management of water infrastructures going well.

A good leader will determine the performance of management leads. Management will become more organized and more reliable. Good management will also give a good effect on other parameters. This will increase public trust in the organization, so that by itself this will increase motivation and participation in maintenance and management of WTP. In general, the contribution of each parameter is shown in the following table.

Table IV.4. The Contribution of Institutional Capacity to the Effectiveness

			EFFECTIVENESS			
			Sustainability		Institution Building	
			Performance	Endurance	Confidence	Experience
INSTITUTIONAL CAPACITY	Intellectual	capability	+	+	0	0
		insight	++	++	+	+
		motivation	++	++	+	+
	Social	participation	+	+	0	0
		networks	+	+	+	+
		management	++	++	++	++
	Political	relationship	+	+	0	0
		organization	+	+	0	0
		leadership	++	++	++	++

(Source: Field Survey and Analysis, 2012) ++ = big + = moderate 0 = little

The table shows the sustainability of the infrastructure in terms of performance and endurance is influenced by all parameters, but the insight, motivation, management, and leadership have the greatest. While the leadership and management have the greatest contribution to institution building in terms of increasing confidence and adding experience.

From the field, it is also known that capability, participation, organization, and relationship have little contribution to institutional building. It is influenced by the great role of leader in moving people, so that participation depends on how the leader ensures people to follow, without looking at the capability owned. Organization, in terms of coordination is also influenced by the leader. Coordination will run well if there is someone who can move people and follow what he or she wants.

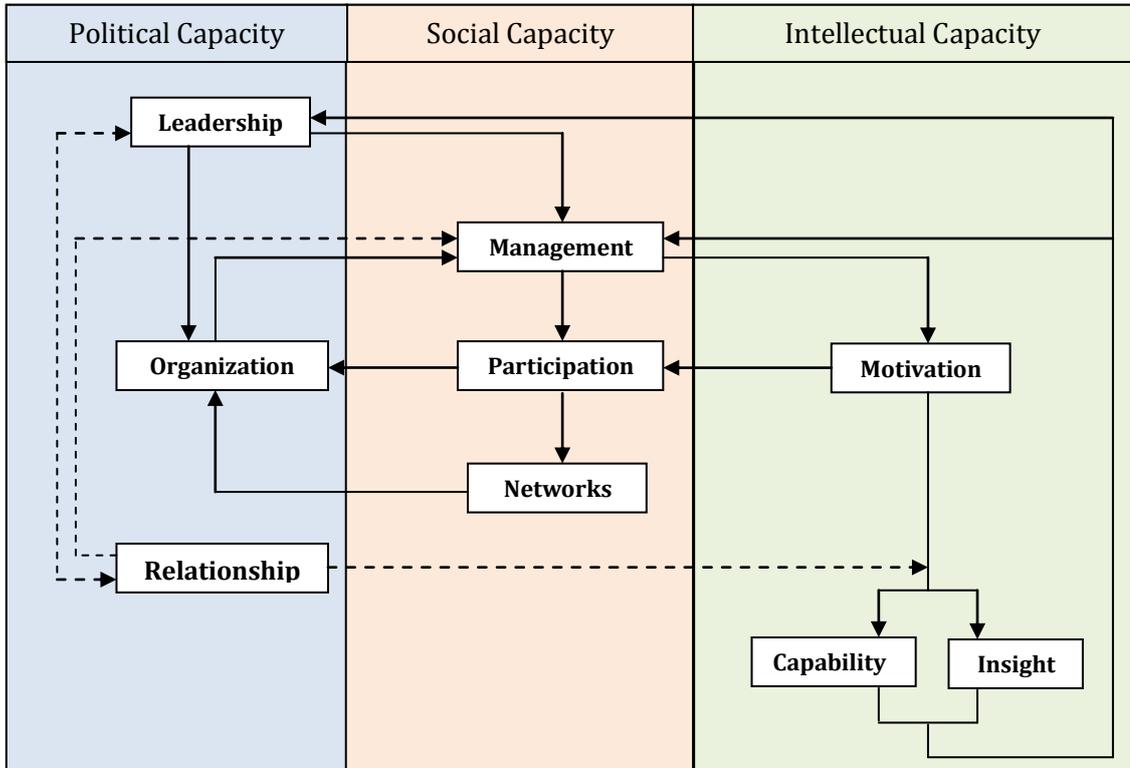
IV.5. The Correlation between Elements of Institutional Capacity

Institutional capacity is the ability of community to exploit all the potentials they have to achieve expected objectives (Beckely et al, 2008). The potentials are

realized in the elements contained in institutional capacity. Of some literature, the elements that make up the institutional capacity are different and Khakee (2002) simplified into 3 capacities: intellectual, social, and political capacity, which are perceived by the authors to 9 parameter appraiser. At first, this study will look for the most important parameter that has the greatest contribution to the effectiveness of water infrastructure. From the results of field surveys, there is interesting thing that can be adduced, which is an indication of mutual relationships among some of these parameters. It is important to determine the pattern of interrelationship between these parameters and it can be seen the parameters which need to be considered to strengthen the other parameters and the overall system. Broadly speaking, the pattern of relationships between parameters can be seen in the figure 4.3.

From the field surveys, the scheme below clearly shows the great leadership role to the other parameters. Good leadership will form good management. This can be realized well if the managements are capable to perform their duties and responsibilities. This will enhance public trust in management. High trust will make it easier to gather people's participation in activities and increase the motivation or the openness of society to accept new things. Participation of all elements will form a strong network within the community, and with the leadership's intervention, the networks will be easy to be coordinated within the organization. In the end, good organization with intensive coordination will result in good management as well. Meanwhile, the motivation or the public openness will enable them to receive the new science, technology, and expertise to enhance the capabilities and insight of the communities in terms of water infrastructure. The broader capability and insight of community is required to run the WTP management properly and to strengthen leadership.

Figure IV.4. The Interrelation between Elements of Institutional Capacity



(Source: *Field Survey and Analysis, 2012*)

From the figure, it can be known that the leader also determines whether they need relationship to other parties or not. They make WTP runs well in their own way. The relationship is not a parameter determining the effectiveness of a WTP. It seems that most of effective WTP do not involve relationship with other parties. However, no relationship could also affect the success of the WTP. So this could indicate two possibilities, people have not needed anymore of relationship or because this is required but has not been proven. For the first possibility, this may occur in WTP that is effective, where people already have the ability to maintain and manage WTP in their own abilities. This can be influenced by their leadership roles and also because of the good management. As concluded from the interviews, good management will enhance public trust in the management of organizations to carry out the planned program, without having to involve the government and other parties. The second possibility, the involvement of other parties, such as the government is still too small to make the WTP has not been successful.

For that, the relationship can be very important if this parameter can improve other parameters, such as capability and insight of society, as well as management and leadership. Relationship with government will be very useful for the improvement of capability on how to manage and maintain the WTP so that it can be more sustainable infrastructure. The role of government can also be used to broaden the public insight about clean water and drinking water. These insights will add to knowledge about the quality of water so that it can increase the odds of utilization of water produced by WTP. In addition, the role of government is also required for management coaching and leadership training. There are many government programs related to management and leadership. If the relationship with the government is better, then those programs will be very useful for the community, especially in terms of maintenance and management of the WTP in order to become more effective.

IV.6. The Level of Elements of Institutional Capacity at the Effective WTPs in Yogyakarta

The influence level of elements of institutional capacity has not reflected this level existing in community and they are different. An element may not have a major influence on the effectiveness of the WTP, but the existing level in community is high. Vice versa, the elements which have great impact are still a low level in society. Therefore, this analysis is needed to determine the current level in the Yogyakarta and compared with its contribution in realizing the effectiveness of the WTP. This is to know the ideal level of the elements for the management and maintenance of WTP. Since the elements influence each other, then the analysis uses the model of interrelations between the elements as described above.

Based on the field survey related to elements of institutional capacity and effectiveness of the WTP (see Table IV.3), the levels of element of institutional capacity on the effective WTP in Yogyakarta in more detail are described in the following table.

Table IV.5. The Current Level of Elements of Institutional Capacity at the Effective WTPs in Yogyakarta

Location	Capability	Insight	Motivation	Participation	Networks	Management	Relationship	Organization	Leadership
1	+	+	+	+	+	++	+	+	++
6	+	++	++	++	+	++	0	++	++
11	+	+	+	+	+	++	0	+	++
14	+	++	++	++	+	++	0	++	++
15	+	++	++	++	+	++	0	++	++

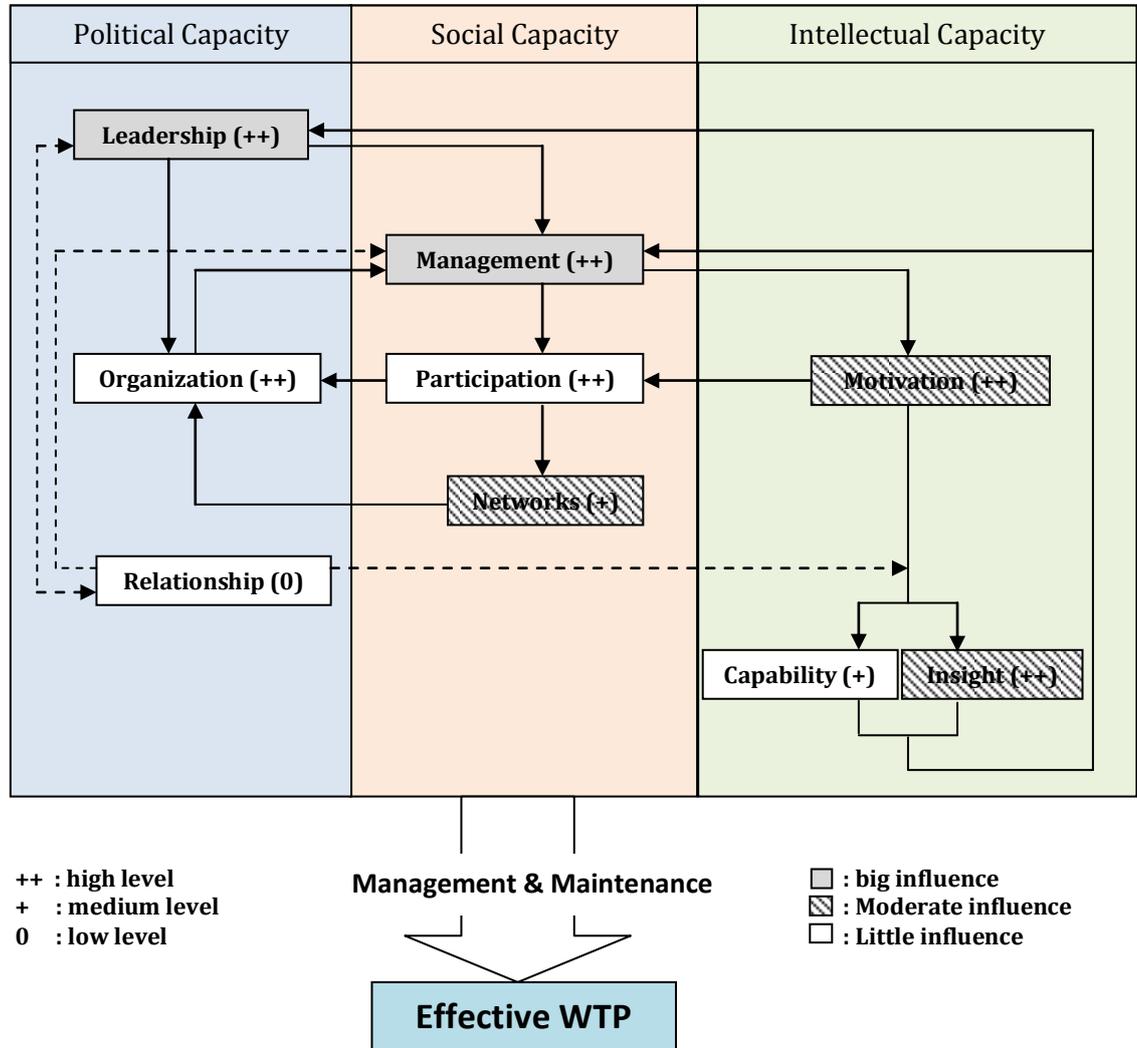
(Source: Field Survey, 2012)

++ = high + = medium 0 = low

From the table, it can be seen that the effective WTPs have high level of management and leadership elements. Meanwhile, the elements of insight, motivation, participation, and the organization have reached a high level at the location 6, 14, and 15. In these locations, the high levels of elements are reflected in the expansion of the construction of a new WTP by self-financing and/or with the initiative of the existing WTP.

According to figure IV.3, the depiction of the interaction between elements of institutional capacity proves the interdependence of these elements. It also gives a sense that a change in one element will give change in another element. Currently, the effective WTPs in Yogyakarta are determined by the interrelation and the level of contribution of each element described in Figure IV. 5.

Figure IV.5. The Current Level of Elements of Institutional Capacity Contributing to the Effective WTP in Yogyakarta



(Source: Field Survey and Analysis, 2012)

From the scheme above, it appears that the leadership and management, both of which have an important role in determining the effectiveness of the WTP, have been owned high by the communities. The great need of this element has been met by the high level on the community of effective WTPs. Strong leadership will determine the quality of management, and good management will affect the level of other elements. Thus, ideally, both elements should be owned by community with a high level.

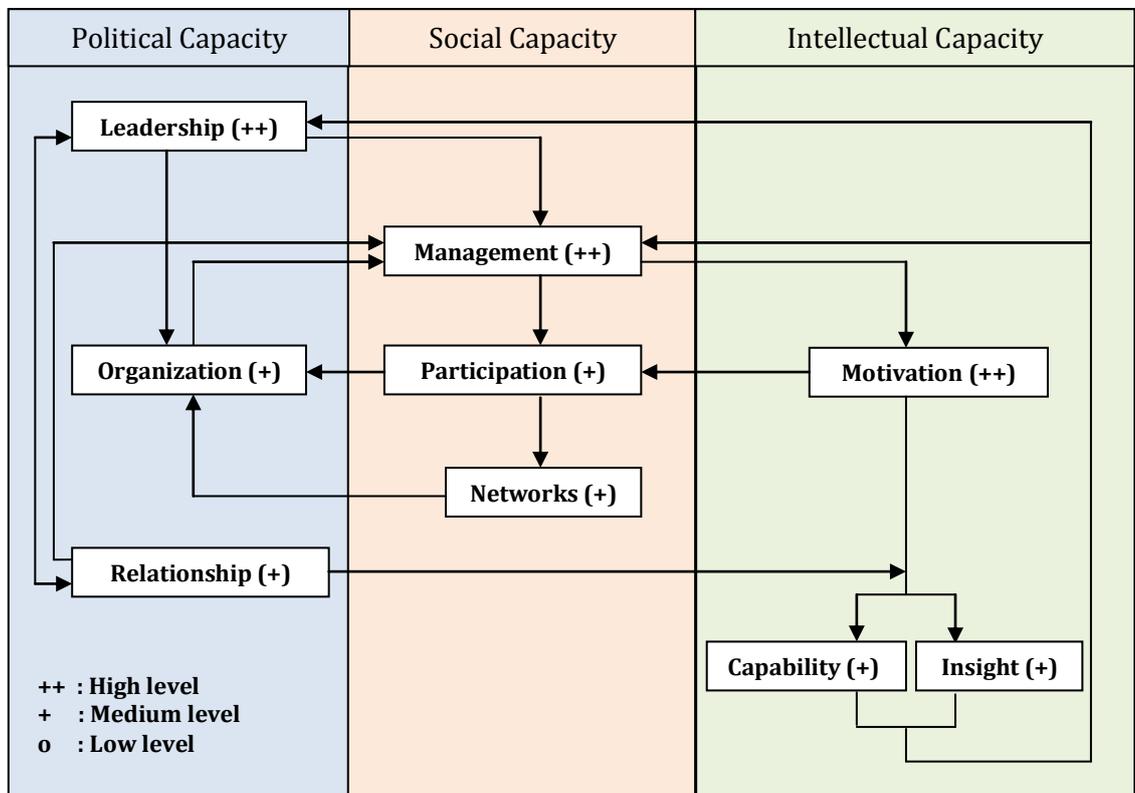
Unlike the two previous elements, motivation, insight, and network have moderate influence in creating the effective WTP. Indeed, since the levels, they do not have to be owned high by the community. The elements will be supported or replaced by the good management and strong leadership role. The motivation can be triggered by public trust after seeing good management. Similarly, insight is necessary to invite the public's willingness to use products from the WTPs. However, if there is no leadership to move people, this insight would not be useful. In addition, the existing network also requires a leadership role in connecting synergistically. For ideal condition, the insight and network could be in the medium level. Different with the motivations, even though it has a moderate contribution, this could be the potential to have great influence in realizing the effectiveness of the WTP. This will increase the participation and organization, which in turn contributes to good management. Furthermore, the motivation is also an opportunity to improve the insight and capability that can enlarge the possibilities to establish a strong leadership. The high level of motivation is judged appropriate in ideal conditions.

Other elements that have little influence on the effectiveness of the WTP are organization, participation, capability, and relationship. Organization and participation level have been high in the communities studied. This is caused by the character that has been established in Yogyakarta people that mostly are Javanese. As the Javanese, the culture of mutual cooperation and coordination meeting is already embedded in the habits of society. Indeed, this could be the capital for the effectiveness of the WTP, however, it does not determine significantly because despite the existence of these two elements, there are still some WTPs that have not been effective. So, other elements are thought to have more dominant influences. Although not necessarily with a high level, the existence of these two elements is still considered to be reasonably necessary because if there is no participation and organization in the form of coordination, the performance of management and maintenance of the WTP would be worse. Moreover, both these elements will be strengthened by increasing the motivation. Meanwhile, capability does not require a high level because the role of leadership and management will be more dominate in the management and maintenance.

The interesting thing is the element of relationship, where the level is low and its influence is also small. However, there is the potential for utilizing the relationship with the government through its development program. For example, in the Agency Budget Document of Yogyakarta Municipality 2012, there are some budget allocations for community empowerment program. Involving the government in the management and maintenance of WTP is an opportunity to empower the community through quality improvement program of leadership, management, insight, and capability. However, the level of this relationship needs to be limited in order that the government involvement is not too great. It is because it fits the purpose of community-based WTP to optimize the community capacity.

From the discussion above, an ideal level of the elements of institutional capacity needed for management and maintenance in order to achieve an effective WTP can be mapped in the following scheme.

Figure IV.6. The Ideal Level of Elements of Institutional Capacity in Yogyakarta



(Source: Analysis, 2012)

IV.7. Overcoming the Limitation on the Essential Elements of Community Capacity

As already discussed above that the factor of leadership and management are the most important factors in the management and maintenance of WTP. Both of these factors have an enormous influence in the effectiveness of the WTP. To achieve a desired ideal condition, the levels of both these factors should be high. However, not all communities have the potential as expected.

Leadership is one of significant factors in determining the effectiveness of the WTP. Field survey shows all the locations that do not have strong leadership the WTPs certainly are not effective. It can be said that the locations which have people who have the potential to be leaders are very lucky because they could bring good performance in the management and maintenance. The leaders there are natural leaders arising in society. They could be from anywhere, from various types of work, educational level, economic level, and position in society. Based on the field survey, the leader is a person who can prove what they can do in relation with the management of WTP. He is the one who has more sense of responsibility towards his surroundings. In addition, he is the person who has willingness to give time, energy, and thoughts for the betterment of society.

Because of the importance of leadership in realizing the effectiveness of WTP, it should exist in the community, especially in terms of the management and maintenance. The question that arises is what if the community faces the limitations to meet the ideal level as expected? In terms of leadership, what if the community has not found anyone who could potentially be a leader? Whether leadership can be designed?

From the field survey, a leader, compared with other, has the superiority in terms of insight and capabilities related to water treatment. As described in the interrelation scheme of the elements of institutional capacity (figure 4.3), the existence of capability and insight will affect the leadership. Thus, this could be an opportunity to establish leadership needed in the community. Increased capability and insight can be a means to design strong leaders in the community.

And this can be done through a relationship with the government, especially with agencies that have capacity building and community empowerment programs.

The role of government is not only directly improving the capability and insight through the programs, but also by using other user groups of WTPs that have been effective. From the field survey, there are several locations of WTP that have been set by the government as pilot project in terms of the management and maintenance, for example at location 1, 11, and 15. The interesting thing is that strong leadership has also the initiative to transfer knowledge and experience to people in other locations. As in location 15, the leader invited some groups of other locations to see and learn about the management of WTP. It can be said that the relations between WTP groups can also be used as a tool to establish and design the leadership and management for the better.

IV.8. Concluding Remarks

In this thesis, a field survey was conducted to find the facts of how the relationship between community capacity for effective water infrastructure. The survey, which was conducted through field observations and interviews in 15 respondents from the public and 3 respondents from the government, found some interesting things related to institutional capacity within the community and its relationship with effectiveness.

The results of field survey shows that leadership and management factors have the greatest role in realizing the effectiveness of WTP that have been built. Strong leadership also led to other parameters such as capability, organization, participation, and the relationship has a limited contribution. It also indicates the interrelationship between the elements of institutional capacity itself. The elements influence each other and have mutual interdependence in a certain pattern.

Another thing to note is the relationship. This element becomes the most unique element because the results of research in the field showed no significant contribution. However, when examined, the relationship with the government is a

large capital for the establishment of strong leadership, good management, and sufficient capability as well as insight into the community.

The current level of institutional capacity in Yogyakarta has not reached the ideal condition. From analysis based on the level of influence on the effectiveness of the WTP and the interrelationship between the elements of institutional capacity resulting from the field survey, it has been mapped the ideal level of the elements of institutional capacity in the management and maintenance of WTP. The leadership, management, and motivation should be in high level while other elements could be in medium level.

Chapter V

Conclusion and Recommendation

Water quality is common problem in densely populated cities, such as Yogyakarta. Construction of water treatment is a way to address the problems. It is the installation for treating water from the sources to produce potable water consumed by people. In addition to the fulfilment of water needs, water treatment also has contribution to the improvement of health quality. Although this needs to be proved further, water treatment at the level of households is believed to be effective to reduce the possibility of diarrhoea in the slums (Schmidt and Cairncross, 2009).

The development of water treatment is directed as community-based infrastructure that involves community from planning, construction, and/or maintenance and management. In Yogyakarta case, the community involvement is in maintenance and management phase after the project is built. In this phase, the community is given the authority to form organization to manage the infrastructure that has been built. From field survey at all water treatment plants (WTPs) studied, the community has established a group of water users. They can freely form group structures that fit their needs because there are no clear standards of formation. The concern of community to choose and establish the organizational structure shows that the communities have had an attempt to manage and maintain the infrastructure to make the WTPs sustainable. In general, organizational structure they form consists of two main parts, namely financial and maintenance section. On WTP which has a lot of users, this coupled with the water divisor, which is formed in order that available water can be distributed evenly.

In practice, not all water user organizations run well and this affects the effectiveness of WTP built. The effectiveness can be defined as a measure of success of a group in achieving the goals, which are not just the final objectives, but also how the process gives effect to community. Accordingly, this study looks at the effectiveness not only the sustainability of WTP, but also further the influence to institution building on the surroundings. The effectiveness of WTP

depends on the readiness of community to manage and maintain the WTP, and is influenced by the institutional capacity in local community. As Robin (2008), increasing the opportunity in making decisions should be balanced with the capacity to accept that responsibility. In other words, the opportunity to maintain and manage water infrastructure should be followed by the ability of community to handle.

Institutional capacity within the community consists of intellectual, social, and political capacity (Khakee, 2002), and this is elaborated to nine parameters, namely capability, insight, motivation, participation, networks, management, relationship, organization, and leadership. From the field survey, all the parameters have influence on the sustainability of WTP, in terms of performance and endurance of the infrastructure. There are four parameters that have the strongest influence on sustainability, namely the insight and motivation in intellectual capacity, management in social capacity and leadership in political capacity. The motivation in terms of the openness of society in accepting the new science and technology will broaden the insight about the importance of WTP built. Good management will increase the public trust to management so that it raises the willingness to participate in the management and maintenance of infrastructure. Meanwhile, strong leadership can affect people in the coordination and management to achieve a sustainable infrastructure.

To achieve effective infrastructure, which should also have an influence on the institution building, the leadership and management give the biggest influence. Strong leadership will release ideas and initiatives to improve water infrastructure in order to achieve optimum objectives. It will also be easier to move people to follow and realize the ideas. Good management will facilitate the coordination and connect the existing network as the capital in realizing the ideas of water infrastructure development. Strong leadership and good management will provide greater opportunities for the achievement of effective infrastructure.

Analysis of this research basically refers to the theory of institutional capacity by Khakee (2002) consisting intellectual, social, and political capacity and is detailed to nine elements as stated before. The theory discusses how to measure capacity

by using more detailed parameters into several elements. However, this seems they have their own area and no linkage. It has not touched the relationship between the elements. Whereas, based on the analysis, the theory is further developed. The important thing to underline is the fact that there is an interrelation between the elements of institutional capacity. This is a mutual influence relationship with a certain pattern or scheme. In this case, leadership has the main effect in triggering the increase of other elements. It affects other elements simultaneously and forms a circle of influence. Even so, of the interrelation scheme, it can be seen that the leadership could be strengthened by enhancing capabilities and insights, as well as creating a relationship with other parties, such as government.

In WTPs studied, the current level of elements of institutional capacity is still not equivalent to the influence level of them. Elements having major influences on the effectiveness of the WTP still have low level in community and vice versa. Since each element is interdependent, the lack of one element will weaken other elements and this will affect the system built by elements as a whole. Ideally, the leadership and management, which have high influence level, should also have high level in community. This also applies to elements which have moderate and low influence level. However, the motivation, which has moderate influence level, is recommended to high level because it will potentially have great influence in realizing the effectiveness of the WTP. This will increase the participation and organization that in turn contributes to good management. In addition, the motivation has opportunity to improve the insight and capability that can establish a strong leadership.

From the field survey, not all elements with little influence level have low level in community. The organization and participation are the elements which have high level in the communities studied. This is caused by the character of Yogyakarta people that mostly are Javanese. The culture of mutual cooperation and coordination meeting is already embedded in the habits of Javanese society. The Javanese people have a gregarious nature (Melalatoa, 1995) and assume they are an absolute unity and not the unity of the individuals (Herusatoto, 2008).

Unfortunately, those capitals does not determine significantly to the effectiveness of WTP. Even so, participation and organization in the form of coordination are considered to be reasonably important because without them, the performance of management and maintenance of the WTP would be worse.

As stated above, Javanese culture in the location studied influences the institutional capacity. As a city that is not too large, the culture background of population relatively does not vary, in contrast to other major cities. Strong Javanese culture in Yogyakarta affects the character of people influencing the elements of capacity. For example, the weaknesses are obtained from the shy habit and not straightforward decision-making, which could affect the quality of leadership. The benefits are derived from the habit of meeting and mutual help that could strengthen elements of the organization and participation. Therefore, these studies need to take the case in other cities or regions that are more heterogeneous with different cultures. It could be a benchmark and strengthens the argument about the institutional capacity that has been stated.

In general, the lessons can be learned from this case is that the elements of institutional capacity have their own levels and patterns of influence in determining the effective of WTP. Not all elements have the same influence. In addition, there is an interrelation system formed by those elements which in turn affects the performance of the management and maintenance of WTP. This makes clear which parts of the institutional capacity having significant contribution in realizing the goals in the construction of water treatment. This can help in determining priorities of capacity building in relation with the limitations in realizing good management and maintenance of WTP in Yogyakarta.

Interrelation scheme in this study put the leadership, management and motivation as crucial elements in the system because they can move the other elements. This system can be used as a reference in other cases related to community capacity, particularly in the development of community-based water treatment. The prioritization of elements building of community capacity will be helped by the scheme. For example, the leadership will be affected by the capability and insight. Thus, this could be an opportunity to establish leadership needed in the

community. Increased capability and insight can be a means to design strong leaders in the community. There are two ways can be done: firstly, through the relationship with the government and transfer knowledge and secondly, experience from the other effective WTPs. The relationship with government is done especially with agencies that have capacity building and community empowerment programs. With the leadership training, it is expected to form capable leaders that are able to control the management and maintenance of WTP. Meanwhile, the success of a WTP can be used as a pilot management including learning how the leaders handle the management and maintenance of WTP.

From the conclusion above, there are some recommendations that can be proposed:

- To build an effective infrastructure, community readiness should be considered in terms of their capacity. The key factors of success are strong leadership and good management. In addition, the interrelation pattern between elements of institutional capacity that is mapped in such a way can be used as guidance in realizing the effectiveness of water infrastructure. This can be utilized to determine the key elements and prioritize in strengthening the particular elements to strengthen all community capacity elements in the achievement of effective water infrastructure. One thing can be done is in the budget planning. Budget allocations for programs of capacity building, especially in the leadership and management improvement, should be considered more. Priority on programs that are deemed essential will also address issues of budget constraints typically faced by local government, such as Yogyakarta Municipality. Proper handling would facilitate the achievement of the effectiveness of water treatment built.
- Relationship is the most problematic element in the community-based water treatment system. On one hand, the role of government should be limited. On the other hand, government is still needed to guide community. Anyhow, relationship with the government should still be built even though it puts the community's role in the management and maintenance. It can be done at the stage of transfer of authority from government to community after the

construction process is complete. At this stage, the government should carry out its role in terms of improving the quality of leadership management, capability, and insight of community through leadership training and management guidance. Government agencies related to the infrastructure development and community empowerment should work together in the form of technology transfer program through infrastructure management and technical training of WTP.

- It needs further study with other cases especially in different type of cities or regions that are more heterogeneous and also in the place with different cultures, such as Jakarta as the complex city and Bandung which dominated by Sundanese culture. This is to test the interrelation scheme and search for the ideal level of elements of institutional capacity needed to realize the effectiveness of water treatment.

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Appendix – List of Questions

No.	Subject	Questions
1.	Management	<ul style="list-style-type: none"> - Whether community has set up water user organization? - What is the structure of the organization formed?
2.	Effectiveness	<ul style="list-style-type: none"> - Is water treatment plant still functions properly? - Is the clean water produced used by people? - Is the drinking water produced used by people? - Whether the WTP is able to meet the need of users? - What are the efforts to improve the performance of WTP?
3.	Institutional Capacity	<ul style="list-style-type: none"> - To what extend the knowledge, skills, and ideas of community used in the management and maintenance of WTP? - How the science, knowledge, skill, and experience used as the basic of management of WTP? - To what extend the community is interested to learn about WTP? - To what extent people participate in the management and maintenance of WTP? - To what extend the community institution of infrastructure management coordinate with the government or policy entrepreneur? - To what extend infrastructure management institution in community function? - How the institution managers active in agenda building to the relevant government agencies or the politicians? - How managers coordinate with the other people? - To what extend the effort of someone in community in the infrastructure management?